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ENERGY EFFICIENCY / RENEWABLE ENERGY IMPACT IN THE TEXAS EMISSIONS REDUCTION PLAN (TERP)

VOLUME III – APPENDIX

Annual Report to the
Texas Commission on Environmental Quality
September 2004 – December 2005

Jeff Haberl, Ph.D., P.E., Charles Culp, Ph.D., P.E.
Bahman Yazdani, P.E., Don Gilman
Tom Fitzpatrick, Shirley Muns, C.B.O.
Malcolm Verdict, C.E.M., Mushtaq Ahmed
Betty Liu, Juan Carlos Baltazar-Cervantes
Larry Degelman, P.E., Dan Turner, Ph.D., P.E.

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ENERGY SYSTEMS LABORATORY

Texas Engineering Experiment Station
Texas A&M University System

ENERGY SYSTEMS LABORATORY
Texas Engineering Experiment Station
Texas A&M University System

3581 TAMU
College Station, Texas 77843-3581

September 12, 2006

Chairman Kathleen Hartnett White
Texas Council on Environmental Quality
P. O. Box 13087
Austin, TX 78711-3087

Dear Chairman White:

The Energy Systems Laboratory (ESL) at the Texas Engineering Experiment Station of the Texas A&M University System is pleased to provide its fourth annual report, "Energy Efficiency/Renewable Energy Impact in the Texas Emissions Reduction Plan (TERP)," as required under Texas Health and Safety Code Ann. § 388.003 (e), Vernon Supp. 2002 (Senate Bill 5, 77R as amended 78 R & 78S).

The ESL is required to annually report the energy savings from statewide adoption of the Texas Building Energy Performance Standards in Senate Bill 5 (SB 5), as amended, and the relative impact of proposed local energy code amendments in the 41 Texas non-attainment and affected counties as part of the Texas Emissions Reduction Plan (TERP).

Please contact me at (979) 862-8480 should you or any of the TCEQ staff have any questions concerning this report or any of the work presently being done to quantify emissions reductions from energy efficiency and renewable energy measures as a result of the TERP implementation.

Sincerely,

Dan Turner

W. Dan Turner, P.E.
Director

Enclosure

cc: Commissioner R. B. "Ralph" Marquez
Glenn Shankle, Executive Director

Disclaimer

This report is provided by the Texas Engineering Experiment Station (TEES) as required under Section 388.003, (e) (2) (A) & (B) of the Texas Health and Safety Code and is distributed for purposes of public information. The information provided in this report is intended to be the best available information at the time of publication. TEES makes no claim or warranty, express or implied, that the report or data herein is necessarily error-free. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise, does not constitute or imply its endorsement, recommendation, or favoring by the Energy Systems Laboratory or any of its employees. The views and opinions of authors expressed herein do not necessarily state or reflect those of the Texas Engineering Experiment Station or the Energy Systems Laboratory.

VOLUME III – APPENDIX

Energy Efficiency / Renewable Energy Impact In The Texas Emissions Reduction Plan

1 EXECUTIVE SUMMARY

The Energy Systems Laboratory, in fulfillment of its responsibilities under Texas Health and Safety Code Ann. § 388.003 (e), Vernon Supp. 2002, submits its fourth annual report, Energy Efficiency/Renewable Energy (EE/RE) Impact in the Texas Emissions Reduction Plan to the Texas Commission on Environmental Quality.

The report is organized in three volumes.

Volume 1 – Summary Report – provides an executive summary;
Volume II – Technical Report – provides a detailed report of activities, methodologies and findings;
Volume III – Technical Appendix – contains detailed data from simulations for each of the 41 counties included in the analysis.

In 2001, the Texas Emissions Reduction Plan (TERP), established by the 77th Texas Legislature with the enactment of Senate Bill 5 (SB 5), identified that Energy Efficiency and Renewable Energy (EE/RE) measures make an important contribution to a comprehensive approach for meeting the minimum federal ambient air quality standards. In 2003 and 2005, the 78th and 79th Legislatures enhanced the use of EE/RE programs for meeting the TERP. The 78th Legislature enhanced the use of EE/RE programs for meeting TERP goals by requiring the Texas Commission on Environmental Quality (TCEQ) to promote EE/RE as a means to improve air quality standards and to develop a methodology for computing emissions reduction for the State Implementation Plan (SIP) from EE/RE programs. The 79th Legislature again expanded the scope of the SIP-eligible credits by adding savings from the State Renewable Portfolio Standards from the generation of electricity from renewable sources; specifically requiring the TCEQ to develop methods to quantify emissions reductions from renewable energy; and requiring the Energy Systems Laboratory to develop at least 3 alternative methods for achieving a 15 percent greater potential energy savings in residential, commercial and industrial construction.

The TERP legislation adopted the energy efficiency provisions of the International Residential Code (IRC) and the International Energy Conservation Code (IECC) for residential, commercial and industrial buildings. Under the TERP legislation, the Energy Systems Laboratory (Laboratory) at the Texas Engineering Experiment Station of the Texas A&M University System must determine the energy savings from energy code adoption and, when applicable, from more stringent local codes or above-code performance ratings and must report these reductions annually to the TCEQ.

Using data available from the TCEQ and the U.S. Environmental Protection Agency (US EPA) with procedures developed by the Laboratory, the following results were determined for energy-code compliant new residential single- and multi-family construction in non-attainment and affected counties built in 2004:

- The annual savings in 2005 amounted to 348,794 megawatt hours (MWh) of electricity and 690,579 million Btus of natural gas. The resultant annual NOx reductions were 268 tons (2007 eGRID[1, 2]).

[1] eGRID, is the EPA's emissions and generation resource integrated database. This publicly available database can be found at *www.epa.gov/airmarkets/eGRID/*. In this report the 2007 version of eGRID was used. This eGRID was specially created for Texas by Art Diem at the USEPA, and includes specific assumptions about plant closures, new plant additions, and capacity factor for annual and Ozone Season Day (OSD) periods that are projected to occur in 2007.

[2] The 2007 version of eGRID used in this report does not consider the coal-fired electricity generating plants proposed by TXU in the Spring of 2006.

- On the peak Ozone Season Day (OSD), the savings would have been 1,799 MWh/day and 1,210 million Btu (MBtu) of natural gas, resulting in peak-OSD NOx emissions reductions of 1.26 tons (2007 eGRID).
- Beginning in 2005, the Laboratory worked with the TCEQ to integrate NOx emissions reductions (iNOxERM) across state agencies implementing EE/RE programs to that the results can be evaluated consistently. As required by the legislation, the TCEQ receives reports: from the Laboratory on savings from code compliance and renewables; from the Public Utilities Commission of Texas (PUCT) on the impacts of the utility-administered programs designed to meet the mandated energy efficiency goals of SB7 and SB5; and from the State Energy Conservation Office (SECO) on the impacts of energy conservation in state agencies and political subdivisions. The Laboratory has also requested data about electricity generated from wind turbines from the Electric Reliability Council of Texas (ERCOT).

  Total cumulative, integrated NOx reductions from these programs were determined to be 5,711.58 tons/year, and 15.43 tons/peak-OSD in 2009, and 6,034.93 tons/year and 17.14 tons/peak-OSD in 2013, which contain the following contributions from the Laboratory, PUCT, SECO, and green power provided by wind turbine[3] renewable energy sources (i.e., ERCOT) programs:
  - energy efficiency savings from code-compliant new construction: 900.52 tons/year, and 4.47 tons/peak-OSD in 2009; and 1,167.49 tons/year with 5.75 tons/peak-OSD in 2013 (2007 eGRID);
  - the PUCT-SB 7 and SB 5 programs: 1,483.22 tons/year, and 3.98 tons/peak-OSD in 2009, and 1,981.05 tons/year, and 5.31 tons/peak-OSD in 2013 (2007 eGRID);
  - the SECO program, 447.10 tons/year, and 1.29 tons/OSD in 2009, and 699.86 tons/year, and 1.76 tons/peak-OSD in 2013; and
  - the Wind/ERCOT program: 2,880.74 tons/year and 5.69 tons/peak-OSD in 2009 and 2,186.33 tons/year and 4.32 tons/peak-OSD in 2013.

The Laboratory was requested to analyze the stringency of several residential and commercial energy codes, including: the 2003 and 2006 IECC, and ASHRAE Standard[4] 90.1-2004 (i.e., commercial buildings), ASHRAE Standard[5] 90.2-2004 (i.e., residential buildings). ASHRAE Standard 90.2-2004 was found to be more stringent for fenestration U-values, external shading and Domestic Hot Water (DHW), and less stringent in geometry and orientation, slab-on-grade construction for Heating Degree Days (HDD) HDD > 2400, total fenestration losses and ceiling attic U-values. ASHRAE Standard 90.2-2004 also had conflicting requirements regarding performance evaluations of ceilings, walls and ducts. The 2006 IECC was found to be less stringent for many of the 41 counties in Texas when compared to the current residential code (i.e., the 2000 IECC with 2001 Supplement). ASHRAE Standard 90.1-2004 was found to be more stringent than ASHRAE Standard 90.1-1999, which is mostly due to reductions in allowed lighting power levels.

The Laboratory provided technical assistance to the TCEQ, PUCT, SECO and ERCOT, as well as Stakeholders participating in the Energy Code and Renewables programs. In 2005, the Laboratory worked closely with the TCEQ to develop an integrated NOx emissions reduction (iNOxERM) calculation that provided the TCEQ with a creditable NOx emissions reduction from energy efficiency and renewable energy (EE/RE) programs reported to the TCEQ in 2005 by the Laboratory, PUCT, SECO, and ERCOT (i.e., wind)[6]. At the request of the TCEQ, the Laboratory also developed procedures for quantifying NOx

[3] The green power provided by wind turbine installations is currently monitored by the Electric Reliability Council of Texas (ERCOT).

[4] ASHRAE Standard 90.1 - 2004, Energy Standard for Buildings Except Low-rise Residential Buildings, American Society of Heating Refrigerating and Air-conditioning Engineers, Atlanta, GA.

[5] ASHRAE Standard 90.2 - 2004, Energy - Efficient Design for Low-Rise Residential Buildings, American Society of Heating Refrigerating and Air-conditioning Engineers, Atlanta, GA. Although Standard 90.2 is not currently referenced by the 2000/2001 IECC, in 2005, efforts were initiated by ASHRAE to make Standard 90.2 equivalent to the IECC. Hence, the Laboratory was required to review Standard 90.2 to determine if it was more/less stringent than the 2000/2001 IECC.

[6] In 2005 the Texas State Energy Conservation Office (SECO) requested technical assistance from the USDOE, through the National Renewable Energy Laboratory (NREL), to review the procedures used in TCEQ's integrated NOx emissions reductions calculations. Although preliminary results indicated a favorable finding, a final report has not been delivered by NREL.

emissions reductions from wind turbines that include weather normalization[7], and quantification of NOx emissions reductions from pilot lights attributable to residential furnace replacements and potential reductions from the elimination of standing pilot lights in domestic water heaters. At the request of the Dallas-Fort Worth International Airport, the Laboratory developed quantifications of NOx emissions reductions from energy-efficiency improvements at the Rent-a-Car facility at the Dallas – Fort Worth (DFW) DFW Airport.

The Laboratory has also enhanced the previously developed emissions reductions calculator[8] by: expanding the capabilities to include all counties in ERCOT; including the collection and assembly of meteorological (i.e., weather) data from 1999 to the present from 17 NOAA weather stations; expanding the calculator to be able to analyze energy efficiency improvement to K-12 schools; developing new modules for municipal water and wastewater calculations; enhancing the underlying computer platform for the calculator; and developing verification procedures for the savings currently calculated and reported by the Laboratory, including calibrated simulations for two office buildings, one residence and one K-12 school, and utility bill analysis of representative residences built before and after the implementation of the Statewide building code (i.e., 2000 IECC with 2001 Supplement)[9].

To accelerate the transfer of technology developed as part of the Senate Bill 5 program, the Laboratory:

- delivered an invited presentation to the US EPA's Air Innovations Conference in Chicago, August, 2005;
- delivered six papers at the International Conference on Enhanced Building Operations at Carnegie Mellon University in Pittsburg, PA, in October 2005;
- hosted the Energy Leadership and Emissions Reduction and Conference in Dallas, in November 2005;
- developed an article for the *ibpsaNEWS* newsletter[10]; and
- published technical reports on advanced window simulations, and methods for reducing residential energy use by 50%.

The Laboratory has and will continue to provide leading edge technical assistance to the TCEQ, counties and communities working toward obtaining full SIP credit for the energy efficiency and renewable energy projects that are lowering emissions and improving the air for all Texans. The Laboratory will continue to provide superior technology to the State of Texas through efforts with the TCEQ and US EPA. The efforts taken by the Laboratory have produced significant success in bringing EE/RE closer to US EPA acceptance in the SIP.

The Energy Systems Laboratory provides the fourth annual report, Energy Efficiency/Renewable Energy (EE/RE) Impact in the Texas Emissions Reduction Plan (TERP), to the Texas Commission on Environmental Quality (TCEQ) in fulfillment of its responsibilities under Texas Health and Safety Code Ann. § 388.003 (e), Vernon Supp. 2002.

If any questions arise, please contact us by phone at 979-458-0675, or by email at SB5info@esl.tamu.edu.

[7] The weather normalization procedures for green power purchases from wind generated electricity primarily involve normalization for wind speed to allow for electricity purchased in 2005 to be projected to the 1999 base year. Additional information about this can be found in Volume II.

[8] In the Fall of 2003, the Laboratory formed a partnership with the Texas Commission for Environmental Quality (TCEQ) and the USEPA to enhance the Emissions Reduction Calculator. Since then, the Laboratory has worked closely with the TCEQ, using funding provided by the USEPA, to enhance the calculator, which includes the addition of two new modules for calculating energy savings from improvements to water and waste water systems. Additional information about these new modules is contained in Volume II.

[9] See Volume II for additional information about each of these topics.

[10] *ibpsaNEWS* is the electronic newsletter for the International Building Performance Simulation Association, co-sponsored by the US DOE.

2 ACKNOWLEDGEMENTS

This work has been completed as a fulfillment of the requirements in Texas Health Code, Senate Bill 5, Section 388.003. Portions of the work in this annual report were funded by grant from the US EPA through the Texas Commission on Environmental Quality (TCEQ). Similarly, selected Code training workshops were funded by the US DOE through the Texas State Energy Conservation Office (SECO).

The authors are also grateful for the timely input provided by the following individuals and agencies: Mr. Art Diem, US EPA, for providing the eGRID database; Mr. Steve Anderson and Mr. Alfred Reyes, TCEQ, for contributing helpful insight about improvement to the Emissions Reduction Calculator.

Numerous additional individuals at the Laboratory contributed significantly to this report, including: Dr. David Claridge, Ms. Sherrie Hughes, Mr. Kelly Milligan, Mr. Jim Sweeney, Mr. Piljae Im, Mr. Seongchan Kim, Ms. Jaya Mukhopadhyay, Mr. Soolyeon Cho, Ms. Mini Malhotra, and Mr. Suwon Song.

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3 CODE AND PRE-CODE SIMULATION RESULTS BY COUNTY

This appendix to the Laboratory's 2005 Annual report contains the simulation results for single-family and multi-family residences in the 41 counties. For each county, code and pre-code simulation, and annual and peak-day results for individual residence are provided (Single-Family and Multi-Family).

	County	Climate Zone
Affected County	Bastrop	4
	Bexar	4
	Caldwell	4
	Comal	4
	Ellis	5
	Gregg	6
	Guadalupe	4
	Harrison	6
	Hays	5
	Henderson	6
	Hood	5
	Hunt	5
	Johnson	5
	Kaufman	6
	Nueces	3
	Parker	6
	Rockwall	6
	Rusk	5
	San Patricio	3
	Smith	5
	Travis	5
	Upshur	6
	Victoria	3
	Williamson	5
	Wilson	4
Nonattainment County	Brazoria	3
	Chambers	4
	Collin	5
	Dallas	5
	Denton	6
	El Paso	6
	Fort Bend	4
	Galveston	3
	Hardin	4
	Harris	4
	Jefferson	4
	Liberty	4
	Montgomery	4
	Orange	4
	Tarrant	5
	Waller	4

Table 1: List of Counties.

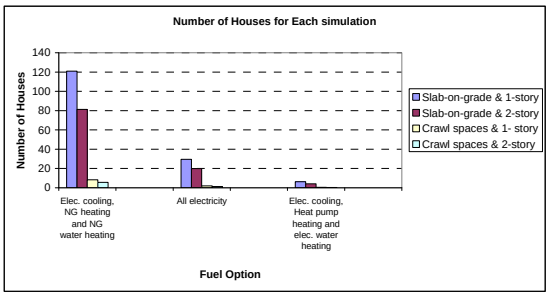
County	SF or MF	Precode or Code-compliant	Options			Simulation #	Annual Elec. (kWh/yr)	Annual NG (Therms/yr)	Avg. OSD Elec. (kWh/day) (Aug. 19)	Avg. OSD NG (Therm/day) (Aug. 19)	Total Annual (Elec. + NG) (MBtu)	Annual Elec.Savings (kWh/yr)	Annual NG Savings (Therms/yr)	Avg. OSD Elec. Savings (kWh/day) (Aug. 19)	Avg. OSD NG Savings (Therm/day) (Aug. 19)	Total Annual Savings (Elec. + NG) (MBtu)
Bastrop	SF	Precode	Slab-on-grade	Fuel Option 1	1-story	1	16122	366	70.1102	0.730761	91.63					
					2-story	2	15195	354	66.264	0.730761	87.31					
				Fuel Option 2	1-story	3	20906	0	78.604	0	71.35					
					2-story	4	19764	0	74.7579	0	67.45					
				Fuel Option 3	1-story	5	20670	0	78.604	0	70.55					
					2-story	6	19596	0	74.7579	0	66.88					
			Crawl Space	Fuel Option 1	1-story	7	16667	356	70.6667	0.730761	92.51					
					2-story	8	15953	345	66.8591	0.730761	88.98					
				Fuel Option 2	1-story	9	21282	0	79.1607	0	72.63					
					2-story	10	20367	0	75.3528	0	69.51					
				Fuel Option 3	1-story	11	21090	0	79.1607	0	71.98					
					2-story	12	20236	0	75.3528	0	69.07					
		Code - Compliant	Slab-on-grade	Fuel Option 1	1-story	13	13857	303	59.3257	0.610761	77.55	2,265	63	10.78	0.12	14.08
					2-story	14	13197	297	56.493	0.610761	74.71	1,998	57	9.77	0.12	12.60
				Fuel Option 2	1-story	15	18264	0	67.8195	0	62.33	2,642	0	10.78	0.00	9.02
					2-story	16	17502	0	64.9869	0	59.73	2,262	0	9.77	0.00	7.72
				Fuel Option 3	1-story	17	18163	0	67.8195	0	61.99	2,507	0	10.78	0.00	8.56
					2-story	18	17429	0	64.9869	0	59.48	2,167	0	9.77	0.00	7.40
			Crawl Space	Fuel Option 1	1-story	19	14475	293	59.9564	0.610761	78.72	2,192	63	10.71	0.12	13.79
					2-story	20	13979	288	57.1644	0.610761	76.51	1,974	57	9.69	0.12	12.47
				Fuel Option 2	1-story	21	18726	0	68.4502	0	63.91	2,556	0	10.71	0.00	8.72
					2-story	22	18140	0	65.6583	0	61.91	2,227	0	9.69	0.00	7.60
				Fuel Option 3	1-story	23	18662	0	68.4502	0	63.69	2,428	0	10.71	0.00	8.29
					2-story	24	18094	0	65.6583	0	61.75	2,142	0	9.69	0.00	7.32
	MF	Precode	Slab-on-grade	Fuel Option 1	1-story	1	6366	208.5	25.77575	0.500135	42.565					
					2-story	2	6220.5	192.75	23.91965	0.46762	40.4975					
					3-story	3	6247.333333	187.66667	23.604	0.456781667	40.085					
				Fuel Option 2	1-story	4	8510.5	0	30.481	0	29.045					
					2-story	5	8086.75	0	28.03675	0	27.6					
					3-story	6	8023.833333	0	27.52516667	0	27.385					
				Fuel Option 3	1-story	7	8509	0	30.481	0	29.04					
					2-story	8	8086.25	0	28.03675	0	27.5975					
					3-story	9	8024.166667	0	27.52516667	0	27.36666667					
		Code - Compliant	Slab-on-grade	Fuel Option 1	1-story	10	5965	166.5	24.13305	0.3801365	37.015	401	42	1.64	0.12	5.55
					2-story	11	5887.5	150.25	22.6787	0.34762	35.1275	333	43	1.24	0.12	5.37
					3-story	12	5917.666667	145.16667	22.4105	0.336781667	34.715	330	43	1.19	0.12	5.37
				Fuel Option 2	1-story	13	8140	0	28.83835	0	27.78	371	0	1.64	0.00	1.27
					2-story	14	7776.25	0	26.79575	0	26.54	311	0	1.24	0.00	1.06
					3-story	15	7715.166667	0	26.33166667	0	26.33166667	309	0	1.19	0.00	1.05
				Fuel Option 3	1-story	16	8139	0	28.83835	0	27.78	370	0	1.64	0.00	1.26
					2-story	17	7779.25	0	26.79575	0	26.55	307	0	1.24	0.00	1.05
					3-story	18	7716.5	0	26.33166667	0	26.33666667	308	0	1.19	0.00	1.05

Table 2: Code and Pre-code Simulation Results for Individual Residences for Bastrop County (Single-Family and Multi-Family).

Prototype of the simulation result for one county

County Name	Bastrop
Division (East or West Texas)	East Texas
Number of new building permits for SFD	280

		Fuel Option			Total
		1	2	3	
		Elec. cooling, NG heating and NG water heating	All electricity	Elec. cooling, Heat pump heating and elec. water heating	
		77.1%	18.9%	4.0%	
Slab-on-grade (93.6%)	1-Story (59.8%)	43.16%	10.58%	2.24%	55.97%
	2-Story (40.2%)	29.01%	7.11%	1.51%	37.63%
Crawl spaces (6.4%)	1-Story (59.8%)	2.95%	0.72%	0.15%	3.83%
	2-Story (39.2%)	1.98%	0.49%	0.10%	2.57%
Total		77.10%	18.90%	4.00%	100.00%



Number of Houses for each simulation

		Fuel Option			Total
		1	2	3	
		Elec. cooling, NG heating and NG water heating	All electricity	Elec. cooling, Heat pump heating and elec. water heating	
		77.1%	18.9%	4.0%	
Slab-on-grade (93.6%)	1-Story (59.8%)	121	30	6	157
	2-Story (40.2%)	81	20	4	105
Crawl spaces (6.4%)	1-Story (59.8%)	8	2	0	11
	2-Story (39.2%)	6	1	0	7
Total		216	53	11	280

Precode Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	16,122	366	20,906	0	20,670	0
	2-Story	15,195	354	19,764	0	19,596	0
Crawl spaces	1-Story	16,667	356	21,282	0	21,090	0
	2-Story	15,953	345	20,367	0	20,238	0
Total		63,937	1,421	82,319	0	81,592	0

Code compliant Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	13,857	303	18,264	0	18,163	0
	2-Story	13,197	297	17,502	0	17,429	0
Crawl spaces	1-Story	14,475	293	18,726	0	18,662	0
	2-Story	13,979	288	18,140	0	18,094	0
Total		55,508	1,181	72,632	0	72,348	0

Precode Total Energy Use (For total houses in a County)

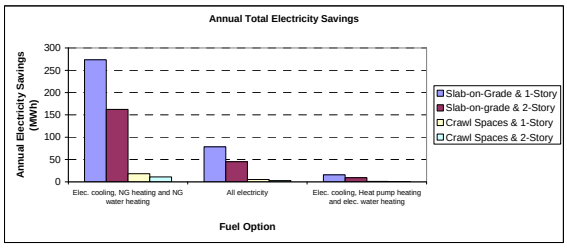
		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	1,948	44,225	619	0	130	0	2,697	44,225
	2-Story	1,234	28,755	394	0	83	0	1,710	28,755
Crawl spaces	1-Story	138	2,941	43	0	9	0	190	2,941
	2-Story	89	1,916	28	0	6	0	122	1,916
Total		3,409	77,838	1,084	0	227	0	4,719	77,838

Code compliant Total Energy Use (For total houses in a County)

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	1,674	36,613	541	0	114	0	2,329	36,613
	2-Story	1,072	24,125	349	0	73	0	1,494	24,125
Crawl spaces	1-Story	120	2,421	38	0	8	0	166	2,421
	2-Story	78	1,600	25	0	5	0	108	1,600
Total		2,944	64,758	952	0	201	0	4,096	64,758

Total Energy Savings Due to the Code Adoption

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)
Slab-on-grade	1-Story	274	7,613	78	0	16	0	368	7,613
	2-Story	162	4,630	45	0	9	0	216	4,630
Crawl spaces	1-Story	18	521	5	0	1	0	24	521
	2-Story	11	317	3	0	1	0	15	317
Total		465	13,080	132	0	27	0	623	13,080



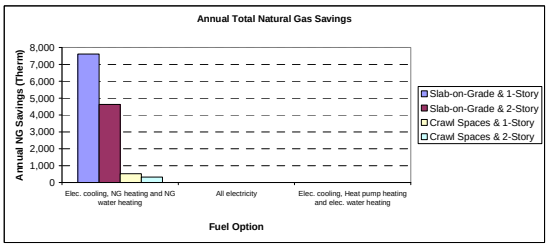


Table 3: Code and Pre-code Annual Simulation Results for Bastrop County (Single-Family).

Precode Avg. OSD Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	70.11	0.73	78.60	0.00	78.60	0.00
	2-Story	66.26	0.73	74.76	0.00	74.76	0.00
Crawl spaces	1-Story	70.67	0.73	79.16	0.00	79.16	0.00
	2-Story	66.86	0.73	75.35	0.00	75.35	0.00
Total		273.90	2.92	307.88	0.00	307.88	0.00

Code compliant Avg. OSD Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	59.33	0.61	67.82	0.00	67.82	0.00
	2-Story	56.49	0.61	64.99	0.00	64.99	0.00
Crawl spaces	1-Story	59.96	0.61	68.45	0.00	68.45	0.00
	2-Story	57.16	0.61	65.66	0.00	65.66	0.00
Total		232.94	2.44	266.91	0.00	266.91	0.00

Precode Avg. OSD Total Energy Use (For total houses in a County)

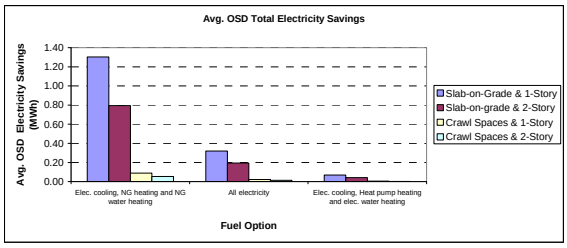
		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	8.47	88.30	2.33	0.00	0.49	0.00	11.29	88.30
	2-Story	5.38	59.36	1.49	0.00	0.32	0.00	7.19	59.36
Crawl spaces	1-Story	0.58	6.04	0.16	0.00	0.03	0.00	0.78	6.04
	2-Story	0.37	4.06	0.10	0.00	0.02	0.00	0.50	4.06
Total		14.81	157.76	4.08	0.00	0.86	0.00	19.75	157.76

Code compliant Avg. OSD Total Energy Use (For total houses in a County)

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	7.17	73.80	2.01	0.00	0.43	0.00	9.60	73.80
	2-Story	4.59	49.61	1.29	0.00	0.27	0.00	6.16	49.61
Crawl spaces	1-Story	0.50	5.05	0.14	0.00	0.03	0.00	0.66	5.05
	2-Story	0.32	3.39	0.09	0.00	0.02	0.00	0.43	3.39
Total		12.57	131.85	3.53	0.00	0.75	0.00	16.85	131.85

Avg. OSD Total Energy Savings Due to the Code Adoption

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)
Slab-on-grade	1-Story	1.30	14.50	0.32	0.00	0.07	0.00	1.69	14.50
	2-Story	0.79	9.75	0.19	0.00	0.04	0.00	1.03	9.75
Crawl spaces	1-Story	0.09	0.99	0.02	0.00	0.00	0.00	0.11	0.99
	2-Story	0.05	0.67	0.01	0.00	0.00	0.00	0.07	0.67
Total		2.24	25.91	0.55	0.00	0.12	0.00	2.90	25.91



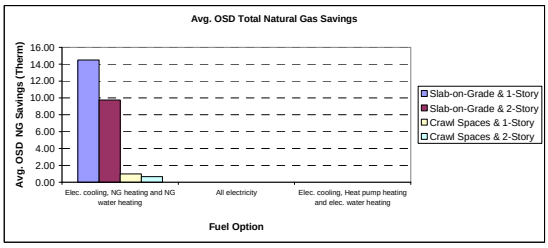
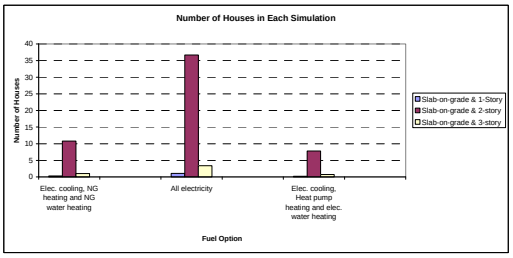


Table 4: Code and Pre-code Average OSD Simulation Results for Bastrop County (Single-Family).

The simulation result for one county

County Name	Bastrop
NAHB Division	West South Central
Number of new building permits for MF	62

		Fuel Option			Total
		1	2	3	
		Elec. cooling, NG heating and NG water heating	All electricity	Elec. cooling, Heat pump heating and elec. water heating	
		19.5%	66.4%	14.1%	
Slab-on-grade (100%)	1-Story (2.6%)	0.51%	1.73%	0.37%	2.60%
	2-Story (89.1%)	17.37%	59.16%	12.56%	89.10%
	3-Story (8.3%)	1.62%	5.51%	1.17%	8.30%
Total		19.50%	66.40%	14.10%	100.00%



Number of Houses for each simulation

		Fuel Option			Total
		1	2	3	
		Elec. cooling, NG heating and NG water heating	All electricity	Elec. cooling, Heat pump heating and elec. water heating	
		19.5%	66.4%	14.1%	
Slab-on-grade (100%)	1-Story (2.6%)	0	1	0	2
	2-Story (89.1%)	11	37	8	55
	3-Story (8.3%)	1	3	1	5
Total		12	41	9	62

Precode Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	6,366	209	8,511	0	8,509	0
	2-Story	6,221	193	8,087	0	8,086	0
	3-Story	6,247	188	8,024	0	8,024	0
Total		18,834	589	24,621	0	24,619	0

Code compliant Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	5,965	167	8,140	0	8,139	0
	2-Story	5,888	150	7,776	0	7,779	0
	3-Story	5,918	145	7,715	0	7,717	0
Total		17,770	462	23,631	0	23,635	0

Precode Total Energy Use (For total houses in a County)

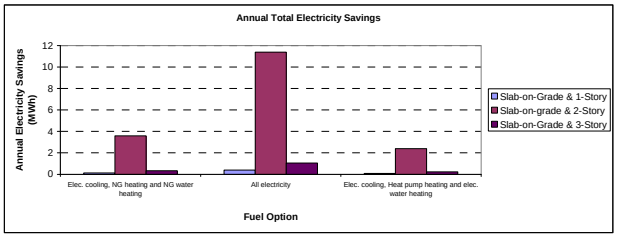
		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	2	66	9	0	2	0	13	66
	2-Story	67	2,076	297	0	63	0	427	2,076
	3-Story	6	188	27	0	6	0	40	188
Total		75	2,330	333	0	71	0	479	2,330

Code compliant Total Energy Use (For total houses in a County)

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	2	52	9	0	2	0	12	52
	2-Story	63	1,619	285	0	61	0	409	1,619
	3-Story	6	146	26	0	6	0	38	146
Total		71	1,817	320	0	68	0	460	1,817

Total Energy Savings Due to the Code Adoption

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	0	13	0	0	0	0	1	13
	2-Story	4	458	11	0	2	0	17	458
	3-Story	0	43	1	0	0	0	2	43
Total		4	514	13	0	3	0	20	514



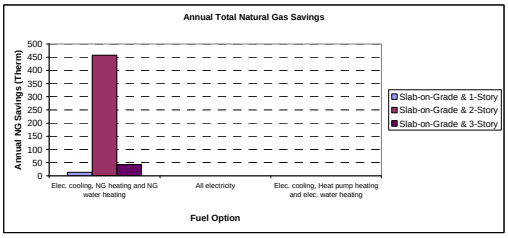


Table 5: Code and Pre-code Annual Simulation Results for Bastrop County (Multi-Family).

Precode Avg. OSD Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	25.78	0.50	30.48	0.00	30.48	0.00
	2-Story	23.92	0.47	28.04	0.00	28.04	0.00
	3-Story	23.60	0.46	27.53	0.00	27.53	0.00
Total		73.30	1.42	86.04	0.00	86.04	0.00

Code compliant Avg. OSD Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	24.13	0.38	28.84	0.00	28.84	0.00
	2-Story	22.68	0.35	26.80	0.00	26.80	0.00
	3-Story	22.41	0.34	26.33	0.00	26.33	0.00
Total		69.22	1.06	81.97	0.00	81.97	0.00

Precode Avg. OSD Total Energy Use (For total houses in a County)

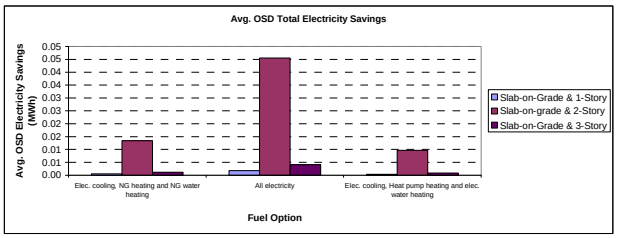
		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	0.01	0.16	0.03	0.00	0.01	0.00	0.05	0.16
	2-Story	0.28	5.04	1.03	0.00	0.22	0.00	1.50	5.04
	3-Story	0.02	0.46	0.09	0.00	0.02	0.00	0.14	0.46
Total		0.29	5.65	1.16	0.00	0.25	0.00	1.69	5.65

Code compliant Avg. OSD Total Energy Use (For total houses in a County)

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	0.01	0.12	0.03	0.00	0.01	0.00	0.05	0.12
	2-Story	0.24	3.74	0.98	0.00	0.21	0.00	1.44	3.74
	3-Story	0.02	0.34	0.09	0.00	0.02	0.00	0.13	0.34
Total		0.27	4.20	1.10	0.00	0.23	0.00	1.61	4.20

Total Energy Savings Due to the Code Adoption

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Savings (kWh)	NG Savings (Therm)	Elec. Savings (kWh)	NG Savings (Therm)	Elec. Savings (kWh)	NG Savings (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.04
	2-Story	0.01	1.29	0.05	0.00	0.01	0.00	0.07	1.29
	3-Story	0.00	0.12	0.00	0.00	0.00	0.00	0.01	0.12
Total		0.02	1.45	0.06	0.00	0.01	0.00	0.08	1.45



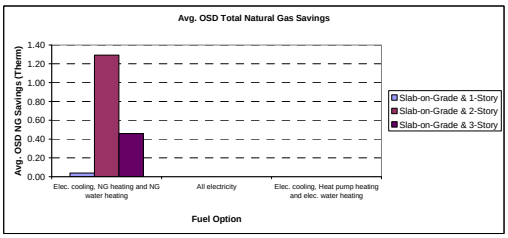


Table 6: Code and Pre-code Average OSD Simulation Results for Bastrop County (Multi-Family).

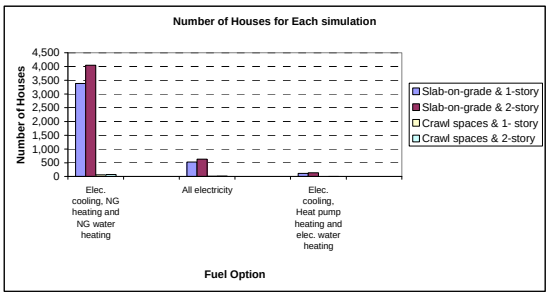
County	SF or MF	Precode or Code-compliant	Options			Simulation #	Annual Elec. (kWh/yr)	Annual NG (Therms/yr)	Avg. OSD Elec. (kWh/day) (Aug. 19)	Avg. OSD NG (Therm/day) (Aug. 19)	Total Annual (Elec. + NG) (MBtu)	Annual Elec.Savings (kWh/yr)	Annual NG Savings (Therms/yr)	Avg. OSD Elec. Savings (kWh/day) (Aug. 19)	Avg. OSD NG Savings (Therm/day) (Aug. 19)	Total Annual Savings (Elec. + NG) (MBtu)
Bexar	SF	Precode	Slab-on-grade	Fuel Option 1	1-story	1	15046	390	65.1893	0.742873	90.32					
					2-story	2	14241	376	61.7633	0.742873	86.24					
				Fuel Option 2	1-story	3	20262	0	73.8828	0	69.15					
					2-story	4	19196	0	70.4567	0	65.52					
				Fuel Option 3	1-story	5	19914	0	73.8828	0	67.97					
					2-story	6	18938	0	70.4567	0	64.63					
			Crawl Space	Fuel Option 1	1-story	7	15628	379	66.119	0.742873	91.27					
					2-story	8	15018	365	62.8382	0.742873	87.8					
				Fuel Option 2	1-story	9	20665	0	74.8123	0	70.53					
					2-story	10	19796	0	71.5317	0	67.56					
				Fuel Option 3	1-story	11	20375	0	74.8123	0	69.54					
					2-story	12	19582	0	71.5317	0	66.83					
		Code - Compliant	Slab-on-grade	Fuel Option 1	1-story	13	13090	321	55.5673	0.622873	76.76	1,956	69	9.62	0.12	13.56
					2-story	14	12511	314	52.946	0.622873	74.1	1,730	62	8.82	0.12	12.14
				Fuel Option 2	1-story	15	17817	0	64.2607	0	60.81	2,445	0	9.62	0.00	8.34
					2-story	16	17110	0	61.6395	0	58.4	2,086	0	8.82	0.00	7.12
				Fuel Option 3	1-story	17	17682	0	64.2607	0	60.35	2,232	0	9.62	0.00	7.62
					2-story	18	16994	0	61.6395	0	58	1,944	0	8.82	0.00	6.63
			Crawl Space	Fuel Option 1	1-story	19	13736	311	56.6073	0.622873	77.99	1,892	68	9.51	0.12	13.28
					2-story	20	13306	305	54.1108	0.622873	75.91	1,712	60	8.73	0.12	11.89
				Fuel Option 2	1-story	21	18305	0	65.3007	0	62.47	2,360	0	9.51	0.00	8.06
					2-story	22	17757	0	62.8042	0	60.6	2,039	0	8.73	0.00	6.96
				Fuel Option 3	1-story	23	18174	0	65.3007	0	62.03	2,201	0	9.51	0.00	7.51
					2-story	24	17654	0	62.8042	0	60.25	1,928	0	8.73	0.00	6.58
	MF	Precode	Slab-on-grade	Fuel Option 1	1-story	1	6066.5	212	24.3152	0.506555	41.92					
					2-story	2	5996	195.5	22.93265	0.4732375	40.0225					
					3-story	3	6033.833333	190.33333	22.72316667	0.462131667	39.62833333					
				Fuel Option 2	1-story	4	8274	0	29.1311	0	28.24					
					2-story	5	7910.25	0	27.1465	0	26.9975					
					3-story	6	7855	0	26.73633333	0	26.80833333					
				Fuel Option 3	1-story	7	8273.5	0	29.1311	0	28.235					
					2-story	8	7912.25	0	27.1465	0	27.005					
					3-story	9	7855.5	0	26.73633333	0	26.81					
		Code - Compliant	Slab-on-grade	Fuel Option 1	1-story	10	5730	171	22.8377	0.386557	36.635	337	41	1.48	0.12	5.29
					2-story	11	5711.25	154	21.7828	0.3532375	34.8825	285	42	1.15	0.12	5.14
					3-story	12	5750.833333	148.33333	21.61416667	0.342131667	34.45833333	283	42	1.11	0.12	5.17
				Fuel Option 2	1-story	13	7976.5	0	27.6536	0	27.225	298	0	1.48	0.00	1.02
					2-story	14	7657.75	0	25.99675	0	26.135	253	0	1.15	0.00	0.86
					3-story	15	7599.333333	0	25.6275	0	25.93666667	256	0	1.11	0.00	0.87
				Fuel Option 3	1-story	16	7973	0	27.6536	0	27.21	301	0	1.48	0.00	1.03
					2-story	17	7659.75	0	25.99675	0	26.1425	253	0	1.15	0.00	0.86
					3-story	18	7599.333333	0	25.6275	0	25.93666667	256	0	1.11	0.00	0.87

Table 7: Code and Pre-code Simulation Results for Individual Residence for Bexar County (Single-Family and Multi-Family).

Prototype of the simulation result for one county

County Name	Bexar
Division (East or West Texas)	West Texas
Number of new building permits for SFD	8,987

		Fuel Option			Total
		1	2	3	
		Elec. cooling, NG heating and NG water heating	All electricity	Elec. cooling, Heat pump heating and elec. water heating	
		84.1%	13.1%	2.8%	
Slab-on-grade (98.3%)	1-Story (45.5%)	37.61%	5.86%	1.25%	44.73%
	2-Story (54.5%)	45.06%	7.02%	1.50%	53.57%
Crawl spaces (1.7%)	1-Story (45.5%)	0.65%	0.10%	0.02%	0.77%
	2-Story (54.5%)	0.78%	0.12%	0.03%	0.93%
Total		84.10%	13.10%	2.80%	100.00%



Number of Houses for each simulation

		Fuel Option			Total
		1	2	3	
		Elec. cooling, NG heating and NG water heating	All electricity	Elec. cooling, Heat pump heating and elec. water heating	
		84.1%	13.1%	2.8%	
Slab-on-grade (98.3%)	1-Story (45.5%)	3,380	527	113	4,020
	2-Story (54.5%)	4,049	631	135	4,815
Crawl spaces (1.7%)	1-Story (45.5%)	58	9	2	70
	2-Story (54.5%)	70	11	2	83
Total		7,558	1,177	252	8,987

Precode Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	15,048	390	20,262	0	19,914	0
	2-Story	14,241	376	19,196	0	18,938	0
Crawl spaces	1-Story	15,628	379	20,665	0	20,375	0
	2-Story	15,018	365	19,798	0	19,582	0
Total		59,933	1,510	79,919	0	78,809	0

Code compliant Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	13,090	321	17,817	0	17,682	0
	2-Story	12,511	314	17,110	0	16,994	0
Crawl spaces	1-Story	13,736	311	18,305	0	18,174	0
	2-Story	13,306	305	17,757	0	17,654	0
Total		52,643	1,251	70,989	0	70,504	0

Precode Total Energy Use (For total houses in a County)

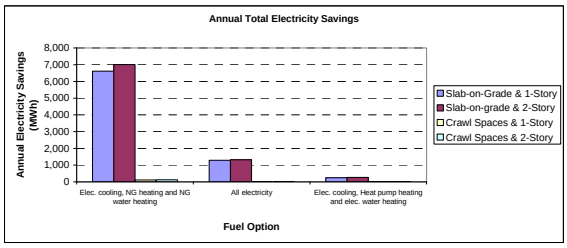
		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	50,862	1,318,379	10,669	0	2,241	0	63,773	1,318,379
	2-Story	57,664	1,522,470	12,107	0	2,553	0	72,324	1,522,470
Crawl spaces	1-Story	914	22,157	188	0	40	0	1,141	22,157
	2-Story	1,052	25,559	216	0	46	0	1,313	25,559
Total		110,491	2,888,565	23,181	0	4,880	0	138,551	2,888,565

Code compliant Total Energy Use (For total houses in a County)

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	44,250	1,085,127	9,382	0	1,990	0	55,622	1,085,127
	2-Story	50,659	1,271,424	10,792	0	2,291	0	63,741	1,271,424
Crawl spaces	1-Story	803	18,182	167	0	35	0	1,005	18,182
	2-Story	932	21,358	194	0	41	0	1,167	21,358
Total		96,644	2,396,091	20,534	0	4,358	0	121,535	2,396,091

Total Energy Savings Due to the Code Adoption

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)
Slab-on-grade	1-Story	6,612	233,252	1,287	0	251	0	8,151	233,252
	2-Story	7,005	251,046	1,316	0	262	0	8,583	251,046
Crawl spaces	1-Story	111	3,975	21	0	4	0	136	3,975
	2-Story	120	4,202	22	0	4	0	147	4,202
Total		13,848	492,474	2,647	0	522	0	17,017	492,474



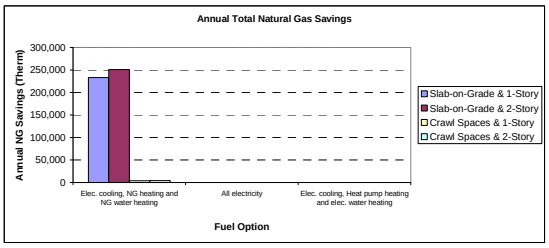


Table 8: Code and Pre-code Annual Simulation Results for Bexar County (Single-Family).

Precode Precode Avg. OSD Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	65.19	0.74	73.88	0.00	73.88	0.00
	2-Story	61.76	0.74	70.46	0.00	70.46	0.00
Crawl spaces	1-Story	66.12	0.74	74.81	0.00	74.81	0.00
	2-Story	62.84	0.74	71.53	0.00	71.53	0.00
Total		255.91	2.97	290.68	0.00	290.68	0.00

Code compliant Precode Avg. OSD Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	55.57	0.62	64.26	0.00	64.26	0.00
	2-Story	52.95	0.62	61.64	0.00	61.64	0.00
Crawl spaces	1-Story	56.61	0.62	65.30	0.00	65.30	0.00
	2-Story	54.11	0.62	62.80	0.00	62.80	0.00
Total		219.23	2.49	254.01	0.00	254.01	0.00

Precode Precode Avg. OSD Total Energy Use (For total houses in a County)

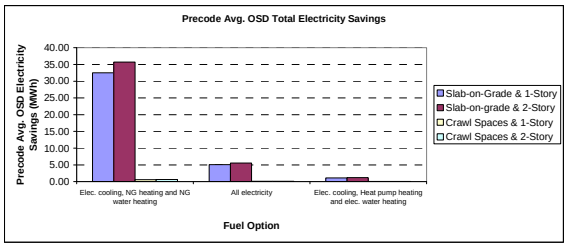
		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	220.37	2,511.25	38.90	0.00	8.32	0.00	267.59	2,511.25
	2-Story	250.09	3,007.98	44.44	0.00	9.50	0.00	304.02	3,007.98
Crawl spaces	1-Story	3.87	43.43	0.68	0.00	0.15	0.00	4.69	43.43
	2-Story	4.40	52.02	0.78	0.00	0.17	0.00	5.35	52.02
Total		478.73	5,614.68	84.80	0.00	18.13	0.00	581.65	5,614.68

Code compliant Precode Avg. OSD Total Energy Use (For total houses in a County)

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	187.84	2,105.60	33.84	0.00	7.23	0.00	228.91	2,105.60
	2-Story	214.38	2,522.09	38.88	0.00	8.31	0.00	261.57	2,522.09
Crawl spaces	1-Story	3.31	36.41	0.59	0.00	0.13	0.00	4.03	36.41
	2-Story	3.79	43.62	0.69	0.00	0.15	0.00	4.62	43.62
Total		409.33	4,707.72	73.99	0.00	15.82	0.00	499.14	4,707.72

Precode Avg. OSD Total Energy Savings Due to the Code Adoption

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)
Slab-on-grade	1-Story	32.53	405.66	5.07	0.00	1.08	0.00	38.68	405.66
	2-Story	35.70	485.89	5.56	0.00	1.19	0.00	42.45	485.89
Crawl spaces	1-Story	0.56	7.02	0.09	0.00	0.02	0.00	0.66	7.02
	2-Story	0.61	8.40	0.10	0.00	0.02	0.00	0.73	8.40
Total		69.40	906.97	10.81	0.00	2.31	0.00	82.52	906.97



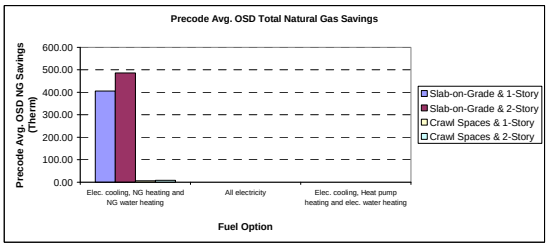
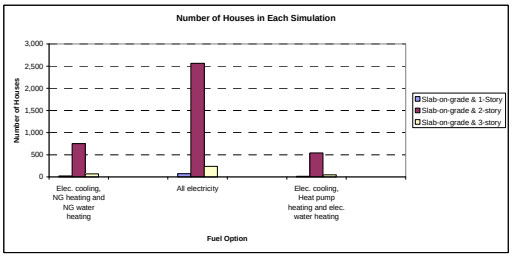


Table 9: Code and Pre-code Average OSD Simulation Results for Bexar County (Single-Family).

The simulation result for one county

County Name	Bexar
NAHB Division	West South Central
Number of new building permits for MF	4,333

		Fuel Option			Total
		1	2	3	
		Elec. cooling, NG heating and NG water heating	All electricity	Elec. cooling, Heat pump heating and elec. water heating	
		19.5%	66.4%	14.1%	
Slab-on-grade (100%)	1-Story (2.6%)	0.51%	1.73%	0.37%	2.60%
	2-Story (89.1%)	17.37%	59.16%	12.56%	89.10%
	3-Story (8.3%)	1.62%	5.51%	1.17%	8.30%
Total		19.50%	66.40%	14.10%	100.00%



Number of Houses for each simulation

		Fuel Option			Total
		1	2	3	
		Elec. cooling, NG heating and NG water heating	All electricity	Elec. cooling, Heat pump heating and elec. water heating	
		19.5%	66.4%	14.2%	
Slab-on-grade (100%)	1-Story (2.6%)	22	75	16	113
	2-Story (89.1%)	753	2,564	544	3,861
	3-Story (8.3%)	70	239	51	360
Total		845	2,877	611	4,333

Precode Energy Use for each option (per house)

		Fuel Option						
		1		2		3		
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating		
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	
Slab-on-grade	1-Story	6,067	212	8,274	0	8,274	0	
	2-Story	5,996	196	7,910	0	7,912	0	
	3-Story	6,034	190	7,858	0	7,856	0	
Total		18,096	598	24,039	0	24,041	0	

Code compliant Energy Use for each option (per house)

		Fuel Option						
		1		2		3		
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating		
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	
Slab-on-grade	1-Story	5,730	171	7,972	0	7,973	0	
	2-Story	5,711	154	7,658	0	7,660	0	
	3-Story	5,751	148	7,599	0	7,599	0	
Total		17,192	473	23,234	0	23,232	0	

Precode Total Energy Use (For total houses in a County)

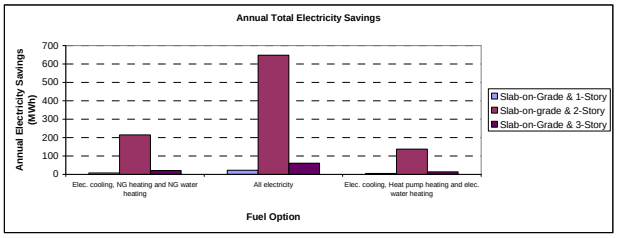
		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	133	4,657	619	0	131	0	884	4,657
	2-Story	4,514	147,180	20,278	0	4,307	0	29,099	147,180
	3-Story	423	13,348	1,876	0	398	0	2,697	13,348
Total		5,070	165,185	22,773	0	4,837	0	32,680	165,185

Code compliant Total Energy Use (For total houses in a County)

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	126	3,757	597	0	127	0	849	3,757
	2-Story	4,300	115,937	19,631	0	4,170	0	28,100	115,937
	3-Story	403	10,403	1,815	0	385	0	2,603	10,403
Total		4,829	130,096	22,042	0	4,682	0	31,553	130,096

Total Energy Savings Due to the Code Adoption

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	7	901	22	0	5	0	34	901
	2-Story	214	31,243	647	0	137	0	999	31,243
	3-Story	20	2,945	61	0	13	0	94	2,945
Total		242	35,089	731	0	156	0	1,127	35,089



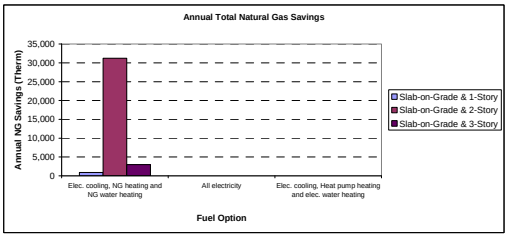


Table 10: Code and Pre-code Annual Simulation Results for Bexar County (Multi-Family).

Precode Avg. OSD Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	24.32	0.51	29.13	0.00	29.13	0.00
	2-Story	22.93	0.47	27.15	0.00	27.15	0.00
	3-Story	22.72	0.46	26.74	0.00	26.74	0.00
Total		69.97	1.44	83.01	0.00	83.01	0.00

Code compliant Avg. OSD Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	22.84	0.39	27.65	0.00	27.65	0.00
	2-Story	21.78	0.35	26.00	0.00	26.00	0.00
	3-Story	21.61	0.34	25.63	0.00	25.63	0.00
Total		66.23	1.08	79.28	0.00	79.28	0.00

Precode Avg. OSD Total Energy Use (For total houses in a County)

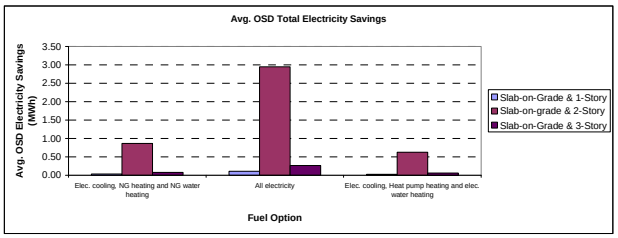
		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	0.53	11.13	2.18	0.00	0.46	0.00	3.18	11.13
	2-Story	17.28	356.27	69.58	0.00	14.78	0.00	101.63	356.27
	3-Story	1.59	32.41	6.38	0.00	1.36	0.00	9.33	32.41
Total		19.39	399.81	78.15	0.00	16.60	0.00	114.14	399.81

Code compliant Avg. OSD Total Energy Use (For total houses in a County)

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	0.50	8.49	2.07	0.00	0.44	0.00	3.01	8.49
	2-Story	16.40	265.93	66.64	0.00	14.15	0.00	97.19	265.93
	3-Story	1.52	23.99	6.12	0.00	1.30	0.00	8.94	23.99
Total		18.42	298.42	74.83	0.00	15.89	0.00	109.14	298.42

Total Energy Savings Due to the Code Adoption

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Savings (kWh)	NG Savings (Therm)	Elec. Savings (kWh)	NG Savings (Therm)	Elec. Savings (kWh)	NG Savings (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	0.03	2.64	0.11	0.00	0.02	0.00	0.17	2.64
	2-Story	0.87	90.34	2.95	0.00	0.63	0.00	4.44	90.34
	3-Story	0.08	8.42	0.26	0.00	0.06	0.00	0.40	8.42
Total		0.98	101.39	3.32	0.00	0.71	0.00	5.00	101.39



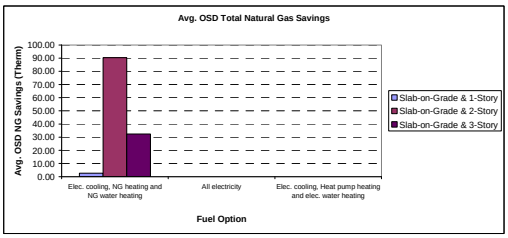


Table 11: Code and Pre-code Average OSD Simulation Results for Bexar County (Multi-Family).

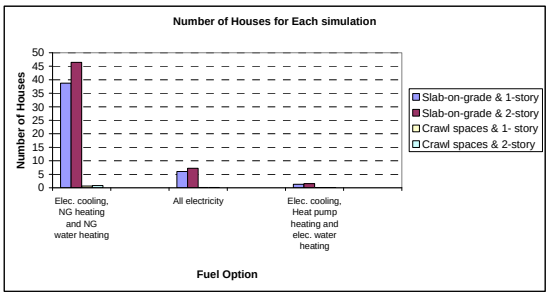
County	SF or MF	Precode or Code-compliant	Options			Simulation #	Annual Elec. (kWh/yr)	Annual NG (Therms/yr)	Avg. OSD Elec. (kWh/day) (Aug. 19)	Avg. OSD NG (Therm/day) (Aug. 19)	Total Annual (Elec. + NG) (MBtu)	Annual Elec.Savings (kWh/yr)	Annual NG Savings (Therms/yr)	Avg. OSD Elec. Savings (kWh/day) (Aug. 19)	Avg. OSD NG Savings (Therm/day) (Aug. 19)	Total Annual Savings (Elec. + NG) (MBtu)
Caldwell	SF	Precode	Slab-on-grade	Fuel Option 1	1-story	1	16081	366	70.002	0.730761	91.5					
					2-story	2	15157	355	66.1566	0.730761	87.21					
				Fuel Option 2	1-story	3	20868	0	78.4958	0	71.22					
					2-story	4	19731	0	74.6505	0	67.34					
				Fuel Option 3	1-story	5	20632	0	78.4958	0	70.42					
					2-story	6	19565	0	74.6505	0	66.77					
			Crawl Space	Fuel Option 1	1-story	7	16624	356	70.5569	0.730761	92.38					
					2-story	8	15912	346	66.7492	0.730761	88.86					
				Fuel Option 2	1-story	9	21242	0	79.0506	0	72.5					
					2-story	10	20330	0	75.243	0	69.39					
				Fuel Option 3	1-story	11	21050	0	79.0506	0	71.84					
					2-story	12	20197	0	75.243	0	68.93					
		Code - Compliant	Slab-on-grade	Fuel Option 1	1-story	13	13831	303	59.2534	0.610761	77.47	2,250	63	10.75	0.12	14.03
					2-story	14	13173	297	56.4198	0.610761	74.67	1,984	58	9.74	0.12	12.54
				Fuel Option 2	1-story	15	18241	0	67.7472	0	62.26	2,627	0	10.75	0.00	8.96
					2-story	16	17484	0	64.9136	0	59.67	2,247	0	9.74	0.00	7.67
				Fuel Option 3	1-story	17	18141	0	67.7472	0	61.91	2,491	0	10.75	0.00	8.51
					2-story	18	17408	0	64.9136	0	59.41	2,157	0	9.74	0.00	7.36
			Crawl Space	Fuel Option 1	1-story	19	14447	293	59.8825	0.610761	78.66	2,177	63	10.67	0.12	13.72
					2-story	20	13952	288	57.0891	0.610761	76.44	1,960	58	9.66	0.12	12.42
				Fuel Option 2	1-story	21	18703	0	68.3763	0	63.83	2,539	0	10.67	0.00	8.67
					2-story	22	18117	0	65.5829	0	61.83	2,213	0	9.66	0.00	7.56
				Fuel Option 3	1-story	23	18638	0	68.3763	0	63.61	2,412	0	10.67	0.00	8.23
					2-story	24	18070	0	65.5829	0	61.67	2,127	0	9.66	0.00	7.26
	MF	Precode	Slab-on-grade	Fuel Option 1	1-story	1	6366	208.5	25.77575	0.500135	42.565					
					2-story	2	6220.5	192.75	23.91965	0.46762	40.4975					
					3-story	3	6247.333333	187.66667	23.604	0.456781667	40.085					
				Fuel Option 2	1-story	4	8510.5	0	30.481	0	29.045					
					2-story	5	8086.75	0	28.03675	0	27.6					
					3-story	6	8023.833333	0	27.52516667	0	27.385					
				Fuel Option 3	1-story	7	8509	0	30.481	0	29.04					
					2-story	8	8086.25	0	28.03675	0	27.5975					
					3-story	9	8024.166667	0	27.52516667	0	27.38666667					
		Code - Compliant	Slab-on-grade	Fuel Option 1	1-story	10	5965	166.5	24.13305	0.3801365	37.015	401	42	1.64	0.12	5.55
					2-story	11	5887.5	150.25	22.6787	0.34762	35.1275	333	43	1.24	0.12	5.37
					3-story	12	5917.666667	145.16667	22.4105	0.336781667	34.715	330	43	1.19	0.12	5.37
				Fuel Option 2	1-story	13	8140	0	28.83835	0	27.78	371	0	1.64	0.00	1.27
					2-story	14	7776.25	0	26.79575	0	26.54	311	0	1.24	0.00	1.06
					3-story	15	7715.166667	0	26.33166667	0	26.33166667	309	0	1.19	0.00	1.05
				Fuel Option 3	1-story	16	8139	0	28.83835	0	27.78	370	0	1.64	0.00	1.26
					2-story	17	7779.25	0	26.79575	0	26.55	307	0	1.24	0.00	1.05
					3-story	18	7716.5	0	26.33166667	0	26.33666667	308	0	1.19	0.00	1.05

Table 12: Code and Pre-code Simulation Results for Individual Residence for Caldwell County (Single-Family and Multi-Family).

Prototype of the simulation result for one county

County Name	Caldwell
Division (East or West Texas)	West Texas
Number of new building permits for SFD	103

		Fuel Option 1	Fuel Option 2	Fuel Option 3	Total
		Elec. cooling, NG heating and NG water heating	All electricity	Elec. cooling, Heat pump heating and elec. water heating	
		84.1%	13.1%	2.8%	
Slab-on-grade (98.3%)	1-Story (45.5%)	37.61%	5.86%	1.25%	44.73%
	2-Story (54.5%)	45.06%	7.02%	1.50%	53.57%
Crawl spaces (1.7%)	1-Story (45.5%)	0.65%	0.10%	0.02%	0.77%
	2-Story (54.5%)	0.78%	0.12%	0.03%	0.93%
Total		84.10%	13.10%	2.80%	100.00%



Number of Houses for each simulation

		Fuel Option 1	Fuel Option 2	Fuel Option 3	Total
		Elec. cooling, NG heating and NG water heating	All electricity	Elec. cooling, Heat pump heating and elec. water heating	
		84.1%	13.1%	2.8%	
Slab-on-grade (98.3%)	1-Story (45.5%)	39	6	1	46
	2-Story (54.5%)	46	7	2	55
Crawl spaces (1.7%)	1-Story (45.5%)	1	0	0	1
	2-Story (54.5%)	1	0	0	1
Total		87	13	3	103

Precode Energy Use for each option (per house)

		Fuel Option 1		Fuel Option 2		Fuel Option 3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	16,081	366	20,868	0	20,632	0
	2-Story	15,157	355	19,731	0	19,565	0
Crawl spaces	1-Story	16,624	356	21,242	0	21,050	0
	2-Story	15,912	346	20,330	0	20,197	0
Total		63,774	1,423	82,171	0	81,444	0

Code compliant Energy Use for each option (per house)

		Fuel Option 1		Fuel Option 2		Fuel Option 3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	13,831	303	18,241	0	18,141	0
	2-Story	13,173	297	17,484	0	17,408	0
Crawl spaces	1-Story	14,447	293	18,703	0	18,638	0
	2-Story	13,952	288	18,117	0	18,070	0
Total		55,403	1,181	72,545	0	72,257	0

Precode Total Energy Use (For total houses in a County)

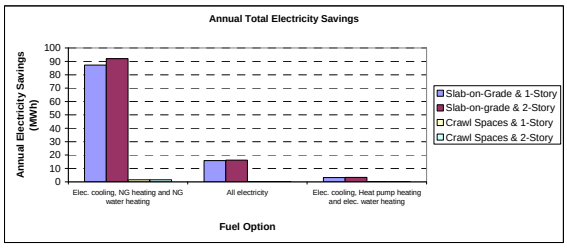
		Fuel Option 1		Fuel Option 2		Fuel Option 3		Total	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	623	14,180	126	0	27	0	776	14,180
	2-Story	703	16,474	143	0	30	0	876	16,474
Crawl spaces	1-Story	11	239	2	0	0	0	14	239
	2-Story	13	278	3	0	1	0	16	278
Total		1,350	31,171	273	0	58	0	1,682	31,171

Code compliant Total Energy Use (For total houses in a County)

		Fuel Option 1		Fuel Option 2		Fuel Option 3		Total	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	536	11,739	110	0	23	0	669	11,739
	2-Story	611	13,783	126	0	27	0	765	13,783
Crawl spaces	1-Story	10	196	2	0	0	0	12	196
	2-Story	11	231	2	0	0	0	14	231
Total		1,168	25,950	241	0	51	0	1,460	25,950

Total Energy Savings Due to the Code Adoption

		Fuel Option 1		Fuel Option 2		Fuel Option 3		Total	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)
Slab-on-grade	1-Story	87	2,441	16	0	3	0	106	2,441
	2-Story	92	2,692	16	0	3	0	112	2,692
Crawl spaces	1-Story	1	42	0	0	0	0	2	42
	2-Story	2	47	0	0	0	0	2	47
Total		182	5,221	33	0	7	0	222	5,221



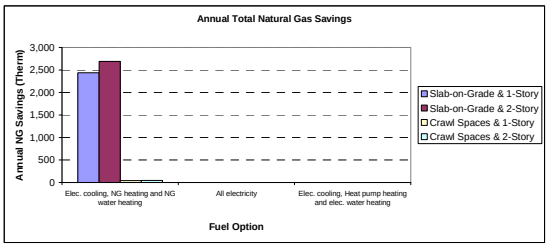


Table 13: Code and Pre-code Annual Simulation Results for Caldwell County (Single-Family).

Precode Precode Avg. OSD Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	70.00	0.73	78.50	0.00	78.50	0.00
	2-Story	66.16	0.73	74.65	0.00	74.65	0.00
Crawl spaces	1-Story	70.58	0.73	79.05	0.00	79.05	0.00
	2-Story	66.75	0.73	75.24	0.00	75.24	0.00
Total		273.49	2.92	307.44	0.00	307.44	0.00

Code compliant Precode Avg. OSD Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	59.25	0.61	67.75	0.00	67.75	0.00
	2-Story	56.42	0.61	64.91	0.00	64.91	0.00
Crawl spaces	1-Story	59.88	0.61	68.38	0.00	68.38	0.00
	2-Story	57.09	0.61	65.58	0.00	65.58	0.00
Total		232.64	2.44	266.62	0.00	266.62	0.00

Precode Precode Avg. OSD Total Energy Use (For total houses in a County)

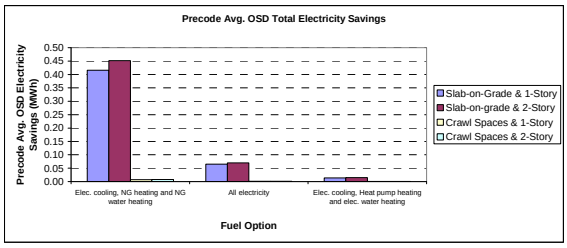
		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	2.71	28.31	0.47	0.00	0.10	0.00	3.29	28.31
	2-Story	3.07	33.91	0.54	0.00	0.12	0.00	3.73	33.91
Crawl spaces	1-Story	0.05	0.49	0.01	0.00	0.00	0.00	0.06	0.49
	2-Story	0.05	0.59	0.01	0.00	0.00	0.00	0.06	0.59
Total		5.88	63.30	1.03	0.00	0.22	0.00	7.13	63.30

Code compliant Precode Avg. OSD Total Energy Use (For total houses in a County)

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	2.30	23.66	0.41	0.00	0.09	0.00	2.79	23.66
	2-Story	2.62	28.34	0.47	0.00	0.10	0.00	3.19	28.34
Crawl spaces	1-Story	0.04	0.41	0.01	0.00	0.00	0.00	0.05	0.41
	2-Story	0.05	0.49	0.01	0.00	0.00	0.00	0.06	0.49
Total		5.00	52.91	0.89	0.00	0.19	0.00	6.08	52.91

Precode Avg. OSD Total Energy Savings Due to the Code Adoption

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)
Slab-on-grade	1-Story	0.42	4.65	0.06	0.00	0.01	0.00	0.50	4.65
	2-Story	0.45	5.57	0.07	0.00	0.02	0.00	0.54	5.57
Crawl spaces	1-Story	0.01	0.08	0.00	0.00	0.00	0.00	0.01	0.08
	2-Story	0.01	0.10	0.00	0.00	0.00	0.00	0.01	0.10
Total		0.88	10.39	0.14	0.00	0.03	0.00	1.05	10.39



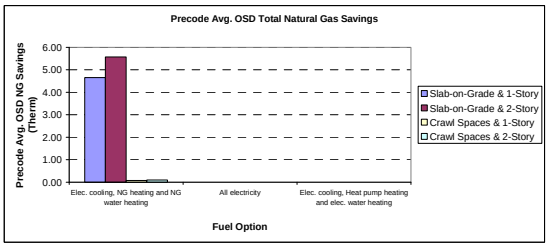
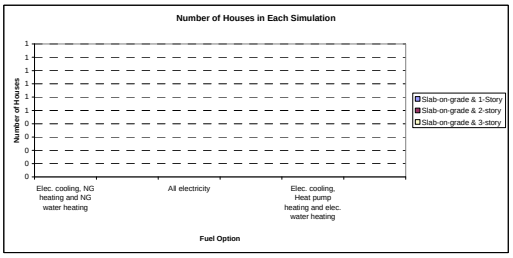


Table 14: Code and Pre-code Average OSD Simulation Results for Caldwell County (Single-Family).

The simulation result for one county

County Name	Caldwell
NAHB Division	West South Central
Number of new building permits for MF	0

		Fuel Option			Total
		1	2	3	
		Elec. cooling, NG heating and NG water heating	All electricity	Elec. cooling, Heat pump heating and elec. water heating	
		19.5%	66.4%	14.1%	
Slab-on-grade (100%)	1-Story (2.6%)	0.51%	1.73%	0.37%	2.60%
	2-Story (89.1%)	17.37%	59.16%	12.56%	89.10%
	3-Story (8.3%)	1.62%	5.51%	1.17%	8.30%
Total		19.50%	66.40%	14.10%	100.00%



Number of Houses for each simulation

		Fuel Option			Total
		1	2	3	
		Elec. cooling, NG heating and NG water heating	All electricity	Elec. cooling, Heat pump heating and elec. water heating	
		19.5%	66.4%	14.1%	
Slab-on-grade (100%)	1-Story (2.6%)	0	0	0	0
	2-Story (89.1%)	0	0	0	0
	3-Story (8.3%)	0	0	0	0
Total		0	0	0	0

Precode Energy Use for each option (per house)

		Fuel Option						
		1		2		3		
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating		
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	
Slab-on-grade	1-Story	6,366	209	8,511	0	8,509	0	
	2-Story	6,221	193	8,087	0	8,089	0	
	3-Story	6,247	188	8,024	0	8,024	0	
Total		18,834	589	24,621	0	24,619	0	

Code compliant Energy Use for each option (per house)

		Fuel Option						
		1		2		3		
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating		
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	
Slab-on-grade	1-Story	5,965	167	8,140	0	8,139	0	
	2-Story	5,888	150	7,776	0	7,779	0	
	3-Story	5,918	145	7,715	0	7,717	0	
Total		17,770	462	23,631	0	23,635	0	

Precode Total Energy Use (For total houses in a County)

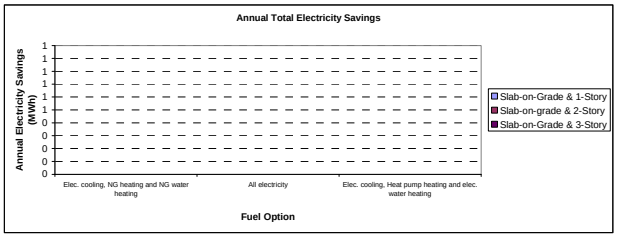
		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	0	0	0	0	0	0	0	0
	2-Story	0	0	0	0	0	0	0	0
	3-Story	0	0	0	0	0	0	0	0
Total		0	0	0	0	0	0	0	0

Code compliant Total Energy Use (For total houses in a County)

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	0	0	0	0	0	0	0	0
	2-Story	0	0	0	0	0	0	0	0
	3-Story	0	0	0	0	0	0	0	0
Total		0	0	0	0	0	0	0	0

Total Energy Savings Due to the Code Adoption

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	0	0	0	0	0	0	0	0
	2-Story	0	0	0	0	0	0	0	0
	3-Story	0	0	0	0	0	0	0	0
Total		0	0	0	0	0	0	0	0



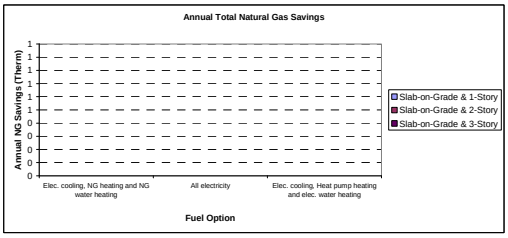


Table 15: Code and Pre-code Annual Simulation Results for Caldwell County (Multi-Family).

Precode Avg. OSD Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	25.78	0.50	30.48	0.00	30.48	0.00
	2-Story	23.92	0.47	28.04	0.00	28.04	0.00
	3-Story	23.60	0.46	27.53	0.00	27.53	0.00
Total		73.30	1.42	86.04	0.00	86.04	0.00

Code compliant Avg. OSD Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	24.13	0.38	28.84	0.00	28.84	0.00
	2-Story	22.68	0.35	26.80	0.00	26.80	0.00
	3-Story	22.41	0.34	26.33	0.00	26.33	0.00
Total		69.22	1.06	81.97	0.00	81.97	0.00

Precode Avg. OSD Total Energy Use (For total houses in a County)

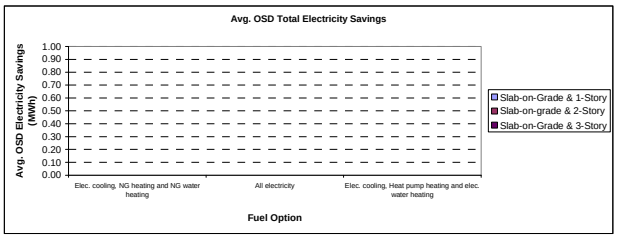
		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	2-Story	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3-Story	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Code compliant Avg. OSD Total Energy Use (For total houses in a County)

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	2-Story	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3-Story	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Total Energy Savings Due to the Code Adoption

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Savings (kWh)	NG Savings (Therm)	Elec. Savings (kWh)	NG Savings (Therm)	Elec. Savings (kWh)	NG Savings (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	2-Story	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3-Story	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00



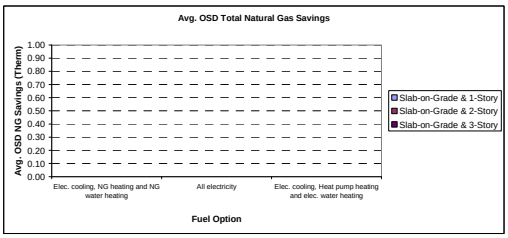


Table 16: Code and Pre-code Average OSD Simulation Results for Caldwell County (Multi-Family).

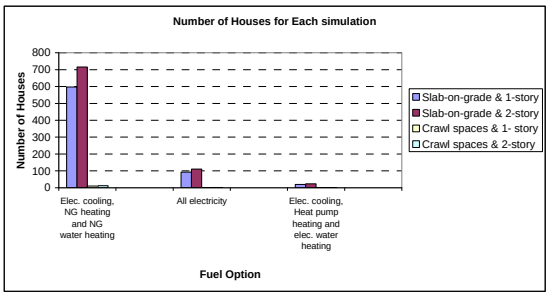
County	SF or MF	Precode or Code-compliant	Options			Simulation #	Annual Elec. (kWh/yr)	Annual NG (Therms/yr)	Avg. OSD Elec. (kWh/day) (Aug. 19)	Avg. OSD NG (Therm/day) (Aug. 19)	Total Annual (Elec. + NG) (MBtu)	Annual Elec.Savings (kWh/yr)	Annual NG Savings (Therms/yr)	Avg. OSD Elec. Savings (kWh/day) (Aug. 19)	Avg. OSD NG Savings (Therm/day) (Aug. 19)	Total Annual Savings (Elec. + NG) (MBtu)
Comal	SF	Precode	Slab-on-grade	Fuel Option 1	1-story	1	15061	390	65.2487	0.742873	90.36					
					2-story	2	14253	376	61.8131	0.742873	86.27					
				Fuel Option 2	1-story	3	20275	0	73.9422	0	69.2					
					2-story	4	19207	0	70.5065	0	65.55					
				Fuel Option 3	1-story	5	19928	0	73.9422	0	68.01					
					2-story	6	18949	0	70.5065	0	64.67					
			Crawl Space	Fuel Option 1	1-story	7	15643	379	66.1786	0.742873	91.31					
					2-story	8	15032	365	62.8895	0.742873	87.84					
				Fuel Option 2	1-story	9	20679	0	74.872	0	70.58					
					2-story	10	19809	0	71.5829	0	67.61					
				Fuel Option 3	1-story	11	20389	0	74.872	0	69.59					
					2-story	12	19594	0	71.5829	0	66.87					
		Code - Compliant	Slab-on-grade	Fuel Option 1	1-story	13	13097	321	55.6007	0.622873	76.78	1,964	69	9.65	0.12	13.58
					2-story	14	12529	314	53.0629	0.622873	74.15	1,724	62	8.75	0.12	12.12
				Fuel Option 2	1-story	15	17824	0	64.2943	0	60.83	2,451	0	9.65	0.00	8.37
					2-story	16	17126	0	61.7564	0	58.45	2,081	0	8.75	0.00	7.10
				Fuel Option 3	1-story	17	17687	0	64.2943	0	60.37	2,241	0	9.65	0.00	7.64
					2-story	18	17014	0	61.7564	0	58.07	1,935	0	8.75	0.00	6.60
			Crawl Space	Fuel Option 1	1-story	19	13745	311	56.641	0.622873	78.01	1,898	68	9.54	0.12	13.30
					2-story	20	13310	305	54.1253	0.622873	75.91	1,722	60	8.76	0.12	11.93
				Fuel Option 2	1-story	21	18312	0	65.3344	0	62.5	2,367	0	9.54	0.00	8.08
					2-story	22	17759	0	62.8188	0	60.61	2,050	0	8.76	0.00	7.00
				Fuel Option 3	1-story	23	18180	0	65.3344	0	62.05	2,209	0	9.54	0.00	7.54
					2-story	24	17657	0	62.8188	0	60.26	1,937	0	8.76	0.00	6.61
	MF	Precode	Slab-on-grade	Fuel Option 1	1-story	1	6066.5	212	24.3152	0.506555	41.92					
					2-story	2	5996	195.5	22.93265	0.4732375	40.0225					
					3-story	3	6033.833333	190.33333	22.72316667	0.462131667	39.62833333					
				Fuel Option 2	1-story	4	8274	0	29.1311	0	28.24					
					2-story	5	7910.25	0	27.1465	0	26.9975					
					3-story	6	7855	0	26.73633333	0	26.80833333					
				Fuel Option 3	1-story	7	8273.5	0	29.1311	0	28.235					
					2-story	8	7912.25	0	27.1465	0	27.005					
					3-story	9	7855.5	0	26.73633333	0	26.81					
		Code - Compliant	Slab-on-grade	Fuel Option 1	1-story	10	5730	171	22.8377	0.386557	36.635	337	41	1.48	0.12	5.29
					2-story	11	5711.25	154	21.7828	0.3532375	34.8825	285	42	1.15	0.12	5.14
					3-story	12	5750.833333	148.33333	21.61416667	0.342131667	34.45833333	283	42	1.11	0.12	5.17
				Fuel Option 2	1-story	13	7976.5	0	27.6536	0	27.225	298	0	1.48	0.00	1.02
					2-story	14	7657.75	0	25.99675	0	26.135	253	0	1.15	0.00	0.86
					3-story	15	7599.333333	0	25.6275	0	25.93666667	256	0	1.11	0.00	0.87
				Fuel Option 3	1-story	16	7973	0	27.6536	0	27.21	301	0	1.48	0.00	1.03
					2-story	17	7659.75	0	25.99675	0	26.1425	253	0	1.15	0.00	0.86
					3-story	18	7599.333333	0	25.6275	0	25.93666667	256	0	1.11	0.00	0.87

Table 17: Code and Pre-code Simulation Results for Individual Residence for Comal County (Single-Family and Multi-Family).

Prototype of the simulation result for one county

County Name	Comal
Division (East or West Texas)	West Texas
Number of new building permits for SFD	1,589

		Fuel Option			Total
		1	2	3	
		Elec. cooling, NG heating and NG water heating	All electricity	Elec. cooling, Heat pump heating and elec. water heating	
		84.1%	13.1%	2.8%	
Slab-on-grade (98.3%)	1-Story (45.5%)	37.61%	5.86%	1.25%	44.73%
	2-Story (54.5%)	45.06%	7.02%	1.50%	53.57%
Crawl spaces (1.7%)	1-Story (45.5%)	0.65%	0.10%	0.02%	0.77%
	2-Story (54.5%)	0.78%	0.12%	0.03%	0.93%
Total		84.10%	13.10%	2.80%	100.00%



Number of Houses for each simulation

		Fuel Option			Total
		1	2	3	
		Elec. cooling, NG heating and NG water heating	All electricity	Elec. cooling, Heat pump heating and elec. water heating	
		84.1%	13.1%	2.8%	
Slab-on-grade (98.3%)	1-Story (45.5%)	598	93	20	711
	2-Story (54.5%)	716	112	24	851
Crawl spaces (1.7%)	1-Story (45.5%)	10	2	0	12
	2-Story (54.5%)	12	2	0	15
Total		1,336	208	44	1,589

Precode Energy Use for each option (per house)

		Fuel Option						
		1		2		3		
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating		
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	
Slab-on-grade	1-Story	15,061	390	20,275	0	19,928	0	
	2-Story	14,253	376	19,207	0	18,949	0	
Crawl spaces	1-Story	15,643	379	20,679	0	20,389	0	
	2-Story	15,032	365	19,809	0	19,594	0	
Total		59,988	1,510	79,970	0	78,860	0	

Code compliant Energy Use for each option (per house)

		Fuel Option						
		1		2		3		
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating		
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	
Slab-on-grade	1-Story	13,097	321	17,824	0	17,687	0	
	2-Story	12,529	314	17,126	0	17,014	0	
Crawl spaces	1-Story	13,745	311	18,312	0	18,180	0	
	2-Story	13,310	305	17,759	0	17,657	0	
Total		52,681	1,251	71,021	0	70,538	0	

Precode Total Energy Use (For total houses in a County)

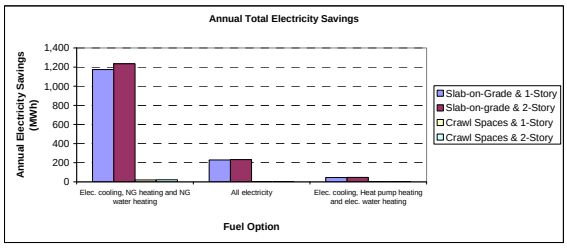
		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	9,002	233,104	1,888	0	397	0	11,288	233,104
	2-Story	10,204	269,189	2,142	0	452	0	12,798	269,189
Crawl spaces	1-Story	162	3,918	33	0	7	0	202	3,918
	2-Story	186	4,519	38	0	8	0	232	4,519
Total		19,554	510,730	4,101	0	863	0	24,519	510,730

Code compliant Total Energy Use (For total houses in a County)

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	7,828	191,862	1,659	0	352	0	9,840	191,862
	2-Story	8,970	224,802	1,910	0	406	0	11,285	224,802
Crawl spaces	1-Story	142	3,215	29	0	6	0	178	3,215
	2-Story	165	3,776	34	0	7	0	206	3,776
Total		17,105	423,655	3,633	0	771	0	21,509	423,655

Total Energy Savings Due to the Code Adoption

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)
Slab-on-grade	1-Story	1,174	41,241	228	0	45	0	1,447	41,241
	2-Story	1,234	44,388	232	0	46	0	1,512	44,388
Crawl spaces	1-Story	20	703	4	0	1	0	24	703
	2-Story	21	743	4	0	1	0	26	743
Total		2,449	87,075	468	0	92	0	3,009	87,075



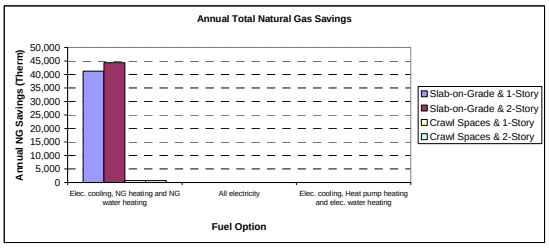


Table 18: Code and Pre-code Annual Simulation Results for Comal County (Single-Family).

Precode Precode Avg. OSD Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	65.25	0.74	73.94	0.00	73.94	0.00
	2-Story	61.81	0.74	70.51	0.00	70.51	0.00
Crawl spaces	1-Story	66.18	0.74	74.87	0.00	74.87	0.00
	2-Story	62.89	0.74	71.58	0.00	71.58	0.00
Total		256.13	2.97	290.90	0.00	290.90	0.00

Code compliant Precode Avg. OSD Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	55.60	0.62	64.29	0.00	64.29	0.00
	2-Story	53.08	0.62	61.76	0.00	61.76	0.00
Crawl spaces	1-Story	56.64	0.62	65.33	0.00	65.33	0.00
	2-Story	54.13	0.62	62.82	0.00	62.82	0.00
Total		219.43	2.49	254.20	0.00	254.20	0.00

Precode Precode Avg. OSD Total Energy Use (For total houses in a County)

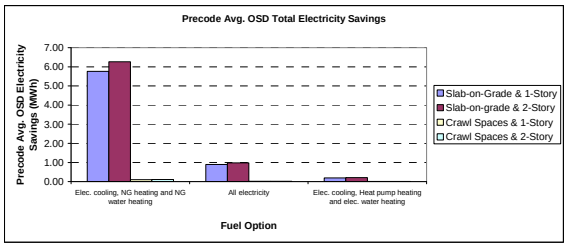
		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	39.00	444.02	6.88	0.00	1.47	0.00	47.35	444.02
	2-Story	44.25	531.84	7.86	0.00	1.68	0.00	53.80	531.84
Crawl spaces	1-Story	0.68	7.68	0.12	0.00	0.03	0.00	0.83	7.68
	2-Story	0.78	9.20	0.14	0.00	0.03	0.00	0.95	9.20
Total		84.72	992.74	15.01	0.00	3.21	0.00	102.93	992.74

Code compliant Precode Avg. OSD Total Energy Use (For total houses in a County)

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	33.23	372.29	5.99	0.00	1.28	0.00	40.50	372.29
	2-Story	37.99	445.93	6.89	0.00	1.47	0.00	46.35	445.93
Crawl spaces	1-Story	0.59	6.44	0.11	0.00	0.02	0.00	0.71	6.44
	2-Story	0.67	7.71	0.12	0.00	0.03	0.00	0.82	7.71
Total		72.48	832.38	13.10	0.00	2.80	0.00	88.38	832.38

Precode Avg. OSD Total Energy Savings Due to the Code Adoption

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)
Slab-on-grade	1-Story	5.77	71.72	0.90	0.00	0.19	0.00	6.86	71.72
	2-Story	6.26	85.91	0.98	0.00	0.21	0.00	7.45	85.91
Crawl spaces	1-Story	0.10	1.24	0.02	0.00	0.00	0.00	0.12	1.24
	2-Story	0.11	1.49	0.02	0.00	0.00	0.00	0.13	1.49
Total		12.24	160.36	1.91	0.00	0.41	0.00	14.55	160.36



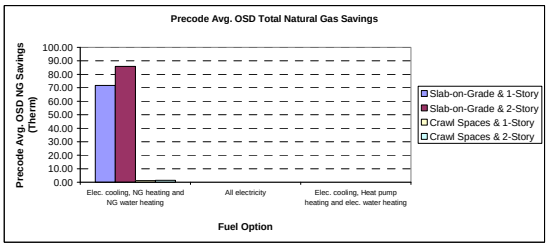
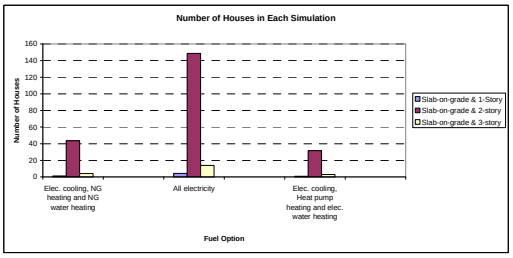


Table 19: Code and Pre-code Average OSD Simulation Results for Comal County (Single-Family).

The simulation result for one county

County Name	Comal
NAHB Division	West South Central
Number of new building permits for MF	251

		Fuel Option			Total
		1	2	3	
		Elec. cooling, NG heating and NG water heating	All electricity	Elec. cooling, Heat pump heating and elec. water heating	
		19.5%	66.4%	14.1%	
Slab-on-grade (100%)	1-Story (2.6%)	0.51%	1.73%	0.37%	2.60%
	2-Story (89.1%)	17.37%	59.16%	12.56%	89.10%
	3-Story (8.3%)	1.62%	5.51%	1.17%	8.30%
Total		19.50%	66.40%	14.10%	100.00%



Number of Houses for each simulation

		Fuel Option			Total
		1	2	3	
		Elec. cooling, NG heating and NG water heating	All electricity	Elec. cooling, Heat pump heating and elec. water heating	
		19.5%	66.4%	14.1%	
Slab-on-grade (100%)	1-Story (2.6%)	1	4	1	7
	2-Story (89.1%)	44	148	32	224
	3-Story (8.3%)	4	14	3	21
Total		49	167	35	251

Precode Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	6,067	212	8,274	0	8,274	0
	2-Story	5,996	196	7,910	0	7,912	0
	3-Story	6,034	190	7,856	0	7,856	0
Total		18,096	598	24,039	0	24,041	0

Code compliant Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	5,730	171	7,972	0	7,972	0
	2-Story	5,711	154	7,658	0	7,660	0
	3-Story	5,751	148	7,599	0	7,599	0
Total		17,192	473	23,234	0	23,232	0

Precode Total Energy Use (For total houses in a County)

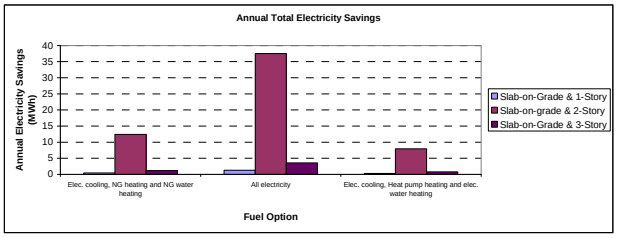
		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	8	270	36	0	8	0	51	270
	2-Story	261	8,526	1,175	0	249	0	1,686	8,526
	3-Story	25	773	109	0	23	0	156	773
Total		294	9,569	1,319	0	280	0	1,893	9,569

Code compliant Total Energy Use (For total houses in a County)

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	7	218	35	0	7	0	49	218
	2-Story	249	6,716	1,137	0	242	0	1,628	6,716
	3-Story	23	603	105	0	22	0	151	603
Total		280	7,536	1,277	0	271	0	1,828	7,536

Total Energy Savings Due to the Code Adoption

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	0	52	1	0	0	0	2	52
	2-Story	12	1,810	37	0	8	0	58	1,810
	3-Story	1	171	4	0	1	0	5	171
Total		14	2,033	42	0	9	0	65	2,033



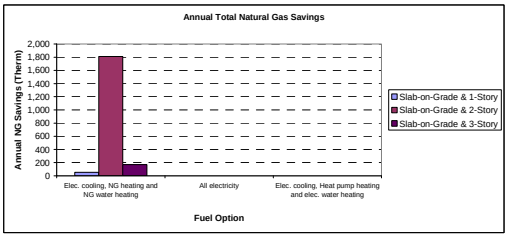


Table 20: Code and Pre-code Annual Simulation Results for Comal County (Multi-Family).

Precode Avg. OSD Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	24.32	0.51	29.13	0.00	29.13	0.00
	2-Story	22.93	0.47	27.15	0.00	27.15	0.00
	3-Story	22.72	0.46	26.74	0.00	26.74	0.00
Total		69.97	1.44	83.01	0.00	83.01	0.00

Code compliant Avg. OSD Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	22.84	0.39	27.65	0.00	27.65	0.00
	2-Story	21.78	0.35	26.00	0.00	26.00	0.00
	3-Story	21.61	0.34	25.63	0.00	25.63	0.00
Total		66.23	1.08	79.28	0.00	79.28	0.00

Precode Avg. OSD Total Energy Use (For total houses in a County)

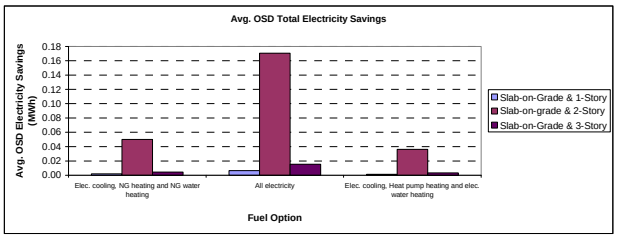
		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	0.03	0.64	0.13	0.00	0.03	0.00	0.18	0.64
	2-Story	1.00	20.64	4.03	0.00	0.86	0.00	5.89	20.64
	3-Story	0.09	1.88	0.37	0.00	0.08	0.00	0.54	1.88
Total		1.12	23.16	4.53	0.00	0.96	0.00	6.61	23.16

Code compliant Avg. OSD Total Energy Use (For total houses in a County)

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	0.03	0.49	0.12	0.00	0.03	0.00	0.17	0.49
	2-Story	0.95	15.40	3.86	0.00	0.82	0.00	5.63	15.40
	3-Story	0.09	1.39	0.35	0.00	0.08	0.00	0.52	1.39
Total		1.07	17.29	4.33	0.00	0.92	0.00	6.32	17.29

Total Energy Savings Due to the Code Adoption

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Savings (kWh)	NG Savings (Therm)	Elec. Savings (kWh)	NG Savings (Therm)	Elec. Savings (kWh)	NG Savings (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	0.00	0.15	0.01	0.00	0.00	0.00	0.01	0.15
	2-Story	0.05	5.23	0.17	0.00	0.04	0.00	0.26	5.23
	3-Story	0.00	0.49	0.02	0.00	0.00	0.00	0.02	0.49
Total		0.06	5.87	0.19	0.00	0.04	0.00	0.29	5.87



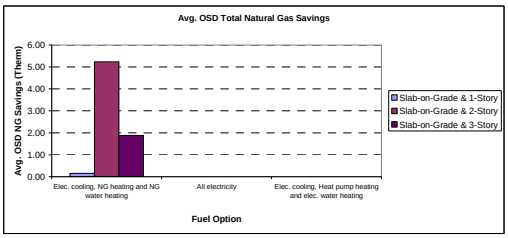


Table 21: Code and Pre-code Average OSD Simulation Results for Comal County (Multi-Family).

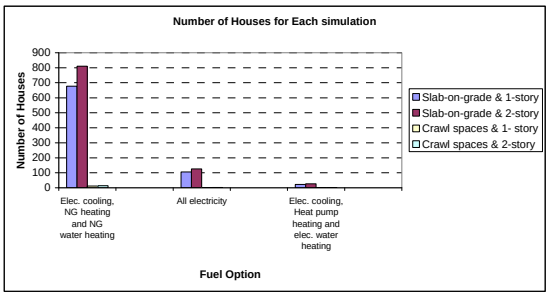
Table 22: Code and Pre-code Simulation Results for Individual Residence for Ellis County (Single-Family and Multi-Family).

County	SF or MF	Precode or Code-compliant	Options			Simulation #	Annual Elec. (kWh/yr)	Annual NG (Therms/yr)	Avg. OSD Elec. (kWh/day) (Aug. 19)	Avg. OSD NG (Therm/day) (Aug. 19)	Total Annual (Elec. + NG) (MBtu)	Annual Elec.Savings (kWh/yr)	Annual NG Savings (Therms/yr)	Avg. OSD Elec. Savings (kWh/day) (Aug. 19)	Avg. OSD NG Savings (Therm/day) (Aug. 19)	Total Annual Savings (Elec. + NG) (MBtu)
Ellis	SF	Precode	Slab-on-grade	Fuel Option 1	1-story	1	15533	505	72.8519	0.725762	103.51					
					2-story	2	14662	497	69.2674	0.725762	99.73					
				Fuel Option 2	1-story	3	22929	0	81.298	0	78.26					
					2-story	4	21884	0	77.7135	0	74.69					
				Fuel Option 3	1-story	5	21899	0	81.298	0	74.74					
					2-story	6	20929	0	77.7135	0	71.43					
			Crawl Space	Fuel Option 1	1-story	7	16079	482	73.6733	0.725762	103.07					
					2-story	8	15394	467	70.0896	0.725762	99.24					
				Fuel Option 2	1-story	9	23034	0	82.1194	0	78.62					
					2-story	10	22046	0	78.5357	0	75.24					
				Fuel Option 3	1-story	11	22171	0	82.1194	0	75.67					
					2-story	12	21287	0	78.5357	0	72.65					
		Code - Compliant	Slab-on-grade	Fuel Option 1	1-story	13	13316	413	60.6144	0.605762	86.7	2,217	92	12.24	0.12	16.81
					2-story	14	12825	423	58.7966	0.605762	86.12	1,837	74	10.47	0.12	13.61
				Fuel Option 2	1-story	15	19704	0	69.0604	0	67.25	3,225	0	12.24	0.00	11.01
					2-story	16	19411	0	67.2428	0	66.25	2,473	0	10.47	0.00	8.44
				Fuel Option 3	1-story	17	19120	0	69.0604	0	65.26	2,779	0	12.24	0.00	9.48
					2-story	18	18768	0	67.2428	0	64.05	2,161	0	10.47	0.00	7.38
			Crawl Space	Fuel Option 1	1-story	19	13920	384	61.4258	0.605762	85.94	2,159	98	12.25	0.12	17.13
					2-story	20	13545	385	59.6076	0.605762	84.71	1,849	82	10.48	0.12	14.53
				Fuel Option 2	1-story	21	19794	0	69.8717	0	67.56	3,240	0	12.25	0.00	11.06
					2-story	22	19422	0	68.0537	0	66.29	2,624	0	10.48	0.00	8.95
				Fuel Option 3	1-story	23	19384	0	69.8717	0	66.16	2,787	0	12.25	0.00	9.51
					2-story	24	19010	0	68.0537	0	64.88	2,277	0	10.48	0.00	7.77
	MF	Precode	Slab-on-grade	Fuel Option 1	1-story	1	6177.5	244	26.48875	0.4974865	45.505					
					2-story	2	6026.5	221	24.75305	0.4653	42.68					
					3-story	3	6040	213.83333	24.47516667	0.454573333	41.99333333					
				Fuel Option 2	1-story	4	8939.5	0	31.1676	0	30.51					
					2-story	5	8380.75	0	28.847	0	28.6025					
					3-story	6	8267.5	0	28.37416667	0	28.21666667					
				Fuel Option 3	1-story	7	8847.5	0	31.1676	0	30.195					
					2-story	8	8324.5	0	28.847	0	28.4125					
					3-story	9	8214.833333	0	28.37416667	0	28.03666667					
		Code - Compliant	Slab-on-grade	Fuel Option 1	1-story	10	5836	205.5	24.807	0.3774865	40.46	342	39	1.68	0.12	5.05
					2-story	11	5754	181.5	23.4804	0.3453	37.7825	273	40	1.27	0.12	4.90
					3-story	12	5770.666667	173.83333	23.2485	0.334573333	37.07333333	269	40	1.23	0.12	4.92
				Fuel Option 2	1-story	13	8678	0	29.48585	0	29.615	262	0	1.68	0.00	0.90
					2-story	14	8171.5	0	27.5745	0	27.89	209	0	1.27	0.00	0.71
					3-story	15	8055.666667	0	27.14766667	0	27.49333333	212	0	1.23	0.00	0.72
				Fuel Option 3	1-story	16	8572	0	29.48585	0	29.255	276	0	1.68	0.00	0.94
					2-story	17	8110.25	0	27.5745	0	27.68	214	0	1.27	0.00	0.73
					3-story	18	7999.5	0	27.14766667	0	27.30166667	215	0	1.23	0.00	0.73

Prototype of the simulation result for one county

County Name	Ellis
Division (East or West Texas)	West Texas
Number of new building permits for SFD	1,798

		Fuel Option			Total
		1	2	3	
		Elec. cooling, NG heating and NG water heating	All electricity	Elec. cooling, Heat pump heating and elec. water heating	
		84.1%	13.1%	2.8%	
Slab-on-grade (98.3%)	1-Story (45.5%)	37.61%	5.86%	1.25%	44.73%
	2-Story (54.5%)	45.06%	7.02%	1.50%	53.57%
Crawl spaces (1.7%)	1-Story (45.5%)	0.65%	0.10%	0.02%	0.77%
	2-Story (54.5%)	0.78%	0.12%	0.03%	0.93%
Total		84.10%	13.10%	2.80%	100.00%



Number of Houses for each simulation

		Fuel Option			Total
		1	2	3	
		Elec. cooling, NG heating and NG water heating	All electricity	Elec. cooling, Heat pump heating and elec. water heating	
		84.1%	13.1%	2.8%	
Slab-on-grade (98.3%)	1-Story (45.5%)	676	105	23	804
	2-Story (54.5%)	810	126	27	963
Crawl spaces (1.7%)	1-Story (45.5%)	12	2	0	14
	2-Story (54.5%)	14	2	0	17
Total		1,512	236	50	1,798

Precode Energy Use for each option (per house)

		Fuel Option						
		1		2		3		
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating		
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	
Slab-on-grade	1-Story	15,533	505	22,929	0	21,899	0	
	2-Story	14,662	497	21,884	0	20,929	0	
Crawl spaces	1-Story	16,079	482	23,034	0	22,171	0	
	2-Story	15,394	467	22,046	0	21,287	0	
Total		61,668	1,951	89,893	0	86,286	0	

Code compliant Energy Use for each option (per house)

		Fuel Option						
		1		2		3		
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating		
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	
Slab-on-grade	1-Story	13,316	413	19,704	0	19,120	0	
	2-Story	12,825	423	19,411	0	18,768	0	
Crawl spaces	1-Story	13,920	384	19,794	0	19,384	0	
	2-Story	13,545	385	19,422	0	19,010	0	
Total		53,606	1,605	78,331	0	76,282	0	

Precode Total Energy Use (For total houses in a County)

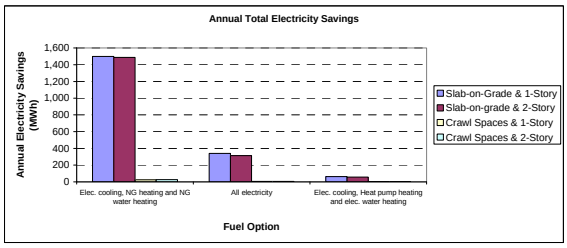
		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	10,505	341,540	2,416	0	493	0	13,414	341,540
	2-Story	11,878	402,617	2,761	0	564	0	15,204	402,617
Crawl spaces	1-Story	188	5,638	42	0	9	0	239	5,638
	2-Story	216	6,543	48	0	10	0	274	6,543
Total		22,787	756,337	5,267	0	1,076	0	29,130	756,337

Code compliant Total Energy Use (For total houses in a County)

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	9,006	279,319	2,076	0	431	0	11,512	279,319
	2-Story	10,389	342,670	2,449	0	506	0	13,345	342,670
Crawl spaces	1-Story	163	4,491	36	0	8	0	206	4,491
	2-Story	190	5,394	42	0	9	0	241	5,394
Total		19,748	631,874	4,604	0	953	0	25,305	631,874

Total Energy Savings Due to the Code Adoption

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)
Slab-on-grade	1-Story	1,499	62,221	340	0	63	0	1,902	62,221
	2-Story	1,488	59,947	312	0	58	0	1,858	59,947
Crawl spaces	1-Story	25	1,146	6	0	1	0	32	1,146
	2-Story	26	1,149	6	0	1	0	33	1,149
Total		3,039	124,463	663	0	123	0	3,825	124,463



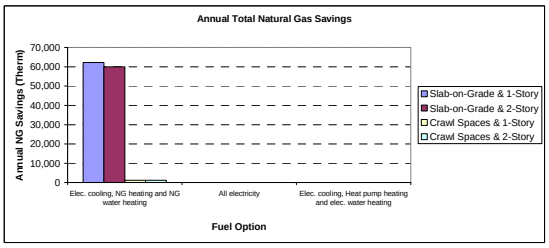


Table 23: Code and Pre-code Annual Simulation Results for Ellis County (Single-Family).

Precode Precode Avg. OSD Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	72.85	0.73	81.30	0.00	81.30	0.00
	2-Story	69.27	0.73	77.71	0.00	77.71	0.00
Crawl spaces	1-Story	73.67	0.73	82.12	0.00	82.12	0.00
	2-Story	70.09	0.73	78.54	0.00	78.54	0.00
Total		285.88	2.90	319.67	0.00	319.67	0.00

Code compliant Precode Avg. OSD Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	60.61	0.61	69.06	0.00	69.06	0.00
	2-Story	58.80	0.61	67.24	0.00	67.24	0.00
Crawl spaces	1-Story	61.43	0.61	69.87	0.00	69.87	0.00
	2-Story	59.61	0.61	68.05	0.00	68.05	0.00
Total		240.44	2.42	274.23	0.00	274.23	0.00

Precode Precode Avg. OSD Total Energy Use (For total houses in a County)

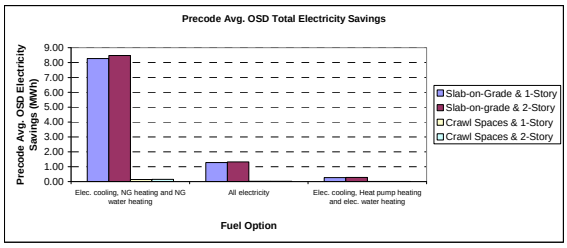
		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	49.27	490.85	8.56	0.00	1.83	0.00	59.67	490.85
	2-Story	56.11	587.94	9.81	0.00	2.10	0.00	68.02	587.94
Crawl spaces	1-Story	0.86	8.49	0.15	0.00	0.03	0.00	1.04	8.49
	2-Story	0.98	10.17	0.17	0.00	0.04	0.00	1.19	10.17
Total		107.23	1,097.44	18.69	0.00	4.00	0.00	129.91	1,097.44

Code compliant Precode Avg. OSD Total Energy Use (For total houses in a County)

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	40.99	409.69	7.28	0.00	1.56	0.00	49.82	409.69
	2-Story	47.63	490.72	8.49	0.00	1.81	0.00	57.93	490.72
Crawl spaces	1-Story	0.72	7.09	0.13	0.00	0.03	0.00	0.87	7.09
	2-Story	0.84	8.49	0.15	0.00	0.03	0.00	1.02	8.49
Total		90.18	915.98	16.04	0.00	3.43	0.00	109.64	915.98

Precode Avg. OSD Total Energy Savings Due to the Code Adoption

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)
Slab-on-grade	1-Story	8.28	81.16	1.29	0.00	0.28	0.00	9.84	81.16
	2-Story	8.48	97.21	1.32	0.00	0.28	0.00	10.09	97.21
Crawl spaces	1-Story	0.14	1.40	0.02	0.00	0.00	0.00	0.17	1.40
	2-Story	0.15	1.68	0.02	0.00	0.00	0.00	0.17	1.68
Total		17.05	181.45	2.66	0.00	0.57	0.00	20.27	181.45



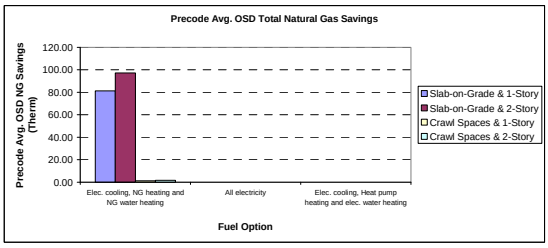
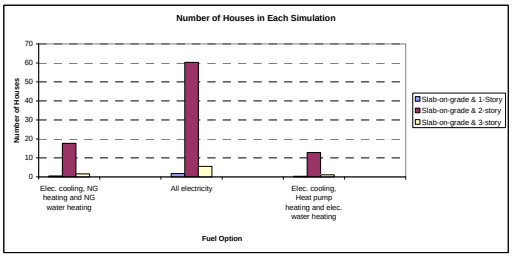


Table 24: Code and Pre-code Average OSD Simulation Results for Ellis County (Single-Family).

The simulation result for one county

County Name	Ellis
NAHB Division	West South Central
Number of new building permits for MF	102

		Fuel Option			Total
		1	2	3	
		Elec. cooling, NG heating and NG water heating	All electricity	Elec. cooling, Heat pump heating and elec. water heating	
		19.5%	66.4%	14.1%	
Slab-on-grade (100%)	1-Story (2.6%)	0.51%	1.73%	0.37%	2.60%
	2-Story (89.1%)	17.37%	59.16%	12.56%	89.10%
	3-Story (8.3%)	1.62%	5.51%	1.17%	8.30%
Total		19.50%	66.40%	14.10%	100.00%



Number of Houses for each simulation

		Fuel Option			Total
		1	2	3	
		Elec. cooling, NG heating and NG water heating	All electricity	Elec. cooling, Heat pump heating and elec. water heating	
		19.5%	66.4%	14.1%	
Slab-on-grade (100%)	1-Story (2.6%)	1	2	0	3
	2-Story (89.1%)	18	60	13	91
	3-Story (8.3%)	2	6	1	8
Total		20	68	14	102

Precode Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	6,178	244	8,940	0	8,849	0
	2-Story	6,027	221	8,381	0	8,325	0
	3-Story	6,040	214	8,268	0	8,215	0
Total		18,244	679	25,588	0	25,387	0

Code compliant Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	5,836	206	8,678	0	8,572	0
	2-Story	5,754	182	8,172	0	8,110	0
	3-Story	5,771	174	8,056	0	8,000	0
Total		17,361	561	24,905	0	24,682	0

Precode Total Energy Use (For total houses in a County)

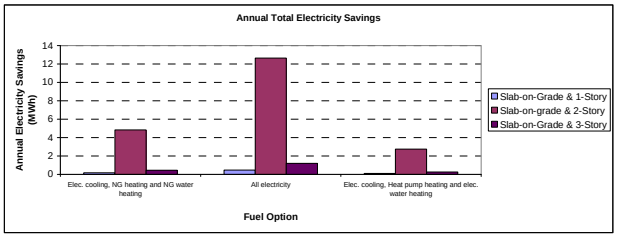
		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	3	126	16	0	3	0	22	126
	2-Story	107	3,917	506	0	107	0	719	3,917
	3-Story	10	353	46	0	10	0	66	353
Total		120	4,396	568	0	120	0	808	4,396

Code compliant Total Energy Use (For total houses in a County)

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	3	106	15	0	3	0	22	106
	2-Story	102	3,217	493	0	104	0	699	3,217
	3-Story	10	287	45	0	10	0	64	287
Total		115	3,610	554	0	117	0	785	3,610

Total Energy Savings Due to the Code Adoption

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	0	20	0	0	0	0	1	20
	2-Story	5	700	13	0	3	0	20	700
	3-Story	0	66	1	0	0	0	2	66
Total		5	786	14	0	3	0	23	786



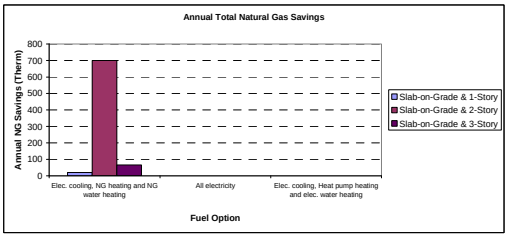


Table 25: Code and Pre-code Annual Simulation Results for Ellis County (Multi-Family).

Precode Avg. OSD Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	26.49	0.50	31.17	0.00	31.17	0.00
	2-Story	24.75	0.47	28.85	0.00	28.85	0.00
	3-Story	24.48	0.45	28.37	0.00	28.37	0.00
Total		75.72	1.42	88.39	0.00	88.39	0.00

Code compliant Avg. OSD Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	24.81	0.38	29.49	0.00	29.49	0.00
	2-Story	23.48	0.35	27.57	0.00	27.57	0.00
	3-Story	23.25	0.33	27.15	0.00	27.15	0.00
Total		71.54	1.06	84.21	0.00	84.21	0.00

Precode Avg. OSD Total Energy Use (For total houses in a County)

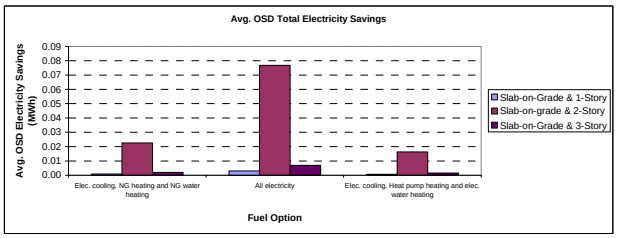
		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	0.01	0.26	0.05	0.00	0.01	0.00	0.08	0.26
	2-Story	0.44	8.25	1.74	0.00	0.37	0.00	2.55	8.25
	3-Story	0.04	0.75	0.16	0.00	0.03	0.00	0.23	0.75
Total		0.49	9.25	1.96	0.00	0.42	0.00	2.86	9.25

Code compliant Avg. OSD Total Energy Use (For total houses in a County)

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	0.01	0.20	0.05	0.00	0.01	0.00	0.08	0.20
	2-Story	0.42	6.12	1.66	0.00	0.35	0.00	2.43	6.12
	3-Story	0.04	0.55	0.15	0.00	0.03	0.00	0.22	0.55
Total		0.47	6.87	1.87	0.00	0.40	0.00	2.73	6.87

Total Energy Savings Due to the Code Adoption

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Savings (kWh)	NG Savings (Therm)	Elec. Savings (kWh)	NG Savings (Therm)	Elec. Savings (kWh)	NG Savings (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	0.00	0.06	0.00	0.00	0.00	0.00	0.00	0.06
	2-Story	0.02	2.13	0.08	0.00	0.02	0.00	0.12	2.13
	3-Story	0.00	0.20	0.01	0.00	0.00	0.00	0.01	0.20
Total		0.03	2.39	0.09	0.00	0.02	0.00	0.13	2.39



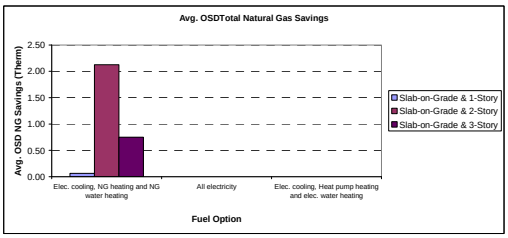


Table 26: Code and Pre-code Average OSD Simulation Results for Ellis County (Multi-Family).

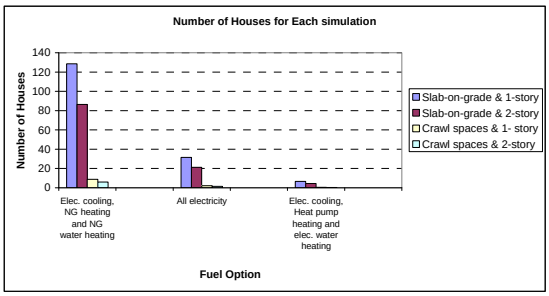
County	SF or MF	Precode or Code-compliant	Options			Simulation #	Annual Elec. (kWh/yr)	Annual NG (Therms/yr)	Avg. OSD Elec. (kWh/day) (Aug. 19)	Avg. OSD NG (Therm/day) (Aug. 19)	Total Annual (Elec. + NG) (MBtu)	Annual Elec.Savings (kWh/yr)	Annual NG Savings (Therms/yr)	Avg. OSD Elec. Savings (kWh/day) (Aug. 19)	Avg. OSD NG Savings (Therm/day) (Aug. 19)	Total Annual Savings (Elec. + NG) (MBtu)
Gregg	SF	Precode	Slab-on-grade	Fuel Option 1	1-story	1	12789	480	55.9088	0.772833	91.67					
					2-story	2	12022	470	52.0935	0.772833	88.04					
				Fuel Option 2	1-story	3	19607	0	65.132	0	66.92					
					2-story	4	18632	0	61.3167	0	63.59					
				Fuel Option 3	1-story	5	18963	0	65.132	0	64.72					
					2-story	6	18057	0	61.3167	0	61.63					
			Crawl Space	Fuel Option 1	1-story	7	13513	445	57.8326	0.772833	90.65					
					2-story	8	12937	426	54.4834	0.772833	86.78					
				Fuel Option 2	1-story	9	19685	0	67.0558	0	67.19					
					2-story	10	18745	0	63.7065	0	63.98					
				Fuel Option 3	1-story	11	19243	0	67.0558	0	65.68					
					2-story	12	18419	0	63.7065	0	62.86					
		Code - Compliant	Slab-on-grade	Fuel Option 1	1-story	13	11342	410	48.0641	0.652833	79.73	1,447	70	7.84	0.12	11.94
					2-story	14	10792	410	45.0059	0.652833	77.86	1,230	60	7.09	0.12	10.18
				Fuel Option 2	1-story	15	17610	0	57.2873	0	60.1	1,997	0	7.84	0.00	6.82
					2-story	16	17042	0	54.229	0	58.16	1,590	0	7.09	0.00	5.43
				Fuel Option 3	1-story	17	17210	0	57.2873	0	58.74	1,753	0	7.84	0.00	5.98
					2-story	18	16672	0	54.229	0	56.9	1,385	0	7.09	0.00	4.73
			Crawl Space	Fuel Option 1	1-story	19	12125	368	50.2223	0.652833	78.18	1,388	77	7.61	0.12	12.47
					2-story	20	11728	357	47.6642	0.652833	75.78	1,209	69	6.82	0.12	11.00
				Fuel Option 2	1-story	21	17641	0	59.4455	0	60.21	2,044	0	7.61	0.00	6.98
					2-story	22	17044	0	56.8874	0	58.17	1,701	0	6.82	0.00	5.81
				Fuel Option 3	1-story	23	17463	0	59.4455	0	59.6	1,780	0	7.61	0.00	6.08
					2-story	24	16916	0	56.8874	0	57.74	1,503	0	6.82	0.00	5.12
	MF	Precode	Slab-on-grade	Fuel Option 1	1-story	1	5788	239	23.40135	0.522435	43.63					
					2-story	2	5722	213.25	22.0921	0.4871325	40.865					
					3-story	3	5771.333333	205.33333	21.9385	0.475365	40.23833333					
				Fuel Option 2	1-story	4	8444.5	0	28.51075	0	28.82					
					2-story	5	7934	0	26.56275	0	27.0775					
					3-story	6	7846.833333	0	26.19633333	0	26.78					
				Fuel Option 3	1-story	7	8406	0	28.51075	0	28.69					
					2-story	8	7934	0	26.56275	0	27.0775					
					3-story	9	7846.5	0	26.19633333	0	26.78					
		Code - Compliant	Slab-on-grade	Fuel Option 1	1-story	10	5469.5	194	21.7698	0.4024375	38.09	319	45	1.63	0.12	5.54
					2-story	11	5476.75	168.25	20.84205	0.3671325	35.515	245	45	1.25	0.12	5.35
					3-story	12	5533.333333	160.16667	20.73316667	0.355365	34.89833333	238	45	1.21	0.12	5.34
				Fuel Option 2	1-story	13	8105	0	26.87915	0	27.665	340	0	1.63	0.00	1.16
					2-story	14	7661.5	0	25.31275	0	26.1475	273	0	1.25	0.00	0.93
					3-story	15	7581.166667	0	24.991	0	25.875	266	0	1.21	0.00	0.91
				Fuel Option 3	1-story	16	8084.5	0	26.87915	0	27.595	322	0	1.63	0.00	1.10
					2-story	17	7673.25	0	25.31275	0	26.19	261	0	1.25	0.00	0.89
					3-story	18	7590.833333	0	24.991	0	25.90833333	256	0	1.21	0.00	0.87

Table 27: Code and Pre-code Simulation Results for Individual Residence for Gregg County (Single-Family and Multi-Family).

Prototype of the simulation result for one county

County Name	Gregg
Division (East or West Texas)	East Texas
Number of new building permits for SFD	298

		Fuel Option			Total
		1	2	3	
		Elec. cooling, NG heating and NG water heating	All electricity	Elec. cooling, Heat pump heating and elec. water heating	
		77.1%	18.9%	4.0%	
Slab-on-grade (93.6%)	1-Story (59.8%)	43.16%	10.58%	2.24%	55.97%
	2-Story (40.2%)	29.01%	7.11%	1.51%	37.63%
Crawl spaces (6.4%)	1-Story (59.8%)	2.95%	0.72%	0.15%	3.83%
	2-Story (39.2%)	1.98%	0.49%	0.10%	2.57%
Total		77.10%	18.90%	4.00%	100.00%



Number of Houses for each simulation

		Fuel Option			Total
		1	2	3	
		Elec. cooling, NG heating and NG water heating	All electricity	Elec. cooling, Heat pump heating and elec. water heating	
		77.1%	18.9%	4.0%	
Slab-on-grade (93.6%)	1-Story (59.8%)	129	32	7	167
	2-Story (40.2%)	86	21	4	112
Crawl spaces (6.4%)	1-Story (59.8%)	9	2	0	11
	2-Story (39.2%)	6	1	0	8
Total		230	56	12	298

Precode Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	12,789	480	19,607	0	18,963	0
	2-Story	12,022	470	18,632	0	18,057	0
Crawl spaces	1-Story	13,513	445	19,685	0	19,243	0
	2-Story	12,937	426	18,745	0	18,419	0
Total		51,261	1,821	76,669	0	74,682	0

Code compliant Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	11,342	410	17,610	0	17,210	0
	2-Story	10,792	410	17,042	0	16,672	0
Crawl spaces	1-Story	12,125	368	17,641	0	17,463	0
	2-Story	11,728	357	17,044	0	16,916	0
Total		45,987	1,545	69,337	0	68,261	0

Precode Total Energy Use (For total houses in a County)

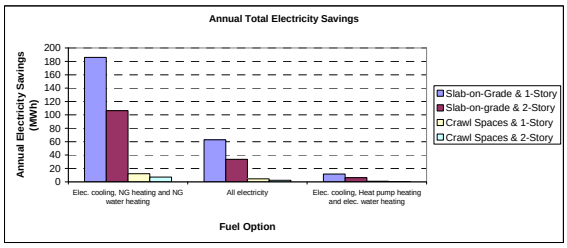
		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	1,645	61,729	618	0	127	0	2,389	61,729
	2-Story	1,039	40,632	395	0	81	0	1,515	40,632
Crawl spaces	1-Story	119	3,913	43	0	9	0	170	3,913
	2-Story	76	2,518	27	0	6	0	109	2,518
Total		2,879	108,792	1,083	0	222	0	4,184	108,792

Code compliant Total Energy Use (For total houses in a County)

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	1,459	52,727	555	0	115	0	2,129	52,727
	2-Story	933	35,445	361	0	75	0	1,369	35,445
Crawl spaces	1-Story	107	3,236	38	0	8	0	153	3,236
	2-Story	69	2,110	25	0	5	0	99	2,110
Total		2,568	93,518	979	0	203	0	3,749	93,518

Total Energy Savings Due to the Code Adoption

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)
Slab-on-grade	1-Story	186	9,002	63	0	12	0	261	9,002
	2-Story	106	5,187	34	0	6	0	146	5,187
Crawl spaces	1-Story	12	677	4	0	1	0	17	677
	2-Story	7	408	2	0	0	0	10	408
Total		312	15,274	104	0	19	0	434	15,274



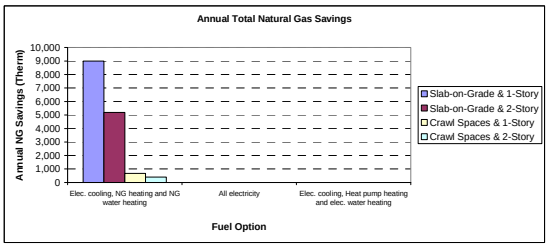


Table 28: Code and Pre-code Annual Simulation Results for Gregg County (Single-Family).

Precode Avg. OSD Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	55.91	0.77	65.13	0.00	65.13	0.00
	2-Story	52.09	0.77	61.32	0.00	61.32	0.00
Crawl spaces	1-Story	57.83	0.77	67.06	0.00	67.06	0.00
	2-Story	54.48	0.77	63.71	0.00	63.71	0.00
Total		220.32	3.09	257.21	0.00	257.21	0.00

Code compliant Avg. OSD Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	48.06	0.65	57.29	0.00	57.29	0.00
	2-Story	45.01	0.65	54.23	0.00	54.23	0.00
Crawl spaces	1-Story	50.22	0.65	59.45	0.00	59.45	0.00
	2-Story	47.66	0.65	56.89	0.00	56.89	0.00
Total		190.96	2.61	227.85	0.00	227.85	0.00

Precode Avg. OSD Total Energy Use (For total houses in a County)

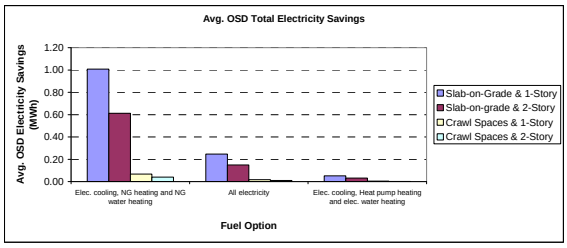
		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	7.19	99.39	2.05	0.00	0.43	0.00	9.68	99.39
	2-Story	4.50	66.81	1.30	0.00	0.28	0.00	6.08	66.81
Crawl spaces	1-Story	0.51	6.80	0.14	0.00	0.03	0.00	0.68	6.80
	2-Story	0.32	4.57	0.09	0.00	0.02	0.00	0.43	4.57
Total		12.52	177.56	3.59	0.00	0.76	0.00	16.87	177.56

Code compliant Avg. OSD Total Energy Use (For total houses in a County)

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	6.18	83.96	1.81	0.00	0.38	0.00	8.37	83.96
	2-Story	3.89	56.44	1.15	0.00	0.24	0.00	5.28	56.44
Crawl spaces	1-Story	0.44	5.74	0.13	0.00	0.03	0.00	0.60	5.74
	2-Story	0.28	3.86	0.08	0.00	0.02	0.00	0.38	3.86
Total		10.80	149.99	3.17	0.00	0.67	0.00	14.63	149.99

Avg. OSD Total Energy Savings Due to the Code Adoption

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)
Slab-on-grade	1-Story	1.01	15.43	0.25	0.00	0.05	0.00	1.31	15.43
	2-Story	0.61	10.37	0.15	0.00	0.03	0.00	0.79	10.37
Crawl spaces	1-Story	0.07	1.06	0.02	0.00	0.00	0.00	0.09	1.06
	2-Story	0.04	0.71	0.01	0.00	0.00	0.00	0.05	0.71
Total		1.73	27.57	0.42	0.00	0.09	0.00	2.24	27.57



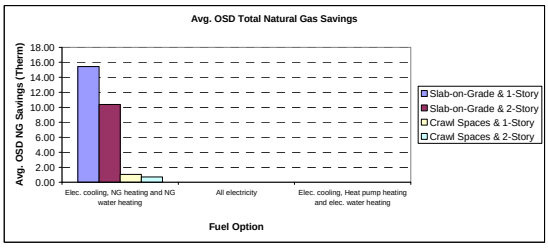
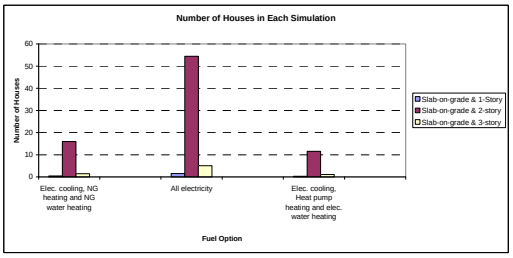


Table 29: Code and Pre-code Average OSD Simulation Results for Gregg County (Single-Family).

The simulation result for one county

County Name	Gregg
NAHB Division	West South Central
Number of new building permits for MF	92

		Fuel Option			Total
		1	2	3	
		Elec. cooling, NG heating and NG water heating	All electricity	Elec. cooling, Heat pump heating and elec. water heating	
		19.5%	66.4%	14.1%	
Slab-on-grade (100%)	1-Story (2.6%)	0.51%	1.73%	0.37%	2.60%
	2-Story (89.1%)	17.37%	59.16%	12.56%	89.10%
	3-Story (8.3%)	1.62%	5.51%	1.17%	8.30%
Total		19.50%	66.40%	14.10%	100.00%



Number of Houses for each simulation

		Fuel Option			Total
		1	2	3	
		Elec. cooling, NG heating and NG water heating	All electricity	Elec. cooling, Heat pump heating and elec. water heating	
		19.5%	66.4%	14.1%	
Slab-on-grade (100%)	1-Story (2.6%)	0	2	0	2
	2-Story (89.1%)	16	54	12	82
	3-Story (8.3%)	1	5	1	8
Total		18	61	13	92

Precode Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	5,788	239	8,445	0	8,406	0
	2-Story	5,722	213	7,934	0	7,934	0
	3-Story	5,771	205	7,847	0	7,847	0
Total		17,281	658	24,225	0	24,187	0

Code compliant Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	5,470	194	8,105	0	8,065	0
	2-Story	5,477	168	7,662	0	7,673	0
	3-Story	5,533	160	7,581	0	7,591	0
Total		16,480	522	23,348	0	23,349	0

Precode Total Energy Use (For total houses in a County)

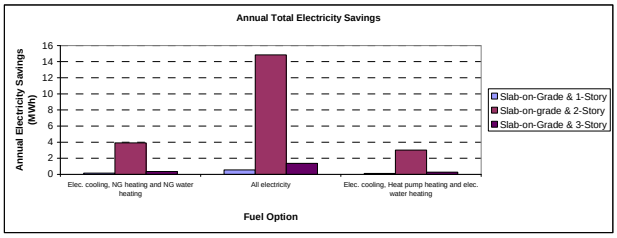
		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	3	111	13	0	3	0	19	111
	2-Story	91	3,409	432	0	92	0	615	3,409
	3-Story	9	306	40	0	8	0	57	306
Total		103	3,826	485	0	103	0	691	3,826

Code compliant Total Energy Use (For total houses in a County)

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	3	90	13	0	3	0	18	90
	2-Story	88	2,689	417	0	89	0	593	2,689
	3-Story	8	238	38	0	8	0	55	238
Total		98	3,018	468	0	100	0	664	3,018

Total Energy Savings Due to the Code Adoption

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	0	21	1	0	0	0	1	21
	2-Story	4	719	15	0	3	0	22	719
	3-Story	0	67	1	0	0	0	2	67
Total		4	808	17	0	3	0	25	808



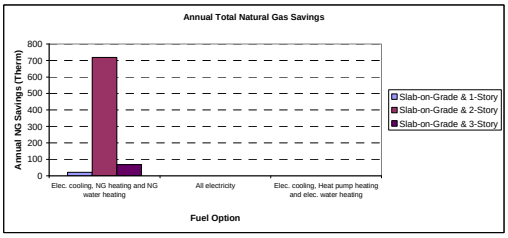


Table 30: Code and Pre-code Annual Simulation Results for Gregg County (Multi-Family).

Precode Avg. OSD Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	23.40	0.52	28.51	0.00	28.51	0.00
	2-Story	22.09	0.49	26.56	0.00	26.56	0.00
	3-Story	21.94	0.48	26.20	0.00	26.20	0.00
Total		67.43	1.49	81.27	0.00	81.27	0.00

Code compliant Avg. OSD Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	21.77	0.40	26.88	0.00	26.88	0.00
	2-Story	20.84	0.37	25.31	0.00	25.31	0.00
	3-Story	20.73	0.36	24.99	0.00	24.99	0.00
Total		63.35	1.12	77.18	0.00	77.18	0.00

Precode Avg. OSD Total Energy Use (For total houses in a County)

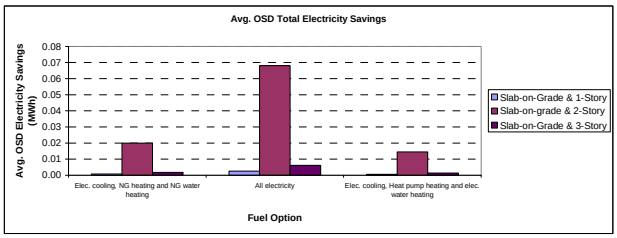
		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	0.01	0.24	0.05	0.00	0.01	0.00	0.07	0.24
	2-Story	0.35	7.79	1.45	0.00	0.31	0.00	2.11	7.79
	3-Story	0.03	0.71	0.13	0.00	0.03	0.00	0.19	0.71
Total		0.40	8.74	1.62	0.00	0.34	0.00	2.37	8.74

Code compliant Avg. OSD Total Energy Use (For total houses in a County)

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	0.01	0.19	0.04	0.00	0.01	0.00	0.06	0.19
	2-Story	0.33	5.87	1.38	0.00	0.29	0.00	2.00	5.87
	3-Story	0.03	0.53	0.13	0.00	0.03	0.00	0.18	0.53
Total		0.37	6.59	1.55	0.00	0.33	0.00	2.25	6.59

Total Energy Savings Due to the Code Adoption

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Savings (kWh)	NG Savings (Therm)	Elec. Savings (kWh)	NG Savings (Therm)	Elec. Savings (kWh)	NG Savings (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	0.00	0.06	0.00	0.00	0.00	0.00	0.00	0.06
	2-Story	0.02	1.92	0.07	0.00	0.01	0.00	0.10	1.92
	3-Story	0.00	0.18	0.01	0.00	0.00	0.00	0.01	0.18
Total		0.02	2.15	0.08	0.00	0.02	0.00	0.12	2.15



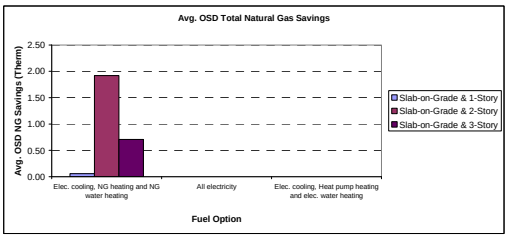


Table 31: Code and Pre-code Average OSD Simulation Results for Gregg County (Multi-Family).

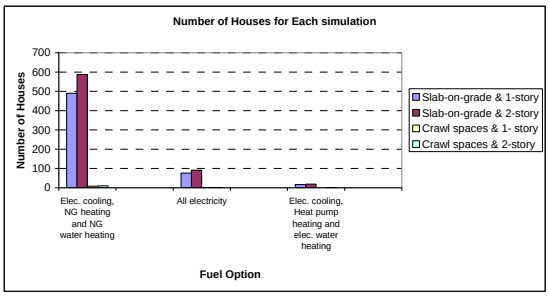
Table 32: Code and Pre-code Simulation Results for Individual Residence for Guadalupe County (Single-Family and Multi-Family).

County	SF or MF	Precode or Code-compliant	Options			Simulation #	Annual Elec. (kWh/yr)	Annual NG (Therms/yr)	Avg. OSD Elec. (kWh/day) (Aug. 19)	Avg. OSD NG (Therm/day) (Aug. 19)	Total Annual (Elec. + NG) (MBtu)	Annual Elec.Savings (kWh/yr)	Annual NG Savings (Therms/yr)	Avg. OSD Elec. Savings (kWh/day) (Aug. 19)	Avg. OSD NG Savings (Therm/day) (Aug. 19)	Total Annual Savings (Elec. + NG) (MBtu)
Guadalupe	SF	Precode	Slab-on-grade	Fuel Option 1	1-story	1	15049	390	65.1786	0.742873	90.33					
					2-story	2	14243	376	61.7573	0.742873	86.24					
				Fuel Option 2	1-story	3	20264	0	73.872	0	69.16					
					2-story	4	19199	0	70.4507	0	65.52					
				Fuel Option 3	1-story	5	19917	0	73.872	0	67.98					
					2-story	6	18941	0	70.4507	0	64.64					
			Crawl Space	Fuel Option 1	1-story	7	15631	379	66.1093	0.742873	91.28					
					2-story	8	15021	365	62.833	0.742873	87.81					
				Fuel Option 2	1-story	9	20668	0	74.8027	0	70.54					
					2-story	10	19799	0	71.5264	0	67.57					
				Fuel Option 3	1-story	11	20378	0	74.8027	0	69.55					
					2-story	12	19585	0	71.5264	0	66.84					
		Code - Compliant	Slab-on-grade	Fuel Option 1	1-story	13	13092	321	55.5648	0.622873	76.77	1,957	69	9.61	0.12	13.56
					2-story	14	12516	314	52.961	0.622873	74.12	1,727	62	8.80	0.12	12.12
				Fuel Option 2	1-story	15	17820	0	64.2583	0	60.82	2,444	0	9.61	0.00	8.34
					2-story	16	17115	0	61.6544	0	58.41	2,084	0	8.80	0.00	7.11
				Fuel Option 3	1-story	17	17684	0	64.2583	0	60.35	2,233	0	9.61	0.00	7.63
					2-story	18	16999	0	61.6544	0	58.02	1,942	0	8.80	0.00	6.62
			Crawl Space	Fuel Option 1	1-story	19	13739	311	56.6056	0.622873	78	1,892	68	9.50	0.12	13.28
					2-story	20	13311	305	54.1269	0.622873	75.93	1,710	60	8.71	0.12	11.88
				Fuel Option 2	1-story	21	18308	0	65.2991	0	62.48	2,360	0	9.50	0.00	8.06
					2-story	22	17763	0	62.8204	0	60.62	2,036	0	8.71	0.00	6.95
				Fuel Option 3	1-story	23	18177	0	65.2991	0	62.04	2,201	0	9.50	0.00	7.51
					2-story	24	17660	0	62.8204	0	60.27	1,925	0	8.71	0.00	6.57
	MF	Precode	Slab-on-grade	Fuel Option 1	1-story	1	6066.5	212	24.3152	0.506555	41.92					
					2-story	2	5996	195.5	22.93265	0.4732375	40.0225					
					3-story	3	6033.833333	190.33333	22.72316667	0.462131667	39.62833333					
				Fuel Option 2	1-story	4	8274	0	29.1311	0	28.24					
					2-story	5	7910.25	0	27.1465	0	26.9975					
					3-story	6	7855	0	26.73633333	0	26.80833333					
				Fuel Option 3	1-story	7	8273.5	0	29.1311	0	28.235					
					2-story	8	7912.25	0	27.1465	0	27.005					
					3-story	9	7855.5	0	26.73633333	0	26.81					
		Code - Compliant	Slab-on-grade	Fuel Option 1	1-story	10	5730	171	22.8377	0.386557	36.635	337	41	1.48	0.12	5.29
					2-story	11	5711.25	154	21.7828	0.3532375	34.8825	285	42	1.15	0.12	5.14
					3-story	12	5750.833333	148.33333	21.61416667	0.342131667	34.45833333	283	42	1.11	0.12	5.17
				Fuel Option 2	1-story	13	7976.5	0	27.6536	0	27.225	298	0	1.48	0.00	1.02
					2-story	14	7657.75	0	25.99675	0	26.135	253	0	1.15	0.00	0.86
					3-story	15	7599.333333	0	25.6275	0	25.93666667	256	0	1.11	0.00	0.87
				Fuel Option 3	1-story	16	7973	0	27.6536	0	27.21	301	0	1.48	0.00	1.03
					2-story	17	7659.75	0	25.99675	0	26.1425	253	0	1.15	0.00	0.86
					3-story	18	7599.333333	0	25.6275	0	25.93666667	256	0	1.11	0.00	0.87

Prototype of the simulation result for one county

County Name	Guadalupe
Division (East or West Texas)	West Texas
Number of new building permits for SFD	1,303

		Fuel Option			Total
		1	2	3	
		Elec. cooling, NG heating and NG water heating	All electricity	Elec. cooling, Heat pump heating and elec. water heating	
		84.1%	13.1%	2.8%	
Slab-on-grade (98.3%)	1-Story (45.5%)	37.61%	5.86%	1.25%	44.73%
	2-Story (54.5%)	45.06%	7.02%	1.50%	53.57%
Crawl spaces (1.7%)	1-Story (45.5%)	0.65%	0.10%	0.02%	0.77%
	2-Story (54.5%)	0.78%	0.12%	0.03%	0.93%
Total		84.10%	13.10%	2.80%	100.00%



Number of Houses for each simulation

		Fuel Option			Total
		1	2	3	
		Elec. cooling, NG heating and NG water heating	All electricity	Elec. cooling, Heat pump heating and elec. water heating	
		84.1%	13.1%	2.8%	
Slab-on-grade (98.3%)	1-Story (45.5%)	490	76	16	583
	2-Story (54.5%)	587	91	20	698
Crawl spaces (1.7%)	1-Story (45.5%)	8	1	0	10
	2-Story (54.5%)	10	2	0	12
Total		1,096	171	36	1,303

Precode Energy Use for each option (per house)

		Fuel Option						
		1		2		3		
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating		
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	
Slab-on-grade	1-Story	15,049	390	20,264	0	19,917	0	
	2-Story	14,243	376	19,199	0	18,941	0	
Crawl spaces	1-Story	15,631	379	20,668	0	20,378	0	
	2-Story	15,021	365	19,799	0	19,585	0	
Total		59,944	1,510	79,930	0	78,821	0	

Code compliant Energy Use for each option (per house)

		Fuel Option						
		1		2		3		
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating		
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	
Slab-on-grade	1-Story	13,092	321	17,820	0	17,684	0	
	2-Story	12,516	314	17,115	0	16,999	0	
Crawl spaces	1-Story	13,739	311	18,308	0	18,177	0	
	2-Story	13,311	305	17,763	0	17,660	0	
Total		52,658	1,251	71,006	0	70,520	0	

Precode Total Energy Use (For total houses in a County)

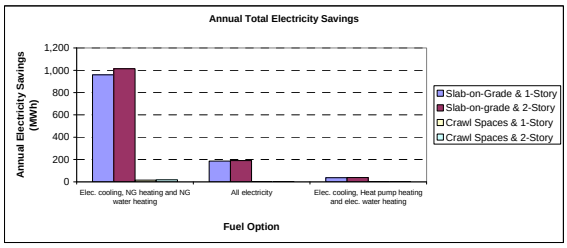
		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	7,378	191,148	1,547	0	325	0	9,248	191,148
	2-Story	8,362	220,739	1,758	0	370	0	10,488	220,739
Crawl spaces	1-Story	132	3,212	27	0	6	0	166	3,212
	2-Story	153	3,706	31	0	7	0	190	3,706
Total		16,023	418,805	3,361	0	708	0	20,091	418,805

Code compliant Total Energy Use (For total houses in a County)

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	6,417	157,330	1,360	0	289	0	8,066	157,330
	2-Story	7,348	184,340	1,563	0	332	0	9,243	184,340
Crawl spaces	1-Story	116	2,636	24	0	5	0	146	2,636
	2-Story	135	3,097	28	0	6	0	169	3,097
Total		14,016	347,402	2,978	0	632	0	17,626	347,402

Total Energy Savings Due to the Code Adoption

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)
Slab-on-grade	1-Story	959	33,819	187	0	36	0	1,182	33,819
	2-Story	1,014	36,398	191	0	38	0	1,242	36,398
Crawl spaces	1-Story	16	576	3	0	1	0	20	576
	2-Story	17	609	3	0	1	0	21	609
Total		2,006	71,402	383	0	76	0	2,466	71,402



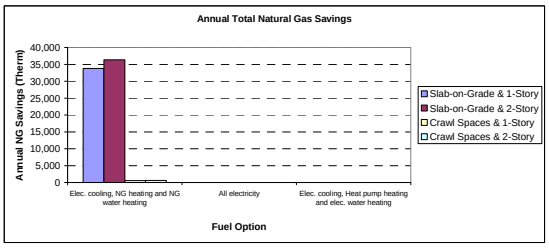


Table 33: Code and Pre-code Annual Simulation Results for Guadalupe County (Single-Family).

Precode Avg. OSD Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	65.18	0.74	73.87	0.00	73.87	0.00
	2-Story	61.76	0.74	70.45	0.00	70.45	0.00
Crawl spaces	1-Story	66.11	0.74	74.80	0.00	74.80	0.00
	2-Story	62.83	0.74	71.53	0.00	71.53	0.00
Total		255.88	2.97	290.65	0.00	290.65	0.00

Code compliant Avg. OSD Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	55.56	0.62	64.26	0.00	64.26	0.00
	2-Story	52.96	0.62	61.65	0.00	61.65	0.00
Crawl spaces	1-Story	56.61	0.62	65.30	0.00	65.30	0.00
	2-Story	54.13	0.62	62.82	0.00	62.82	0.00
Total		219.26	2.49	254.03	0.00	254.03	0.00

Precode Avg. OSD Total Energy Use (For total houses in a County)

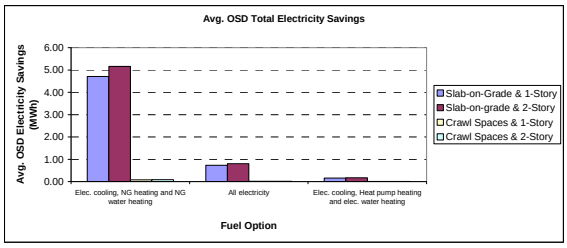
		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	31.95	364.10	5.64	0.00	1.21	0.00	38.79	364.10
	2-Story	36.26	436.12	6.44	0.00	1.38	0.00	44.08	436.12
Crawl spaces	1-Story	0.56	6.30	0.10	0.00	0.02	0.00	0.68	6.30
	2-Story	0.64	7.54	0.11	0.00	0.02	0.00	0.78	7.54
Total		69.40	814.06	12.29	0.00	2.63	0.00	84.32	814.06

Code compliant Avg. OSD Total Energy Use (For total houses in a County)

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	27.23	305.28	4.91	0.00	1.05	0.00	33.19	305.28
	2-Story	31.09	365.67	5.64	0.00	1.21	0.00	37.93	365.67
Crawl spaces	1-Story	0.48	5.28	0.09	0.00	0.02	0.00	0.58	5.28
	2-Story	0.55	6.32	0.10	0.00	0.02	0.00	0.67	6.32
Total		59.35	682.56	10.73	0.00	2.29	0.00	72.38	682.56

Avg. OSD Total Energy Savings Due to the Code Adoption

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)
Slab-on-grade	1-Story	4.71	58.81	0.73	0.00	0.16	0.00	5.60	58.81
	2-Story	5.16	70.45	0.80	0.00	0.17	0.00	6.14	70.45
Crawl spaces	1-Story	0.08	1.02	0.01	0.00	0.00	0.00	0.10	1.02
	2-Story	0.09	1.22	0.01	0.00	0.00	0.00	0.11	1.22
Total		10.04	131.50	1.56	0.00	0.33	0.00	11.94	131.50



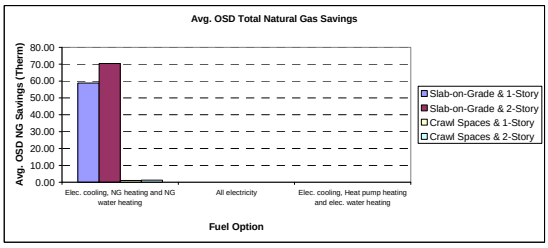
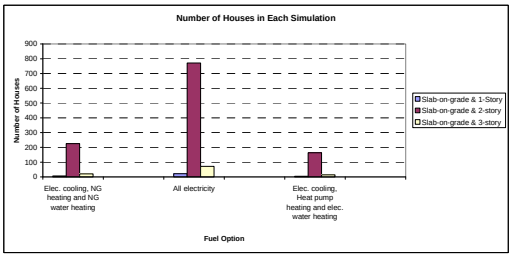


Table 34: Code and Pre-code Average OSD Simulation Results for Guadalupe County (Single-Family).

The simulation result for one county

County Name	Guadalupe
NAHB Division	West South Central
Number of new building permits for MF	1,303

		Fuel Option			Total
		1	2	3	
		Elec. cooling, NG heating and NG water heating	All electricity	Elec. cooling, Heat pump heating and elec. water heating	
		19.5%	66.4%	14.1%	
Slab-on-grade (100%)	1-Story (2.6%)	0.51%	1.73%	0.37%	2.60%
	2-Story (89.1%)	17.37%	59.16%	12.56%	89.10%
	3-Story (8.3%)	1.62%	5.51%	1.17%	8.30%
Total		19.50%	66.40%	14.10%	100.00%



Number of Houses for each simulation

		Fuel Option			Total
		1	2	3	
		Elec. cooling, NG heating and NG water heating	All electricity	Elec. cooling, Heat pump heating and elec. water heating	
		19.5%	66.4%	14.1%	
Slab-on-grade (100%)	1-Story (2.6%)	7	22	5	34
	2-Story (89.1%)	226	771	164	1,161
	3-Story (8.3%)	21	72	15	108
Total		254	865	184	1,303

Precode Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	6,067	212	8,274	0	8,274	0
	2-Story	5,996	196	7,910	0	7,912	0
	3-Story	6,034	190	7,858	0	7,856	0
Total		18,096	598	24,039	0	24,041	0

Code compliant Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	5,730	171	7,972	0	7,972	0
	2-Story	5,711	154	7,658	0	7,660	0
	3-Story	5,751	148	7,599	0	7,599	0
Total		17,192	473	23,234	0	23,232	0

Precode Total Energy Use (For total houses in a County)

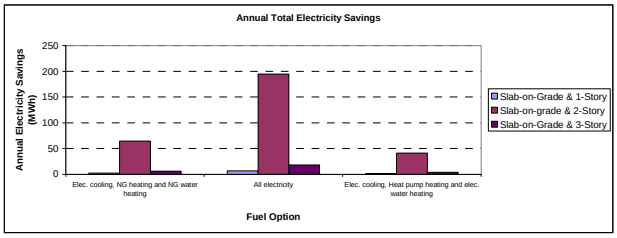
		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	40	1,401	186	0	40	0	266	1,401
	2-Story	1,357	44,259	6,098	0	1,295	0	8,751	44,259
	3-Story	127	4,014	564	0	120	0	811	4,014
Total		1,525	49,674	6,848	0	1,455	0	9,827	49,674

Code compliant Total Energy Use (For total houses in a County)

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	38	1,130	179	0	38	0	255	1,130
	2-Story	1,293	34,864	5,903	0	1,254	0	8,450	34,864
	3-Story	121	3,128	546	0	116	0	783	3,128
Total		1,452	39,122	6,628	0	1,408	0	9,488	39,122

Total Energy Savings Due to the Code Adoption

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	2	271	7	0	1	0	10	271
	2-Story	64	9,395	195	0	41	0	300	9,395
	3-Story	6	886	18	0	4	0	28	886
Total		73	10,552	220	0	47	0	339	10,552



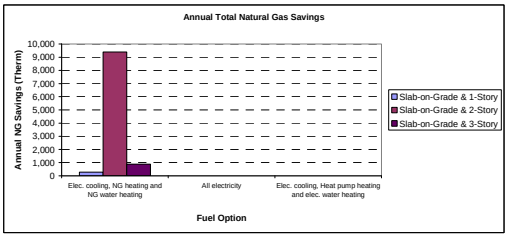


Table 35: Code and Pre-code Annual Simulation Results for Guadalupe County (Multi-Family).

Precode Avg. OSD Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	24.32	0.51	29.13	0.00	29.13	0.00
	2-Story	22.93	0.47	27.15	0.00	27.15	0.00
	3-Story	22.72	0.46	26.74	0.00	26.74	0.00
Total		69.97	1.44	83.01	0.00	83.01	0.00

Code compliant Avg. OSD Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	22.84	0.39	27.65	0.00	27.65	0.00
	2-Story	21.78	0.35	26.00	0.00	26.00	0.00
	3-Story	21.61	0.34	25.63	0.00	25.63	0.00
Total		66.23	1.08	79.28	0.00	79.28	0.00

Precode Avg. OSD Total Energy Use (For total houses in a County)

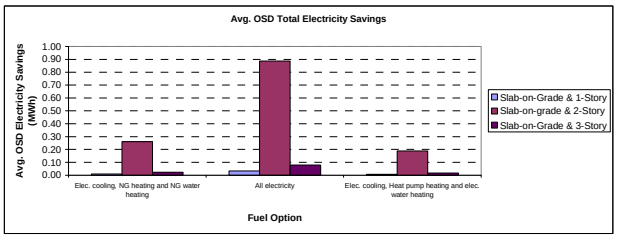
		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	0.16	3.35	0.66	0.00	0.14	0.00	0.96	3.35
	2-Story	5.19	107.14	20.93	0.00	4.44	0.00	30.56	107.14
	3-Story	0.48	9.75	1.92	0.00	0.41	0.00	2.81	9.75
Total		5.83	120.23	23.50	0.00	4.99	0.00	34.32	120.23

Code compliant Avg. OSD Total Energy Use (For total houses in a County)

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	0.15	2.55	0.62	0.00	0.13	0.00	0.91	2.55
	2-Story	4.93	79.97	20.04	0.00	4.26	0.00	29.23	79.97
	3-Story	0.46	7.22	1.84	0.00	0.39	0.00	2.69	7.22
Total		5.54	89.74	22.50	0.00	4.78	0.00	32.82	89.74

Total Energy Savings Due to the Code Adoption

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Savings (kWh)	NG Savings (Therm)	Elec. Savings (kWh)	NG Savings (Therm)	Elec. Savings (kWh)	NG Savings (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	0.01	0.79	0.03	0.00	0.01	0.00	0.05	0.79
	2-Story	0.26	27.17	0.89	0.00	0.19	0.00	1.33	27.17
	3-Story	0.02	2.53	0.08	0.00	0.02	0.00	0.12	2.53
Total		0.29	30.49	1.00	0.00	0.21	0.00	1.50	30.49



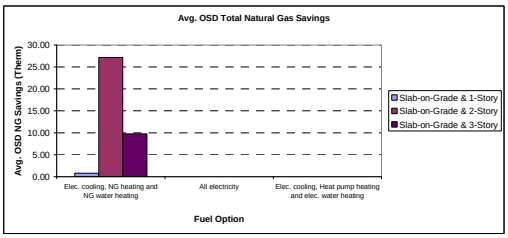


Table 36: Code and Pre-code Average OSD Simulation Results for Guadalupe County (Multi-Family).

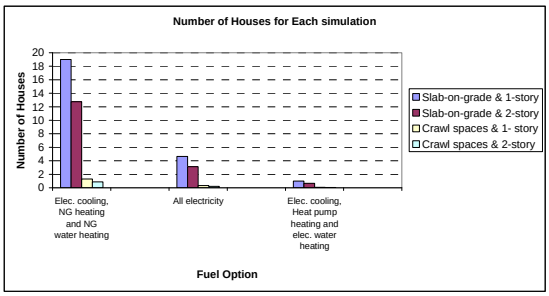
County	SF or MF	Precode or Code-compliant	Options			Simulation #	Annual Elec. (kWh/yr)	Annual NG (Therms/yr)	Avg. OSD Elec. (kWh/day) (Aug. 19)	Avg. OSD NG (Therm/day) (Aug. 19)	Total Annual (Elec. + NG) (MBtu)	Annual Elec.Savings (kWh/yr)	Annual NG Savings (Therms/yr)	Avg. OSD Elec. Savings (kWh/day) (Aug. 19)	Avg. OSD NG Savings (Therm/day) (Aug. 19)	Total Annual Savings (Elec. + NG) (MBtu)
Harrison	SF	Precode	Slab-on-grade	Fuel Option 1	1-story	1	12786	481	55.8929	0.772833	91.69					
					2-story	2	12019	471	52.0764	0.772833	88.08					
				Fuel Option 2	1-story	3	19609	0	65.1161	0	66.92					
					2-story	4	18636	0	61.2996	0	63.6					
				Fuel Option 3	1-story	5	18964	0	65.1161	0	64.72					
					2-story	6	18060	0	61.2996	0	61.64					
			Crawl Space	Fuel Option 1	1-story	7	13509	446	57.8148	0.772833	90.66					
					2-story	8	12932	427	54.4658	0.772833	86.81					
				Fuel Option 2	1-story	9	19685	0	67.038		67.19					
					2-story	10	18747	0	63.6891	0	63.98					
				Fuel Option 3	1-story	11	19243	0	67.038	0	65.68					
					2-story	12	18421	0	63.6891	0	62.87					
		Code - Compliant	Slab-on-grade	Fuel Option 1	1-story	13	11340	411	48.0529	0.652833	79.76	1,446	70	7.84	0.12	11.93
					2-story	14	10790	411	44.9931	0.652833	77.88	1,229	60	7.08	0.12	10.20
				Fuel Option 2	1-story	15	17613	0	57.2761	0	60.11	1,996	0	7.84	0.00	6.81
					2-story	16	17045	0	54.2163	0	58.17	1,591	0	7.08	0.00	5.43
				Fuel Option 3	1-story	17	17211	0	57.2761	0	58.74	1,753	0	7.84	0.00	5.98
					2-story	18	16674	0	54.2163	0	56.91	1,386	0	7.08	0.00	4.73
			Crawl Space	Fuel Option 1	1-story	19	12122	368	50.2106	0.652833	78.21	1,387	78	7.60	0.12	12.45
					2-story	20	11726	358	47.651	0.652833	75.79	1,206	69	6.81	0.12	11.02
				Fuel Option 2	1-story	21	17643	0	59.4337	0	60.22	2,042	0	7.60	0.00	6.97
					2-story	22	17046	0	56.8742	0	58.18	1,701	0	6.81	0.00	5.80
				Fuel Option 3	1-story	23	17465	0	59.4337	0	59.61	1,778	0	7.60	0.00	6.07
					2-story	24	16920	0	56.8742	0	57.75	1,501	0	6.81	0.00	5.12
	MF	Precode	Slab-on-grade	Fuel Option 1	1-story	1	5788	239	23.40135	0.522435	43.63					
					2-story	2	5722	213.25	22.0921	0.4871325	40.865					
					3-story	3	5771.333333	205.33333	21.9385	0.475365	40.23833333					
				Fuel Option 2	1-story	4	8444.5	0	28.51075	0	28.82					
					2-story	5	7934	0	26.56275	0	27.0775					
					3-story	6	7846.833333	0	26.19633333	0	26.78					
				Fuel Option 3	1-story	7	8406	0	28.51075	0	28.69					
					2-story	8	7934	0	26.56275	0	27.0775					
					3-story	9	7846.5	0	26.19633333	0	26.78					
		Code - Compliant	Slab-on-grade	Fuel Option 1	1-story	10	5469.5	194	21.7698	0.4024375	38.09	319	45	1.63	0.12	5.54
					2-story	11	5476.75	168.25	20.84205	0.3671325	35.515	245	45	1.25	0.12	5.35
					3-story	12	5533.333333	160.16667	20.73316667	0.355365	34.89833333	238	45	1.21	0.12	5.34
				Fuel Option 2	1-story	13	8105	0	26.87915	0	27.665	340	0	1.63	0.00	1.16
					2-story	14	7661.5	0	25.31275	0	26.1475	273	0	1.25	0.00	0.93
					3-story	15	7581.166667	0	24.991	0	25.875	266	0	1.21	0.00	0.91
				Fuel Option 3	1-story	16	8084.5	0	26.87915	0	27.595	322	0	1.63	0.00	1.10
					2-story	17	7673.25	0	25.31275	0	26.19	261	0	1.25	0.00	0.89
					3-story	18	7590.833333	0	24.991	0	25.90833333	256	0	1.21	0.00	0.87

Table 37: Code and Pre-code Simulation Results for Individual Residence for Harrison County (Single-Family and Multi-Family).

Prototype of the simulation result for one county

County Name	Harrison
Division (East or West Texas)	East Texas
Number of new building permits for SFD	44

		Fuel Option 1: Elec. cooling, NG heating and NG water heating	Fuel Option 2: All electricity	Fuel Option 3: Elec. cooling, Heat pump heating and elec. water heating	Total
		77.1%	18.9%	4.0%	
Slab-on-grade (93.6%)	1-Story (59.8%)	43.16%	10.58%	2.24%	55.97%
	2-Story (40.2%)	29.01%	7.11%	1.51%	37.63%
Crawl spaces (6.4%)	1-Story (59.8%)	2.95%	0.72%	0.15%	3.83%
	2-Story (39.2%)	1.98%	0.49%	0.10%	2.57%
Total		77.10%	18.90%	4.00%	100.00%



Number of Houses for each simulation

		Fuel Option 1: Elec. cooling, NG heating and NG water heating	Fuel Option 2: All electricity	Fuel Option 3: Elec. cooling, Heat pump heating and elec. water heating	Total
		77.1%	18.9%	4.0%	
Slab-on-grade (93.6%)	1-Story (59.8%)	19	5	1	25
	2-Story (40.2%)	13	3	1	17
Crawl spaces (6.4%)	1-Story (59.8%)	1	0	0	2
	2-Story (39.2%)	1	0	0	1
Total		34	8	2	44

Precode Energy Use for each option (per house)

		Fuel Option 1: Elec. cooling, NG heating and NG water heating		Fuel Option 2: All electricity		Fuel Option 3: Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	12,788	481	19,609	0	18,964	0
	2-Story	12,019	471	18,636	0	18,060	0
Crawl spaces	1-Story	13,509	446	19,685	0	19,243	0
	2-Story	12,932	427	18,747	0	18,421	0
Total		51,248	1,825	76,677	0	74,688	0

Code compliant Energy Use for each option (per house)

		Fuel Option 1: Elec. cooling, NG heating and NG water heating		Fuel Option 2: All electricity		Fuel Option 3: Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	11,340	411	17,613	0	17,211	0
	2-Story	10,790	411	17,045	0	16,674	0
Crawl spaces	1-Story	12,122	368	17,643	0	17,465	0
	2-Story	11,726	358	17,046	0	16,920	0
Total		45,978	1,548	69,347	0	68,270	0

Precode Total Energy Use (For total houses in a County)

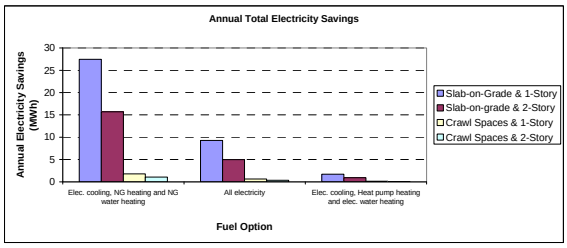
		Fuel Option 1: Elec. cooling, NG heating and NG water heating		Fuel Option 2: All electricity		Fuel Option 3: Elec. cooling, Heat pump heating and elec. water heating		Total	
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	243	9,133	91	0	19	0	353	9,133
	2-Story	153	6,012	58	0	12	0	224	6,012
Crawl spaces	1-Story	18	579	6	0	1	0	25	579
	2-Story	11	373	4	0	1	0	16	373
Total		425	16,097	160	0	33	0	618	16,097

Code compliant Total Energy Use (For total houses in a County)

		Fuel Option 1: Elec. cooling, NG heating and NG water heating		Fuel Option 2: All electricity		Fuel Option 3: Elec. cooling, Heat pump heating and elec. water heating		Total	
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	215	7,804	82	0	17	0	314	7,804
	2-Story	138	5,246	53	0	11	0	202	5,246
Crawl spaces	1-Story	16	478	6	0	1	0	23	478
	2-Story	10	312	4	0	1	0	15	312
Total		379	13,841	145	0	30	0	554	13,841

Total Energy Savings Due to the Code Adoption

		Fuel Option 1: Elec. cooling, NG heating and NG water heating		Fuel Option 2: All electricity		Fuel Option 3: Elec. cooling, Heat pump heating and elec. water heating		Total	
		Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)
Slab-on-grade	1-Story	27	1,329	9	0	2	0	38	1,329
	2-Story	16	766	5	0	1	0	22	766
Crawl spaces	1-Story	2	101	1	0	0	0	3	101
	2-Story	1	60	0	0	0	0	1	60
Total		46	2,257	15	0	3	0	64	2,257



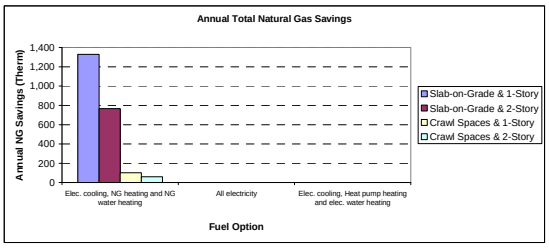


Table 38: Code and Pre-code Annual Simulation Results for Harrison County (Single-Family).

Precode Avg. OSD Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	55.89	0.77	65.12	0.00	65.12	0.00
	2-Story	52.08	0.77	61.30	0.00	61.30	0.00
Crawl spaces	1-Story	57.81	0.77	67.04	0.00	67.04	0.00
	2-Story	54.47	0.77	63.69	0.00	63.69	0.00
Total		220.25	3.09	257.14	0.00	257.14	0.00

Code compliant Avg. OSD Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	48.05	0.65	57.28	0.00	57.28	0.00
	2-Story	44.99	0.65	54.22	0.00	54.22	0.00
Crawl spaces	1-Story	50.21	0.65	59.43	0.00	59.43	0.00
	2-Story	47.65	0.65	56.87	0.00	56.87	0.00
Total		190.91	2.61	227.80	0.00	227.80	0.00

Precode Avg. OSD Total Energy Use (For total houses in a County)

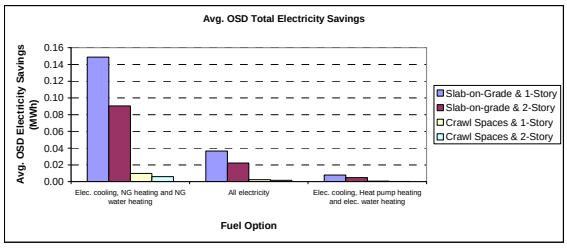
		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	1.08	14.67	0.30	0.00	0.06	0.00	1.43	14.67
	2-Story	0.66	9.86	0.19	0.00	0.04	0.00	0.90	9.86
Crawl spaces	1-Story	0.08	1.00	0.02	0.00	0.00	0.00	0.10	1.00
	2-Story	0.05	0.67	0.01	0.00	0.00	0.00	0.06	0.67
Total		1.85	26.22	0.53	0.00	0.11	0.00	2.49	26.22

Code compliant Avg. OSD Total Energy Use (For total houses in a County)

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	0.91	12.40	0.27	0.00	0.06	0.00	1.24	12.40
	2-Story	0.57	8.33	0.17	0.00	0.04	0.00	0.78	8.33
Crawl spaces	1-Story	0.07	0.85	0.02	0.00	0.00	0.00	0.09	0.85
	2-Story	0.04	0.57	0.01	0.00	0.00	0.00	0.06	0.57
Total		1.59	22.15	0.47	0.00	0.10	0.00	2.16	22.15

Avg. OSD Total Energy Savings Due to the Code Adoption

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)
Slab-on-grade	1-Story	0.15	2.28	0.04	0.00	0.01	0.00	0.19	2.28
	2-Story	0.09	1.53	0.02	0.00	0.00	0.00	0.12	1.53
Crawl spaces	1-Story	0.01	0.16	0.00	0.00	0.00	0.00	0.01	0.16
	2-Story	0.01	0.10	0.00	0.00	0.00	0.00	0.01	0.10
Total		0.26	4.07	0.06	0.00	0.01	0.00	0.33	4.07



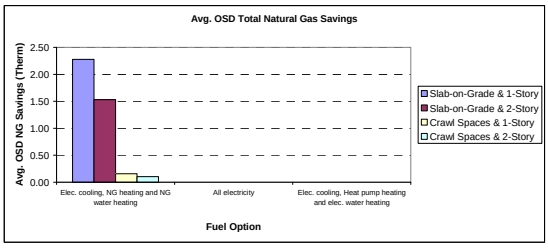
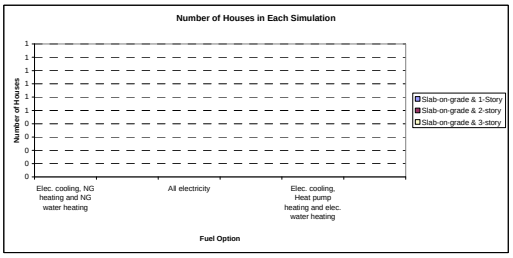


Table 39: Code and Pre-code Average OSD Simulation Results for Harrison County (Single-Family).

The simulation result for one county

County Name	Harrison
NAHB Division	West South Central
Number of new building permits for MF	0

		Fuel Option			Total
		1	2	3	
		Elec. cooling, NG heating and NG water heating	All electricity	Elec. cooling, Heat pump heating and elec. water heating	
		19.5%	66.4%	14.1%	
Slab-on-grade (100%)	1-Story (2.6%)	0.51%	1.73%	0.37%	2.60%
	2-Story (89.1%)	17.37%	59.16%	12.56%	89.10%
	3-Story (8.3%)	1.62%	5.51%	1.17%	8.30%
Total		19.50%	66.40%	14.10%	100.00%



Number of Houses for each simulation

		Fuel Option			Total
		1	2	3	
		Elec. cooling, NG heating and NG water heating	All electricity	Elec. cooling, Heat pump heating and elec. water heating	
		19.5%	66.4%	14.1%	
Slab-on-grade (100%)	1-Story (2.6%)	0	0	0	0
	2-Story (89.1%)	0	0	0	0
	3-Story (8.3%)	0	0	0	0
Total		0	0	0	0

Precode Energy Use for each option (per house)

		Fuel Option						
		1		2		3		
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating		
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	
Slab-on-grade	1-Story	5,788	239	8,445	0	8,406	0	
	2-Story	5,722	213	7,934	0	7,934	0	
	3-Story	5,771	205	7,847	0	7,847	0	
Total		17,281	658	24,225	0	24,187	0	

Code compliant Energy Use for each option (per house)

		Fuel Option						
		1		2		3		
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating		
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	
Slab-on-grade	1-Story	5,470	194	8,105	0	8,065	0	
	2-Story	5,477	168	7,662	0	7,673	0	
	3-Story	5,533	160	7,581	0	7,591	0	
Total		16,480	522	23,348	0	23,349	0	

Precode Total Energy Use (For total houses in a County)

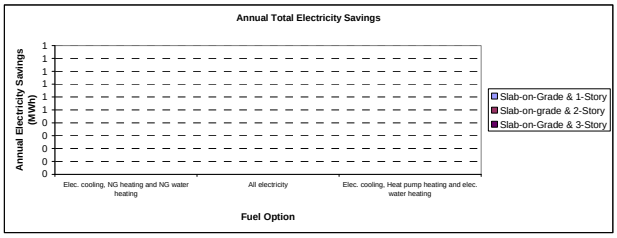
		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	0	0	0	0	0	0	0	0
	2-Story	0	0	0	0	0	0	0	0
	3-Story	0	0	0	0	0	0	0	0
Total		0	0	0	0	0	0	0	0

Code compliant Total Energy Use (For total houses in a County)

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	0	0	0	0	0	0	0	0
	2-Story	0	0	0	0	0	0	0	0
	3-Story	0	0	0	0	0	0	0	0
Total		0	0	0	0	0	0	0	0

Total Energy Savings Due to the Code Adoption

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	0	0	0	0	0	0	0	0
	2-Story	0	0	0	0	0	0	0	0
	3-Story	0	0	0	0	0	0	0	0
Total		0	0	0	0	0	0	0	0



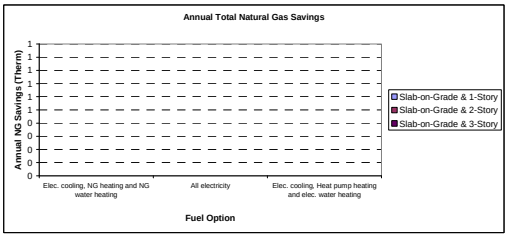


Table 40: Code and Pre-code Annual Simulation Results for Harrison County (Multi-Family).

Precode Avg. OSD Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	23.40	0.52	28.51	0.00	28.51	0.00
	2-Story	22.09	0.49	26.56	0.00	26.56	0.00
	3-Story	21.94	0.48	26.20	0.00	26.20	0.00
Total		67.43	1.49	81.27	0.00	81.27	0.00

Code compliant Avg. OSD Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	21.77	0.40	26.88	0.00	26.88	0.00
	2-Story	20.84	0.37	25.31	0.00	25.31	0.00
	3-Story	20.73	0.36	24.99	0.00	24.99	0.00
Total		63.35	1.12	77.18	0.00	77.18	0.00

Precode Avg. OSD Total Energy Use (For total houses in a County)

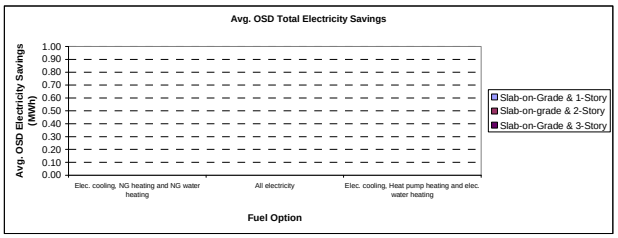
		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	2-Story	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3-Story	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Code compliant Avg. OSD Total Energy Use (For total houses in a County)

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	2-Story	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3-Story	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Total Energy Savings Due to the Code Adoption

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Savings (kWh)	NG Savings (Therm)	Elec. Savings (kWh)	NG Savings (Therm)	Elec. Savings (kWh)	NG Savings (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	2-Story	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3-Story	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00



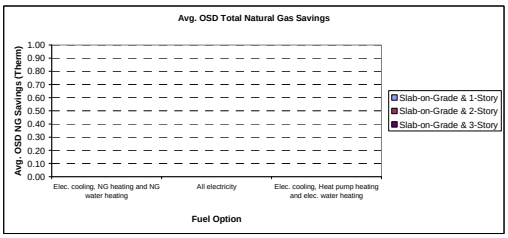


Table 41: Code and Pre-code Average OSD Simulation Results for Harrison County (Multi-Family).

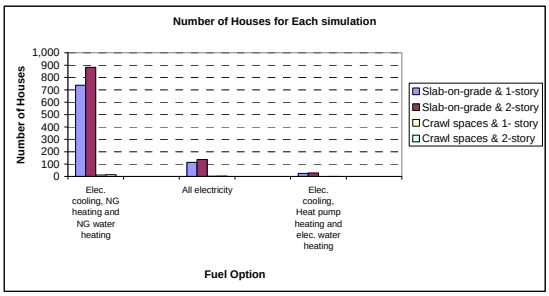
County	SF or MF	Precode or Code-compliant	Options			Simulation #	Annual Elec. (kWh/yr)	Annual NG (Therms/yr)	Avg. OSD Elec. (kWh/day) (Aug. 19)	Avg. OSD NG (Therm/day) (Aug. 19)	Total Annual (Elec. + NG) (MBtu)	Annual Elec.Savings (kWh/yr)	Annual NG Savings (Therms/yr)	Avg. OSD Elec. Savings (kWh/day) (Aug. 19)	Avg. OSD NG Savings (Therm/day) (Aug. 19)	Total Annual Savings (Elec. + NG) (MBtu)
Hays	SF	Precode	Slab-on-grade	Fuel Option 1	1-story	1	16129	366	70.1393	0.730761	91.64					
					2-story	2	15203	354	66.2925	0.730761	87.32					
				Fuel Option 2	1-story	3	20912	0	78.6331	0	71.37					
					2-story	4	19771	0	74.7863	0	67.48					
				Fuel Option 3	1-story	5	20671	0	78.6331	0	70.55					
					2-story	6	19602	0	74.7863	0	66.9					
			Crawl Space	Fuel Option 1	1-story	7	16673	356	70.6949	0.730761	92.51					
					2-story	8	15961	345	66.8863	0.730761	88.99					
				Fuel Option 2	1-story	9	21287	0	79.1886	0	72.65					
					2-story	10	20374	0	75.3801	0	69.53					
				Fuel Option 3	1-story	11	21093	0	79.1886	0	71.99					
					2-story	12	20241	0	75.3801	0	69.08					
		Code - Compliant	Slab-on-grade	Fuel Option 1	1-story	13	13750	295	58.3121	0.610761	76.41	2,379	71	11.83	0.12	15.23
					2-story	14	13171	294	56.2655	0.610761	74.38	2,032	60	10.03	0.12	12.94
				Fuel Option 2	1-story	15	18022	0	66.806	0	61.51	2,890	0	11.83	0.00	9.86
					2-story	16	17434	0	64.7594	0	59.5	2,337	0	10.03	0.00	7.98
				Fuel Option 3	1-story	17	17955	0	66.806	0	61.28	2,716	0	11.83	0.00	9.27
					2-story	18	17374	0	64.7594	0	59.3	2,228	0	10.03	0.00	7.60
			Crawl Space	Fuel Option 1	1-story	19	14420	287	58.8901	0.610761	77.89	2,253	69	11.80	0.12	14.62
					2-story	20	14011	286	56.8756	0.610761	76.37	1,950	59	10.01	0.12	12.62
				Fuel Option 2	1-story	21	18560	0	67.3838	0	63.35	2,727	0	11.80	0.00	9.30
					2-story	22	18130	0	65.3693	0	61.88	2,244	0	10.01	0.00	7.65
				Fuel Option 3	1-story	23	18519	0	67.3838	0	63.21	2,574	0	11.80	0.00	8.78
					2-story	24	18089	0	65.3693	0	61.74	2,152	0	10.01	0.00	7.34
	MF	Precode	Slab-on-grade	Fuel Option 1	1-story	1	6366	208.5	25.77575	0.500135	42.565					
					2-story	2	6220.5	192.75	23.91965	0.46762	40.4975					
					3-story	3	6247.333333	187.66667	23.604	0.456781667	40.085					
				Fuel Option 2	1-story	4	8510.5	0	30.481	0	29.045					
					2-story	5	8086.75	0	28.03675	0	27.6					
					3-story	6	8023.833333	0	27.52516667	0	27.385					
				Fuel Option 3	1-story	7	8509	0	30.481	0	29.04					
					2-story	8	8086.25	0	28.03675	0	27.5975					
					3-story	9	8024.166667	0	27.52516667	0	27.38666667					
		Code - Compliant	Slab-on-grade	Fuel Option 1	1-story	10	5969.5	166	24.0956	0.3801365	36.965	397	43	1.68	0.12	5.60
					2-story	11	5894	149.75	22.6385	0.34762	35.0975	327	43	1.28	0.12	5.40
					3-story	12	5926	144.66667	22.36966667	0.336781667	34.69666667	321	43	1.23	0.12	5.39
				Fuel Option 2	1-story	13	8134	0	28.80095	0	27.76	377	0	1.68	0.00	1.29
					2-story	14	7774.25	0	26.75575	0	26.5325	313	0	1.28	0.00	1.07
					3-story	15	7715.5	0	26.29083333	0	26.33333333	308	0	1.23	0.00	1.05
				Fuel Option 3	1-story	16	8135.5	0	28.80095	0	27.765	374	0	1.68	0.00	1.28
					2-story	17	7777.5	0	26.75575	0	26.545	309	0	1.28	0.00	1.05
					3-story	18	7717.833333	0	26.29083333	0	26.34	306	0	1.23	0.00	1.05

Table 42: Code and Pre-code Simulation Results for Individual Residence for Hays County (Single-Family and Multi-Family).

Prototype of the simulation result for one county

County Name	Hays
Division (East or West Texas)	West Texas
Number of new building permits for SFD	1,960

		Fuel Option			Total
		1	2	3	
		Elec. cooling, NG heating and NG water heating	All electricity	Elec. cooling, Heat pump heating and elec. water heating	
		84.1%	13.1%	2.8%	
Slab-on-grade (98.3%)	1-Story (45.5%)	37.61%	5.86%	1.25%	44.73%
	2-Story (54.5%)	45.06%	7.02%	1.50%	53.57%
Crawl spaces (1.7%)	1-Story (45.5%)	0.65%	0.10%	0.02%	0.77%
	2-Story (54.5%)	0.78%	0.12%	0.03%	0.93%
Total		84.10%	13.10%	2.80%	100.00%



Number of Houses for each simulation

		Fuel Option			Total
		1	2	3	
		Elec. cooling, NG heating and NG water heating	All electricity	Elec. cooling, Heat pump heating and elec. water heating	
		84.1%	13.1%	2.8%	
Slab-on-grade (98.3%)	1-Story (45.5%)	737	115	25	877
	2-Story (54.5%)	883	138	29	1,050
Crawl spaces (1.7%)	1-Story (45.5%)	13	2	0	15
	2-Story (54.5%)	15	2	1	18
Total		1,648	257	55	1,960

Precode Energy Use for each option (per house)

		Fuel Option						
		1		2		3		
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating		
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	
Slab-on-grade	1-Story	16,129	366	20,912	0	20,671	0	
	2-Story	15,203	354	19,771	0	19,602	0	
Crawl spaces	1-Story	16,673	356	21,287	0	21,093	0	
	2-Story	15,961	345	20,374	0	20,241	0	
Total		63,966	1,421	82,344	0	81,607	0	

Code compliant Energy Use for each option (per house)

		Fuel Option						
		1		2		3		
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating		
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	
Slab-on-grade	1-Story	13,750	295	18,022	0	17,955	0	
	2-Story	13,171	294	17,434	0	17,374	0	
Crawl spaces	1-Story	14,420	287	18,560	0	18,519	0	
	2-Story	14,011	286	18,130	0	18,089	0	
Total		55,352	1,162	72,146	0	71,937	0	

Precode Total Energy Use (For total houses in a County)

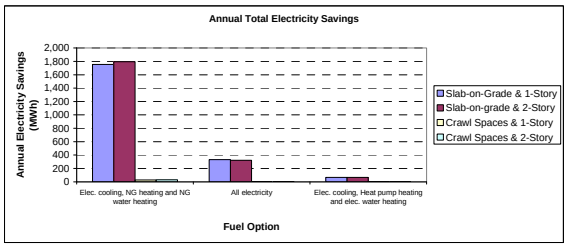
		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	11,891	269,835	2,402	0	507	0	14,800	269,835
	2-Story	13,428	312,612	2,720	0	576	0	16,721	312,612
Crawl spaces	1-Story	213	4,539	43	0	9	0	264	4,539
	2-Story	244	5,269	48	0	10	0	303	5,269
Total		25,773	592,255	5,212	0	1,103	0	32,088	592,255

Code compliant Total Energy Use (For total houses in a County)

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	10,137	217,490	2,070	0	441	0	12,648	217,490
	2-Story	11,631	259,627	2,398	0	511	0	14,540	259,627
Crawl spaces	1-Story	184	3,659	37	0	8	0	229	3,659
	2-Story	214	4,368	43	0	9	0	266	4,368
Total		22,166	485,144	4,548	0	969	0	27,683	485,144

Total Energy Savings Due to the Code Adoption

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)
Slab-on-grade	1-Story	1,754	52,345	332	0	67	0	2,152	52,345
	2-Story	1,794	52,985	321	0	66	0	2,181	52,985
Crawl spaces	1-Story	29	880	5	0	1	0	35	880
	2-Story	30	901	5	0	1	0	36	901
Total		3,607	107,111	664	0	134	0	4,405	107,111



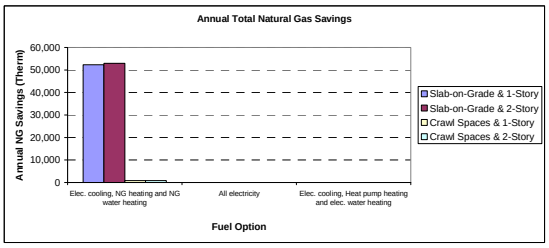


Table 43: Code and Pre-code Annual Simulation Results for Hays County (Single-Family).

Precode Avg. OSD Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	70.14	0.73	78.63	0.00	78.63	0.00
	2-Story	66.29	0.73	74.79	0.00	74.79	0.00
Crawl spaces	1-Story	70.69	0.73	79.19	0.00	79.19	0.00
	2-Story	66.89	0.73	75.38	0.00	75.38	0.00
Total		274.01	2.92	307.99	0.00	307.99	0.00

Code compliant Avg. OSD Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	58.31	0.61	66.81	0.00	66.81	0.00
	2-Story	56.27	0.61	64.76	0.00	64.76	0.00
Crawl spaces	1-Story	58.89	0.61	67.38	0.00	67.38	0.00
	2-Story	56.88	0.61	65.37	0.00	65.37	0.00
Total		230.34	2.44	264.32	0.00	264.32	0.00

Precode Avg. OSD Total Energy Use (For total houses in a County)

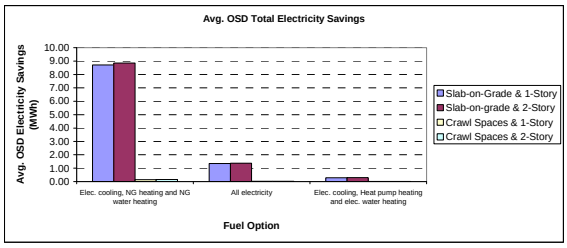
		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	51.71	538.76	9.03	0.00	1.93	0.00	62.67	538.76
	2-Story	58.54	645.32	10.29	0.00	2.20	0.00	71.03	645.32
Crawl spaces	1-Story	0.90	9.32	0.16	0.00	0.03	0.00	1.09	9.32
	2-Story	1.02	11.16	0.18	0.00	0.04	0.00	1.24	11.16
Total		112.18	1,204.56	19.65	0.00	4.20	0.00	136.03	1,204.56

Code compliant Avg. OSD Total Energy Use (For total houses in a County)

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	42.99	450.29	7.67	0.00	1.64	0.00	52.30	450.29
	2-Story	49.69	539.35	8.91	0.00	1.90	0.00	60.50	539.35
Crawl spaces	1-Story	0.75	7.79	0.13	0.00	0.03	0.00	0.91	7.79
	2-Story	0.87	9.33	0.16	0.00	0.03	0.00	1.06	9.33
Total		94.30	1,006.75	16.87	0.00	3.61	0.00	114.77	1,006.75

Avg. OSD Total Energy Savings Due to the Code Adoption

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)
Slab-on-grade	1-Story	8.72	88.47	1.36	0.00	0.29	0.00	10.37	88.47
	2-Story	8.85	105.97	1.38	0.00	0.29	0.00	10.53	105.97
Crawl spaces	1-Story	0.15	1.53	0.02	0.00	0.01	0.00	0.18	1.53
	2-Story	0.15	1.83	0.02	0.00	0.01	0.00	0.18	1.83
Total		17.88	197.80	2.78	0.00	0.60	0.00	21.26	197.80



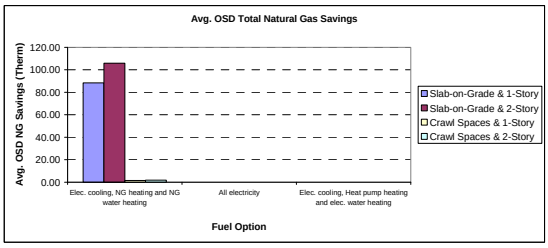
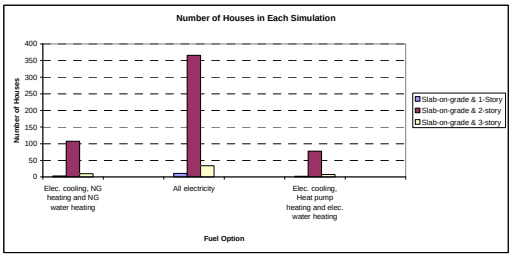


Table 44: Code and Pre-code Average OSD Simulation Results for Hays County (Single-Family).

The simulation result for one county

County Name	Hays
NAHB Division	West South Central
Number of new building permits for MF	618

		Fuel Option			Total
		1	2	3	
		Elec. cooling, NG heating and NG water heating	All electricity	Elec. cooling, Heat pump heating and elec. water heating	
		19.5%	66.4%	14.1%	
Slab-on-grade (100%)	1-Story (2.6%)	0.51%	1.73%	0.37%	2.60%
	2-Story (89.1%)	17.37%	59.16%	12.56%	89.10%
	3-Story (8.3%)	1.62%	5.51%	1.17%	8.30%
Total		19.50%	66.40%	14.10%	100.00%



Number of Houses for each simulation

		Fuel Option			Total
		1	2	3	
		Elec. cooling, NG heating and NG water heating	All electricity	Elec. cooling, Heat pump heating and elec. water heating	
		19.5%	66.4%	14.2%	
Slab-on-grade (100%)	1-Story (2.6%)	3	11	2	16
	2-Story (89.1%)	107	366	78	551
	3-Story (8.3%)	10	34	7	51
Total		121	410	87	618

Precode Energy Use for each option (per house)

		Fuel Option						
		1		2		3		
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating		
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	
Slab-on-grade	1-Story	6,366	209	8,511	0	8,509	0	
	2-Story	6,221	193	8,087	0	8,086	0	
	3-Story	6,247	188	8,024	0	8,024	0	
Total		18,834	589	24,621	0	24,619	0	

Code compliant Energy Use for each option (per house)

		Fuel Option						
		1		2		3		
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating		
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	
Slab-on-grade	1-Story	5,970	166	8,134	0	8,136	0	
	2-Story	5,894	150	7,774	0	7,778	0	
	3-Story	5,926	145	7,716	0	7,718	0	
Total		17,790	460	23,624	0	23,631	0	

Precode Total Energy Use (For total houses in a County)

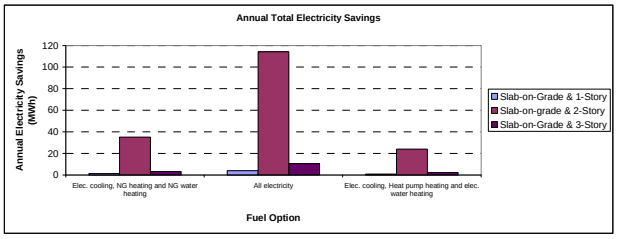
		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	20	653	91	0	19	0	130	653
	2-Story	668	20,696	2,957	0	628	0	4,252	20,696
	3-Story	62	1,877	273	0	58	0	394	1,877
Total		750	23,227	3,321	0	705	0	4,776	23,227

Code compliant Total Energy Use (For total houses in a County)

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	19	520	87	0	18	0	124	520
	2-Story	633	16,079	2,842	0	604	0	4,079	16,079
	3-Story	59	1,447	263	0	56	0	378	1,447
Total		711	18,046	3,192	0	678	0	4,581	18,046

Total Energy Savings Due to the Code Adoption

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	1	133	4	0	1	0	6	133
	2-Story	35	4,617	114	0	24	0	173	4,617
	3-Story	3	430	11	0	2	0	16	430
Total		40	5,180	129	0	27	0	195	5,180



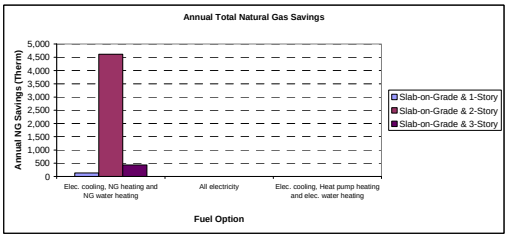


Table 45: Code and Pre-code Annual Simulation Results for Hays County (Multi-Family).

Precode Avg. OSD Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	25.78	0.50	30.48	0.00	30.48	0.00
	2-Story	23.92	0.47	28.04	0.00	28.04	0.00
	3-Story	23.60	0.46	27.53	0.00	27.53	0.00
Total		73.30	1.42	86.04	0.00	86.04	0.00

Code compliant Avg. OSD Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	24.10	0.38	28.80	0.00	28.80	0.00
	2-Story	22.64	0.35	26.76	0.00	26.76	0.00
	3-Story	22.37	0.34	26.29	0.00	26.29	0.00
Total		69.10	1.06	81.85	0.00	81.85	0.00

Precode Avg. OSD Total Energy Use (For total houses in a County)

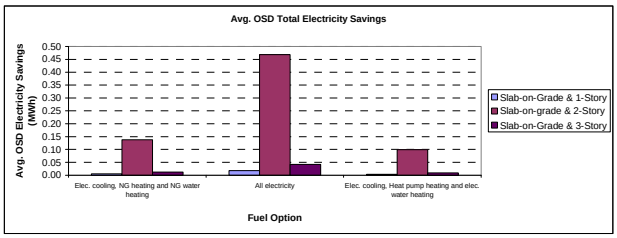
		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	0.08	1.57	0.33	0.00	0.07	0.00	0.48	1.57
	2-Story	2.57	50.21	10.25	0.00	2.18	0.00	15.00	50.21
	3-Story	0.24	4.57	0.94	0.00	0.20	0.00	1.37	4.57
Total		2.89	56.35	11.51	0.00	2.44	0.00	16.84	56.35

Code compliant Avg. OSD Total Energy Use (For total houses in a County)

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	0.08	1.19	0.31	0.00	0.07	0.00	0.45	1.19
	2-Story	2.43	37.33	9.78	0.00	2.08	0.00	14.29	37.33
	3-Story	0.22	3.37	0.90	0.00	0.19	0.00	1.31	3.37
Total		2.73	41.89	10.99	0.00	2.33	0.00	16.05	41.89

Total Energy Savings Due to the Code Adoption

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Savings (kWh)	NG Savings (Therm)	Elec. Savings (kWh)	NG Savings (Therm)	Elec. Savings (kWh)	NG Savings (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	0.01	0.38	0.02	0.00	0.00	0.00	0.03	0.38
	2-Story	0.14	12.88	0.47	0.00	0.10	0.00	0.71	12.88
	3-Story	0.01	1.20	0.04	0.00	0.01	0.00	0.06	1.20
Total		0.16	14.46	0.53	0.00	0.11	0.00	0.80	14.46



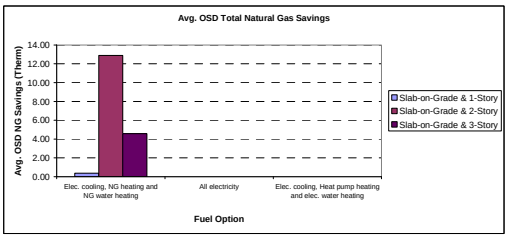


Table 46: Code and Pre-code Average OSD Simulation Results for Hays County (Multi-Family).

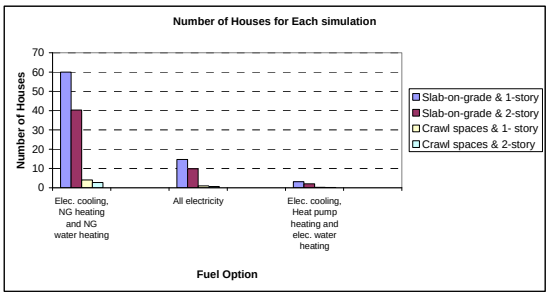
County	SF or MF	Precode or Code-compliant	Options			Simulation #	Annual Elec. (kWh/yr)	Annual NG (Therms/yr)	Avg. OSD Elec. (kWh/day) (Aug. 19)	Avg. OSD NG (Therm/day) (Aug. 19)	Total Annual (Elec. + NG) (MBtu)	Annual Elec.Savings (kWh/yr)	Annual NG Savings (Therms/yr)	Avg. OSD Elec. Savings (kWh/day) (Aug. 19)	Avg. OSD NG Savings (Therm/day) (Aug. 19)	Total Annual Savings (Elec. + NG) (MBtu)
Henderson	SF	Precode	Slab-on-grade	Fuel Option 1	1-story	1	12872	495	56.6943	0.772833	93.39					
					2-story	2	12111	485	52.892	0.772833	89.79					
				Fuel Option 2	1-story	3	19967	0	65.9175	0	68.15					
					2-story	4	19001	0	62.1152	0	64.85					
				Fuel Option 3	1-story	5	19217	0	65.9175	0	65.59					
					2-story	6	18324	0	62.1152	0	62.54					
			Crawl Space	Fuel Option 1	1-story	7	13592	461	58.6959	0.772833	92.45					
					2-story	8	13022	442	55.3624	0.772833	88.61					
				Fuel Option 2	1-story	9	20060	0	67.9192	0	68.46					
					2-story	10	19116	0	64.5855	0	65.24					
				Fuel Option 3	1-story	11	19510	0	67.9192	0	66.59					
					2-story	12	18683	0	64.5855	0	63.76					
		Code - Compliant	Slab-on-grade	Fuel Option 1	1-story	13	11416	432	48.8653	0.652833	82.17	1,456	63	7.83	0.12	11.22
					2-story	14	10891	431	45.908	0.652833	80.24	1,220	54	6.98	0.12	9.55
				Fuel Option 2	1-story	15	18098	0	58.0885	0	61.77	1,869	0	7.83	0.00	6.38
					2-story	16	17534	0	55.131	0	59.84	1,467	0	6.98	0.00	5.01
				Fuel Option 3	1-story	17	17561	0	58.0885	0	59.94	1,656	0	7.83	0.00	5.65
					2-story	18	16997	0	55.131	0	58.01	1,327	0	6.98	0.00	4.53
			Crawl Space	Fuel Option 1	1-story	19	12163	392	51.1244	0.652833	80.69	1,429	69	7.57	0.12	11.76
					2-story	20	11773	381	48.5978	0.652833	78.28	1,249	61	6.76	0.12	10.33
				Fuel Option 2	1-story	21	18120	0	60.3475	0	61.84	1,940	0	7.57	0.00	6.62
					2-story	22	17522	0	57.8211	0	59.8	1,594	0	6.76	0.00	5.44
				Fuel Option 3	1-story	23	17797	0	60.3475	0	60.74	1,713	0	7.57	0.00	5.85
					2-story	24	17240	0	57.8211	0	58.84	1,443	0	6.76	0.00	4.92
	MF	Precode	Slab-on-grade	Fuel Option 1	1-story	1	5809.5	243.5	23.66105	0.522435	44.16					
					2-story	2	5733.75	218	22.34465	0.4871325	41.3575					
					3-story	3	5779.5	209.83333	22.2155	0.475365	40.71333333					
				Fuel Option 2	1-story	4	8550	0	28.7704	0	29.18					
					2-story	5	8025.5	0	26.81525	0	27.39					
					3-story	6	7932.5	0	26.47333333	0	27.07333333					
				Fuel Option 3	1-story	7	8488.5	0	28.7704	0	28.97					
					2-story	8	8007	0	26.81525	0	27.3275					
					3-story	9	7917	0	26.47333333	0	27.02					
		Code - Compliant	Slab-on-grade	Fuel Option 1	1-story	10	5478	204.5	22.07565	0.4024375	39.13	332	39	1.59	0.12	5.03
					2-story	11	5468.25	178	21.157575	0.3671325	36.46	266	40	1.19	0.12	4.90
					3-story	12	5515.666667	169.33333	21.07333333	0.355365	35.76166667	264	41	1.14	0.12	4.95
				Fuel Option 2	1-story	13	8296.5	0	27.185	0	28.315	254	0	1.59	0.00	0.86
					2-story	14	7819	0	25.62825	0	26.6875	207	0	1.19	0.00	0.70
					3-story	15	7718.833333	0	25.33116667	0	26.345	214	0	1.14	0.00	0.73
				Fuel Option 3	1-story	16	8223.5	0	27.185	0	28.065	265	0	1.59	0.00	0.90
					2-story	17	7797.5	0	25.62825	0	26.6125	210	0	1.19	0.00	0.72
					3-story	18	7702.833333	0	25.33116667	0	26.29	214	0	1.14	0.00	0.73

Table 47: Code and Pre-code Simulation Results for Individual Residence for Henderson County (Single-Family and Multi-Family).

Prototype of the simulation result for one county

County Name	Henderson
Division (East or West Texas)	East Texas
Number of new building permits for SFD	139

		Fuel Option			Total
		1	2	3	
		Elec. cooling, NG heating and NG water heating	All electricity	Elec. cooling, Heat pump heating and elec. water heating	
		77.1%	18.9%	4.0%	
Slab-on-grade (93.6%)	1-Story (59.8%)	43.16%	10.58%	2.24%	55.97%
	2-Story (40.2%)	29.01%	7.11%	1.51%	37.63%
Crawl spaces (6.4%)	1-Story (59.8%)	2.95%	0.72%	0.15%	3.83%
	2-Story (39.2%)	1.98%	0.49%	0.10%	2.57%
Total		77.10%	18.90%	4.00%	100.00%



Number of Houses for each simulation

		Fuel Option			Total
		1	2	3	
		Elec. cooling, NG heating and NG water heating	All electricity	Elec. cooling, Heat pump heating and elec. water heating	
		77.1%	18.9%	4.0%	
Slab-on-grade (93.6%)	1-Story (59.8%)	60	15	3	78
	2-Story (40.2%)	40	10	2	52
Crawl spaces (6.4%)	1-Story (59.8%)	4	1	0	5
	2-Story (39.2%)	3	1	0	4
Total		107	26	6	139

Precode Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	12,872	495	19,967	0	19,217	0
	2-Story	12,111	485	19,001	0	18,324	0
Crawl spaces	1-Story	13,592	461	20,060	0	19,510	0
	2-Story	13,022	442	19,116	0	18,663	0
Total		51,597	1,883	78,144	0	75,734	0

Code compliant Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	11,416	432	18,098	0	17,561	0
	2-Story	10,891	431	17,534	0	16,997	0
Crawl spaces	1-Story	12,163	392	18,120	0	17,797	0
	2-Story	11,773	381	17,522	0	17,240	0
Total		46,243	1,636	71,274	0	69,595	0

Precode Total Energy Use (For total houses in a County)

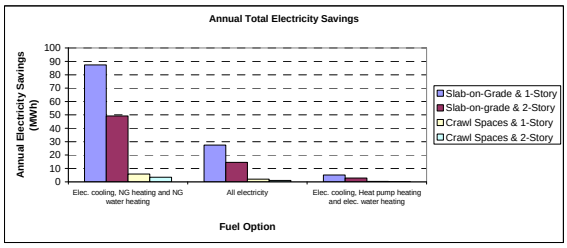
		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	772	29,693	294	0	60	0	1,126	29,693
	2-Story	488	19,557	188	0	38	0	715	19,557
Crawl spaces	1-Story	58	1,891	20	0	4	0	83	1,891
	2-Story	36	1,219	13	0	3	0	51	1,219
Total		1,352	52,360	515	0	105	0	1,972	52,360

Code compliant Total Energy Use (For total houses in a County)

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	685	25,914	266	0	55	0	1,006	25,914
	2-Story	439	17,380	173	0	36	0	648	17,380
Crawl spaces	1-Story	50	1,608	18	0	4	0	72	1,608
	2-Story	32	1,051	12	0	2	0	47	1,051
Total		1,206	45,952	470	0	96	0	1,772	45,952

Total Energy Savings Due to the Code Adoption

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)
Slab-on-grade	1-Story	87	3,779	27	0	5	0	120	3,779
	2-Story	49	2,178	15	0	3	0	66	2,178
Crawl spaces	1-Story	6	283	2	0	0	0	8	283
	2-Story	3	168	1	0	0	0	5	168
Total		146	6,408	45	0	9	0	199	6,408



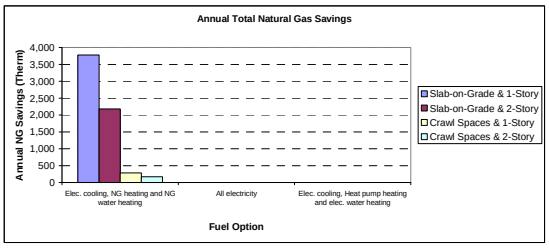


Table 48: Code and Pre-code Annual Simulation Results for Henderson County (Single-Family).

Precode Avg. OSD Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	56.69	0.77	65.92	0.00	65.92	0.00
	2-Story	52.89	0.77	62.12	0.00	62.12	0.00
Crawl spaces	1-Story	58.70	0.77	67.92	0.00	67.92	0.00
	2-Story	55.36	0.77	64.59	0.00	64.59	0.00
Total		223.64	3.09	260.54	0.00	260.54	0.00

Code compliant Avg. OSD Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	48.87	0.65	58.09	0.00	58.09	0.00
	2-Story	45.91	0.65	55.13	0.00	55.13	0.00
Crawl spaces	1-Story	51.12	0.65	60.35	0.00	60.35	0.00
	2-Story	48.60	0.65	57.82	0.00	57.82	0.00
Total		194.50	2.61	231.39	0.00	231.39	0.00

Precode Avg. OSD Total Energy Use (For total houses in a County)

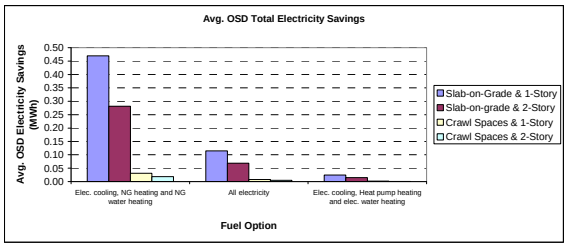
		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	3.40	46.36	0.97	0.00	0.21	0.00	4.58	46.36
	2-Story	2.13	31.16	0.61	0.00	0.13	0.00	2.88	31.16
Crawl spaces	1-Story	0.24	3.17	0.07	0.00	0.01	0.00	0.32	3.17
	2-Story	0.15	2.13	0.04	0.00	0.01	0.00	0.21	2.13
Total		5.93	82.82	1.70	0.00	0.36	0.00	7.98	82.82

Code compliant Avg. OSD Total Energy Use (For total houses in a County)

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	2.93	39.16	0.85	0.00	0.18	0.00	3.97	39.16
	2-Story	1.85	26.33	0.54	0.00	0.12	0.00	2.51	26.33
Crawl spaces	1-Story	0.21	2.68	0.06	0.00	0.01	0.00	0.28	2.68
	2-Story	0.13	1.80	0.04	0.00	0.01	0.00	0.18	1.80
Total		5.13	69.96	1.50	0.00	0.32	0.00	6.94	69.96

Avg. OSD Total Energy Savings Due to the Code Adoption

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)
Slab-on-grade	1-Story	0.47	7.20	0.12	0.00	0.02	0.00	0.61	7.20
	2-Story	0.28	4.84	0.07	0.00	0.01	0.00	0.37	4.84
Crawl spaces	1-Story	0.03	0.49	0.01	0.00	0.00	0.00	0.04	0.49
	2-Story	0.02	0.33	0.00	0.00	0.00	0.00	0.02	0.33
Total		0.80	12.86	0.20	0.00	0.04	0.00	1.04	12.86



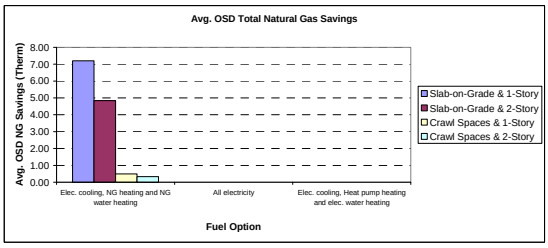
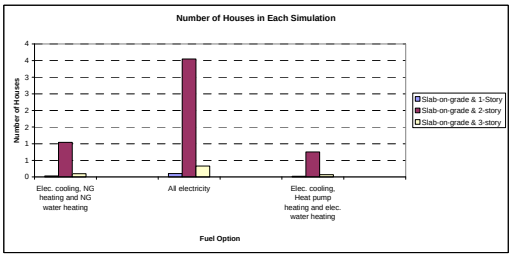


Table 49: Code and Pre-code Average OSD Simulation Results for Henderson County (Single-Family).

The simulation result for one county

County Name	Henderson
NAHB Division	West South Central
Number of new building permits for MF	6

		Fuel Option			Total
		1	2	3	
		Elec. cooling, NG heating and NG water heating	All electricity	Elec. cooling, Heat pump heating and elec. water heating	
		19.5%	66.4%	14.1%	
Slab-on-grade (100%)	1-Story (2.6%)	0.51%	1.73%	0.37%	2.60%
	2-Story (89.1%)	17.37%	59.16%	12.56%	89.10%
	3-Story (8.3%)	1.62%	5.51%	1.17%	8.30%
Total		19.50%	66.40%	14.10%	100.00%



Number of Houses for each simulation

		Fuel Option			Total
		1	2	3	
		Elec. cooling, NG heating and NG water heating	All electricity	Elec. cooling, Heat pump heating and elec. water heating	
		19.5%	66.4%	14.2%	
Slab-on-grade (100%)	1-Story (2.6%)	0	0	0	0
	2-Story (89.1%)	1	4	1	5
	3-Story (8.3%)	0	0	0	0
Total		1	4	1	6

Precode Energy Use for each option (per house)

		Fuel Option						
		1		2		3		
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating		
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	
Slab-on-grade	1-Story	5,810	244	8,550	0	8,489	0	
	2-Story	5,734	219	8,026	0	8,007	0	
	3-Story	5,780	210	7,933	0	7,917	0	
Total		17,323	671	24,508	0	24,413	0	

Code compliant Energy Use for each option (per house)

		Fuel Option						
		1		2		3		
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating		
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	
Slab-on-grade	1-Story	5,478	206	8,297	0	8,224	0	
	2-Story	5,468	178	7,819	0	7,798	0	
	3-Story	5,516	169	7,719	0	7,703	0	
Total		16,462	552	23,834	0	23,724	0	

Precode Total Energy Use (For total houses in a County)

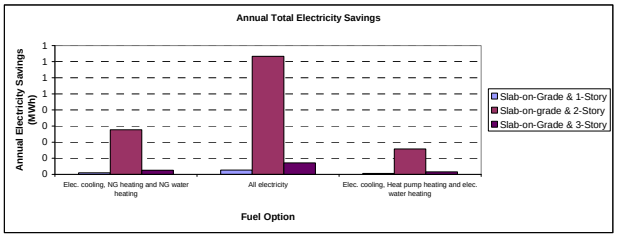
		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	0	7	1	0	0	0	1	7
	2-Story	6	227	28	0	6	0	41	227
	3-Story	1	20	3	0	1	0	4	20
Total		7	255	32	0	7	0	45	255

Code compliant Total Energy Use (For total houses in a County)

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	0	6	1	0	0	0	1	6
	2-Story	6	186	28	0	6	0	39	186
	3-Story	1	16	3	0	1	0	4	16
Total		6	208	31	0	7	0	44	208

Total Energy Savings Due to the Code Adoption

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	0	1	0	0	0	0	0	1
	2-Story	0	42	1	0	0	0	1	42
	3-Story	0	4	0	0	0	0	0	4
Total		0	47	1	0	0	0	1	47



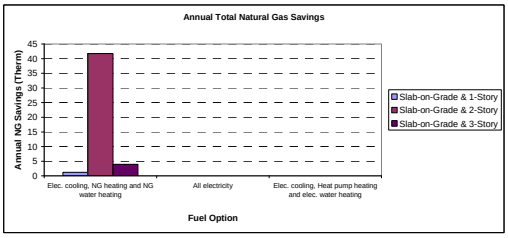


Table 50: Code and Pre-code Annual Simulation Results for Henderson County (Multi-Family).

Precode Avg. OSD Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	23.66	0.52	28.77	0.00	28.77	0.00
	2-Story	22.34	0.49	26.82	0.00	26.82	0.00
	3-Story	22.22	0.48	26.47	0.00	26.47	0.00
Total		68.22	1.49	82.06	0.00	82.06	0.00

Code compliant Avg. OSD Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	22.08	0.40	27.19	0.00	27.19	0.00
	2-Story	21.16	0.37	25.63	0.00	25.63	0.00
	3-Story	21.07	0.36	25.33	0.00	25.33	0.00
Total		64.31	1.12	78.14	0.00	78.14	0.00

Precode Avg. OSD Total Energy Use (For total houses in a County)

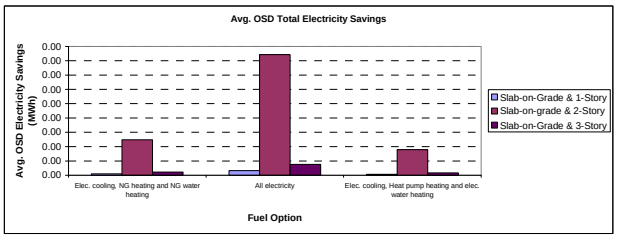
		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.02
	2-Story	0.02	0.51	0.10	0.00	0.02	0.00	0.14	0.51
	3-Story	0.00	0.05	0.01	0.00	0.00	0.00	0.01	0.05
Total		0.03	0.57	0.11	0.00	0.02	0.00	0.16	0.57

Code compliant Avg. OSD Total Energy Use (For total houses in a County)

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.01
	2-Story	0.02	0.38	0.09	0.00	0.02	0.00	0.13	0.38
	3-Story	0.00	0.03	0.01	0.00	0.00	0.00	0.01	0.03
Total		0.02	0.43	0.10	0.00	0.02	0.00	0.15	0.43

Total Energy Savings Due to the Code Adoption

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Savings (kWh)	NG Savings (Therm)	Elec. Savings (kWh)	NG Savings (Therm)	Elec. Savings (kWh)	NG Savings (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	2-Story	0.00	0.13	0.00	0.00	0.00	0.00	0.01	0.13
	3-Story	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.01
Total		0.00	0.14	0.00	0.00	0.00	0.00	0.01	0.14



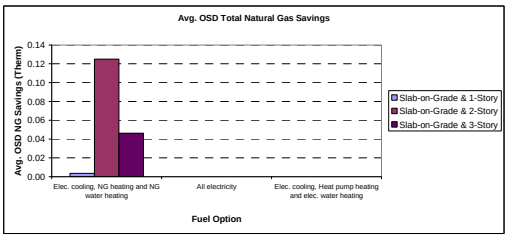


Table 51: Code and Pre-code Average OSD Simulation Results for Henderson County (Multi-Family).

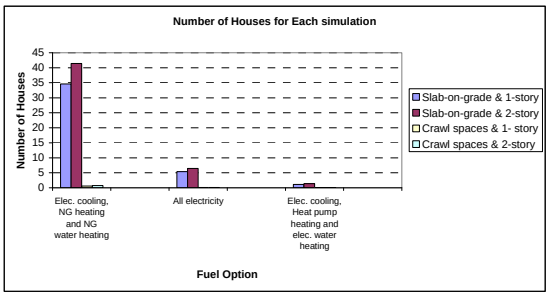
County	SF or MF	Precode or Code-compliant	Options			Simulation #	Annual Elec. (kWh/yr)	Annual NG (Therms/yr)	Avg. OSD Elec. (kWh/day) (Aug. 19)	Avg. OSD NG (Therm/day) (Aug. 19)	Total Annual (Elec. + NG) (MBtu)	Annual Elec.Savings (kWh/yr)	Annual NG Savings (Therms/yr)	Avg. OSD Elec. Savings (kWh/day) (Aug. 19)	Avg. OSD NG Savings (Therm/day) (Aug. 19)	Total Annual Savings (Elec. + NG) (MBtu)
Hood	SF	Precode	Slab-on-grade	Fuel Option 1	1-story	1	15543	505	72.9115	0.725762	103.53					
					2-story	2	14670	497	69.3171	0.725762	99.74					
				Fuel Option 2	1-story	3	22935	0	81.3575	0	78.27					
					2-story	4	21887	0	77.7631	0	74.7					
				Fuel Option 3	1-story	5	21908	0	81.3575	0	74.77					
					2-story	6	20935	0	77.7631	0	71.45					
			Crawl Space	Fuel Option 1	1-story	7	16090	482	73.7335	0.725762	103.1					
					2-story	8	15404	467	70.1411	0.725762	99.25					
				Fuel Option 2	1-story	9	23041	0	82.1795	0	78.64					
					2-story	10	22051	0	78.5872	0	75.26					
				Fuel Option 3	1-story	11	22178	0	82.1795	0	75.69					
					2-story	12	21294	0	78.5872	0	72.68					
		Code - Compliant	Slab-on-grade	Fuel Option 1	1-story	13	13319	412	60.6425	0.605762	86.7	2,224	93	12.27	0.12	16.83
					2-story	14	12827	423	58.8193	0.605762	86.11	1,843	74	10.50	0.12	13.63
				Fuel Option 2	1-story	15	19704	0	69.0886	0	67.25	3,231	0	12.27	0.00	11.02
					2-story	16	19408	0	67.2653	0	66.24	2,479	0	10.50	0.00	8.46
				Fuel Option 3	1-story	17	19122	0	69.0886	0	65.26	2,786	0	12.27	0.00	9.51
					2-story	18	18769	0	67.2653	0	64.06	2,166	0	10.50	0.00	7.39
			Crawl Space	Fuel Option 1	1-story	19	13925	384	61.4542	0.605762	85.95	2,165	98	12.28	0.12	17.15
					2-story	20	13548	385	59.6317	0.605762	84.71	1,856	82	10.51	0.12	14.54
				Fuel Option 2	1-story	21	19795	0	69.9003	0	67.56	3,246	0	12.28	0.00	11.08
					2-story	22	19421	0	68.0778	0	66.28	2,630	0	10.51	0.00	8.98
				Fuel Option 3	1-story	23	19387	0	69.9003	0	66.17	2,791	0	12.28	0.00	9.52
					2-story	24	19012	0	68.0778	0	64.89	2,282	0	10.51	0.00	7.79
	MF	Precode	Slab-on-grade	Fuel Option 1	1-story	1	6172.5	244	26.4617	0.4974865	45.49					
					2-story	2	6019.75	221.25	24.718125	0.4653	42.665					
					3-story	3	6032.666667	213.83333	24.43933333	0.454573333	41.97666667					
				Fuel Option 2	1-story	4	8934.5	0	31.14055	0	30.49					
					2-story	5	8374.75	0	28.812	0	28.5825					
					3-story	6	8261.166667	0	28.33833333	0	28.195					
				Fuel Option 3	1-story	7	8842.5	0	31.14055	0	30.18					
					2-story	8	8318.5	0	28.812	0	28.39					
					3-story	9	8208.833333	0	28.33833333	0	28.01666667					
		Code - Compliant	Slab-on-grade	Fuel Option 1	1-story	10	5831.5	205.5	24.7837	0.3774865	40.45	341	39	1.68	0.12	5.04
					2-story	11	5748.5	181.5	23.451175	0.3453	37.7725	271	40	1.27	0.12	4.89
					3-story	12	5764.833333	173.83333	23.2185	0.334573333	37.06	268	40	1.22	0.12	4.92
				Fuel Option 2	1-story	13	8674	0	29.4625	0	29.605	261	0	1.68	0.00	0.88
					2-story	14	8167	0	27.54525	0	27.8725	208	0	1.27	0.00	0.71
					3-story	15	8050.666667	0	27.1175	0	27.47666667	210	0	1.22	0.00	0.72
				Fuel Option 3	1-story	16	8568	0	29.4625	0	29.245	275	0	1.68	0.00	0.93
					2-story	17	8106.25	0	27.54525	0	27.6675	212	0	1.27	0.00	0.72
					3-story	18	7994.833333	0	27.1175	0	27.28666667	214	0	1.22	0.00	0.73

Table 52: Code and Pre-code Simulation Results for Individual Residence for Hood County (Single-Family and Multi-Family).

Prototype of the simulation result for one county

County Name	Hood
Division (East or West Texas)	West Texas
Number of new building permits for SFD	92

		Fuel Option			Total
		1	2	3	
		Elec. cooling, NG heating and NG water heating	All electricity	Elec. cooling, Heat pump heating and elec. water heating	
		84.1%	13.1%	2.8%	
Slab-on-grade (98.3%)	1-Story (45.5%)	37.61%	5.86%	1.25%	44.73%
	2-Story (54.5%)	45.06%	7.02%	1.50%	53.57%
Crawl spaces (1.7%)	1-Story (45.5%)	0.65%	0.10%	0.02%	0.77%
	2-Story (54.5%)	0.78%	0.12%	0.03%	0.93%
Total		84.10%	13.10%	2.80%	100.00%



Number of Houses for each simulation

		Fuel Option			Total
		1	2	3	
		Elec. cooling, NG heating and NG water heating	All electricity	Elec. cooling, Heat pump heating and elec. water heating	
		84.1%	13.1%	2.8%	
Slab-on-grade (98.3%)	1-Story (45.5%)	35	5	1	41
	2-Story (54.5%)	41	6	1	49
Crawl spaces (1.7%)	1-Story (45.5%)	1	0	0	1
	2-Story (54.5%)	1	0	0	1
Total		77	12	3	92

Precode Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	15,543	505	22,935	0	21,908	0
	2-Story	14,670	497	21,887	0	20,935	0
Crawl spaces	1-Story	16,090	482	23,041	0	22,178	0
	2-Story	15,404	467	22,051	0	21,294	0
Total		61,707	1,951	89,914	0	86,315	0

Code compliant Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	13,319	412	19,704	0	19,122	0
	2-Story	12,827	423	19,408	0	18,769	0
Crawl spaces	1-Story	13,925	384	19,795	0	19,387	0
	2-Story	13,548	385	19,421	0	19,012	0
Total		53,619	1,604	78,328	0	76,290	0

Precode Total Energy Use (For total houses in a County)

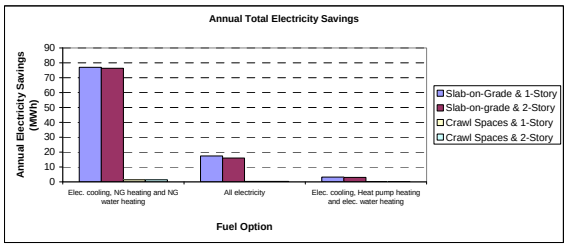
		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	538	17,476	124	0	25	0	687	17,476
	2-Story	608	20,601	141	0	29	0	778	20,601
Crawl spaces	1-Story	10	288	2	0	0	0	12	288
	2-Story	11	335	2	0	1	0	14	335
Total		1,167	38,700	270	0	55	0	1,491	38,700

Code compliant Total Energy Use (For total houses in a County)

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	461	14,258	106	0	22	0	589	14,258
	2-Story	532	17,534	125	0	26	0	683	17,534
Crawl spaces	1-Story	8	230	2	0	0	0	11	230
	2-Story	10	276	2	0	0	0	12	276
Total		1,011	32,297	236	0	49	0	1,295	32,297

Total Energy Savings Due to the Code Adoption

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)
Slab-on-grade	1-Story	77	3,218	17	0	3	0	98	3,218
	2-Story	76	3,067	16	0	3	0	95	3,067
Crawl spaces	1-Story	1	59	0	0	0	0	2	59
	2-Story	1	59	0	0	0	0	2	59
Total		156	6,403	34	0	6	0	196	6,403



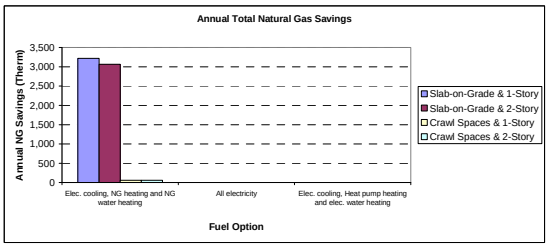


Table 53: Code and Pre-code Annual Simulation Results for Hood County (Single-Family).

Precode Avg. OSD Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	72.91	0.73	81.36	0.00	81.36	0.00
	2-Story	69.32	0.73	77.76	0.00	77.76	0.00
Crawl spaces	1-Story	73.73	0.73	82.18	0.00	82.18	0.00
	2-Story	70.14	0.73	78.59	0.00	78.59	0.00
Total		286.10	2.90	319.89	0.00	319.89	0.00

Code compliant Avg. OSD Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	60.64	0.61	69.09	0.00	69.09	0.00
	2-Story	58.82	0.61	67.27	0.00	67.27	0.00
Crawl spaces	1-Story	61.45	0.61	69.90	0.00	69.90	0.00
	2-Story	59.63	0.61	68.08	0.00	68.08	0.00
Total		240.55	2.42	274.33	0.00	274.33	0.00

Precode Avg. OSD Total Energy Use (For total houses in a County)

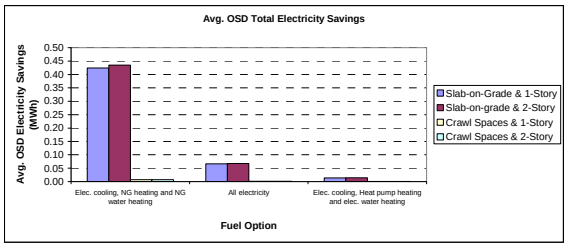
		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	2.52	25.12	0.44	0.00	0.09	0.00	3.06	25.12
	2-Story	2.87	30.08	0.50	0.00	0.11	0.00	3.48	30.08
Crawl spaces	1-Story	0.04	0.43	0.01	0.00	0.00	0.00	0.05	0.43
	2-Story	0.05	0.52	0.01	0.00	0.00	0.00	0.06	0.52
Total		5.49	56.15	0.96	0.00	0.20	0.00	6.65	56.15

Code compliant Avg. OSD Total Energy Use (For total houses in a County)

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	2.10	20.96	0.37	0.00	0.08	0.00	2.55	20.96
	2-Story	2.44	25.11	0.43	0.00	0.09	0.00	2.97	25.11
Crawl spaces	1-Story	0.04	0.36	0.01	0.00	0.00	0.00	0.04	0.36
	2-Story	0.04	0.43	0.01	0.00	0.00	0.00	0.05	0.43
Total		4.62	46.87	0.82	0.00	0.18	0.00	5.61	46.87

Avg. OSD Total Energy Savings Due to the Code Adoption

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)
Slab-on-grade	1-Story	0.42	4.15	0.07	0.00	0.01	0.00	0.50	4.15
	2-Story	0.44	4.97	0.07	0.00	0.01	0.00	0.52	4.97
Crawl spaces	1-Story	0.01	0.07	0.00	0.00	0.00	0.00	0.01	0.07
	2-Story	0.01	0.09	0.00	0.00	0.00	0.00	0.01	0.09
Total		0.87	9.28	0.14	0.00	0.03	0.00	1.04	9.28



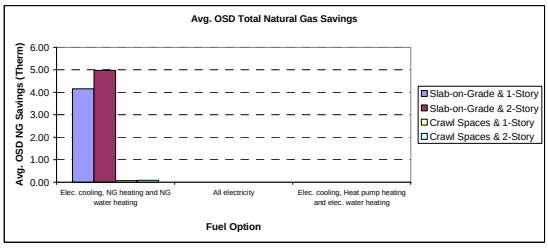
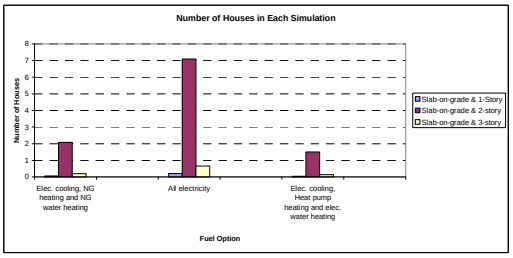


Table 54: Code and Pre-code Average OSD Simulation Results for Hood County (Single-Family).

The simulation result for one county

County Name	Hood
NAHB Division	West South Central
Number of new building permits for MF	12

		Fuel Option			Total
		1	2	3	
		Elec. cooling, NG heating and NG water heating	All electricity	Elec. cooling, Heat pump heating and elec. water heating	
		19.5%	66.4%	14.1%	
Slab-on-grade (100%)	1-Story (2.6%)	0.51%	1.73%	0.37%	2.60%
	2-Story (89.1%)	17.37%	59.16%	12.56%	89.10%
	3-Story (8.3%)	1.62%	5.51%	1.17%	8.30%
Total		19.50%	66.40%	14.10%	100.00%



Number of Houses for each simulation

		Fuel Option			Total
		1	2	3	
		Elec. cooling, NG heating and NG water heating	All electricity	Elec. cooling, Heat pump heating and elec. water heating	
		19.5%	66.4%	14.1%	
Slab-on-grade (100%)	1-Story (2.6%)	0	0	0	0
	2-Story (89.1%)	2	7	2	11
	3-Story (8.3%)	0	1	0	1
Total		2	8	2	12

Precode Energy Use for each option (per house)

		Fuel Option						
		1		2		3		
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating		
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	
Slab-on-grade	1-Story	6,173	244	8,935	0	8,843	0	
	2-Story	6,020	221	8,375	0	8,319	0	
	3-Story	6,033	214	8,261	0	8,209	0	
Total		18,225	679	25,570	0	25,370	0	

Code compliant Energy Use for each option (per house)

		Fuel Option						
		1		2		3		
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating		
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	
Slab-on-grade	1-Story	5,832	206	8,674	0	8,568	0	
	2-Story	5,749	182	8,167	0	8,106	0	
	3-Story	5,765	174	8,051	0	7,995	0	
Total		17,345	561	24,892	0	24,669	0	

Precode Total Energy Use (For total houses in a County)

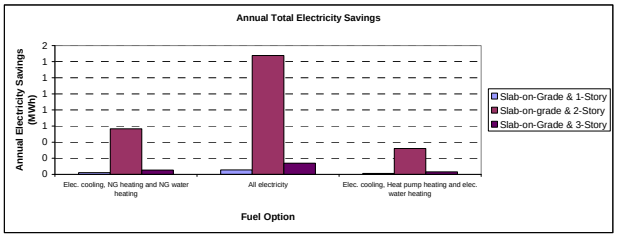
		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	0	15	2	0	0	0	3	15
	2-Story	13	461	59	0	13	0	85	461
	3-Story	1	42	5	0	1	0	8	42
Total		14	518	67	0	14	0	95	518

Code compliant Total Energy Use (For total houses in a County)

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	0	13	2	0	0	0	3	13
	2-Story	12	378	58	0	12	0	82	378
	3-Story	1	34	5	0	1	0	8	34
Total		13	425	65	0	14	0	92	425

Total Energy Savings Due to the Code Adoption

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	0	2	0	0	0	0	0	2
	2-Story	1	83	1	0	0	0	2	83
	3-Story	0	8	0	0	0	0	0	8
Total		1	93	2	0	0	0	3	93



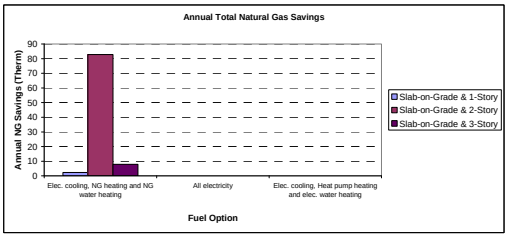


Table 55: Code and Pre-code Annual Simulation Results for Hood County (Multi-Family).

Precode Avg. OSD Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	26.46	0.50	31.14	0.00	31.14	0.00
	2-Story	24.72	0.47	28.81	0.00	28.81	0.00
	3-Story	24.44	0.45	28.34	0.00	28.34	0.00
Total		75.62	1.42	88.29	0.00	88.29	0.00

Code compliant Avg. OSD Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	24.78	0.38	29.46	0.00	29.46	0.00
	2-Story	23.45	0.35	27.55	0.00	27.55	0.00
	3-Story	23.22	0.33	27.12	0.00	27.12	0.00
Total		71.45	1.06	84.13	0.00	84.13	0.00

Precode Avg. OSD Total Energy Use (For total houses in a County)

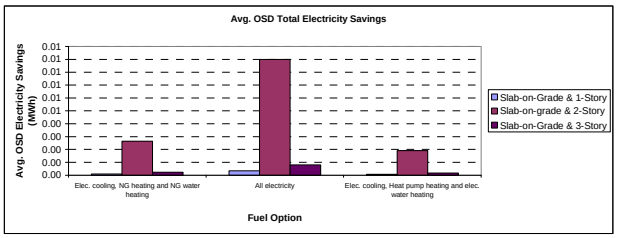
		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	0.00	0.03	0.01	0.00	0.00	0.00	0.01	0.03
	2-Story	0.05	0.97	0.20	0.00	0.04	0.00	0.30	0.97
	3-Story	0.00	0.05	0.02	0.00	0.00	0.00	0.03	0.09
Total		0.05	1.05	0.23	0.00	0.05	0.00	0.34	1.09

Code compliant Avg. OSD Total Energy Use (For total houses in a County)

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	0.00	0.02	0.01	0.00	0.00	0.00	0.01	0.02
	2-Story	0.05	0.72	0.20	0.00	0.04	0.00	0.29	0.72
	3-Story	0.00	0.06	0.02	0.00	0.00	0.00	0.03	0.06
Total		0.05	0.81	0.23	0.00	0.05	0.00	0.32	0.81

Total Energy Savings Due to the Code Adoption

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Savings (kWh)	NG Savings (Therm)	Elec. Savings (kWh)	NG Savings (Therm)	Elec. Savings (kWh)	NG Savings (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.01
	2-Story	0.00	0.25	0.01	0.00	0.00	0.00	0.01	0.25
	3-Story	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.02
Total		0.00	0.28	0.01	0.00	0.00	0.00	0.02	0.28



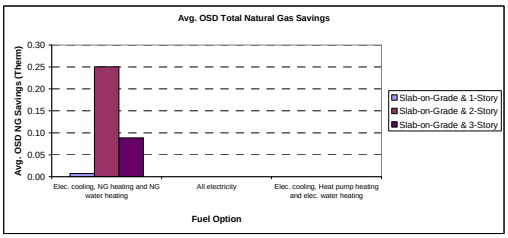


Table 56: Code and Pre-code Average OSD Simulation Results for Hood County (Multi-Family).

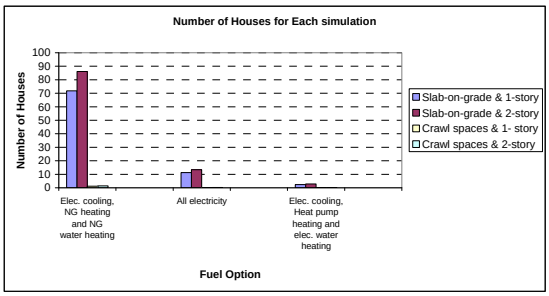
Table 57: Code and Pre-code Simulation Results for Individual Residence for Hunt County (Single-Family and Multi-Family).

County	SF or MF	Precode or Code-compliant	Options			Simulation #	Annual Elec. (kWh/yr)	Annual NG (Therms/yr)	Avg. OSD Elec. (kWh/day) (Aug. 19)	Avg. OSD NG (Therm/day) (Aug. 19)	Total Annual (Elec. + NG) (MBtu)	Annual Elec.Savings (kWh/yr)	Annual NG Savings (Therms/yr)	Avg. OSD Elec. Savings (kWh/day) (Aug. 19)	Avg. OSD NG Savings (Therm/day) (Aug. 19)	Total Annual Savings (Elec. + NG) (MBtu)
Hunt	SF	Precode	Slab-on-grade	Fuel Option 1	1-story	1	15570	505	73.0327	0.725762	103.65					
					2-story	2	14693	497	69.4453	0.725762	99.88					
				Fuel Option 2	1-story	3	22970	0	81.4787	0	78.39					
					2-story	4	21922	0	77.8913	0	74.82					
				Fuel Option 3	1-story	5	21942	0	81.4787	0	74.89					
					2-story	6	20977	0	77.8913	0	71.59					
			Crawl Space	Fuel Option 1	1-story	7	16118	482	73.8569	0.725762	103.23					
					2-story	8	15428	467	70.2722	0.725762	99.39					
				Fuel Option 2	1-story	9	23078	0	82.3029	0	78.76					
					2-story	10	22087	0	78.7182	0	75.38					
				Fuel Option 3	1-story	11	22215	0	82.3029	0	75.82					
					2-story	12	21335	0	78.7182	0	72.81					
		Code - Compliant	Slab-on-grade	Fuel Option 1	1-story	13	13461	386	59.9832	0.605762	84.53	2,109	119	13.05	0.12	19.12
					2-story	14	12947	390	57.9431	0.605762	83.22	1,746	107	11.50	0.12	16.66
				Fuel Option 2	1-story	15	19346	0	68.4293	0	66.03	3,624	0	13.05	0.00	12.36
					2-story	16	18906	0	66.3892	0	64.52	3,016	0	11.50	0.00	10.30
				Fuel Option 3	1-story	17	18937	0	68.4293	0	64.63	3,005	0	13.05	0.00	10.26
					2-story	18	18473	0	66.3892	0	63.05	2,504	0	11.50	0.00	8.54
			Crawl Space	Fuel Option 1	1-story	19	13917	370	60.7969	0.605762	84.48	2,201	112	13.06	0.12	18.75
					2-story	20	13519	367	58.7617	0.605762	82.87	1,909	100	11.51	0.12	16.52
				Fuel Option 2	1-story	21	19521	0	69.2429	0	66.62	3,557	0	13.06	0.00	12.14
					2-story	22	19073	0	67.2076	0	65.09	3,014	0	11.51	0.00	10.29
				Fuel Option 3	1-story	23	19196	0	69.2429	0	65.51	3,019	0	13.06	0.00	10.31
					2-story	24	18759	0	67.2076	0	64.02	2,576	0	11.51	0.00	8.79
	MF	Precode	Slab-on-grade	Fuel Option 1	1-story	1	6177.5	244.5	26.48775	0.4974865	45.52					
					2-story	2	6027	221.25	24.753075	0.4653	42.6875					
					3-story	3	6040.166667	213.83333	24.47516667	0.454573333	41.99833333					
				Fuel Option 2	1-story	4	8941.5	0	31.16665	0	30.515					
					2-story	5	8382.5	0	28.847	0	28.61					
					3-story	6	8268.833333	0	28.37416667	0	28.22166667					
				Fuel Option 3	1-story	7	8848	0	31.16665	0	30.2					
					2-story	8	8325.75	0	28.847	0	28.415					
					3-story	9	8216	0	28.37416667	0	28.04166667					
		Code - Compliant	Slab-on-grade	Fuel Option 1	1-story	10	5836.5	200	24.63055	0.3774865	39.925	341	45	1.86	0.12	5.60
					2-story	11	5758.75	176.5	23.293975	0.3453	37.295	268	45	1.46	0.12	5.39
					3-story	12	5778.833333	168.83333	23.05883333	0.334573333	36.60833333	261	45	1.42	0.12	5.39
				Fuel Option 2	1-story	13	8580	0	29.30935	0	29.285	362	0	1.86	0.00	1.23
					2-story	14	8086.5	0	27.388	0	27.6	296	0	1.46	0.00	1.01
					3-story	15	7977.833333	0	26.958	0	27.22833333	291	0	1.42	0.00	0.99
				Fuel Option 3	1-story	16	8504	0	29.30935	0	29.025	344	0	1.86	0.00	1.18
					2-story	17	8046.25	0	27.388	0	27.4625	280	0	1.46	0.00	0.95
					3-story	18	7940.166667	0	26.958	0	27.1	276	0	1.42	0.00	0.94

Prototype of the simulation result for one county

County Name	Hunt
Division (East or West Texas)	West Texas
Number of new building permits for SFD	191

		Fuel Option 1	Fuel Option 2	Fuel Option 3	Total
		Elec. cooling, NG heating and NG water heating	All electricity	Elec. cooling, Heat pump heating and elec. water heating	
		84.1%	13.1%	2.8%	
Slab-on-grade (98.3%)	1-Story (45.5%)	37.61%	5.86%	1.25%	44.73%
	2-Story (54.5%)	45.06%	7.02%	1.50%	53.57%
Crawl spaces (1.7%)	1-Story (45.5%)	0.65%	0.10%	0.02%	0.77%
	2-Story (54.5%)	0.78%	0.12%	0.03%	0.93%
Total		84.10%	13.10%	2.80%	100.00%



Number of Houses for each simulation

		Fuel Option 1	Fuel Option 2	Fuel Option 3	Total
		Elec. cooling, NG heating and NG water heating	All electricity	Elec. cooling, Heat pump heating and elec. water heating	
		84.1%	13.1%	2.8%	
Slab-on-grade (98.3%)	1-Story (45.5%)	72	11	2	85
	2-Story (54.5%)	86	13	3	102
Crawl spaces (1.7%)	1-Story (45.5%)	1	0	0	1
	2-Story (54.5%)	1	0	0	2
Total		161	25	5	191

Precode Energy Use for each option (per house)

		Fuel Option 1		Fuel Option 2		Fuel Option 3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	15,570	505	22,970	0	21,942	0
	2-Story	14,693	497	21,922	0	20,977	0
Crawl spaces	1-Story	16,118	482	23,078	0	22,215	0
	2-Story	15,428	467	22,087	0	21,335	0
Total		61,809	1,951	90,057	0	86,469	0

Code compliant Energy Use for each option (per house)

		Fuel Option 1		Fuel Option 2		Fuel Option 3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	13,461	386	19,346	0	18,937	0
	2-Story	12,947	390	18,906	0	18,473	0
Crawl spaces	1-Story	13,917	370	19,521	0	19,196	0
	2-Story	13,519	367	19,073	0	18,759	0
Total		53,844	1,513	76,846	0	75,365	0

Precode Total Energy Use (For total houses in a County)

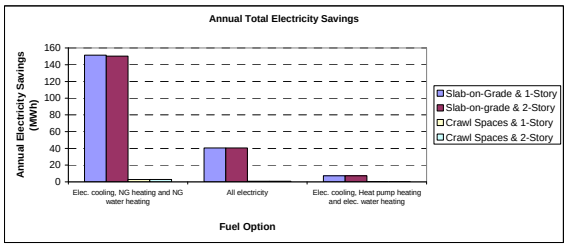
		Fuel Option 1		Fuel Option 2		Fuel Option 3		Total	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	1,119	36,282	257	0	52	0	1,428	36,282
	2-Story	1,264	42,770	294	0	60	0	1,618	42,770
Crawl spaces	1-Story	20	599	4	0	1	0	25	599
	2-Story	23	695	5	0	1	0	29	695
Total		2,426	80,345	561	0	115	0	3,101	80,345

Code compliant Total Energy Use (For total houses in a County)

		Fuel Option 1		Fuel Option 2		Fuel Option 3		Total	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	967	27,732	217	0	45	0	1,229	27,732
	2-Story	1,114	33,562	253	0	53	0	1,421	33,562
Crawl spaces	1-Story	17	460	4	0	1	0	22	460
	2-Story	20	546	4	0	1	0	25	546
Total		2,119	62,300	478	0	100	0	2,697	62,300

Total Energy Savings Due to the Code Adoption

		Fuel Option 1		Fuel Option 2		Fuel Option 3		Total	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)
Slab-on-grade	1-Story	152	8,550	41	0	7	0	199	8,550
	2-Story	150	9,208	40	0	7	0	198	9,208
Crawl spaces	1-Story	3	139	1	0	0	0	4	139
	2-Story	3	149	1	0	0	0	4	149
Total		307	18,045	82	0	15	0	404	18,045



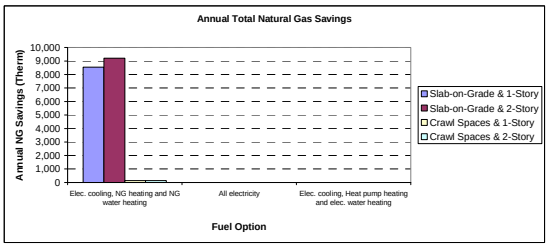


Table 58: Code and Pre-code Annual Simulation Results for Hunt County (Single-Family).

Precode Avg. OSD Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	73.03	0.73	81.48	0.00	81.48	0.00
	2-Story	69.45	0.73	77.89	0.00	77.89	0.00
Crawl spaces	1-Story	73.88	0.73	82.30	0.00	82.30	0.00
	2-Story	70.27	0.73	78.72	0.00	78.72	0.00
Total		286.61	2.90	320.39	0.00	320.39	0.00

Code compliant Avg. OSD Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	59.98	0.61	68.43	0.00	68.43	0.00
	2-Story	57.94	0.61	66.39	0.00	66.39	0.00
Crawl spaces	1-Story	60.80	0.61	69.24	0.00	69.24	0.00
	2-Story	58.76	0.61	67.21	0.00	67.21	0.00
Total		237.48	2.42	271.27	0.00	271.27	0.00

Precode Avg. OSD Total Energy Use (For total houses in a County)

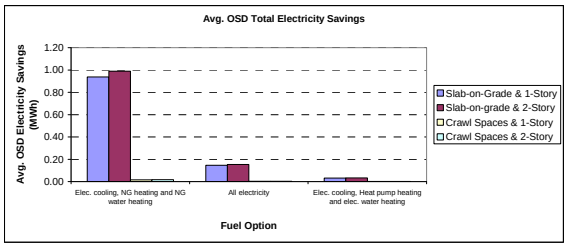
		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	5.25	52.14	0.91	0.00	0.19	0.00	6.35	52.14
	2-Story	5.98	62.46	1.04	0.00	0.22	0.00	7.24	62.46
Crawl spaces	1-Story	0.09	0.90	0.02	0.00	0.00	0.00	0.11	0.90
	2-Story	0.10	1.08	0.02	0.00	0.00	0.00	0.13	1.08
Total		11.42	116.58	1.99	0.00	0.43	0.00	13.83	116.58

Code compliant Avg. OSD Total Energy Use (For total houses in a County)

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	4.31	43.52	0.77	0.00	0.16	0.00	5.24	43.52
	2-Story	4.99	52.13	0.89	0.00	0.19	0.00	6.07	52.13
Crawl spaces	1-Story	0.08	0.75	0.01	0.00	0.00	0.00	0.09	0.75
	2-Story	0.09	0.90	0.02	0.00	0.00	0.00	0.11	0.90
Total		9.46	97.30	1.68	0.00	0.36	0.00	11.50	97.30

Avg. OSD Total Energy Savings Due to the Code Adoption

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)
Slab-on-grade	1-Story	0.94	8.62	0.15	0.00	0.03	0.00	1.11	8.62
	2-Story	0.99	10.33	0.15	0.00	0.03	0.00	1.18	10.33
Crawl spaces	1-Story	0.02	0.15	0.00	0.00	0.00	0.00	0.02	0.15
	2-Story	0.02	0.18	0.00	0.00	0.00	0.00	0.02	0.18
Total		1.96	19.28	0.31	0.00	0.07	0.00	2.33	19.28



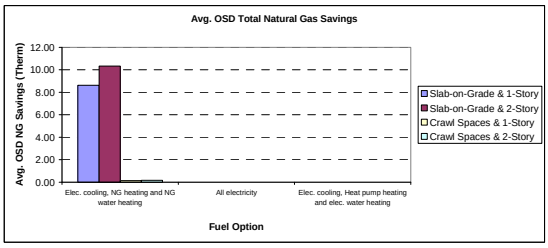
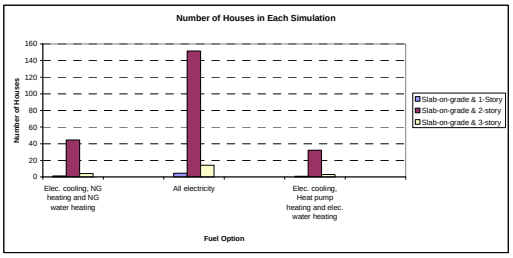


Table 59: Code and Pre-code Average OSD Simulation Results for Hunt County (Single-Family).

The simulation result for one county

County Name	Hunt
NAHB Division	West South Central
Number of new building permits for MF	256

		Fuel Option			Total
		1	2	3	
		Elec. cooling, NG heating and NG water heating	All electricity	Elec. cooling, Heat pump heating and elec. water heating	
		19.5%	66.4%	14.1%	
Slab-on-grade (100%)	1-Story (2.6%)	0.51%	1.73%	0.37%	2.60%
	2-Story (89.1%)	17.37%	59.16%	12.56%	89.10%
	3-Story (8.3%)	1.62%	5.51%	1.17%	8.30%
Total		19.50%	66.40%	14.10%	100.00%



Number of Houses for each simulation

		Fuel Option			Total
		1	2	3	
		Elec. cooling, NG heating and NG water heating	All electricity	Elec. cooling, Heat pump heating and elec. water heating	
		19.5%	66.4%	14.1%	
Slab-on-grade (100%)	1-Story (2.6%)	1	4	1	7
	2-Story (89.1%)	44	151	32	228
	3-Story (8.3%)	4	14	3	21
Total		50	170	36	256

Precode Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	6,178	245	8,942	0	8,848	0
	2-Story	6,027	221	8,383	0	8,326	0
	3-Story	6,040	214	8,269	0	8,218	0
Total		18,245	680	25,593	0	25,390	0

Code compliant Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	5,837	200	8,589	0	8,504	0
	2-Story	5,759	177	8,087	0	8,046	0
	3-Story	5,779	169	7,978	0	7,940	0
Total		17,374	545	24,644	0	24,490	0

Precode Total Energy Use (For total houses in a County)

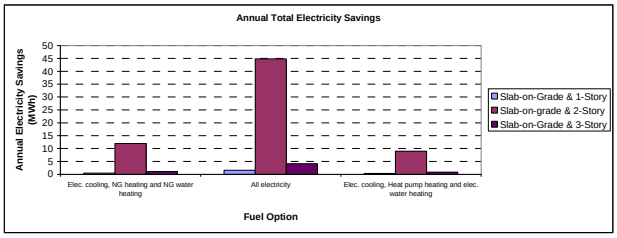
		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	8	317	40	0	8	0	56	317
	2-Story	268	9,841	1,270	0	268	0	1,805	9,841
	3-Story	25	886	117	0	25	0	166	886
Total		301	11,044	1,426	0	301	0	2,029	11,044

Code compliant Total Energy Use (For total houses in a County)

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	8	260	38	0	8	0	53	260
	2-Story	256	7,850	1,225	0	259	0	1,740	7,850
	3-Story	24	700	113	0	24	0	160	700
Total		288	8,810	1,375	0	291	0	1,953	8,810

Total Energy Savings Due to the Code Adoption

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	0	58	2	0	0	0	2	58
	2-Story	12	1,990	45	0	9	0	66	1,990
	3-Story	1	186	4	0	1	0	6	186
Total		13	2,235	51	0	10	0	74	2,235



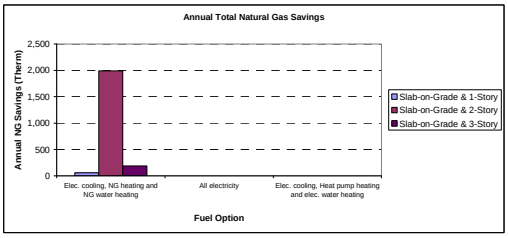


Table 60: Code and Pre-code Annual Simulation Results for Hunt County (Multi-Family).

Precode Avg. OSD Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	26.49	0.50	31.17	0.00	31.17	0.00
	2-Story	24.75	0.47	28.85	0.00	28.85	0.00
	3-Story	24.48	0.45	28.37	0.00	28.37	0.00
Total		75.72	1.42	88.39	0.00	88.39	0.00

Code compliant Avg. OSD Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	24.63	0.38	29.31	0.00	29.31	0.00
	2-Story	23.29	0.35	27.39	0.00	27.39	0.00
	3-Story	23.06	0.33	26.96	0.00	26.96	0.00
Total		70.98	1.06	83.66	0.00	83.66	0.00

Precode Avg. OSD Total Energy Use (For total houses in a County)

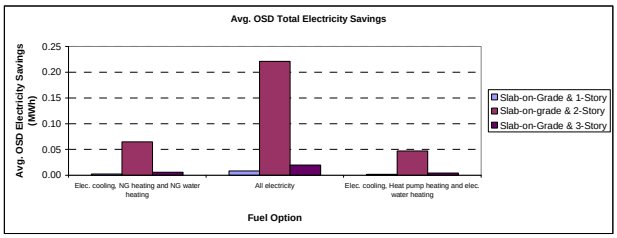
		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	0.03	0.65	0.14	0.00	0.03	0.00	0.20	0.65
	2-Story	1.10	20.70	4.37	0.00	0.93	0.00	6.40	20.70
	3-Story	0.10	1.88	0.40	0.00	0.09	0.00	0.59	1.88
Total		1.24	23.23	4.91	0.00	1.04	0.00	7.19	23.23

Code compliant Avg. OSD Total Energy Use (For total houses in a County)

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	0.03	0.49	0.13	0.00	0.03	0.00	0.19	0.49
	2-Story	1.04	15.36	4.15	0.00	0.88	0.00	6.06	15.36
	3-Story	0.10	1.39	0.38	0.00	0.08	0.00	0.56	1.39
Total		1.16	17.23	4.66	0.00	0.99	0.00	6.81	17.23

Total Energy Savings Due to the Code Adoption

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Savings (kWh)	NG Savings (Therm)	Elec. Savings (kWh)	NG Savings (Therm)	Elec. Savings (kWh)	NG Savings (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	0.00	0.16	0.01	0.00	0.00	0.00	0.01	0.16
	2-Story	0.06	5.34	0.22	0.00	0.05	0.00	0.33	5.34
	3-Story	0.01	0.50	0.02	0.00	0.00	0.00	0.03	0.50
Total		0.07	5.99	0.25	0.00	0.06	0.00	0.38	5.99



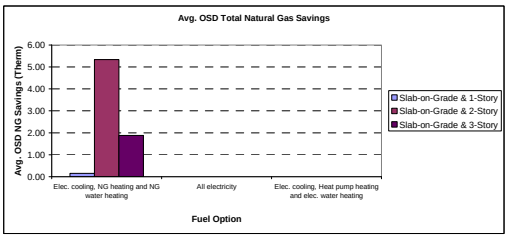


Table 61: Code and Pre-code Average OSD Simulation Results for Hunt County (Multi-Family).

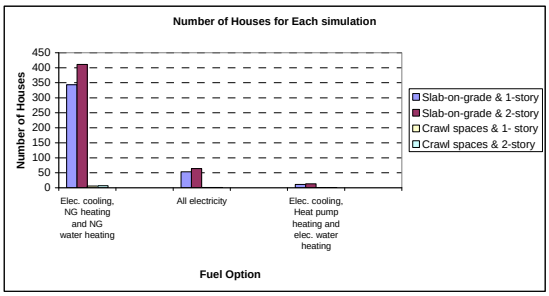
Table 62: Code and Pre-code Simulation Results for Individual Residence for Johnson County (Single-Family and Multi-Family).

County	SF or MF	Precode or Code-compliant	Options			Simulation #	Annual Elec. (kWh/yr)	Annual NG (Therms/yr)	Avg. OSD Elec. (kWh/day) (Aug. 19)	Avg. OSD NG (Therm/day) (Aug. 19)	Total Annual (Elec. + NG) (MBtu)	Annual Elec.Savings (kWh/yr)	Annual NG Savings (Therms/yr)	Avg. OSD Elec. Savings (kWh/day) (Aug. 19)	Avg. OSD NG Savings (Therm/day) (Aug. 19)	Total Annual Savings (Elec. + NG) (MBtu)
Johnson	SF	Precode	Slab-on-grade	Fuel Option 1	1-story	1	15539	505	72.8854	0.725762	103.51					
					2-story	2	14669	496	69.3037	0.725762	99.71					
				Fuel Option 2	1-story	3	22928	0	81.3315	0	78.25					
					2-story	4	21882	0	77.7497	0	74.68					
				Fuel Option 3	1-story	5	21902	0	81.3315	0	74.75					
					2-story	6	20930	0	77.7497	0	71.44					
			Crawl Space	Fuel Option 1	1-story	7	16086	482	73.7068	0.725762	103.08					
					2-story	8	15404	467	70.126	0.725762	99.24					
				Fuel Option 2	1-story	9	23035	0	82.1528	0	78.62					
					2-story	10	22048	0	78.5721	0	75.25					
				Fuel Option 3	1-story	11	22173	0	82.1528	0	75.68					
					2-story	12	21293	0	78.5721	0	72.67					
		Code - Compliant	Slab-on-grade	Fuel Option 1	1-story	13	13318	412	60.6312	0.605762	86.68	2,221	93	12.25	0.12	16.83
					2-story	14	12828	423	58.8167	0.605762	86.09	1,841	73	10.49	0.12	13.62
				Fuel Option 2	1-story	15	19701	0	69.0773	0	67.24	3,227	0	12.25	0.00	11.01
					2-story	16	19406	0	67.2629	0	66.23	2,476	0	10.49	0.00	8.45
				Fuel Option 3	1-story	17	19121	0	69.0773	0	65.26	2,781	0	12.25	0.00	9.49
					2-story	18	18767	0	67.2629	0	64.05	2,163	0	10.49	0.00	7.39
			Crawl Space	Fuel Option 1	1-story	19	13924	384	61.4424	0.605762	85.94	2,162	98	12.26	0.12	17.14
					2-story	20	13550	385	59.6278	0.605762	84.7	1,854	82	10.50	0.12	14.54
				Fuel Option 2	1-story	21	19792	0	69.8885	0	67.55	3,243	0	12.26	0.00	11.07
					2-story	22	19420	0	68.0739	0	66.28	2,628	0	10.50	0.00	8.97
				Fuel Option 3	1-story	23	19385	0	69.8885	0	66.16	2,788	0	12.26	0.00	9.52
					2-story	24	19012	0	68.0739	0	64.89	2,281	0	10.50	0.00	7.78
	MF	Precode	Slab-on-grade	Fuel Option 1	1-story	1	6177.5	244	26.48875	0.4974865	45.505					
					2-story	2	6026.5	221	24.75305	0.4653	42.68					
					3-story	3	6040	213.83333	24.47516667	0.454573333	41.99333333					
				Fuel Option 2	1-story	4	8939.5	0	31.1676	0	30.51					
					2-story	5	8380.75	0	28.847	0	28.6025					
					3-story	6	8267.5	0	28.37416667	0	28.21666667					
				Fuel Option 3	1-story	7	8847.5	0	31.1676	0	30.195					
					2-story	8	8324.5	0	28.847	0	28.4125					
					3-story	9	8214.833333	0	28.37416667	0	28.03666667					
		Code - Compliant	Slab-on-grade	Fuel Option 1	1-story	10	5836	205.5	24.807	0.3774865	40.46	342	39	1.68	0.12	5.05
					2-story	11	5754	181.5	23.4804	0.3453	37.7825	273	40	1.27	0.12	4.90
					3-story	12	5770.666667	173.83333	23.2485	0.334573333	37.07333333	269	40	1.23	0.12	4.92
				Fuel Option 2	1-story	13	8678	0	29.48585	0	29.615	262	0	1.68	0.00	0.90
					2-story	14	8171.5	0	27.5745	0	27.89	209	0	1.27	0.00	0.71
					3-story	15	8055.666667	0	27.14766667	0	27.49333333	212	0	1.23	0.00	0.72
				Fuel Option 3	1-story	16	8572	0	29.48585	0	29.255	276	0	1.68	0.00	0.94
					2-story	17	8110.25	0	27.5745	0	27.68	214	0	1.27	0.00	0.73
					3-story	18	7999.5	0	27.14766667	0	27.30166667	215	0	1.23	0.00	0.73

Prototype of the simulation result for one county

County Name	Johnson
Division (East or West Texas)	West Texas
Number of new building permits for SFD	913

		Fuel Option 1	Fuel Option 2	Fuel Option 3	Total
		Elec. cooling, NG heating and NG water heating	All electricity	Elec. cooling, Heat pump heating and elec. water heating	
		84.1%	13.1%	2.8%	
Slab-on-grade (98.3%)	1-Story (45.5%)	37.61%	5.86%	1.25%	44.73%
	2-Story (54.5%)	45.06%	7.02%	1.50%	53.57%
Crawl spaces (1.7%)	1-Story (45.5%)	0.65%	0.10%	0.02%	0.77%
	2-Story (54.5%)	0.78%	0.12%	0.03%	0.93%
Total		84.10%	13.10%	2.80%	100.00%



Number of Houses for each simulation

		Fuel Option 1	Fuel Option 2	Fuel Option 3	Total
		Elec. cooling, NG heating and NG water heating	All electricity	Elec. cooling, Heat pump heating and elec. water heating	
		84.1%	13.1%	2.8%	
Slab-on-grade (98.3%)	1-Story (45.5%)	343	53	11	408
	2-Story (54.5%)	411	64	14	489
Crawl spaces (1.7%)	1-Story (45.5%)	6	1	0	7
	2-Story (54.5%)	7	1	0	8
Total		768	120	26	913

Precode Energy Use for each option (per house)

		Fuel Option 1		Fuel Option 2		Fuel Option 3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	15,539	505	22,928	0	21,902	0
	2-Story	14,669	496	21,882	0	20,930	0
Crawl spaces	1-Story	16,086	482	23,035	0	22,173	0
	2-Story	15,404	467	22,048	0	21,293	0
Total		61,698	1,950	89,893	0	86,298	0

Code compliant Energy Use for each option (per house)

		Fuel Option 1		Fuel Option 2		Fuel Option 3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	13,318	412	19,701	0	19,121	0
	2-Story	12,828	423	19,406	0	18,767	0
Crawl spaces	1-Story	13,924	384	19,792	0	19,385	0
	2-Story	13,550	385	19,420	0	19,012	0
Total		53,620	1,604	78,319	0	76,285	0

Precode Total Energy Use (For total houses in a County)

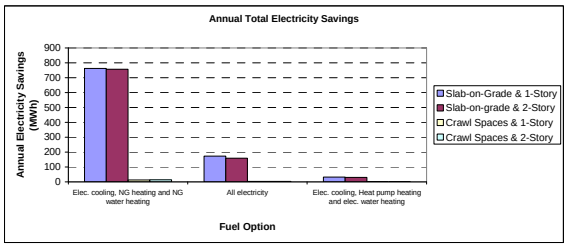
		Fuel Option 1		Fuel Option 2		Fuel Option 3		Total	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	5,336	173,430	1,227	0	250	0	6,813	173,430
	2-Story	6,034	204,032	1,402	0	287	0	7,723	204,032
Crawl spaces	1-Story	98	2,863	21	0	4	0	123	2,863
	2-Story	110	3,322	24	0	5	0	139	3,322
Total		11,576	383,647	2,674	0	547	0	14,797	383,647

Code compliant Total Energy Use (For total houses in a County)

		Fuel Option 1		Fuel Option 2		Fuel Option 3		Total	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	4,574	141,491	1,054	0	219	0	5,846	141,491
	2-Story	5,277	174,003	1,243	0	257	0	6,777	174,003
Crawl spaces	1-Story	83	2,281	18	0	4	0	105	2,281
	2-Story	96	2,739	22	0	5	0	122	2,739
Total		10,030	320,514	2,337	0	484	0	12,851	320,514

Total Energy Savings Due to the Code Adoption

		Fuel Option 1		Fuel Option 2		Fuel Option 3		Total	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)
Slab-on-grade	1-Story	763	31,939	173	0	32	0	967	31,939
	2-Story	757	30,029	159	0	30	0	946	30,029
Crawl spaces	1-Story	13	582	3	0	1	0	16	582
	2-Story	13	583	3	0	1	0	17	583
Total		1,546	63,133	337	0	63	0	1,946	63,133



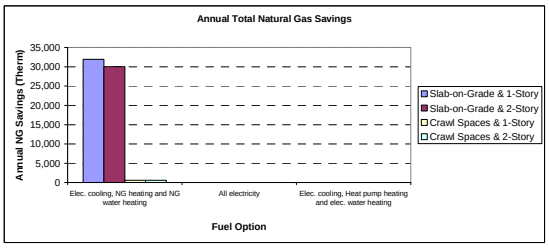


Table 63: Code and Pre-code Annual Simulation Results for Johnson County (Single-Family).

Precode Avg. OSD Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	72.89	0.73	81.33	0.00	81.33	0.00
	2-Story	69.30	0.73	77.75	0.00	77.75	0.00
Crawl spaces	1-Story	73.71	0.73	82.15	0.00	82.15	0.00
	2-Story	70.13	0.73	78.57	0.00	78.57	0.00
Total		286.02	2.90	319.81	0.00	319.81	0.00

Code compliant Avg. OSD Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	60.63	0.61	69.08	0.00	69.08	0.00
	2-Story	58.82	0.61	67.26	0.00	67.26	0.00
Crawl spaces	1-Story	61.44	0.61	69.89	0.00	69.89	0.00
	2-Story	59.63	0.61	68.07	0.00	68.07	0.00
Total		240.52	2.42	274.30	0.00	274.30	0.00

Precode Avg. OSD Total Energy Use (For total houses in a County)

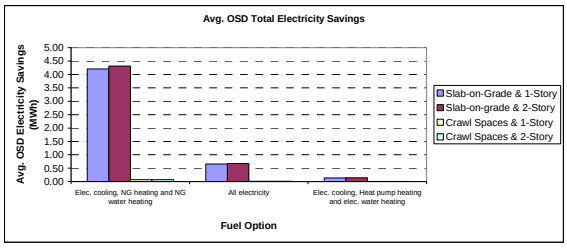
		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	25.03	249.24	4.35	0.00	0.93	0.00	30.31	249.24
	2-Story	28.51	298.55	4.98	0.00	1.06	0.00	34.56	298.55
Crawl spaces	1-Story	0.44	4.31	0.08	0.00	0.02	0.00	0.53	4.31
	2-Story	0.50	5.16	0.09	0.00	0.02	0.00	0.60	5.16
Total		54.48	557.26	9.50	0.00	2.03	0.00	66.00	557.26

Code compliant Avg. OSD Total Energy Use (For total houses in a County)

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	20.82	208.03	3.70	0.00	0.79	0.00	25.31	208.03
	2-Story	24.19	249.18	4.31	0.00	0.92	0.00	29.43	249.18
Crawl spaces	1-Story	0.36	3.60	0.06	0.00	0.01	0.00	0.44	3.60
	2-Story	0.42	4.31	0.08	0.00	0.02	0.00	0.52	4.31
Total		45.81	465.12	8.15	0.00	1.74	0.00	55.69	465.12

Avg. OSD Total Energy Savings Due to the Code Adoption

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)
Slab-on-grade	1-Story	4.21	41.21	0.66	0.00	0.14	0.00	5.00	41.21
	2-Story	4.31	49.36	0.67	0.00	0.14	0.00	5.13	49.36
Crawl spaces	1-Story	0.07	0.71	0.01	0.00	0.00	0.00	0.09	0.71
	2-Story	0.07	0.85	0.01	0.00	0.00	0.00	0.09	0.85
Total		8.67	92.14	1.35	0.00	0.29	0.00	10.31	92.14



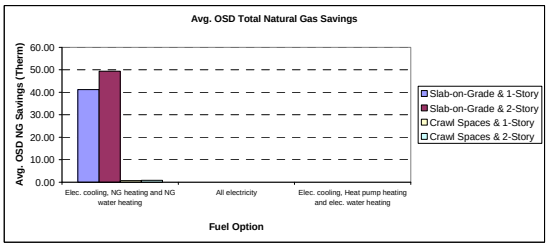
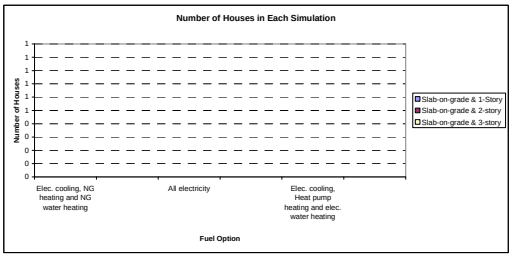


Table 64: Code and Pre-code Average OSD Simulation Results for Johnson County (Single-Family).

The simulation result for one county

County Name	Johnson
NAHB Division	West South Central
Number of new building permits for MF	0

		Fuel Option			Total
		1	2	3	
		Elec. cooling, NG heating and NG water heating	All electricity	Elec. cooling, Heat pump heating and elec. water heating	
		19.5%	66.4%	14.1%	
Slab-on-grade (100%)	1-Story (2.6%)	0.51%	1.73%	0.37%	2.60%
	2-Story (89.1%)	17.37%	59.16%	12.56%	89.10%
	3-Story (8.3%)	1.62%	5.51%	1.17%	8.30%
Total		19.50%	66.40%	14.10%	100.00%



Number of Houses for each simulation

		Fuel Option			Total
		1	2	3	
		Elec. cooling, NG heating and NG water heating	All electricity	Elec. cooling, Heat pump heating and elec. water heating	
		19.5%	66.4%	14.1%	
Slab-on-grade (100%)	1-Story (2.6%)	0	0	0	0
	2-Story (89.1%)	0	0	0	0
	3-Story (8.3%)	0	0	0	0
Total		0	0	0	0

Precode Energy Use for each option (per house)

		Fuel Option						
		1		2		3		
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating		
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	
Slab-on-grade	1-Story	6,178	244	8,940	0	8,849	0	
	2-Story	6,027	221	8,381	0	8,325	0	
	3-Story	6,040	214	8,268	0	8,215	0	
Total		18,244	679	25,588	0	25,387	0	

Code compliant Energy Use for each option (per house)

		Fuel Option						
		1		2		3		
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating		
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	
Slab-on-grade	1-Story	5,836	206	8,678	0	8,572	0	
	2-Story	5,754	182	8,172	0	8,110	0	
	3-Story	5,771	174	8,056	0	8,000	0	
Total		17,361	561	24,905	0	24,682	0	

Precode Total Energy Use (For total houses in a County)

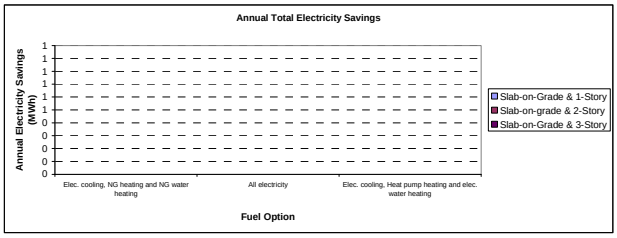
		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	0	0	0	0	0	0	0	0
	2-Story	0	0	0	0	0	0	0	0
	3-Story	0	0	0	0	0	0	0	0
Total		0	0	0	0	0	0	0	0

Code compliant Total Energy Use (For total houses in a County)

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	0	0	0	0	0	0	0	0
	2-Story	0	0	0	0	0	0	0	0
	3-Story	0	0	0	0	0	0	0	0
Total		0	0	0	0	0	0	0	0

Total Energy Savings Due to the Code Adoption

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	0	0	0	0	0	0	0	0
	2-Story	0	0	0	0	0	0	0	0
	3-Story	0	0	0	0	0	0	0	0
Total		0	0	0	0	0	0	0	0



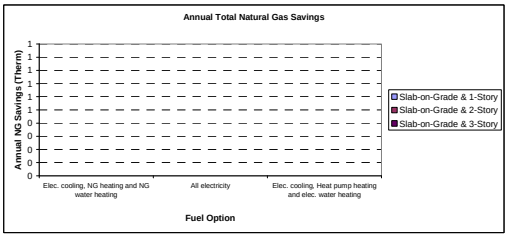


Table 65: Code and Pre-code Annual Simulation Results for Johnson County (Multi-Family).

Precode Avg. OSD Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	26.49	0.50	31.17	0.00	31.17	0.00
	2-Story	24.75	0.47	28.85	0.00	28.85	0.00
	3-Story	24.48	0.45	28.37	0.00	28.37	0.00
Total		75.72	1.42	88.39	0.00	88.39	0.00

Code compliant Avg. OSD Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	24.81	0.38	29.49	0.00	29.49	0.00
	2-Story	23.48	0.35	27.57	0.00	27.57	0.00
	3-Story	23.25	0.33	27.15	0.00	27.15	0.00
Total		71.54	1.06	84.21	0.00	84.21	0.00

Precode Avg. OSD Total Energy Use (For total houses in a County)

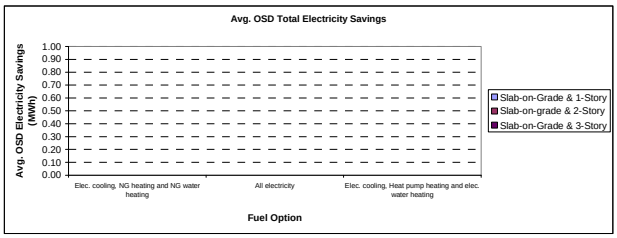
		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	2-Story	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3-Story	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Code compliant Avg. OSD Total Energy Use (For total houses in a County)

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	2-Story	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3-Story	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Total Energy Savings Due to the Code Adoption

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Savings (kWh)	NG Savings (Therm)	Elec. Savings (kWh)	NG Savings (Therm)	Elec. Savings (kWh)	NG Savings (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	2-Story	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3-Story	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00



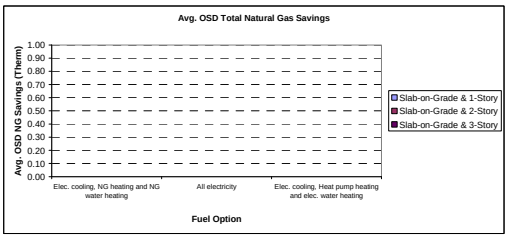


Table 66: Code and Pre-code Average OSD Simulation Results for Johnson County (Multi-Family).

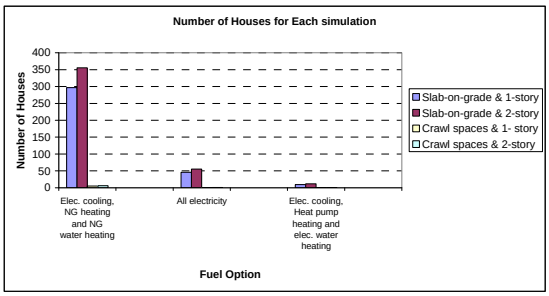
Table 67: Code and Pre-code Simulation Results for Individual Residence for Kaufman County (Single-Family and Multi-Family).

County	SF or MF	Precode or Code-compliant	Options			Simulation #	Annual Elec. (kWh/yr)	Annual NG (Therms/yr)	Avg. OSD Elec. (kWh/day) (Aug. 19)	Avg. OSD NG (Therm/day) (Aug. 19)	Total Annual (Elec. + NG) (MBtu)	Annual Elec.Savings (kWh/yr)	Annual NG Savings (Therms/yr)	Avg. OSD Elec. Savings (kWh/day) (Aug. 19)	Avg. OSD NG Savings (Therm/day) (Aug. 19)	Total Annual Savings (Elec. + NG) (MBtu)
Kaufman	SF	Precode	Slab-on-grade	Fuel Option 1	1-story	1	15529	505	72.8272	0.725762	103.53					
					2-story	2	14658	497	69.2444	0.725762	99.77					
				Fuel Option 2	1-story	3	22928	0	81.2733	0	78.25					
					2-story	4	21886	0	77.6905	0	74.7					
				Fuel Option 3	1-story	5	21905	0	81.2733	0	74.76					
					2-story	6	20933	0	77.6905	0	71.44					
			Crawl Space	Fuel Option 1	1-story	7	16075	482	73.6482	0.725762	103.09					
					2-story	8	15389	467	70.066	0.725762	99.26					
				Fuel Option 2	1-story	9	23034	0	82.0942	0	78.61					
					2-story	10	22046	0	78.512	0	75.24					
				Fuel Option 3	1-story	11	22175	0	82.0942	0	75.68					
					2-story	12	21289	0	78.512	0	72.66					
		Code - Compliant	Slab-on-grade	Fuel Option 1	1-story	13	13436	386	59.848	0.605762	84.46	2,093	119	12.98	0.12	19.07
					2-story	14	12926	391	57.8116	0.605762	83.17	1,732	106	11.43	0.12	16.60
				Fuel Option 2	1-story	15	19322	0	68.294	0	65.95	3,606	0	12.98	0.00	12.30
					2-story	16	18886	0	66.2576	0	64.46	3,000	0	11.43	0.00	10.24
				Fuel Option 3	1-story	17	18916	0	68.294	0	64.56	2,989	0	12.98	0.00	10.20
					2-story	18	18457	0	66.2576	0	62.99	2,476	0	11.43	0.00	8.45
			Crawl Space	Fuel Option 1	1-story	19	13891	370	60.6589	0.605762	84.4	2,184	112	12.99	0.12	18.69
					2-story	20	13495	367	58.6259	0.605762	82.79	1,894	100	11.44	0.12	16.47
				Fuel Option 2	1-story	21	19494	0	69.105	0	66.53	3,540	0	12.99	0.00	12.08
					2-story	22	19048	0	67.0721	0	65.01	2,998	0	11.44	0.00	10.23
				Fuel Option 3	1-story	23	19172	0	69.105	0	65.43	3,003	0	12.99	0.00	10.25
					2-story	24	18738	0	67.0721	0	63.95	2,551	0	11.44	0.00	8.71
	MF	Precode	Slab-on-grade	Fuel Option 1	1-story	1	6177.5	244	26.48875	0.4974865	45.505					
					2-story	2	6026.5	221	24.75305	0.4653	42.68					
					3-story	3	6040	213.83333	24.47516667	0.454573333	41.99333333					
				Fuel Option 2	1-story	4	8939.5	0	31.1676	0	30.51					
					2-story	5	8380.75	0	28.847	0	28.6025					
					3-story	6	8267.5	0	28.37416667	0	28.21666667					
				Fuel Option 3	1-story	7	8847.5	0	31.1676	0	30.195					
					2-story	8	8324.5	0	28.847	0	28.4125					
					3-story	9	8214.833333	0	28.37416667	0	28.03666667					
		Code - Compliant	Slab-on-grade	Fuel Option 1	1-story	10	5836.5	200	24.6313	0.3774865	39.915	341	44	1.86	0.12	5.59
					2-story	11	5758.5	176.25	23.293775	0.3453	37.285	268	45	1.46	0.12	5.40
					3-story	12	5778.666667	168.83333	23.05883333	0.334573333	36.60166667	261	45	1.42	0.12	5.39
				Fuel Option 2	1-story	13	8578.5	0	29.31015	0	29.28	361	0	1.86	0.00	1.23
					2-story	14	8085	0	27.38775	0	27.5925	296	0	1.46	0.00	1.01
					3-story	15	7976.5	0	26.95783333	0	27.22333333	291	0	1.42	0.00	0.99
				Fuel Option 3	1-story	16	8503.5	0	29.31015	0	29.02	344	0	1.86	0.00	1.18
					2-story	17	8045	0	27.38775	0	27.4575	280	0	1.46	0.00	0.96
					3-story	18	7939.333333	0	26.95783333	0	27.09666667	276	0	1.42	0.00	0.94

Prototype of the simulation result for one county

County Name	Kaufman
Division (East or West Texas)	West Texas
Number of new building permits for SFD	789

		Fuel Option			Total
		1	2	3	
		Elec. cooling, NG heating and NG water heating	All electricity	Elec. cooling, Heat pump heating and elec. water heating	
		84.1%	13.1%	2.8%	
Slab-on-grade (98.3%)	1-Story (45.5%)	37.61%	5.86%	1.25%	44.73%
	2-Story (54.5%)	45.06%	7.02%	1.50%	53.57%
Crawl spaces (1.7%)	1-Story (45.5%)	0.65%	0.10%	0.02%	0.77%
	2-Story (54.5%)	0.78%	0.12%	0.03%	0.93%
Total		84.10%	13.10%	2.80%	100.00%



Number of Houses for each simulation

		Fuel Option			Total
		1	2	3	
		Elec. cooling, NG heating and NG water heating	All electricity	Elec. cooling, Heat pump heating and elec. water heating	
		84.1%	13.1%	2.8%	
Slab-on-grade (98.3%)	1-Story (45.5%)	297	46	10	353
	2-Story (54.5%)	355	55	12	423
Crawl spaces (1.7%)	1-Story (45.5%)	5	1	0	6
	2-Story (54.5%)	6	1	0	7
Total		664	103	22	789

Precode Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	15,529	505	22,928	0	21,905	0
	2-Story	14,658	497	21,886	0	20,933	0
Crawl spaces	1-Story	16,075	482	23,034	0	22,175	0
	2-Story	15,389	467	22,046	0	21,289	0
Total		61,651	1,951	89,894	0	86,302	0

Code compliant Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	13,436	386	19,322	0	18,916	0
	2-Story	12,926	391	18,886	0	18,457	0
Crawl spaces	1-Story	13,891	370	19,494	0	19,172	0
	2-Story	13,495	367	19,048	0	18,738	0
Total		53,748	1,514	76,750	0	75,283	0

Precode Total Energy Use (For total houses in a County)

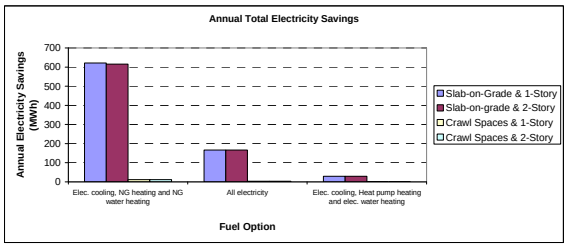
		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	4,609	149,875	1,060	0	216	0	5,885	149,875
	2-Story	5,211	176,677	1,212	0	248	0	6,670	176,677
Crawl spaces	1-Story	83	2,474	18	0	4	0	105	2,474
	2-Story	95	2,871	21	0	4	0	120	2,871
Total		9,997	331,897	2,311	0	472	0	12,780	331,897

Code compliant Total Energy Use (For total houses in a County)

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	3,988	114,558	893	0	187	0	5,068	114,558
	2-Story	4,595	138,995	1,046	0	218	0	5,859	138,995
Crawl spaces	1-Story	71	1,899	16	0	3	0	90	1,899
	2-Story	83	2,256	18	0	4	0	105	2,256
Total		8,737	257,708	1,973	0	412	0	11,122	257,708

Total Energy Savings Due to the Code Adoption

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)
Slab-on-grade	1-Story	621	35,317	167	0	30	0	817	35,317
	2-Story	616	37,682	166	0	29	0	811	37,682
Crawl spaces	1-Story	11	575	3	0	1	0	15	575
	2-Story	12	615	3	0	1	0	15	615
Total		1,260	74,188	339	0	60	0	1,658	74,188



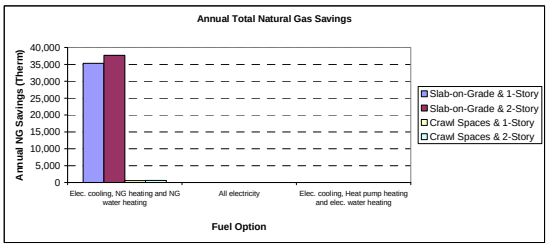


Table 68: Code and Pre-code Annual Simulation Results for Kaufman County (Single-Family).

Precode Avg. OSD Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	72.83	0.73	81.27	0.00	81.27	0.00
	2-Story	69.24	0.73	77.69	0.00	77.69	0.00
Crawl spaces	1-Story	73.65	0.73	82.09	0.00	82.09	0.00
	2-Story	70.07	0.73	78.51	0.00	78.51	0.00
Total		285.79	2.90	319.57	0.00	319.57	0.00

Code compliant Avg. OSD Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	59.85	0.61	68.29	0.00	68.29	0.00
	2-Story	57.81	0.61	66.26	0.00	66.26	0.00
Crawl spaces	1-Story	60.66	0.61	69.11	0.00	69.11	0.00
	2-Story	58.63	0.61	67.07	0.00	67.07	0.00
Total		236.94	2.42	270.73	0.00	270.73	0.00

Precode Avg. OSD Total Energy Use (For total houses in a County)

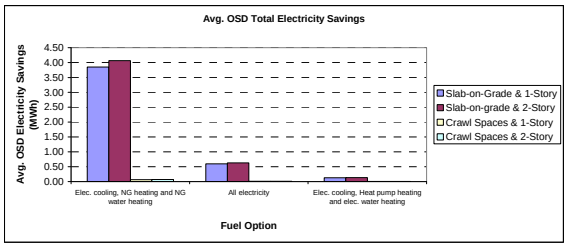
		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	21.61	215.39	3.76	0.00	0.80	0.00	26.17	215.39
	2-Story	24.62	258.00	4.30	0.00	0.92	0.00	29.84	258.00
Crawl spaces	1-Story	0.38	3.73	0.07	0.00	0.01	0.00	0.46	3.73
	2-Story	0.43	4.46	0.08	0.00	0.02	0.00	0.53	4.46
Total		47.04	481.58	8.20	0.00	1.75	0.00	56.99	481.58

Code compliant Avg. OSD Total Energy Use (For total houses in a County)

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	17.76	179.78	3.16	0.00	0.67	0.00	21.59	179.78
	2-Story	20.55	215.34	3.67	0.00	0.78	0.00	25.00	215.34
Crawl spaces	1-Story	0.31	3.11	0.06	0.00	0.01	0.00	0.38	3.11
	2-Story	0.36	3.72	0.06	0.00	0.01	0.00	0.44	3.72
Total		38.98	401.95	6.95	0.00	1.48	0.00	47.41	401.95

Avg. OSD Total Energy Savings Due to the Code Adoption

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)
Slab-on-grade	1-Story	3.85	35.61	0.60	0.00	0.13	0.00	4.58	35.61
	2-Story	4.08	42.66	0.63	0.00	0.14	0.00	4.83	42.66
Crawl spaces	1-Story	0.07	0.62	0.01	0.00	0.00	0.00	0.08	0.62
	2-Story	0.07	0.74	0.01	0.00	0.00	0.00	0.08	0.74
Total		8.05	79.63	1.25	0.00	0.27	0.00	9.58	79.63



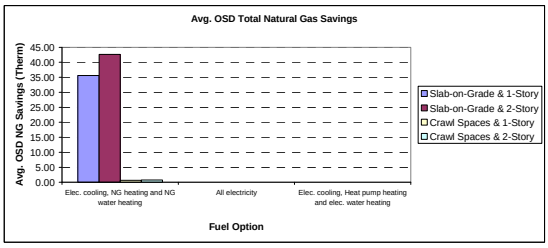
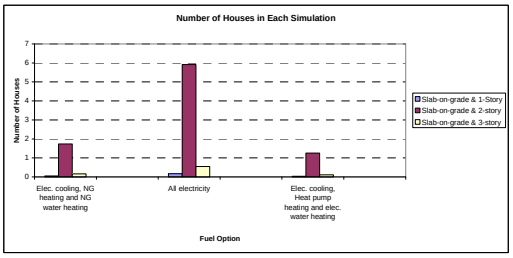


Table 69: Code and Pre-code Average OSD Simulation Results for Kaufman County (Single-Family).

The simulation result for one county

County Name	Kaufman
NAHB Division	West South Central
Number of new building permits for MF	10

		Fuel Option			Total
		1	2	3	
		Elec. cooling, NG heating and NG water heating	All electricity	Elec. cooling, Heat pump heating and elec. water heating	
		19.5%	66.4%	14.1%	
Slab-on-grade (100%)	1-Story (2.6%)	0.51%	1.73%	0.37%	2.60%
	2-Story (89.1%)	17.37%	59.16%	12.56%	89.10%
	3-Story (8.3%)	1.62%	5.51%	1.17%	8.30%
Total		19.50%	66.40%	14.10%	100.00%



Number of Houses for each simulation

		Fuel Option			Total
		1	2	3	
		Elec. cooling, NG heating and NG water heating	All electricity	Elec. cooling, Heat pump heating and elec. water heating	
		19.5%	66.4%	14.1%	
Slab-on-grade (100%)	1-Story (2.6%)	0	0	0	0
	2-Story (89.1%)	2	6	1	9
	3-Story (8.3%)	0	1	0	1
Total		2	7	1	10

Precode Energy Use for each option (per house)

		Fuel Option						
		1		2		3		
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating		
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	
Slab-on-grade	1-Story	6,178	244	8,940	0	8,848	0	
	2-Story	6,027	221	8,381	0	8,325	0	
	3-Story	6,040	214	8,268	0	8,215	0	
Total		18,244	679	25,588	0	25,387	0	

Code compliant Energy Use for each option (per house)

		Fuel Option						
		1		2		3		
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating		
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	
Slab-on-grade	1-Story	5,837	200	8,579	0	8,504	0	
	2-Story	5,759	176	8,085	0	8,045	0	
	3-Story	5,779	169	7,977	0	7,939	0	
Total		17,374	545	24,640	0	24,488	0	

Precode Total Energy Use (For total houses in a County)

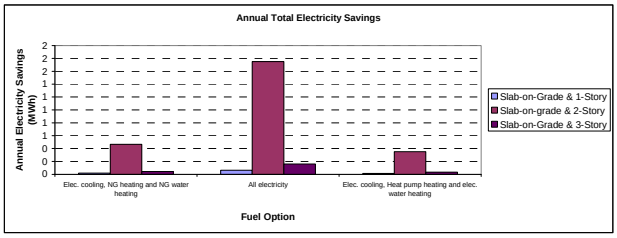
		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	0	12	2	0	0	0	2	12
	2-Story	10	384	50	0	10	0	71	384
	3-Story	1	35	5	0	1	0	8	35
Total		12	431	56	0	12	0	79	431

Code compliant Total Energy Use (For total houses in a County)

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	0	10	1	0	0	0	2	10
	2-Story	10	306	48	0	10	0	68	306
	3-Story	1	27	4	0	1	0	6	27
Total		11	344	54	0	11	0	76	344

Total Energy Savings Due to the Code Adoption

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	0	2	0	0	0	0	0	2
	2-Story	0	78	2	0	0	0	3	78
	3-Story	0	7	0	0	0	0	0	7
Total		1	87	2	0	0	0	3	87



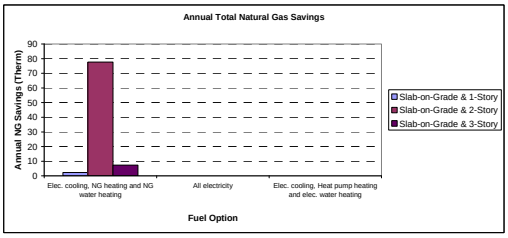


Table 70: Code and Pre-code Annual Simulation Results for Kaufman County (Multi-Family).

Precode Avg. OSD Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	26.49	0.50	31.17	0.00	31.17	0.00
	2-Story	24.75	0.47	28.85	0.00	28.85	0.00
	3-Story	24.48	0.45	28.37	0.00	28.37	0.00
Total		75.72	1.42	88.39	0.00	88.39	0.00

Code compliant Avg. OSD Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	24.63	0.38	29.31	0.00	29.31	0.00
	2-Story	23.29	0.35	27.39	0.00	27.39	0.00
	3-Story	23.06	0.33	26.96	0.00	26.96	0.00
Total		70.98	1.06	83.66	0.00	83.66	0.00

Precode Avg. OSD Total Energy Use (For total houses in a County)

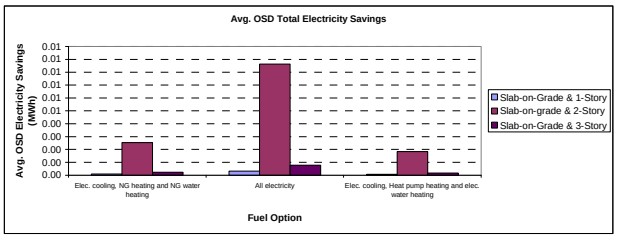
		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	0.00	0.03	0.01	0.00	0.00	0.00	0.01	0.03
	2-Story	0.04	0.81	0.17	0.00	0.04	0.00	0.25	0.81
	3-Story	0.00	0.07	0.02	0.00	0.00	0.00	0.02	0.07
Total		0.05	0.91	0.19	0.00	0.04	0.00	0.28	0.91

Code compliant Avg. OSD Total Energy Use (For total houses in a County)

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	0.00	0.02	0.01	0.00	0.00	0.00	0.01	0.02
	2-Story	0.04	0.60	0.16	0.00	0.03	0.00	0.24	0.60
	3-Story	0.00	0.05	0.01	0.00	0.00	0.00	0.02	0.05
Total		0.05	0.67	0.18	0.00	0.04	0.00	0.27	0.67

Total Energy Savings Due to the Code Adoption

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Savings (kWh)	NG Savings (Therm)	Elec. Savings (kWh)	NG Savings (Therm)	Elec. Savings (kWh)	NG Savings (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.01
	2-Story	0.00	0.21	0.01	0.00	0.00	0.00	0.01	0.21
	3-Story	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.02
Total		0.00	0.23	0.01	0.00	0.00	0.00	0.01	0.23



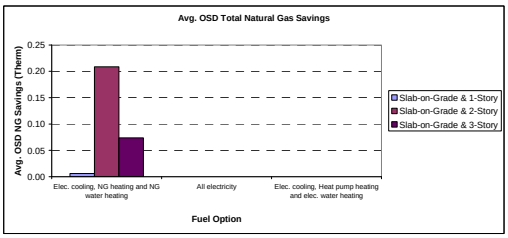


Table 71: Code and Pre-code Average OSD Simulation Results for Kaufman County (Multi-Family).

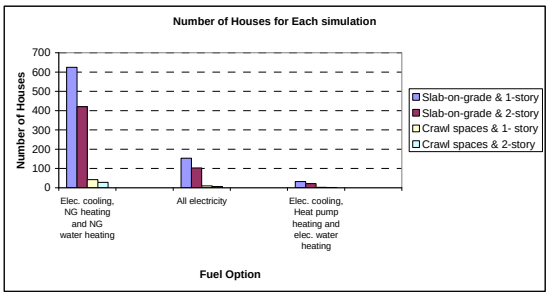
County	SF or MF	Precode or Code-compliant	Options			Simulation #	Annual Elec. (kWh/yr)	Annual NG (Therms/yr)	Avg. OSD Elec. (kWh/day) (Aug. 19)	Avg. OSD NG (Therm/day) (Aug. 19)	Total Annual (Elec. + NG) (MBtu)	Annual Elec.Savings (kWh/yr)	Annual NG Savings (Therms/yr)	Avg. OSD Elec. Savings (kWh/day) (Aug. 19)	Avg. OSD NG Savings (Therm/day) (Aug. 19)	Total Annual Savings (Elec. + NG) (MBtu)
Nueces	SF	Precode	Slab-on-grade	Fuel Option 1	1-story	1	15258	335	60.6103	0.734325	85.61					
					2-story	2	14514	328	58.0842	0.734325	82.32					
				Fuel Option 2	1-story	3	19487	0	69.1298	0	66.51					
					2-story	4	18608	0	66.6035	0	63.51					
				Fuel Option 3	1-story	5	19325	0	69.1298	0	65.96					
					2-story	6	18487	0	66.6035	0	63.1					
			Crawl Space	Fuel Option 1	1-story	7	15819	337	61.2185	0.734325	87.7					
					2-story	8	15278	331	58.6904	0.734325	85.2					
				Fuel Option 2	1-story	9	20084	0	69.7378	0	68.55					
					2-story	10	19420	0	67.2098	0	66.28					
				Fuel Option 3	1-story	11	19903	0	69.7378	0	67.93					
					2-story	12	19288	0	67.2098	0	65.83					
		Code - Compliant	Slab-on-grade	Fuel Option 1	1-story	13	13407	287	53.5181	0.614325	74.49	1,851	48	7.09	0.12	11.12
					2-story	14	12826	281	51.337	0.614325	71.88	1,688	47	6.75	0.12	10.44
				Fuel Option 2	1-story	15	17549	0	62.0375	0	59.89	1,938	0	7.09	0.00	6.62
					2-story	16	16859	0	59.8565	0	57.54	1,749	0	6.75	0.00	5.97
				Fuel Option 3	1-story	17	17440	0	62.0375	0	59.52	1,885	0	7.09	0.00	6.44
					2-story	18	16771	0	59.8565	0	57.24	1,716	0	6.75	0.00	5.86
			Crawl Space	Fuel Option 1	1-story	19	14015	290	54.2099	0.614325	76.8	1,804	47	7.01	0.12	10.90
					2-story	20	13594	284	51.9992	0.614325	74.79	1,684	47	6.69	0.12	10.41
				Fuel Option 2	1-story	21	18201	0	62.7291	0	62.12	1,883	0	7.01	0.00	6.43
					2-story	22	17677	0	60.5187	0	60.33	1,743	0	6.69	0.00	5.95
				Fuel Option 3	1-story	23	18061	0	62.7291	0	61.64	1,842	0	7.01	0.00	6.29
					2-story	24	17567	0	60.5187	0	59.96	1,721	0	6.69	0.00	5.87
	MF	Precode	Slab-on-grade	Fuel Option 1	1-story	1	6760	202	25.43115	0.502025	43.275					
					2-story	2	6597.25	198.5	23.88355	0.4692725	41.3725					
					3-story	3	6623.666667	184.16667	23.70383333	0.458355	41.025					
				Fuel Option 2	1-story	4	8791.5	0	30.15065	0	30.005					
					2-story	5	8388.75	0	28.013	0	28.63					
					3-story	6	8336	0	27.63666667	0	28.45					
				Fuel Option 3	1-story	7	8787.5	0	30.15055	0	29.99					
					2-story	8	8381.5	0	28.013	0	28.605					
					3-story	9	8328	0	27.63666667	0	28.42333333					
		Code - Compliant	Slab-on-grade	Fuel Option 1	1-story	10	6322	159	23.9335	0.382026	37.49	438	43	1.50	0.12	5.79
					2-story	11	6244.5	145.75	22.75625	0.3492725	35.88	353	43	1.13	0.12	5.49
					3-story	12	6279.333333	141.16667	22.61583333	0.338355	35.55333333	344	43	1.09	0.12	5.47
				Fuel Option 2	1-story	13	8366.5	0	28.65295	0	28.555	425	0	1.50	0.00	1.45
					2-story	14	8050	0	26.88575	0	27.475	339	0	1.13	0.00	1.16
					3-story	15	8005	0	26.54883333	0	27.32166667	331	0	1.09	0.00	1.13
				Fuel Option 3	1-story	16	8362	0	28.65295	0	28.54	426	0	1.50	0.00	1.45
					2-story	17	8040.25	0	26.88575	0	27.44	341	0	1.13	0.00	1.17
					3-story	18	7995	0	26.54883333	0	27.28666667	333	0	1.09	0.00	1.14

Table 72: Code and Pre-code Simulation Results for Individual Residence for Nueces County (Single-Family and Multi-Family).

Prototype of the simulation result for one county

County Name	Nueces
Division (East or West Texas)	East Texas
Number of new building permits for SFD	1,448

		Fuel Option			Total
		1	2	3	
		Elec. cooling, NG heating and NG water heating	All electricity	Elec. cooling, Heat pump heating and elec. water heating	
		77.1%	18.9%	4.0%	
Slab-on-grade (93.6%)	1-Story (59.8%)	43.16%	10.58%	2.24%	55.97%
	2-Story (40.2%)	29.01%	7.11%	1.51%	37.63%
Crawl spaces (6.4%)	1-Story (59.8%)	2.95%	0.72%	0.15%	3.83%
	2-Story (39.2%)	1.98%	0.49%	0.10%	2.57%
Total		77.10%	18.90%	4.00%	100.00%



Number of Houses for each simulation

		Fuel Option			Total
		1	2	3	
		Elec. cooling, NG heating and NG water heating	All electricity	Elec. cooling, Heat pump heating and elec. water heating	
		77.1%	18.9%	4.0%	
Slab-on-grade (93.6%)	1-Story (59.8%)	625	153	32	810
	2-Story (40.2%)	420	103	22	545
Crawl spaces (6.4%)	1-Story (59.8%)	43	10	2	55
	2-Story (39.2%)	29	7	1	37
Total		1,116	274	58	1,448

Precode Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	15,258	335	19,487	0	19,325	0
	2-Story	14,514	328	18,608	0	18,487	0
Crawl spaces	1-Story	15,819	337	20,084	0	19,903	0
	2-Story	15,278	331	19,420	0	19,288	0
Total		60,869	1,331	77,599	0	77,003	0

Code compliant Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	13,407	287	17,549	0	17,440	0
	2-Story	12,826	281	16,859	0	16,771	0
Crawl spaces	1-Story	14,015	290	18,201	0	18,061	0
	2-Story	13,594	284	17,677	0	17,567	0
Total		53,842	1,142	70,286	0	69,839	0

Precode Total Energy Use (For total houses in a County)

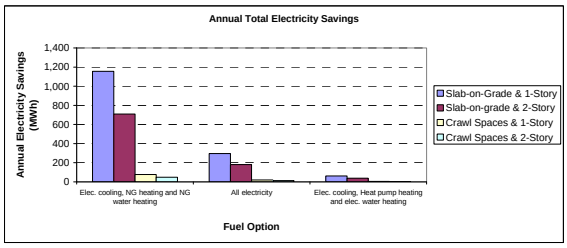
		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	9,534	209,336	2,985	0	627	0	13,146	209,336
	2-Story	6,097	137,784	1,918	0	403	0	8,418	137,784
Crawl spaces	1-Story	676	14,399	210	0	44	0	930	14,399
	2-Story	439	9,507	137	0	29	0	604	9,507
Total		16,746	371,027	5,248	0	1,102	0	23,097	371,027

Code compliant Total Energy Use (For total houses in a County)

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	8,378	179,342	2,688	0	565	0	11,631	179,342
	2-Story	5,388	118,041	1,736	0	366	0	7,489	118,041
Crawl spaces	1-Story	599	12,391	191	0	40	0	829	12,391
	2-Story	390	8,157	124	0	26	0	541	8,157
Total		14,755	317,931	4,739	0	997	0	20,491	317,931

Total Energy Savings Due to the Code Adoption

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)
Slab-on-grade	1-Story	1,157	29,994	297	0	61	0	1,515	29,994
	2-Story	709	19,743	180	0	37	0	927	19,743
Crawl spaces	1-Story	77	2,008	20	0	4	0	101	2,008
	2-Story	48	1,350	12	0	3	0	63	1,350
Total		1,991	53,096	509	0	105	0	2,605	53,096



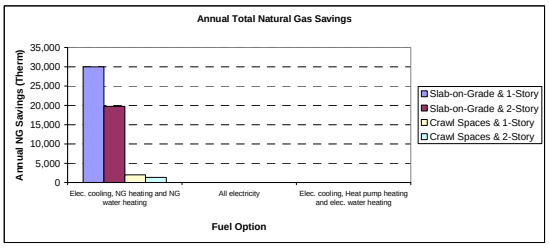


Table 73: Code and Pre-code Annual Simulation Results for Nueces County (Single-Family).

Precode Avg. OSD Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	60.61	0.73	69.13	0.00	69.13	0.00
	2-Story	58.08	0.73	66.60	0.00	66.60	0.00
Crawl spaces	1-Story	61.22	0.73	69.74	0.00	69.74	0.00
	2-Story	58.69	0.73	67.21	0.00	67.21	0.00
Total		238.60	2.94	272.68	0.00	272.68	0.00

Code compliant Avg. OSD Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	53.52	0.61	62.04	0.00	62.04	0.00
	2-Story	51.34	0.61	59.86	0.00	59.86	0.00
Crawl spaces	1-Story	54.21	0.61	62.73	0.00	62.73	0.00
	2-Story	52.00	0.61	60.52	0.00	60.52	0.00
Total		211.06	2.46	245.14	0.00	245.14	0.00

Precode Avg. OSD Total Energy Use (For total houses in a County)

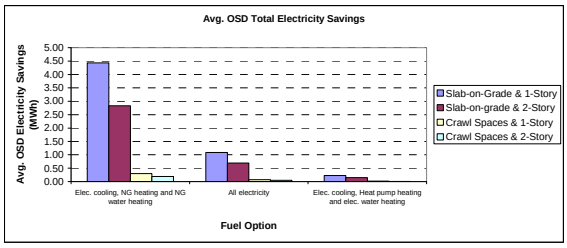
		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	37.87	458.87	10.59	0.00	2.24	0.00	50.71	458.87
	2-Story	24.40	308.47	6.86	0.00	1.45	0.00	32.71	308.47
Crawl spaces	1-Story	2.62	31.38	0.73	0.00	0.15	0.00	3.50	31.38
	2-Story	1.69	21.09	0.47	0.00	0.10	0.00	2.26	21.09
Total		66.58	819.81	18.65	0.00	3.95	0.00	89.17	819.81

Code compliant Avg. OSD Total Energy Use (For total houses in a County)

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	33.44	383.88	9.50	0.00	2.01	0.00	44.96	383.88
	2-Story	21.57	258.06	6.16	0.00	1.30	0.00	29.03	258.06
Crawl spaces	1-Story	2.32	26.25	0.66	0.00	0.14	0.00	3.11	26.25
	2-Story	1.49	17.65	0.43	0.00	0.09	0.00	2.01	17.65
Total		58.82	685.84	16.75	0.00	3.54	0.00	79.11	685.84

Avg. OSD Total Energy Savings Due to the Code Adoption

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)
Slab-on-grade	1-Story	4.43	74.99	1.09	0.00	0.23	0.00	5.75	74.99
	2-Story	2.83	50.41	0.69	0.00	0.15	0.00	3.69	50.41
Crawl spaces	1-Story	0.30	5.13	0.07	0.00	0.02	0.00	0.39	5.13
	2-Story	0.19	3.45	0.05	0.00	0.01	0.00	0.25	3.45
Total		7.76	133.97	1.90	0.00	0.40	0.00	10.06	133.97



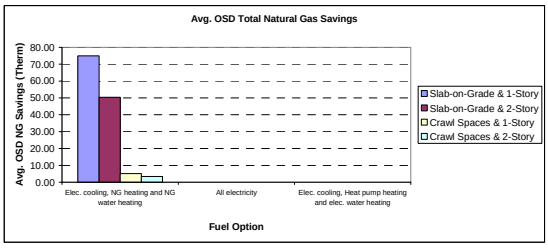
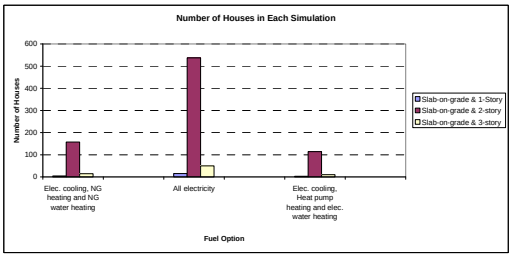


Table 74: Code and Pre-code Average OSD Simulation Results for Nueces County (Single-Family).

The simulation result for one county

County Name	Nueces
NAHB Division	West South Central
Number of new building permits for MF	908

		Fuel Option			Total
		1	2	3	
		Elec. cooling, NG heating and NG water heating	All electricity	Elec. cooling, Heat pump heating and elec. water heating	
		19.5%	66.4%	14.1%	
Slab-on-grade (100%)	1-Story (2.6%)	0.51%	1.73%	0.37%	2.60%
	2-Story (89.1%)	17.37%	59.16%	12.56%	89.10%
	3-Story (8.3%)	1.62%	5.51%	1.17%	8.30%
Total		19.50%	66.40%	14.10%	100.00%



Number of Houses for each simulation

		Fuel Option			Total
		1	2	3	
		Elec. cooling, NG heating and NG water heating	All electricity	Elec. cooling, Heat pump heating and elec. water heating	
		19.5%	66.4%	14.1%	
Slab-on-grade (100%)	1-Story (2.6%)	5	16	3	24
	2-Story (89.1%)	158	537	114	809
	3-Story (8.3%)	15	50	11	75
Total		177	603	128	908

Precode Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	6,760	202	8,792	0	8,788	0
	2-Story	6,597	189	8,389	0	8,382	0
	3-Story	6,624	184	8,336	0	8,328	0
Total		19,981	575	25,516	0	25,497	0

Code compliant Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	6,322	159	8,367	0	8,362	0
	2-Story	6,245	146	8,050	0	8,040	0
	3-Story	6,279	141	8,005	0	7,995	0
Total		18,846	446	24,422	0	24,397	0

Precode Total Energy Use (For total houses in a County)

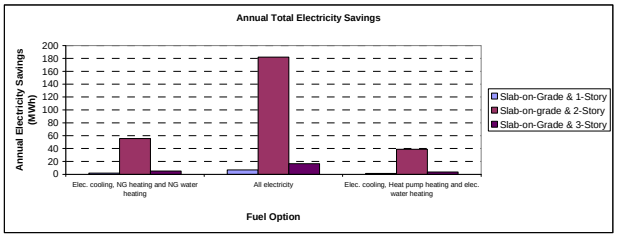
		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	31	930	138	0	29	0	198	930
	2-Story	1,041	29,738	4,506	0	956	0	6,503	29,738
	3-Story	97	2,707	417	0	88	0	603	2,707
Total		1,169	33,374	5,061	0	1,074	0	7,304	33,374

Code compliant Total Energy Use (For total houses in a County)

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	29	732	131	0	28	0	188	732
	2-Story	985	22,994	4,324	0	917	0	6,227	22,994
	3-Story	92	2,075	401	0	85	0	578	2,075
Total		1,107	25,800	4,856	0	1,030	0	6,993	25,800

Total Energy Savings Due to the Code Adoption

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	2	198	7	0	1	0	10	198
	2-Story	56	6,744	182	0	39	0	277	6,744
	3-Story	5	632	17	0	4	0	25	632
Total		63	7,574	205	0	44	0	312	7,574



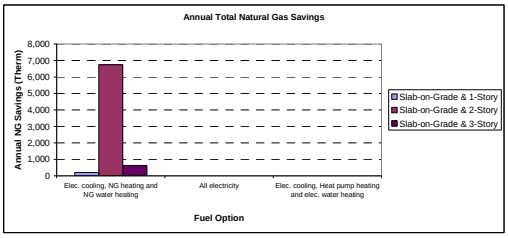


Table 75: Code and Pre-code Annual Simulation Results for Nueces County (Multi-Family).

Precode Avg. OSD Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	25.43	0.50	30.15	0.00	30.15	0.00
	2-Story	23.88	0.47	28.01	0.00	28.01	0.00
	3-Story	23.70	0.46	27.64	0.00	27.64	0.00
Total		73.02	1.43	85.80	0.00	85.80	0.00

Code compliant Avg. OSD Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	23.93	0.38	28.65	0.00	28.65	0.00
	2-Story	22.76	0.35	26.89	0.00	26.89	0.00
	3-Story	22.62	0.34	26.55	0.00	26.55	0.00
Total		69.31	1.07	82.09	0.00	82.09	0.00

Precode Avg. OSD Total Energy Use (For total houses in a County)

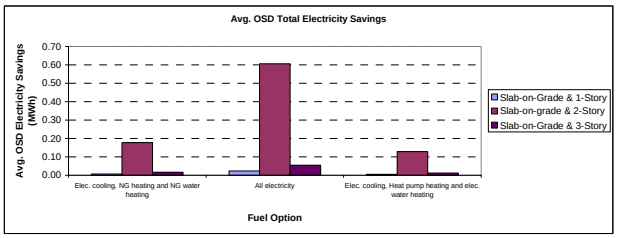
		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	0.12	2.31	0.47	0.00	0.10	0.00	0.69	2.31
	2-Story	3.77	74.03	15.05	0.00	3.20	0.00	22.01	74.03
	3-Story	0.35	6.74	1.38	0.00	0.29	0.00	2.03	6.74
Total		4.23	83.08	16.90	0.00	3.59	0.00	24.73	83.08

Code compliant Avg. OSD Total Energy Use (For total houses in a County)

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	0.11	1.76	0.45	0.00	0.10	0.00	0.65	1.76
	2-Story	3.59	55.10	14.44	0.00	3.07	0.00	21.10	55.10
	3-Story	0.33	4.97	1.33	0.00	0.28	0.00	1.94	4.97
Total		4.03	61.83	16.22	0.00	3.44	0.00	23.70	61.83

Total Energy Savings Due to the Code Adoption

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Savings (kWh)	NG Savings (Therm)	Elec. Savings (kWh)	NG Savings (Therm)	Elec. Savings (kWh)	NG Savings (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	0.01	0.55	0.02	0.00	0.00	0.00	0.04	0.55
	2-Story	0.18	18.93	0.61	0.00	0.13	0.00	0.91	18.93
	3-Story	0.02	1.76	0.05	0.00	0.01	0.00	0.08	1.76
Total		0.20	21.25	0.68	0.00	0.15	0.00	1.03	21.25



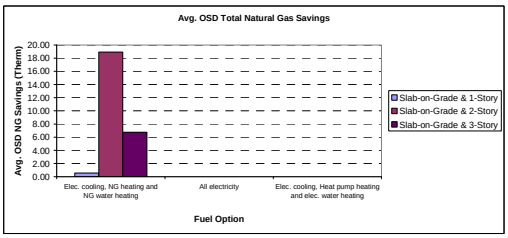


Table 76: Code and Pre-code Average OSD Simulation Results for Nueces County (Multi-Family).

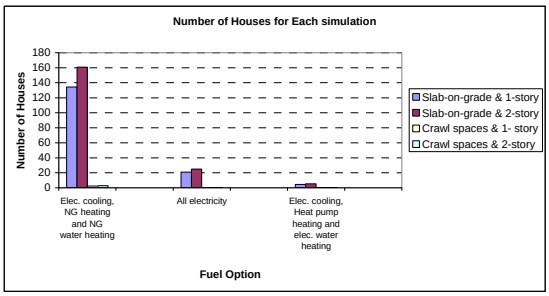
County	SF or MF	Precode or Code-compliant	Options			Simulation #	Annual Elec. (kWh/yr)	Annual NG (Therms/yr)	Avg. OSD Elec. (kWh/day) (Aug. 19)	Avg. OSD NG (Therm/day) (Aug. 19)	Total Annual (Elec. + NG) (MBtu)	Annual Elec.Savings (kWh/yr)	Annual NG Savings (Therms/yr)	Avg. OSD Elec. Savings (kWh/day) (Aug. 19)	Avg. OSD NG Savings (Therm/day) (Aug. 19)	Total Annual Savings (Elec. + NG) (MBtu)
Parker	SF	Precode	Slab-on-grade	Fuel Option 1	1-story	1	15560	505	72.9997	0.725762	103.56					
					2-story	2	14689	496	69.4157	0.725762	99.75					
				Fuel Option 2	1-story	3	22948	0	81.4458	0	78.32					
					2-story	4	21898	0	77.8618	0	74.74					
				Fuel Option 3	1-story	5	21918	0	81.4458	0	74.81					
					2-story	6	20944	0	77.8618	0	71.48					
			Crawl Space	Fuel Option 1	1-story	7	16109	482	73.8229	0.725762	103.13					
					2-story	8	15426	466	70.2407	0.725762	99.28					
				Fuel Option 2	1-story	9	23056	0	82.269	0	78.69					
					2-story	10	22066	0	78.6867	0	75.31					
				Fuel Option 3	1-story	11	22192	0	82.269	0	75.74					
					2-story	12	21308	0	78.6867	0	72.72					
		Code - Compliant	Slab-on-grade	Fuel Option 1	1-story	13	13455	385	59.9569	0.605762	84.44	2,105	120	13.04	0.12	19.12
					2-story	14	12944	390	57.9221	0.605762	83.14	1,745	106	11.49	0.12	16.61
				Fuel Option 2	1-story	15	19331	0	68.403	0	65.97	3,617	0	13.04	0.00	12.35
					2-story	16	18890	0	66.3682	0	64.47	3,008	0	11.49	0.00	10.27
				Fuel Option 3	1-story	17	18924	0	68.403	0	64.59	2,994	0	13.04	0.00	10.22
					2-story	18	18461	0	66.3682	0	63.01	2,483	0	11.49	0.00	8.47
			Crawl Space	Fuel Option 1	1-story	19	13911	369	60.7699	0.605762	84.4	2,198	113	13.05	0.12	18.73
					2-story	20	13517	366	58.7393	0.605762	82.77	1,909	100	11.50	0.12	16.51
				Fuel Option 2	1-story	21	19506	0	69.2159	0	66.57	3,550	0	13.05	0.00	12.12
					2-story	22	19056	0	67.1853	0	65.04	3,010	0	11.50	0.00	10.27
				Fuel Option 3	1-story	23	19183	0	69.2159	0	65.47	3,009	0	13.05	0.00	10.27
					2-story	24	18745	0	67.1853	0	63.98	2,563	0	11.50	0.00	8.74
	MF	Precode	Slab-on-grade	Fuel Option 1	1-story	1	6177.5	244	26.48875	0.4974865	45.505					
					2-story	2	6026.5	221	24.75305	0.4653	42.68					
					3-story	3	6040	213.83333	24.47516667	0.454573333	41.99333333					
				Fuel Option 2	1-story	4	8939.5	0	31.1676	0	30.51					
					2-story	5	8380.75	0	28.847	0	28.6025					
					3-story	6	8267.5	0	28.37416667	0	28.21666667					
				Fuel Option 3	1-story	7	8847.5	0	31.1676	0	30.195					
					2-story	8	8324.5	0	28.847	0	28.4125					
					3-story	9	8214.833333	0	28.37416667	0	28.03666667					
		Code - Compliant	Slab-on-grade	Fuel Option 1	1-story	10	5836.5	200	24.6313	0.3774865	39.915	341	44	1.86	0.12	5.59
					2-story	11	5758.5	176.25	23.293775	0.3453	37.285	268	45	1.46	0.12	5.40
					3-story	12	5778.666667	168.83333	23.05883333	0.334573333	36.60166667	261	45	1.42	0.12	5.39
				Fuel Option 2	1-story	13	8578.5	0	29.31015	0	29.28	361	0	1.86	0.00	1.23
					2-story	14	8085	0	27.38775	0	27.5925	296	0	1.46	0.00	1.01
					3-story	15	7976.5	0	26.95783333	0	27.22333333	291	0	1.42	0.00	0.99
				Fuel Option 3	1-story	16	8503.5	0	29.31015	0	29.02	344	0	1.86	0.00	1.18
					2-story	17	8045	0	27.38775	0	27.4575	280	0	1.46	0.00	0.96
					3-story	18	7939.333333	0	26.95783333	0	27.09666667	276	0	1.42	0.00	0.94

Table 77: Code and Pre-code Simulation Results for Individual Residence for Parker County (Single-Family and Multi-Family).

Prototype of the simulation result for one county

County Name	Parker
Division (East or West Texas)	West Texas
Number of new building permits for SFD	357

		Fuel Option			Total
		1	2	3	
		Elec. cooling, NG heating and NG water heating	All electricity	Elec. cooling, Heat pump heating and elec. water heating	
		84.1%	13.1%	2.8%	
Slab-on-grade (98.3%)	1-Story (45.5%)	37.61%	5.86%	1.25%	44.73%
	2-Story (54.5%)	45.06%	7.02%	1.50%	53.57%
Crawl spaces (1.7%)	1-Story (45.5%)	0.65%	0.10%	0.02%	0.77%
	2-Story (54.5%)	0.78%	0.12%	0.03%	0.93%
Total		84.10%	13.10%	2.80%	100.00%



Number of Houses for each simulation

		Fuel Option			Total
		1	2	3	
		Elec. cooling, NG heating and NG water heating	All electricity	Elec. cooling, Heat pump heating and elec. water heating	
		84.1%	13.1%	2.8%	
Slab-on-grade (98.3%)	1-Story (45.5%)	134	21	4	160
	2-Story (54.5%)	161	25	5	191
Crawl spaces (1.7%)	1-Story (45.5%)	2	0	0	3
	2-Story (54.5%)	3	0	0	3
Total		300	47	10	357

Precode Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	15,560	505	22,948	0	21,918	0
	2-Story	14,689	496	21,898	0	20,944	0
Crawl spaces	1-Story	16,109	482	23,056	0	22,192	0
	2-Story	15,428	466	22,066	0	21,308	0
Total		61,784	1,949	89,968	0	86,362	0

Code compliant Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	13,455	385	19,331	0	18,924	0
	2-Story	12,944	390	18,890	0	18,461	0
Crawl spaces	1-Story	13,911	369	19,506	0	19,183	0
	2-Story	13,517	366	19,056	0	18,745	0
Total		53,827	1,510	76,783	0	75,313	0

Precode Total Energy Use (For total houses in a County)

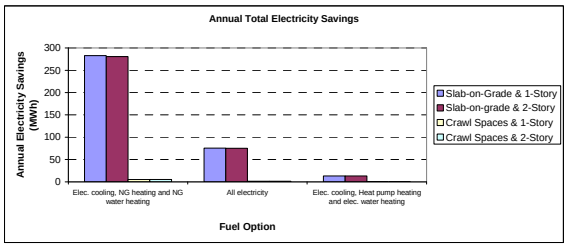
		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	2,089	67,814	480	0	98	0	2,667	67,814
	2-Story	2,363	79,780	549	0	112	0	3,023	79,780
Crawl spaces	1-Story	37	1,119	8	0	2	0	47	1,119
	2-Story	43	1,296	10	0	2	0	54	1,296
Total		4,532	150,010	1,047	0	214	0	5,793	150,010

Code compliant Total Energy Use (For total houses in a County)

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	1,807	51,700	404	0	85	0	2,296	51,700
	2-Story	2,082	62,731	473	0	99	0	2,654	62,731
Crawl spaces	1-Story	32	857	7	0	1	0	41	857
	2-Story	38	1,018	8	0	2	0	48	1,018
Total		3,959	116,305	893	0	187	0	5,038	116,305

Total Energy Savings Due to the Code Adoption

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)
Slab-on-grade	1-Story	283	16,114	76	0	13	0	372	16,114
	2-Story	281	17,050	75	0	13	0	369	17,050
Crawl spaces	1-Story	5	262	1	0	0	0	7	262
	2-Story	5	278	1	0	0	0	7	278
Total		574	33,705	154	0	27	0	755	33,705



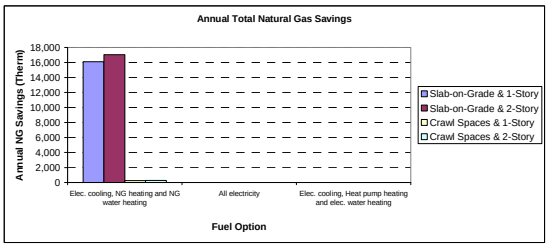


Table 78: Code and Pre-code Annual Simulation Results for Parker County (Single-Family).

Precode Avg. OSD Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	73.00	0.73	81.45	0.00	81.45	0.00
	2-Story	69.42	0.73	77.86	0.00	77.86	0.00
Crawl spaces	1-Story	73.82	0.73	82.27	0.00	82.27	0.00
	2-Story	70.24	0.73	78.69	0.00	78.69	0.00
Total		286.48	2.90	320.26	0.00	320.26	0.00

Code compliant Avg. OSD Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	59.96	0.61	68.40	0.00	68.40	0.00
	2-Story	57.92	0.61	66.37	0.00	66.37	0.00
Crawl spaces	1-Story	60.77	0.61	69.22	0.00	69.22	0.00
	2-Story	58.74	0.61	67.19	0.00	67.19	0.00
Total		237.39	2.42	271.17	0.00	271.17	0.00

Precode Avg. OSD Total Energy Use (For total houses in a County)

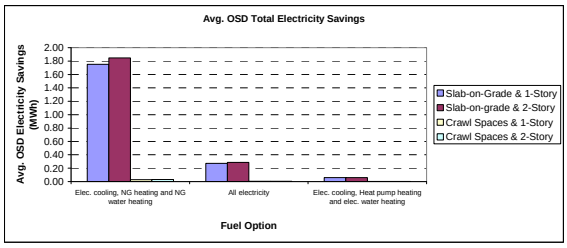
		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	9.80	97.46	1.70	0.00	0.36	0.00	11.87	97.46
	2-Story	11.17	116.74	1.95	0.00	0.42	0.00	13.53	116.74
Crawl spaces	1-Story	0.17	1.69	0.03	0.00	0.01	0.00	0.21	1.69
	2-Story	0.20	2.02	0.03	0.00	0.01	0.00	0.24	2.02
Total		21.33	217.90	3.72	0.00	0.79	0.00	25.85	217.90

Code compliant Avg. OSD Total Energy Use (For total houses in a County)

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	8.05	81.35	1.43	0.00	0.31	0.00	9.79	81.35
	2-Story	9.32	97.44	1.66	0.00	0.36	0.00	11.33	97.44
Crawl spaces	1-Story	0.14	1.41	0.03	0.00	0.01	0.00	0.17	1.41
	2-Story	0.16	1.69	0.03	0.00	0.01	0.00	0.20	1.69
Total		17.67	181.87	3.15	0.00	0.67	0.00	21.49	181.87

Avg. OSD Total Energy Savings Due to the Code Adoption

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)
Slab-on-grade	1-Story	1.75	16.11	0.27	0.00	0.06	0.00	2.08	16.11
	2-Story	1.85	19.30	0.29	0.00	0.06	0.00	2.20	19.30
Crawl spaces	1-Story	0.03	0.28	0.00	0.00	0.00	0.00	0.04	0.28
	2-Story	0.03	0.33	0.00	0.00	0.00	0.00	0.04	0.33
Total		3.66	36.03	0.57	0.00	0.12	0.00	4.35	36.03



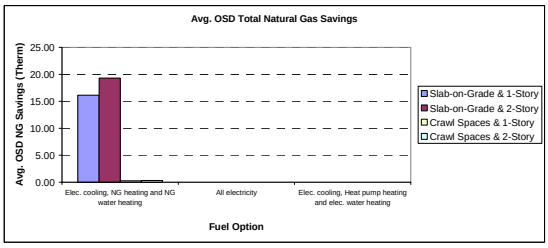
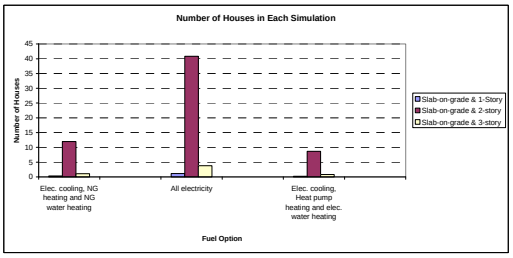


Table 79: Code and Pre-code Average OSD Simulation Results for Parker County (Single-Family).

The simulation result for one county

County Name	Parker
NAHB Division	West South Central
Number of new building permits for MF	69

		Fuel Option			Total
		1	2	3	
		Elec. cooling, NG heating and NG water heating	All electricity	Elec. cooling, Heat pump heating and elec. water heating	
		19.5%	66.4%	14.1%	
Slab-on-grade (100%)	1-Story (2.6%)	0.51%	1.73%	0.37%	2.60%
	2-Story (89.1%)	17.37%	59.16%	12.56%	89.10%
	3-Story (8.3%)	1.62%	5.51%	1.17%	8.30%
Total		19.50%	66.40%	14.10%	100.00%



Number of Houses for each simulation

		Fuel Option			Total
		1	2	3	
		Elec. cooling, NG heating and NG water heating	All electricity	Elec. cooling, Heat pump heating and elec. water heating	
		19.5%	66.4%	14.1%	
Slab-on-grade (100%)	1-Story (2.6%)	0	1	0	2
	2-Story (89.1%)	12	41	9	61
	3-Story (8.3%)	1	4	1	6
Total		13	46	10	69

Precode Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	6,178	244	8,940	0	8,848	0
	2-Story	6,027	221	8,381	0	8,325	0
	3-Story	6,040	214	8,268	0	8,215	0
Total		18,244	679	25,588	0	25,387	0

Code compliant Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	5,837	200	8,579	0	8,504	0
	2-Story	5,759	176	8,085	0	8,045	0
	3-Story	5,779	169	7,977	0	7,939	0
Total		17,374	545	24,640	0	24,488	0

Precode Total Energy Use (For total houses in a County)

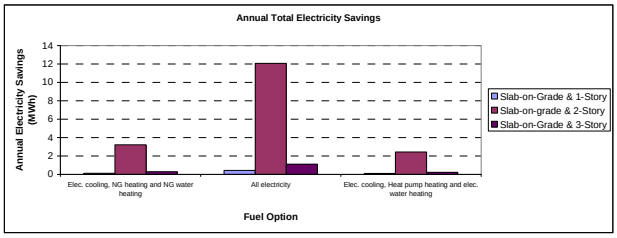
		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	2	85	11	0	2	0	15	85
	2-Story	72	2,649	342	0	72	0	487	2,649
	3-Story	7	239	31	0	7	0	45	239
Total		81	2,974	384	0	81	0	546	2,974

Code compliant Total Energy Use (For total houses in a County)

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	2	70	10	0	2	0	14	70
	2-Story	69	2,113	330	0	70	0	469	2,113
	3-Story	6	189	30	0	6	0	43	189
Total		78	2,371	371	0	78	0	526	2,371

Total Energy Savings Due to the Code Adoption

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	0	15	0	0	0	0	1	15
	2-Story	3	536	12	0	2	0	18	536
	3-Story	0	50	1	0	0	0	2	50
Total		4	602	14	0	3	0	20	602



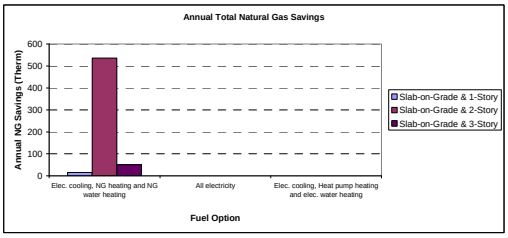


Table 80: Code and Pre-code Annual Simulation Results for Parker County (Multi-Family).

Precode Avg. OSD Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	26.49	0.50	31.17	0.00	31.17	0.00
	2-Story	24.75	0.47	28.85	0.00	28.85	0.00
	3-Story	24.48	0.45	28.37	0.00	28.37	0.00
Total		75.72	1.42	88.39	0.00	88.39	0.00

Code compliant Avg. OSD Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	24.63	0.38	29.31	0.00	29.31	0.00
	2-Story	23.29	0.35	27.39	0.00	27.39	0.00
	3-Story	23.06	0.33	26.96	0.00	26.96	0.00
Total		70.98	1.06	83.66	0.00	83.66	0.00

Precode Avg. OSD Total Energy Use (For total houses in a County)

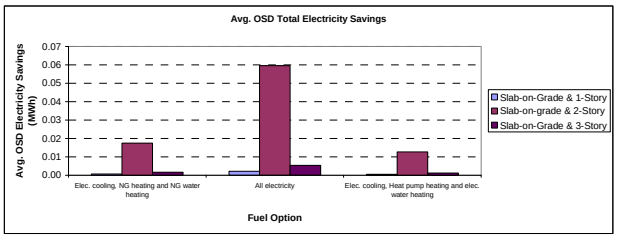
		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	0.01	0.17	0.04	0.00	0.01	0.00	0.05	0.17
	2-Story	0.30	5.58	1.18	0.00	0.25	0.00	1.72	5.58
	3-Story	0.03	0.51	0.11	0.00	0.02	0.00	0.16	0.51
Total		0.33	6.26	1.32	0.00	0.28	0.00	1.94	6.26

Code compliant Avg. OSD Total Energy Use (For total houses in a County)

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	0.01	0.13	0.03	0.00	0.01	0.00	0.05	0.13
	2-Story	0.28	4.14	1.12	0.00	0.24	0.00	1.63	4.14
	3-Story	0.03	0.37	0.10	0.00	0.02	0.00	0.15	0.37
Total		0.31	4.65	1.26	0.00	0.27	0.00	1.84	4.65

Total Energy Savings Due to the Code Adoption

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Savings (kWh)	NG Savings (Therm)	Elec. Savings (kWh)	NG Savings (Therm)	Elec. Savings (kWh)	NG Savings (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.04
	2-Story	0.02	1.44	0.06	0.00	0.01	0.00	0.09	1.44
	3-Story	0.00	0.13	0.01	0.00	0.00	0.00	0.01	0.13
Total		0.02	1.61	0.07	0.00	0.01	0.00	0.10	1.61



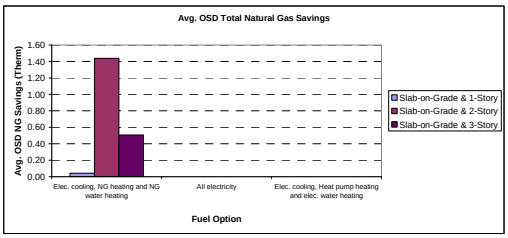


Table 81: Code and Pre-code Average OSD Simulation Results for Parker County (Multi-Family).

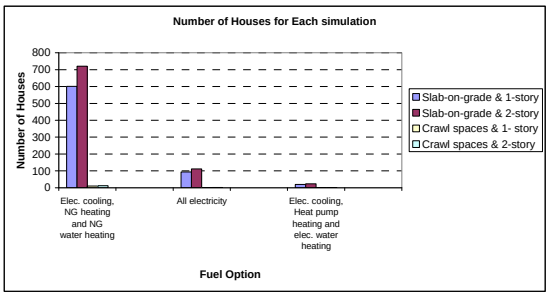
Table 82: Code and Pre-code Simulation Results for Individual Residence for Rockwall County (Single-Family and Multi-Family).

County	SF or MF	Precode or Code-compliant	Options			Simulation #	Annual Elec. (kWh/yr)	Annual NG (Therms/yr)	Avg. OSD Elec. (kWh/day) (Aug. 19)	Avg. OSD NG (Therm/day) (Aug. 19)	Total Annual (Elec. + NG) (MBtu)	Annual Elec.Savings (kWh/yr)	Annual NG Savings (Therms/yr)	Avg. OSD Elec. Savings (kWh/day) (Aug. 19)	Avg. OSD NG Savings (Therm/day) (Aug. 19)	Total Annual Savings (Elec. + NG) (MBtu)
Rockwall	SF	Precode	Slab-on-grade	Fuel Option 1	1-story	1	15551	505	72.9412	0.725762	103.57					
					2-story	2	14677	497	69.3554	0.725762	99.79					
				Fuel Option 2	1-story	3	22948	0	81.3872	0	78.32					
					2-story	4	21902	0	77.8015	0	74.75					
				Fuel Option 3	1-story	5	21921	0	81.3872	0	74.81					
					2-story	6	20956	0	77.8015	0	71.52					
			Crawl Space	Fuel Option 1	1-story	7	16098	482	73.764	0.725762	103.13					
					2-story	8	15410	467	70.1765	0.725762	99.3					
				Fuel Option 2	1-story	9	23054	0	82.21	0	78.68					
					2-story	10	22065	0	78.6226	0	75.31					
				Fuel Option 3	1-story	11	22192	0	82.21	0	75.74					
					2-story	12	21304	0	78.6226	0	72.71					
		Code - Compliant	Slab-on-grade	Fuel Option 1	1-story	13	13449	386	59.9236	0.605762	84.47	2,102	119	13.02	0.12	19.10
					2-story	14	12937	390	57.8835	0.605762	83.17	1,740	107	11.47	0.12	16.62
				Fuel Option 2	1-story	15	19333	0	68.3696	0	65.98	3,615	0	13.02	0.00	12.34
					2-story	16	18894	0	66.3297	0	64.49	3,008	0	11.47	0.00	10.26
				Fuel Option 3	1-story	17	18924	0	68.3696	0	64.59	2,997	0	13.02	0.00	10.22
					2-story	18	18463	0	66.3297	0	63.01	2,493	0	11.47	0.00	8.51
			Crawl Space	Fuel Option 1	1-story	19	13905	370	60.7361	0.605762	84.42	2,193	112	13.03	0.12	18.71
					2-story	20	13508	367	58.7003	0.605762	82.8	1,902	100	11.48	0.12	16.50
				Fuel Option 2	1-story	21	19507	0	69.182	0	66.58	3,547	0	13.03	0.00	12.10
					2-story	22	19059	0	67.1465	0	65.05	3,006	0	11.48	0.00	10.26
				Fuel Option 3	1-story	23	19182	0	69.182	0	65.47	3,010	0	13.03	0.00	10.27
					2-story	24	18746	0	67.1465	0	63.98	2,558	0	11.48	0.00	8.73
	MF	Precode	Slab-on-grade	Fuel Option 1	1-story	1	6177.5	244	26.48875	0.4974865	45.505					
					2-story	2	6026.5	221	24.75305	0.4653	42.68					
					3-story	3	6040	213.83333	24.47516667	0.454573333	41.99333333					
				Fuel Option 2	1-story	4	8939.5	0	31.1676	0	30.51					
					2-story	5	8380.75	0	28.847	0	28.6025					
					3-story	6	8267.5	0	28.37416667	0	28.21666667					
				Fuel Option 3	1-story	7	8847.5	0	31.1676	0	30.195					
					2-story	8	8324.5	0	28.847	0	28.4125					
					3-story	9	8214.833333	0	28.37416667	0	28.03666667					
		Code - Compliant	Slab-on-grade	Fuel Option 1	1-story	10	5836.5	200	24.6313	0.3774865	39.915	341	44	1.86	0.12	5.59
					2-story	11	5758.5	176.25	23.293775	0.3453	37.285	268	45	1.46	0.12	5.40
					3-story	12	5778.666667	168.83333	23.05883333	0.334573333	36.60166667	261	45	1.42	0.12	5.39
				Fuel Option 2	1-story	13	8578.5	0	29.31015	0	29.28	361	0	1.86	0.00	1.23
					2-story	14	8085	0	27.38775	0	27.5925	296	0	1.46	0.00	1.01
					3-story	15	7976.5	0	26.95783333	0	27.22333333	291	0	1.42	0.00	0.99
				Fuel Option 3	1-story	16	8503.5	0	29.31015	0	29.02	344	0	1.86	0.00	1.18
					2-story	17	8045	0	27.38775	0	27.4575	280	0	1.46	0.00	0.96
					3-story	18	7939.333333	0	26.95783333	0	27.09666667	276	0	1.42	0.00	0.94

Prototype of the simulation result for one county

County Name	Rockwall
Division (East or West Texas)	West Texas
Number of new building permits for SFD	1,598

		Fuel Option			Total
		1	2	3	
		Elec. cooling, NG heating and NG water heating	All electricity	Elec. cooling, Heat pump heating and elec. water heating	
		84.1%	13.1%	2.8%	
Slab-on-grade (98.3%)	1-Story (45.5%)	37.61%	5.86%	1.25%	44.73%
	2-Story (54.5%)	45.06%	7.02%	1.50%	53.57%
Crawl spaces (1.7%)	1-Story (45.5%)	0.65%	0.10%	0.02%	0.77%
	2-Story (54.5%)	0.78%	0.12%	0.03%	0.93%
Total		84.10%	13.10%	2.80%	100.00%



Number of Houses for each simulation

		Fuel Option			Total
		1	2	3	
		Elec. cooling, NG heating and NG water heating	All electricity	Elec. cooling, Heat pump heating and elec. water heating	
		84.1%	13.1%	2.8%	
Slab-on-grade (98.3%)	1-Story (45.5%)	601	94	20	715
	2-Story (54.5%)	720	112	24	856
Crawl spaces (1.7%)	1-Story (45.5%)	10	2	0	12
	2-Story (54.5%)	12	2	0	15
Total		1,344	209	45	1,598

Precode Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	15,551	505	22,948	0	21,921	0
	2-Story	14,677	497	21,902	0	20,956	0
Crawl spaces	1-Story	16,098	482	23,054	0	22,192	0
	2-Story	15,410	467	22,065	0	21,304	0
Total		61,736	1,951	89,969	0	86,373	0

Code compliant Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	13,449	386	19,333	0	18,924	0
	2-Story	12,937	390	18,894	0	18,463	0
Crawl spaces	1-Story	13,905	370	19,507	0	19,182	0
	2-Story	13,508	367	19,059	0	18,746	0
Total		53,799	1,513	76,793	0	75,315	0

Precode Total Energy Use (For total houses in a County)

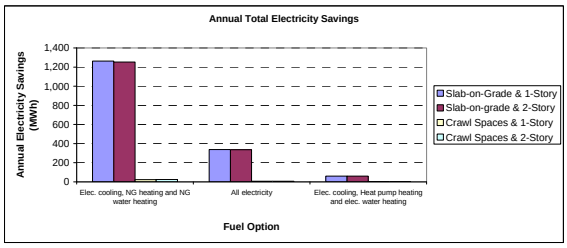
		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	9,348	303,549	2,149	0	439	0	11,935	303,549
	2-Story	10,567	357,832	2,458	0	502	0	13,526	357,832
Crawl spaces	1-Story	167	5,010	37	0	8	0	212	5,010
	2-Story	192	5,815	43	0	9	0	244	5,815
Total		20,274	672,206	4,685	0	958	0	25,917	672,206

Code compliant Total Energy Use (For total houses in a County)

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	8,084	232,020	1,810	0	379	0	10,273	232,020
	2-Story	9,314	280,794	2,119	0	443	0	11,876	280,794
Crawl spaces	1-Story	145	3,846	32	0	7	0	183	3,846
	2-Story	168	4,570	37	0	8	0	213	4,570
Total		17,711	521,229	3,998	0	836	0	22,545	521,229

Total Energy Savings Due to the Code Adoption

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)
Slab-on-grade	1-Story	1,263	71,529	338	0	60	0	1,662	71,529
	2-Story	1,253	77,038	337	0	60	0	1,650	77,038
Crawl spaces	1-Story	23	1,164	6	0	1	0	30	1,164
	2-Story	24	1,245	6	0	1	0	31	1,245
Total		2,563	150,977	687	0	122	0	3,372	150,977



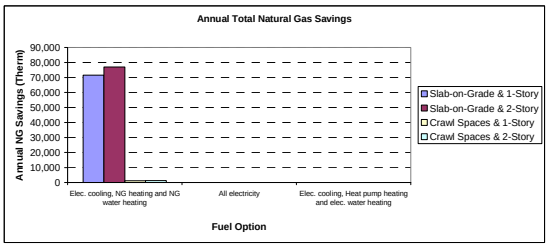


Table 83: Code and Pre-code Annual Simulation Results for Rockwall County (Single-Family).

Precode Avg. OSD Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	72.94	0.73	81.39	0.00	81.39	0.00
	2-Story	69.36	0.73	77.80	0.00	77.80	0.00
Crawl spaces	1-Story	73.76	0.73	82.21	0.00	82.21	0.00
	2-Story	70.18	0.73	78.62	0.00	78.62	0.00
Total		286.24	2.90	320.02	0.00	320.02	0.00

Code compliant Avg. OSD Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	59.92	0.61	68.37	0.00	68.37	0.00
	2-Story	57.88	0.61	66.33	0.00	66.33	0.00
Crawl spaces	1-Story	60.74	0.61	69.18	0.00	69.18	0.00
	2-Story	58.70	0.61	67.15	0.00	67.15	0.00
Total		237.24	2.42	271.03	0.00	271.03	0.00

Precode Avg. OSD Total Energy Use (For total houses in a County)

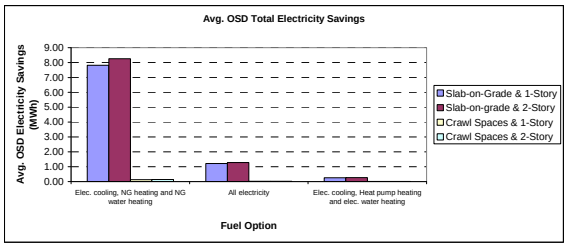
		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	43.84	436.25	7.62	0.00	1.63	0.00	53.09	436.25
	2-Story	49.93	522.54	8.73	0.00	1.86	0.00	60.53	522.54
Crawl spaces	1-Story	0.77	7.54	0.13	0.00	0.03	0.00	0.93	7.54
	2-Story	0.87	9.04	0.15	0.00	0.03	0.00	1.06	9.04
Total		95.42	975.36	16.63	0.00	3.55	0.00	115.61	975.36

Code compliant Avg. OSD Total Energy Use (For total houses in a County)

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	36.02	364.12	6.40	0.00	1.37	0.00	43.79	364.12
	2-Story	41.68	436.14	7.44	0.00	1.59	0.00	50.70	436.14
Crawl spaces	1-Story	0.63	6.30	0.11	0.00	0.02	0.00	0.77	6.30
	2-Story	0.73	7.54	0.13	0.00	0.03	0.00	0.89	7.54
Total		79.06	814.09	14.08	0.00	3.01	0.00	96.15	814.09

Avg. OSD Total Energy Savings Due to the Code Adoption

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)
Slab-on-grade	1-Story	7.82	72.13	1.22	0.00	0.26	0.00	9.30	72.13
	2-Story	8.26	86.40	1.29	0.00	0.27	0.00	9.82	86.40
Crawl spaces	1-Story	0.14	1.25	0.02	0.00	0.00	0.00	0.16	1.25
	2-Story	0.14	1.49	0.02	0.00	0.00	0.00	0.17	1.49
Total		16.36	161.27	2.55	0.00	0.54	0.00	19.46	161.27



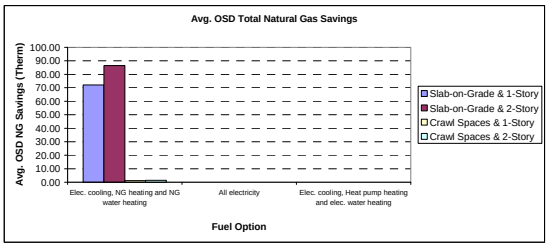
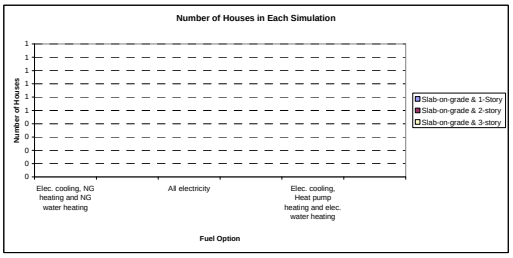


Table 84: Code and Pre-code Average OSD Simulation Results for Rockwall County (Single-Family).

The simulation result for one county

County Name	Rockwall
NAHB Division	West South Central
Number of new building permits for MF	0

		Fuel Option			Total
		1	2	3	
		Elec. cooling, NG heating and NG water heating	All electricity	Elec. cooling, Heat pump heating and elec. water heating	
		19.5%	66.4%	14.1%	
Slab-on-grade (100%)	1-Story (2.6%)	0.51%	1.73%	0.37%	2.60%
	2-Story (89.1%)	17.37%	59.16%	12.56%	89.10%
	3-Story (8.3%)	1.62%	5.51%	1.17%	8.30%
Total		19.50%	66.40%	14.10%	100.00%



Number of Houses for each simulation

		Fuel Option			Total
		1	2	3	
		Elec. cooling, NG heating and NG water heating	All electricity	Elec. cooling, Heat pump heating and elec. water heating	
		19.5%	66.4%	14.1%	
Slab-on-grade (100%)	1-Story (2.6%)	0	0	0	0
	2-Story (89.1%)	0	0	0	0
	3-Story (8.3%)	0	0	0	0
Total		0	0	0	0

Precode Energy Use for each option (per house)

		Fuel Option						
		1		2		3		
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating		
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	
Slab-on-grade	1-Story	6,178	244	8,940	0	8,849	0	
	2-Story	6,027	221	8,381	0	8,325	0	
	3-Story	6,040	214	8,268	0	8,215	0	
Total		18,244	679	25,588	0	25,387	0	

Code compliant Energy Use for each option (per house)

		Fuel Option						
		1		2		3		
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating		
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	
Slab-on-grade	1-Story	5,837	200	8,579	0	8,504	0	
	2-Story	5,759	176	8,085	0	8,045	0	
	3-Story	5,779	169	7,977	0	7,939	0	
Total		17,374	545	24,640	0	24,488	0	

Precode Total Energy Use (For total houses in a County)

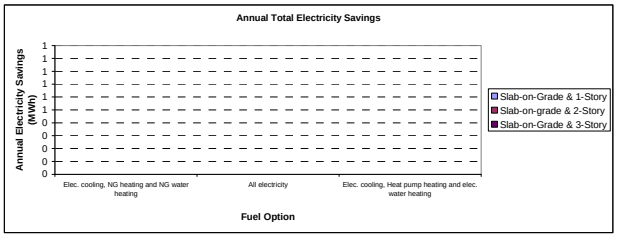
		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	0	0	0	0	0	0	0	0
	2-Story	0	0	0	0	0	0	0	0
	3-Story	0	0	0	0	0	0	0	0
Total		0	0	0	0	0	0	0	0

Code compliant Total Energy Use (For total houses in a County)

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	0	0	0	0	0	0	0	0
	2-Story	0	0	0	0	0	0	0	0
	3-Story	0	0	0	0	0	0	0	0
Total		0	0	0	0	0	0	0	0

Total Energy Savings Due to the Code Adoption

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	0	0	0	0	0	0	0	0
	2-Story	0	0	0	0	0	0	0	0
	3-Story	0	0	0	0	0	0	0	0
Total		0	0	0	0	0	0	0	0



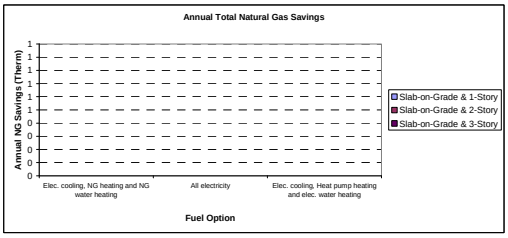


Table 85: Code and Pre-code Annual Simulation Results for Rockwall County (Multi-Family).

Precode Avg. OSD Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	26.49	0.50	31.17	0.00	31.17	0.00
	2-Story	24.75	0.47	28.85	0.00	28.85	0.00
	3-Story	24.48	0.45	28.37	0.00	28.37	0.00
Total		75.72	1.42	88.39	0.00	88.39	0.00

Code compliant Avg. OSD Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	24.63	0.38	29.31	0.00	29.31	0.00
	2-Story	23.29	0.35	27.39	0.00	27.39	0.00
	3-Story	23.06	0.33	26.96	0.00	26.96	0.00
Total		70.98	1.06	83.66	0.00	83.66	0.00

Precode Avg. OSD Total Energy Use (For total houses in a County)

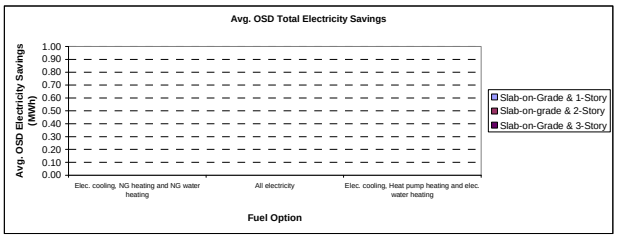
		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	2-Story	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3-Story	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Code compliant Avg. OSD Total Energy Use (For total houses in a County)

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	2-Story	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3-Story	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Total Energy Savings Due to the Code Adoption

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Savings (kWh)	NG Savings (Therm)	Elec. Savings (kWh)	NG Savings (Therm)	Elec. Savings (kWh)	NG Savings (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	2-Story	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3-Story	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00



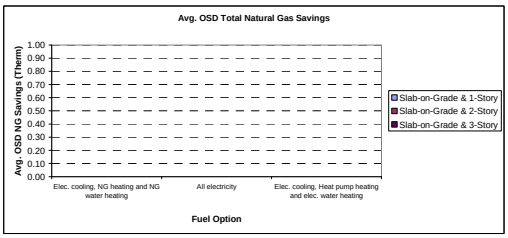


Table 86: Code and Pre-code Average OSD Simulation Results for Rockwall County (Multi-Family).

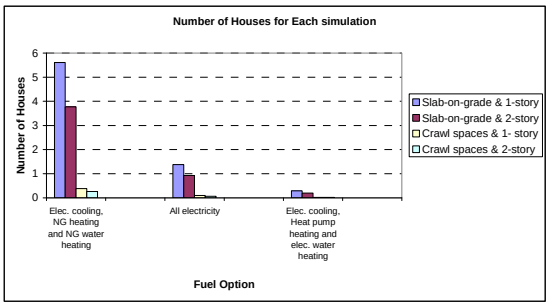
Table 87: Code and Pre-code Simulation Results for Individual Residence for Rusk County (Single-Family and Multi-Family).

County	SF or MF	Precode or Code-compliant	Options			Simulation #	Annual Elec. (kWh/yr)	Annual NG (Therms/yr)	Avg. OSD Elec. (kWh/day) (Aug. 19)	Avg. OSD NG (Therm/day) (Aug. 19)	Total Annual (Elec. + NG) (MBtu)	Annual Elec.Savings (kWh/yr)	Annual NG Savings (Therms/yr)	Avg. OSD Elec. Savings (kWh/day) (Aug. 19)	Avg. OSD NG Savings (Therm/day) (Aug. 19)	Total Annual Savings (Elec. + NG) (MBtu)
Rusk	SF	Precode	Slab-on-grade	Fuel Option 1	1-story	1	12773	480	55.8208	0.772833	91.64					
					2-story	2	12006	470	51.9905	0.772833	88					
				Fuel Option 2	1-story	3	19591	0	65.044	0	66.86					
					2-story	4	18616	0	61.2137	0	63.54					
				Fuel Option 3	1-story	5	18950	0	65.044	0	64.68					
					2-story	6	18043	0	61.2137	0	61.58					
			Crawl Space	Fuel Option 1	1-story	7	13495	445	57.7411	0.772833	90.6					
					2-story	8	12918	426	54.3768	0.772833	86.73					
				Fuel Option 2	1-story	9	19668	0	66.9643	0	67.13					
					2-story	10	18726	0	63.6	0	63.91					
				Fuel Option 3	1-story	11	19229	0	66.9643	0	65.63					
					2-story	12	18402	0	63.6	0	62.81					
		Code - Compliant	Slab-on-grade	Fuel Option 1	1-story	13	11325	417	48.0792	0.652833	80.34	1,448	63	7.74	0.12	11.30
					2-story	14	10805	415	45.1347	0.652833	78.41	1,201	55	6.86	0.12	9.59
				Fuel Option 2	1-story	15	17715	0	57.3025	0	60.46	1,876	0	7.74	0.00	6.40
					2-story	16	17149	0	54.3578	0	58.53	1,467	0	6.86	0.00	5.01
				Fuel Option 3	1-story	17	17277	0	57.3025	0	58.97	1,673	0	7.74	0.00	5.71
					2-story	18	16748	0	54.3578	0	57.16	1,295	0	6.86	0.00	4.42
			Crawl Space	Fuel Option 1	1-story	19	12079	375	50.2502	0.652833	78.76	1,416	70	7.49	0.12	11.84
					2-story	20	11689	365	47.7433	0.652833	76.42	1,229	61	6.63	0.12	10.31
				Fuel Option 2	1-story	21	17721	0	59.4734	0	60.48	1,947	0	7.49	0.00	6.65
					2-story	22	17140	0	56.9664	0	58.5	1,586	0	6.63	0.00	5.41
				Fuel Option 3	1-story	23	17504	0	59.4734	0	59.74	1,725	0	7.49	0.00	5.89
					2-story	24	16972	0	56.9664	0	57.93	1,430	0	6.63	0.00	4.88
	MF	Precode	Slab-on-grade	Fuel Option 1	1-story	1	5755.5	239	23.26095	0.522435	43.52					
					2-story	2	5684	213.75	21.90865	0.4871325	40.765					
					3-story	3	5732.166667	205.66667	21.75816667	0.475365	40.13333333					
				Fuel Option 2	1-story	4	8413	0	28.3703	0	28.715					
					2-story	5	7900.5	0	26.37925	0	26.965					
					3-story	6	7812	0	26.01583333	0	26.66166667					
				Fuel Option 3	1-story	7	8375.5	0	28.3703	0	28.585					
					2-story	8	7901.25	0	26.37925	0	26.9675					
					3-story	9	7813	0	26.01583333	0	26.665					
		Code - Compliant	Slab-on-grade	Fuel Option 1	1-story	10	5435.5	199.5	21.7353	0.4024375	38.49	320	40	1.53	0.12	5.03
					2-story	11	5427.5	173	20.778475	0.3671325	35.8225	257	41	1.13	0.12	4.94
					3-story	12	5476.833333	164.5	20.67366667	0.355365	35.14333333	255	41	1.08	0.12	4.99
				Fuel Option 2	1-story	13	8163.5	0	26.84465	0	27.86	250	0	1.53	0.00	0.86
					2-story	14	7692.5	0	25.24925	0	26.255	208	0	1.13	0.00	0.71
					3-story	15	7596.166667	0	24.9315	0	25.925	216	0	1.08	0.00	0.74
				Fuel Option 3	1-story	16	8121.5	0	26.84465	0	27.72	254	0	1.53	0.00	0.87
					2-story	17	7694.5	0	25.24925	0	26.2625	207	0	1.13	0.00	0.71
					3-story	18	7599	0	24.9315	0	25.935	214	0	1.08	0.00	0.73

Prototype of the simulation result for one county

County Name	Rusk
Division (East or West Texas)	East Texas
Number of new building permits for SFD	13

		Fuel Option			Total
		1	2	3	
		Elec. cooling, NG heating and NG water heating	All electricity	Elec. cooling, Heat pump heating and elec. water heating	
		77.1%	18.9%	4.0%	
Slab-on-grade (93.6%)	1-Story (59.8%)	43.16%	10.58%	2.24%	55.97%
	2-Story (40.2%)	29.01%	7.11%	1.51%	37.63%
Crawl spaces (6.4%)	1-Story (59.8%)	2.95%	0.72%	0.15%	3.83%
	2-Story (39.2%)	1.98%	0.49%	0.10%	2.57%
Total		77.10%	18.90%	4.00%	100.00%



Number of Houses for each simulation

		Fuel Option			Total
		1	2	3	
		Elec. cooling, NG heating and NG water heating	All electricity	Elec. cooling, Heat pump heating and elec. water heating	
		77.1%	18.9%	4.0%	
Slab-on-grade (93.6%)	1-Story (59.8%)	6	1	0	7
	2-Story (40.2%)	4	1	0	5
Crawl spaces (6.4%)	1-Story (59.8%)	0	0	0	0
	2-Story (39.2%)	0	0	0	0
Total		10	2	1	13

Precode Energy Use for each option (per house)

		Fuel Option						
		1		2		3		
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating		
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	
Slab-on-grade	1-Story	12,773	480	19,591	0	18,950	0	
	2-Story	12,008	470	18,618	0	18,043	0	
Crawl spaces	1-Story	13,495	445	19,668	0	19,229	0	
	2-Story	12,918	426	18,726	0	18,402	0	
Total		51,192	1,821	76,601	0	74,624	0	

Code compliant Energy Use for each option (per house)

		Fuel Option						
		1		2		3		
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating		
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	
Slab-on-grade	1-Story	11,325	417	17,715	0	17,277	0	
	2-Story	10,809	415	17,149	0	16,748	0	
Crawl spaces	1-Story	12,079	375	17,721	0	17,504	0	
	2-Story	11,689	365	17,140	0	16,972	0	
Total		45,898	1,572	69,725	0	68,501	0	

Precode Total Energy Use (For total houses in a County)

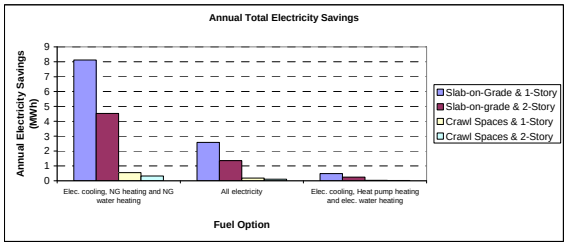
		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	72	2,693	27	0	6	0	104	2,693
	2-Story	45	1,773	17	0	4	0	66	1,773
Crawl spaces	1-Story	5	171	2	0	0	0	7	171
	2-Story	3	110	1	0	0	0	5	110
Total		125	4,746	47	0	10	0	182	4,746

Code compliant Total Energy Use (For total houses in a County)

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	64	2,339	24	0	5	0	93	2,339
	2-Story	41	1,565	16	0	3	0	60	1,565
Crawl spaces	1-Story	5	144	2	0	0	0	7	144
	2-Story	3	94	1	0	0	0	4	94
Total		112	4,143	43	0	9	0	164	4,143

Total Energy Savings Due to the Code Adoption

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)
Slab-on-grade	1-Story	8	353	3	0	0	0	11	353
	2-Story	5	207	1	0	0	0	6	207
Crawl spaces	1-Story	1	27	0	0	0	0	1	27
	2-Story	0	16	0	0	0	0	0	16
Total		14	603	4	0	1	0	19	603



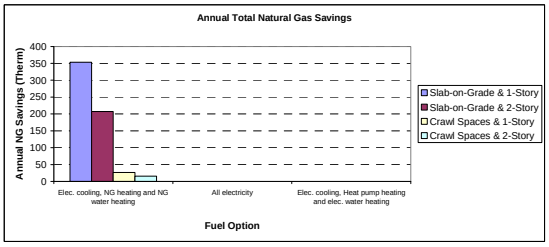


Table 88: Code and Pre-code Annual Simulation Results for Rusk County (Single-Family).

Precode Avg. OSD Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	55.82	0.77	65.04	0.00	65.04	0.00
	2-Story	51.99	0.77	61.21	0.00	61.21	0.00
Crawl spaces	1-Story	57.74	0.77	66.96	0.00	66.96	0.00
	2-Story	54.38	0.77	63.60	0.00	63.60	0.00
Total		219.93	3.09	256.82	0.00	256.82	0.00

Code compliant Avg. OSD Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	48.08	0.65	57.30	0.00	57.30	0.00
	2-Story	45.13	0.65	54.36	0.00	54.36	0.00
Crawl spaces	1-Story	50.25	0.65	59.47	0.00	59.47	0.00
	2-Story	47.74	0.65	56.97	0.00	56.97	0.00
Total		191.21	2.61	228.10	0.00	228.10	0.00

Precode Avg. OSD Total Energy Use (For total houses in a County)

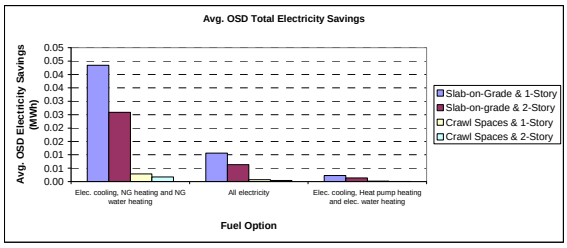
		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	0.31	4.34	0.09	0.00	0.02	0.00	0.42	4.34
	2-Story	0.20	2.91	0.06	0.00	0.01	0.00	0.26	2.91
Crawl spaces	1-Story	0.02	0.30	0.01	0.00	0.00	0.00	0.03	0.30
	2-Story	0.01	0.20	0.00	0.00	0.00	0.00	0.02	0.20
Total		0.55	7.75	0.16	0.00	0.03	0.00	0.73	7.75

Code compliant Avg. OSD Total Energy Use (For total houses in a County)

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	0.27	3.66	0.08	0.00	0.02	0.00	0.37	3.66
	2-Story	0.17	2.46	0.05	0.00	0.01	0.00	0.23	2.46
Crawl spaces	1-Story	0.02	0.25	0.01	0.00	0.00	0.00	0.03	0.25
	2-Story	0.01	0.17	0.00	0.00	0.00	0.00	0.02	0.17
Total		0.47	6.54	0.14	0.00	0.03	0.00	0.64	6.54

Avg. OSD Total Energy Savings Due to the Code Adoption

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)
Slab-on-grade	1-Story	0.04	0.67	0.01	0.00	0.00	0.00	0.06	0.67
	2-Story	0.03	0.45	0.01	0.00	0.00	0.00	0.03	0.45
Crawl spaces	1-Story	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.05
	2-Story	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.03
Total		0.07	1.20	0.02	0.00	0.00	0.00	0.10	1.20



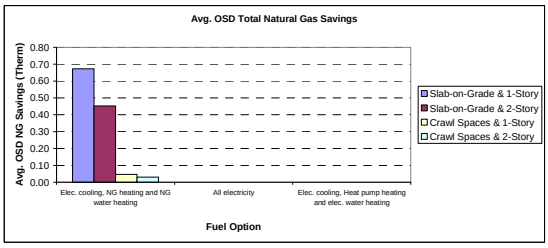
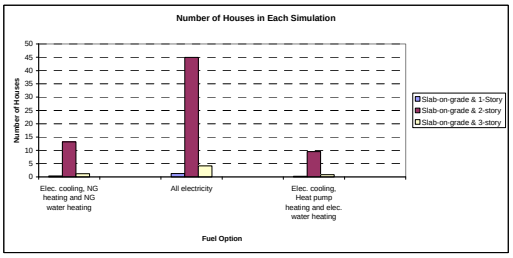


Table 89: Code and Pre-code Average OSD Simulation Results for Rusk County (Single-Family).

The simulation result for one county

County Name	Rusk
NAHB Division	West South Central
Number of new building permits for MF	76

		Fuel Option			Total
		1	2	3	
		Elec. cooling, NG heating and NG water heating	All electricity	Elec. cooling, Heat pump heating and elec. water heating	
		19.5%	66.4%	14.1%	
Slab-on-grade (100%)	1-Story (2.6%)	0.51%	1.73%	0.37%	2.60%
	2-Story (89.1%)	17.37%	59.16%	12.56%	89.10%
	3-Story (8.3%)	1.62%	5.51%	1.17%	8.30%
Total		19.50%	66.40%	14.10%	100.00%



Number of Houses for each simulation

		Fuel Option			Total
		1	2	3	
		Elec. cooling, NG heating and NG water heating	All electricity	Elec. cooling, Heat pump heating and elec. water heating	
		19.5%	66.4%	14.1%	
Slab-on-grade (100%)	1-Story (2.6%)	0	1	0	2
	2-Story (89.1%)	13	45	10	68
	3-Story (8.3%)	1	4	1	6
Total		15	50	11	76

Precode Energy Use for each option (per house)

		Fuel Option						
		1		2		3		
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating		
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	
Slab-on-grade	1-Story	5,756	239	8,413	0	8,376	0	
	2-Story	5,684	214	7,901	0	7,901	0	
	3-Story	5,732	206	7,812	0	7,813	0	
Total		17,172	658	24,126	0	24,090	0	

Code compliant Energy Use for each option (per house)

		Fuel Option						
		1		2		3		
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating		
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	
Slab-on-grade	1-Story	5,436	200	8,164	0	8,122	0	
	2-Story	5,428	173	7,693	0	7,695	0	
	3-Story	5,477	165	7,596	0	7,599	0	
Total		16,340	537	23,452	0	23,415	0	

Precode Total Energy Use (For total houses in a County)

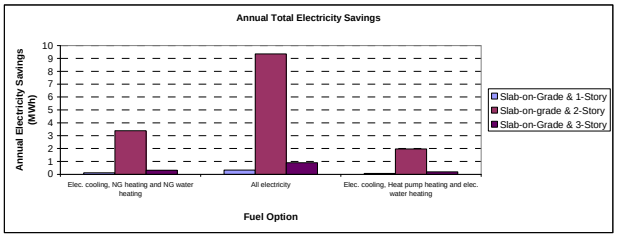
		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	2	92	11	0	2	0	16	92
	2-Story	75	2,822	355	0	75	0	506	2,822
	3-Story	7	253	33	0	7	0	47	253
Total		84	3,168	399	0	84	0	568	3,168

Code compliant Total Energy Use (For total houses in a County)

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	2	77	11	0	2	0	15	77
	2-Story	72	2,284	346	0	73	0	491	2,284
	3-Story	7	202	32	0	7	0	45	202
Total		80	2,564	388	0	82	0	551	2,564

Total Energy Savings Due to the Code Adoption

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	0	15	0	0	0	0	1	15
	2-Story	3	538	9	0	2	0	15	538
	3-Story	0	51	1	0	0	0	1	51
Total		4	604	11	0	2	0	17	604



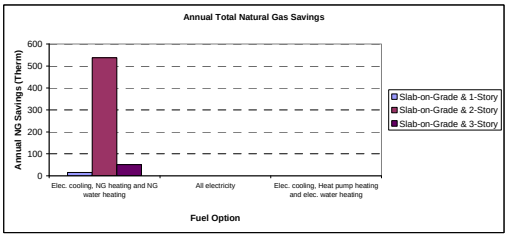


Table 90: Code and Pre-code Annual Simulation Results for Rusk County (Multi-Family).

Precode Avg. OSD Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	23.26	0.52	28.37	0.00	28.37	0.00
	2-Story	21.91	0.49	26.38	0.00	26.38	0.00
	3-Story	21.78	0.48	26.02	0.00	26.02	0.00
Total		66.93	1.49	80.77	0.00	80.77	0.00

Code compliant Avg. OSD Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	21.74	0.40	26.84	0.00	26.84	0.00
	2-Story	20.78	0.37	25.25	0.00	25.25	0.00
	3-Story	20.67	0.36	24.93	0.00	24.93	0.00
Total		63.19	1.12	77.03	0.00	77.03	0.00

Precode Avg. OSD Total Energy Use (For total houses in a County)

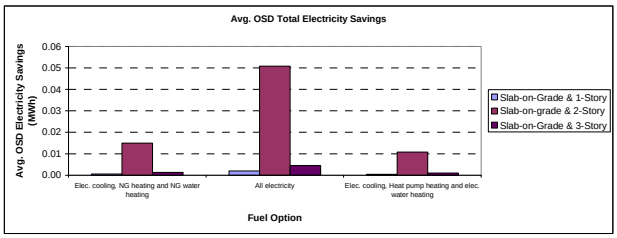
		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	0.01	0.20	0.04	0.00	0.01	0.00	0.05	0.20
	2-Story	0.29	6.43	1.19	0.00	0.25	0.00	1.73	6.43
	3-Story	0.03	0.58	0.11	0.00	0.02	0.00	0.16	0.58
Total		0.33	7.22	1.33	0.00	0.28	0.00	1.94	7.22

Code compliant Avg. OSD Total Energy Use (For total houses in a County)

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	0.01	0.16	0.04	0.00	0.01	0.00	0.05	0.16
	2-Story	0.27	4.85	1.14	0.00	0.24	0.00	1.65	4.85
	3-Story	0.03	0.44	0.10	0.00	0.02	0.00	0.15	0.44
Total		0.31	5.44	1.27	0.00	0.27	0.00	1.85	5.44

Total Energy Savings Due to the Code Adoption

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Savings (kWh)	NG Savings (Therm)	Elec. Savings (kWh)	NG Savings (Therm)	Elec. Savings (kWh)	NG Savings (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.05
	2-Story	0.01	1.58	0.05	0.00	0.01	0.00	0.08	1.58
	3-Story	0.00	0.15	0.00	0.00	0.00	0.00	0.01	0.15
Total		0.02	1.78	0.06	0.00	0.01	0.00	0.09	1.78



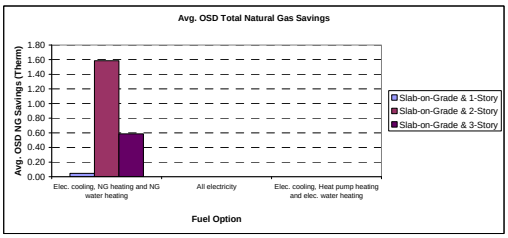


Table 91: Code and Pre-code Average OSD Simulation Results for Rusk County (Multi-Family).

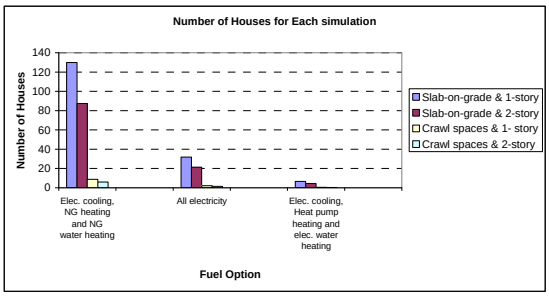
Table 92: Code and Pre-code Simulation Results for Individual Residence for San Patricio County (Single-Family and Multi-Family).

County	SF or MF	Precode or Code-compliant	Options			Simulation #	Annual Elec. (kWh/yr)	Annual NG (Therms/yr)	Avg. OSD Elec. (kWh/day) (Aug. 19)	Avg. OSD NG (Therm/day) (Aug. 19)	Total Annual (Elec. + NG) (MBtu)	Annual Elec.Savings (kWh/yr)	Annual NG Savings (Therms/yr)	Avg. OSD Elec. Savings (kWh/day) (Aug. 19)	Avg. OSD NG Savings (Therm/day) (Aug. 19)	Total Annual Savings (Elec. + NG) (MBtu)
San Patricio	SF	Precode	Slab-on-grade	Fuel Option 1	1-story	1	15276	335	60.6808	0.734325	85.67					
					2-story	2	14532	328	58.1559	0.734325	82.38					
				Fuel Option 2	1-story	3	19505	0	69.2003	0	66.57					
					2-story	4	18625	0	66.6752	0	63.57					
				Fuel Option 3	1-story	5	19343	0	69.2003	0	66.02					
					2-story	6	18504	0	66.6752	0	63.15					
			Crawl Space	Fuel Option 1	1-story	7	15838	337	61.2902	0.734325	87.75					
					2-story	8	15296	331	58.7635	0.734325	85.26					
				Fuel Option 2	1-story	9	20102	0	69.8095	0	68.61					
					2-story	10	19438	0	67.2829	0	66.34					
				Fuel Option 3	1-story	11	19921	0	69.8095	0	67.99					
					2-story	12	19307	0	67.2829	0	65.89					
		Code - Compliant	Slab-on-grade	Fuel Option 1	1-story	13	13417	287	53.5628	0.614325	74.52	1,859	48	7.12	0.12	11.15
					2-story	14	12837	281	51.3849	0.614325	71.91	1,695	47	6.77	0.12	10.47
				Fuel Option 2	1-story	15	17559	0	62.0821	0	59.93	1,946	0	7.12	0.00	6.64
					2-story	16	16869	0	59.9043	0	57.57	1,756	0	6.77	0.00	6.00
				Fuel Option 3	1-story	17	17450	0	62.0821	0	59.56	1,893	0	7.12	0.00	6.46
					2-story	18	16780	0	59.9043	0	57.27	1,724	0	6.77	0.00	5.88
			Crawl Space	Fuel Option 1	1-story	19	14027	290	54.2565	0.614325	76.84	1,811	47	7.03	0.12	10.91
					2-story	20	13606	284	52.0487	0.614325	74.83	1,690	47	6.71	0.12	10.43
				Fuel Option 2	1-story	21	18212	0	62.7759	0	62.16	1,890	0	7.03	0.00	6.45
					2-story	22	17689	0	60.5681	0	60.37	1,749	0	6.71	0.00	5.97
				Fuel Option 3	1-story	23	18072	0	62.7759	0	61.68	1,849	0	7.03	0.00	6.31
					2-story	24	17158	0	58.5091	0	58.56	2,149	0	8.77	0.00	7.33
	MF	Precode	Slab-on-grade	Fuel Option 1	1-story	1	6760	202	25.43115	0.502025	43.275					
					2-story	2	6597.25	188.5	23.88355	0.4692725	41.3725					
					3-story	3	6623.666667	184.16667	23.70383333	0.458355	41.025					
				Fuel Option 2	1-story	4	8791.5	0	30.15055	0	30.005					
					2-story	5	8388.75	0	28.013	0	28.63					
					3-story	6	8336	0	27.63666667	0	28.45					
				Fuel Option 3	1-story	7	8787.5	0	30.15055	0	29.99					
					2-story	8	8381.5	0	28.013	0	28.605					
					3-story	9	8328	0	27.63666667	0	28.42333333					
		Code - Compliant	Slab-on-grade	Fuel Option 1	1-story	10	6322	159	23.9335	0.382026	37.49	438	43	1.50	0.12	5.79
					2-story	11	6244.5	145.75	22.75625	0.3492725	35.88	353	43	1.13	0.12	5.49
					3-story	12	6279.333333	141.16667	22.61583333	0.338355	35.55333333	344	43	1.09	0.12	5.47
				Fuel Option 2	1-story	13	8366.5	0	28.65295	0	28.555	425	0	1.50	0.00	1.45
					2-story	14	8050	0	26.88575	0	27.475	339	0	1.13	0.00	1.16
					3-story	15	8005	0	26.54883333	0	27.32166667	331	0	1.09	0.00	1.13
				Fuel Option 3	1-story	16	8362	0	28.65295	0	28.54	426	0	1.50	0.00	1.45
					2-story	17	8040.25	0	26.88575	0	27.44	341	0	1.13	0.00	1.17
					3-story	18	7995	0	26.54883333	0	27.28666667	333	0	1.09	0.00	1.14

Prototype of the simulation result for one county

County Name	San Patricio
Division (East or West Texas)	East Texas
Number of new building permits for SFD	301

		Fuel Option 1	Fuel Option 2	Fuel Option 3	Total
		Elec. cooling, NG heating and NG water heating	All electricity	Elec. cooling, Heat pump heating and elec. water heating	
		77.1%	18.9%	4.0%	
Slab-on-grade (93.6%)	1-Story (59.8%)	43.16%	10.58%	2.24%	55.97%
	2-Story (40.2%)	29.01%	7.11%	1.51%	37.63%
Crawl spaces (6.4%)	1-Story (59.8%)	2.95%	0.72%	0.15%	3.83%
	2-Story (39.2%)	1.98%	0.49%	0.10%	2.57%
Total		77.10%	18.90%	4.00%	100.00%



Number of Houses for each simulation

		Fuel Option 1	Fuel Option 2	Fuel Option 3	Total
		Elec. cooling, NG heating and NG water heating	All electricity	Elec. cooling, Heat pump heating and elec. water heating	
		77.1%	18.9%	4.0%	
Slab-on-grade (93.6%)	1-Story (59.8%)	130	32	7	168
	2-Story (40.2%)	87	21	5	113
Crawl spaces (6.4%)	1-Story (59.8%)	9	2	0	12
	2-Story (39.2%)	6	1	0	8
Total		232	57	12	301

Precode Energy Use for each option (per house)

		Fuel Option 1		Fuel Option 2		Fuel Option 3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	15,276	335	19,505	0	19,343	0
	2-Story	14,532	328	18,625	0	18,504	0
Crawl spaces	1-Story	15,838	337	20,102	0	19,921	0
	2-Story	15,296	331	19,438	0	19,307	0
Total		60,942	1,331	77,670	0	77,075	0

Code compliant Energy Use for each option (per house)

		Fuel Option 1		Fuel Option 2		Fuel Option 3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	13,417	287	17,559	0	17,450	0
	2-Story	12,837	281	16,869	0	16,780	0
Crawl spaces	1-Story	14,027	290	18,212	0	18,072	0
	2-Story	13,606	284	17,689	0	17,158	0
Total		53,887	1,142	70,329	0	69,460	0

Precode Total Energy Use (For total houses in a County)

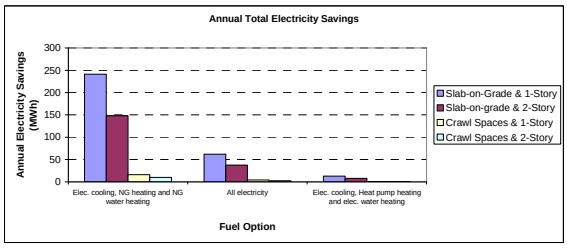
		Fuel Option 1		Fuel Option 2		Fuel Option 3		Total	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	1,984	43,515	621	0	130	0	2,736	43,515
	2-Story	1,269	28,642	399	0	84	0	1,751	28,642
Crawl spaces	1-Story	141	2,993	44	0	9	0	194	2,993
	2-Story	91	1,976	28	0	6	0	126	1,976
Total		3,485	77,126	1,092	0	229	0	4,807	77,126

Code compliant Total Energy Use (For total houses in a County)

		Fuel Option 1		Fuel Option 2		Fuel Option 3		Total	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	1,743	37,280	559	0	118	0	2,420	37,280
	2-Story	1,121	24,537	361	0	76	0	1,558	24,537
Crawl spaces	1-Story	125	2,576	40	0	8	0	173	2,576
	2-Story	81	1,696	26	0	5	0	112	1,696
Total		3,070	66,089	986	0	207	0	4,263	66,089

Total Energy Savings Due to the Code Adoption

		Fuel Option 1		Fuel Option 2		Fuel Option 3		Total	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)
Slab-on-grade	1-Story	241	6,235	62	0	13	0	316	6,235
	2-Story	148	4,104	38	0	8	0	193	4,104
Crawl spaces	1-Story	16	417	4	0	1	0	21	417
	2-Story	10	281	3	0	1	0	13	281
Total		416	11,037	106	0	22	0	544	11,037



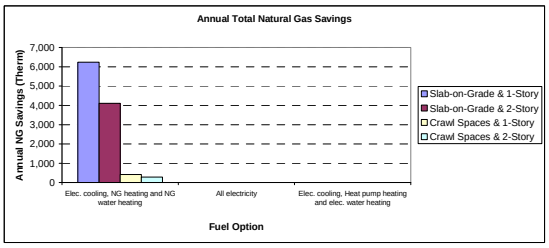


Table 93: Code and Pre-code Annual Simulation Results for San Patricio County (Single-Family).

Precode Avg. OSD Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	60.68	0.73	69.20	0.00	69.20	0.00
	2-Story	58.16	0.73	66.68	0.00	66.68	0.00
Crawl spaces	1-Story	61.29	0.73	69.81	0.00	69.81	0.00
	2-Story	58.76	0.73	67.28	0.00	67.28	0.00
Total		238.89	2.94	272.97	0.00	272.97	0.00

Code compliant Avg. OSD Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	53.56	0.61	62.08	0.00	62.08	0.00
	2-Story	51.38	0.61	59.90	0.00	59.90	0.00
Crawl spaces	1-Story	54.26	0.61	62.78	0.00	62.78	0.00
	2-Story	52.05	0.61	60.57	0.00	58.51	0.00
Total		211.25	2.46	245.33	0.00	243.27	0.00

Precode Avg. OSD Total Energy Use (For total houses in a County)

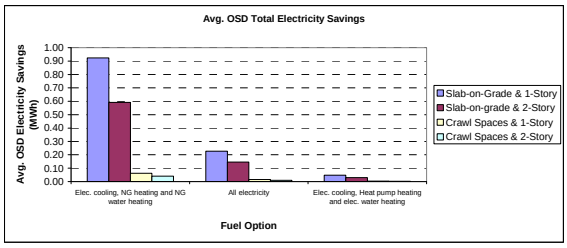
		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	7.88	95.39	2.20	0.00	0.47	0.00	10.55	95.39
	2-Story	5.08	64.12	1.43	0.00	0.30	0.00	6.81	64.12
Crawl spaces	1-Story	0.54	6.52	0.15	0.00	0.03	0.00	0.73	6.52
	2-Story	0.35	4.38	0.10	0.00	0.02	0.00	0.47	4.38
Total		13.86	170.42	3.88	0.00	0.82	0.00	18.56	170.42

Code compliant Avg. OSD Total Energy Use (For total houses in a County)

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	6.96	79.80	1.98	0.00	0.42	0.00	9.35	79.80
	2-Story	4.49	53.64	1.28	0.00	0.27	0.00	6.04	53.64
Crawl spaces	1-Story	0.48	5.46	0.14	0.00	0.03	0.00	0.65	5.46
	2-Story	0.31	3.67	0.09	0.00	0.02	0.00	0.42	3.67
Total		12.24	142.57	3.48	0.00	0.74	0.00	16.46	142.57

Avg. OSD Total Energy Savings Due to the Code Adoption

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)
Slab-on-grade	1-Story	0.92	15.59	0.23	0.00	0.05	0.00	1.20	15.59
	2-Story	0.59	10.48	0.14	0.00	0.03	0.00	0.77	10.48
Crawl spaces	1-Story	0.08	1.07	0.02	0.00	0.00	0.00	0.08	1.07
	2-Story	0.04	0.72	0.01	0.00	0.00	0.00	0.05	0.72
Total		1.62	27.85	0.40	0.00	0.08	0.00	2.10	27.85



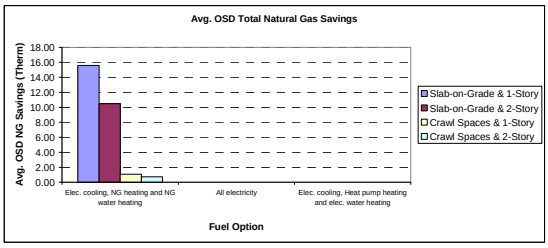
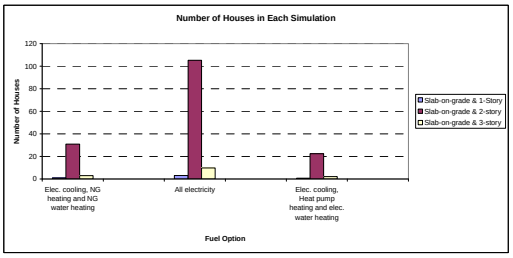


Table 94: Code and Pre-code Average OSD Simulation Results for San Patricio County (Single-Family).

The simulation result for one county

County Name	San Patricio
NAHB Division	West South Central
Number of new building permits for MF	178

		Fuel Option			Total
		1	2	3	
		Elec. cooling, NG heating and NG water heating	All electricity	Elec. cooling, Heat pump heating and elec. water heating	
		19.5%	66.4%	14.1%	
Slab-on-grade (100%)	1-Story (2.6%)	0.51%	1.73%	0.37%	2.60%
	2-Story (89.1%)	17.37%	59.16%	12.56%	89.10%
	3-Story (8.3%)	1.62%	5.51%	1.17%	8.30%
Total		19.50%	66.40%	14.10%	100.00%



Number of Houses for each simulation

		Fuel Option			Total
		1	2	3	
		Elec. cooling, NG heating and NG water heating	All electricity	Elec. cooling, Heat pump heating and elec. water heating	
		19.5%	66.4%	14.1%	
Slab-on-grade (100%)	1-Story (2.6%)	1	3	1	5
	2-Story (89.1%)	31	105	22	159
	3-Story (8.3%)	3	10	2	15
Total		35	118	25	178

Precode Energy Use for each option (per house)

		Fuel Option						
		1		2		3		
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating		
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	
Slab-on-grade	1-Story	6,760	202	8,792	0	8,788	0	
	2-Story	6,597	189	8,389	0	8,382	0	
	3-Story	6,624	184	8,336	0	8,328	0	
Total		19,981	575	25,516	0	25,497	0	

Code compliant Energy Use for each option (per house)

		Fuel Option						
		1		2		3		
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating		
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	
Slab-on-grade	1-Story	6,322	159	8,367	0	8,362	0	
	2-Story	6,245	146	8,050	0	8,040	0	
	3-Story	6,279	141	8,005	0	7,995	0	
Total		18,846	446	24,422	0	24,397	0	

Precode Total Energy Use (For total houses in a County)

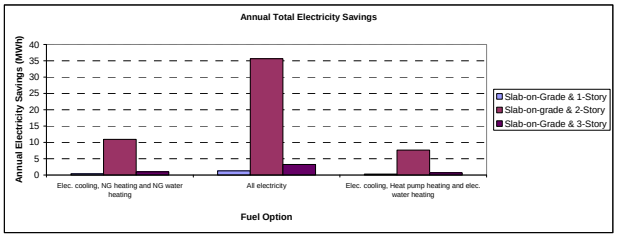
		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	6	182	27	0	6	0	39	182
	2-Story	204	5,830	883	0	187	0	1,275	5,830
	3-Story	19	531	82	0	17	0	118	531
Total		229	6,543	992	0	211	0	1,432	6,543

Code compliant Total Energy Use (For total houses in a County)

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	6	143	26	0	5	0	37	143
	2-Story	193	4,508	848	0	180	0	1,221	4,508
	3-Story	18	407	79	0	17	0	113	407
Total		217	5,058	952	0	202	0	1,371	5,058

Total Energy Savings Due to the Code Adoption

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	0	39	1	0	0	0	2	39
	2-Story	11	1,322	36	0	8	0	54	1,322
	3-Story	1	124	3	0	1	0	5	124
Total		12	1,485	40	0	9	0	61	1,485



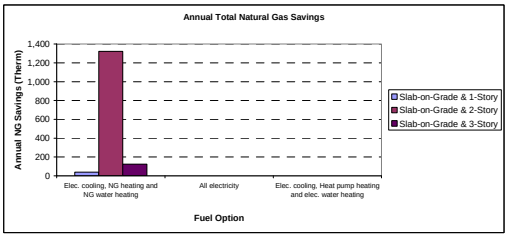


Table 95: Code and Pre-code Annual Simulation Results for San Patricio County (Multi-Family).

Precode Avg. OSD Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	25.43	0.50	30.15	0.00	30.15	0.00
	2-Story	23.88	0.47	28.01	0.00	28.01	0.00
	3-Story	23.70	0.46	27.64	0.00	27.64	0.00
Total		73.02	1.43	85.80	0.00	85.80	0.00

Code compliant Avg. OSD Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	23.93	0.38	28.65	0.00	28.65	0.00
	2-Story	22.76	0.35	26.89	0.00	26.89	0.00
	3-Story	22.62	0.34	26.55	0.00	26.55	0.00
Total		69.31	1.07	82.09	0.00	82.09	0.00

Precode Avg. OSD Total Energy Use (For total houses in a County)

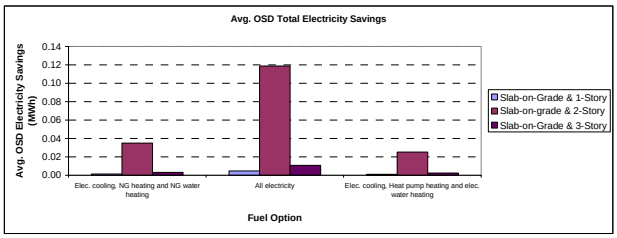
		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	0.02	0.45	0.09	0.00	0.02	0.00	0.14	0.45
	2-Story	0.74	14.51	2.95	0.00	0.63	0.00	4.32	14.51
	3-Story	0.07	1.32	0.27	0.00	0.06	0.00	0.40	1.32
Total		0.83	16.29	3.31	0.00	0.70	0.00	4.85	16.29

Code compliant Avg. OSD Total Energy Use (For total houses in a County)

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	0.02	0.34	0.09	0.00	0.02	0.00	0.13	0.34
	2-Story	0.70	10.80	2.83	0.00	0.60	0.00	4.14	10.80
	3-Story	0.07	0.97	0.26	0.00	0.06	0.00	0.38	0.97
Total		0.79	12.12	3.18	0.00	0.68	0.00	4.65	12.12

Total Energy Savings Due to the Code Adoption

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Savings (kWh)	NG Savings (Therm)	Elec. Savings (kWh)	NG Savings (Therm)	Elec. Savings (kWh)	NG Savings (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	0.00	0.11	0.00	0.00	0.00	0.00	0.01	0.11
	2-Story	0.03	3.71	0.12	0.00	0.03	0.00	0.18	3.71
	3-Story	0.00	0.35	0.01	0.00	0.00	0.00	0.02	0.35
Total		0.04	4.17	0.13	0.00	0.03	0.00	0.20	4.17



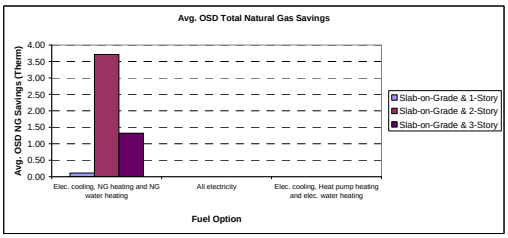


Table 96: Code and Pre-code Average OSD Simulation Results for San Patricio County (Multi-Family).

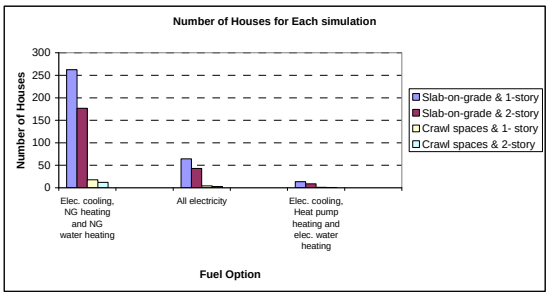
County	SF or MF	Precode or Code-compliant	Options			Simulation #	Annual Elec. (kWh/yr)	Annual NG (Therms/yr)	Avg. OSD Elec. (kWh/day) (Aug. 19)	Avg. OSD NG (Therm/day) (Aug. 19)	Total Annual (Elec. + NG) (MBtu)	Annual Elec.Savings (kWh/yr)	Annual NG Savings (Therms/yr)	Avg. OSD Elec. Savings (kWh/day) (Aug. 19)	Avg. OSD NG Savings (Therm/day) (Aug. 19)	Total Annual Savings (Elec. + NG) (MBtu)
Smith	SF	Precode	Slab-on-grade	Fuel Option 1	1-story	1	12796	490	55.956	0.772833	91.64					
					2-story	2	12036	469	52.1903	0.772833	87.99					
				Fuel Option 2	1-story	3	19602	0	65.1792	0	66.9					
					2-story	4	18628	0	61.4136	0	63.58					
				Fuel Option 3	1-story	5	18961	0	65.1792	0	64.71					
					2-story	6	18078	0	61.4136	0	61.7					
			Crawl Space	Fuel Option 1	1-story	7	13523	445	57.8806	0.772833	90.64					
					2-story	8	12956	425	54.5904	0.772833	86.77					
				Fuel Option 2	1-story	9	19685	0	67.1038	0	67.18					
					2-story	10	18749	0	63.8135	0	63.99					
				Fuel Option 3	1-story	11	19247	0	67.1038	0	65.69					
					2-story	12	18444	0	63.8135	0	62.95					
		Code - Compliant	Slab-on-grade	Fuel Option 1	1-story	13	11338	416	48.1694	0.652833	80.31	1,458	64	7.79	0.12	11.33
					2-story	14	10819	415	45.2323	0.652833	78.38	1,217	54	6.96	0.12	9.61
				Fuel Option 2	1-story	15	17718	0	57.3915	0	60.47	1,884	0	7.79	0.00	6.43
					2-story	16	17149	0	54.4555	0	58.53	1,479	0	6.96	0.00	5.05
				Fuel Option 3	1-story	17	17280	0	57.3915	0	58.98	1,681	0	7.79	0.00	5.73
					2-story	18	16746	0	54.4555	0	57.15	1,332	0	6.96	0.00	4.55
			Crawl Space	Fuel Option 1	1-story	19	12095	375	50.3428	0.652833	78.74	1,428	70	7.54	0.12	11.90
					2-story	20	11707	364	47.8438	0.652833	76.38	1,249	61	6.75	0.12	10.39
				Fuel Option 2	1-story	21	17726	0	59.566	0	60.5	1,959	0	7.54	0.00	6.68
					2-story	22	17144	0	57.067	0	58.51	1,605	0	6.75	0.00	5.48
				Fuel Option 3	1-story	23	17511	0	59.566	0	59.77	1,736	0	7.54	0.00	5.92
					2-story	24	16548	0	55.4265	0	56.48	1,996	0	8.39	0.00	6.47
	MF	Precode	Slab-on-grade	Fuel Option 1	1-story	1	5755.5	239	23.26095	0.522435	43.52					
					2-story	2	5684	213.75	21.90865	0.4871325	40.765					
					3-story	3	5732.166667	205.66667	21.75816667	0.475365	40.13333333					
				Fuel Option 2	1-story	4	8413	0	28.3703	0	28.715					
					2-story	5	7900.5	0	26.37925	0	26.965					
					3-story	6	7812	0	26.01583333	0	26.66166667					
				Fuel Option 3	1-story	7	8375.5	0	28.3703	0	28.585					
					2-story	8	7901.25	0	26.37925	0	26.9675					
					3-story	9	7813	0	26.01583333	0	26.665					
		Code - Compliant	Slab-on-grade	Fuel Option 1	1-story	10	5435.5	199.5	21.7353	0.4024375	38.49	320	40	1.53	0.12	5.03
					2-story	11	5427.5	173	20.778475	0.3671325	35.8225	257	41	1.13	0.12	4.94
					3-story	12	5476.833333	164.5	20.67366667	0.355365	35.14333333	255	41	1.08	0.12	4.99
				Fuel Option 2	1-story	13	8163.5	0	26.84465	0	27.86	250	0	1.53	0.00	0.86
					2-story	14	7692.5	0	25.24925	0	26.255	208	0	1.13	0.00	0.71
					3-story	15	7596.166667	0	24.9315	0	25.925	216	0	1.08	0.00	0.74
				Fuel Option 3	1-story	16	8121.5	0	26.84465	0	27.72	254	0	1.53	0.00	0.87
					2-story	17	7694.5	0	25.24925	0	26.2625	207	0	1.13	0.00	0.71
					3-story	18	7599	0	24.9315	0	25.935	214	0	1.08	0.00	0.73

Table 97: Code and Pre-code Simulation Results for Individual Residence for Smith County (Single-Family and Multi-Family).

Prototype of the simulation result for one county

County Name	Smith
Division (East or West Texas)	East Texas
Number of new building permits for SFD	608

		Fuel Option 1	Fuel Option 2	Fuel Option 3	Total
		Elec. cooling, NG heating and NG water heating	All electricity	Elec. cooling, Heat pump heating and elec. water heating	
		77.1%	18.9%	4.0%	
Slab-on-grade (93.6%)	1-Story (59.8%)	43.16%	10.58%	2.24%	55.97%
	2-Story (40.2%)	29.01%	7.11%	1.51%	37.63%
Crawl spaces (6.4%)	1-Story (59.8%)	2.95%	0.72%	0.15%	3.83%
	2-Story (39.2%)	1.98%	0.49%	0.10%	2.57%
Total		77.10%	18.90%	4.00%	100.00%



Number of Houses for each simulation

		Fuel Option 1	Fuel Option 2	Fuel Option 3	Total
		Elec. cooling, NG heating and NG water heating	All electricity	Elec. cooling, Heat pump heating and elec. water heating	
		77.1%	18.9%	4.0%	
Slab-on-grade (93.6%)	1-Story (59.8%)	262	64	14	340
	2-Story (40.2%)	176	43	9	229
Crawl spaces (6.4%)	1-Story (59.8%)	18	4	1	23
	2-Story (39.2%)	12	3	1	16
Total		469	115	24	608

Precode Energy Use for each option (per house)

		Fuel Option 1		Fuel Option 2		Fuel Option 3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	12,798	480	19,602	0	18,961	0
	2-Story	12,038	469	18,628	0	18,078	0
Crawl spaces	1-Story	13,523	445	19,685	0	19,247	0
	2-Story	12,950	425	18,749	0	18,444	0
Total		51,311	1,819	76,664	0	74,730	0

Code compliant Energy Use for each option (per house)

		Fuel Option 1		Fuel Option 2		Fuel Option 3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	11,338	416	17,718	0	17,280	0
	2-Story	10,819	415	17,149	0	16,746	0
Crawl spaces	1-Story	12,095	375	17,726	0	17,511	0
	2-Story	11,707	364	17,144	0	16,548	0
Total		45,959	1,570	69,737	0	68,085	0

Precode Total Energy Use (For total houses in a County)

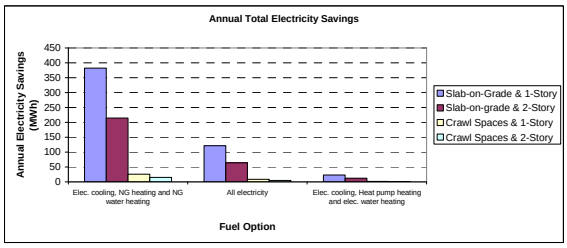
		Fuel Option 1		Fuel Option 2		Fuel Option 3		Total	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	3,357	125,944	1,261	0	258	0	4,876	125,944
	2-Story	2,123	82,724	809	0	165	0	3,094	82,724
Crawl spaces	1-Story	243	7,984	87	0	18	0	347	7,984
	2-Story	156	5,126	55	0	12	0	223	5,126
Total		5,879	221,777	2,208	0	453	0	8,541	221,777

Code compliant Total Energy Use (For total houses in a County)

		Fuel Option 1		Fuel Option 2		Fuel Option 3		Total	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	2,975	109,151	1,140	0	235	0	4,350	109,151
	2-Story	1,908	73,199	741	0	153	0	2,803	73,199
Crawl spaces	1-Story	217	6,728	78	0	16	0	311	6,728
	2-Story	141	4,390	51	0	10	0	202	4,390
Total		5,241	193,468	2,010	0	415	0	7,666	193,468

Total Energy Savings Due to the Code Adoption

		Fuel Option 1		Fuel Option 2		Fuel Option 3		Total	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)
Slab-on-grade	1-Story	383	16,792	121	0	23	0	527	16,792
	2-Story	215	9,525	64	0	12	0	291	9,525
Crawl spaces	1-Story	26	1,256	9	0	2	0	36	1,256
	2-Story	15	736	5	0	1	0	21	736
Total		638	28,309	198	0	38	0	874	28,309



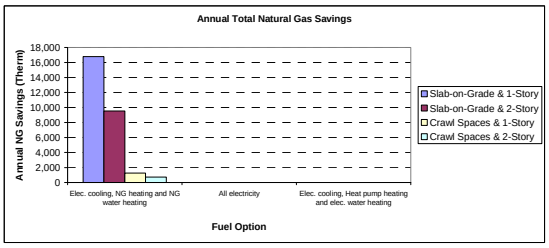


Table 98: Code and Pre-code Annual Simulation Results for Smith County (Single-Family).

Precode Avg. OSD Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	55.96	0.77	65.18	0.00	65.18	0.00
	2-Story	52.19	0.77	61.41	0.00	61.41	0.00
Crawl spaces	1-Story	57.88	0.77	67.10	0.00	67.10	0.00
	2-Story	54.59	0.77	63.81	0.00	63.81	0.00
Total		220.62	3.09	257.51	0.00	257.51	0.00

Code compliant Avg. OSD Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	48.17	0.65	57.39	0.00	57.39	0.00
	2-Story	45.23	0.65	54.46	0.00	54.46	0.00
Crawl spaces	1-Story	50.34	0.65	59.57	0.00	59.57	0.00
	2-Story	47.84	0.65	57.07	0.00	55.43	0.00
Total		191.59	2.61	228.49	0.00	226.84	0.00

Precode Avg. OSD Total Energy Use (For total houses in a County)

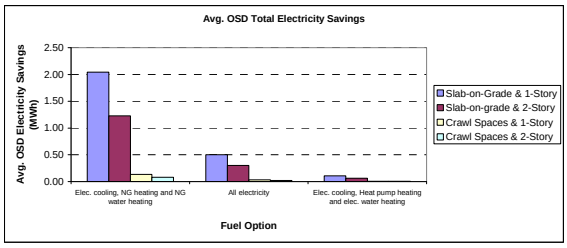
		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	14.68	202.78	4.19	0.00	0.89	0.00	19.76	202.78
	2-Story	9.21	136.32	2.66	0.00	0.56	0.00	12.42	136.32
Crawl spaces	1-Story	1.04	13.87	0.30	0.00	0.06	0.00	1.40	13.87
	2-Story	0.66	9.32	0.19	0.00	0.04	0.00	0.89	9.32
Total		25.58	362.28	7.33	0.00	1.55	0.00	34.47	362.28

Code compliant Avg. OSD Total Energy Use (For total houses in a County)

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	12.64	171.29	3.69	0.00	0.78	0.00	17.11	171.29
	2-Story	7.98	115.15	2.35	0.00	0.50	0.00	10.83	115.15
Crawl spaces	1-Story	0.90	11.71	0.26	0.00	0.06	0.00	1.22	11.71
	2-Story	0.58	7.87	0.17	0.00	0.03	0.00	0.78	7.87
Total		22.10	306.03	6.48	0.00	1.37	0.00	29.94	306.03

Avg. OSD Total Energy Savings Due to the Code Adoption

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)
Slab-on-grade	1-Story	2.04	31.49	0.50	0.00	0.11	0.00	2.65	31.49
	2-Story	1.23	21.17	0.30	0.00	0.06	0.00	1.59	21.17
Crawl spaces	1-Story	0.14	2.15	0.03	0.00	0.01	0.00	0.18	2.15
	2-Story	0.08	1.45	0.02	0.00	0.01	0.00	0.11	1.45
Total		3.49	56.25	0.85	0.00	0.18	0.00	4.52	56.25



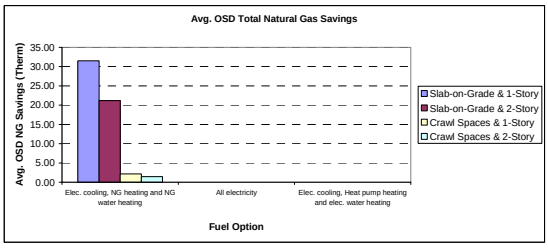
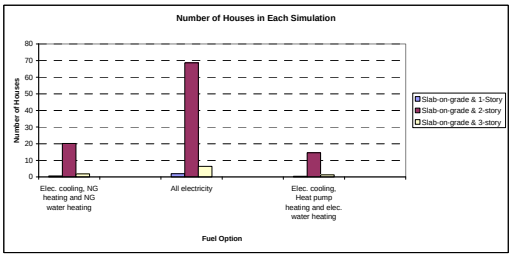


Table 99: Code and Pre-code Average OSD Simulation Results for Smith County (Single-Family).

The simulation result for one county

County Name	Smith
NAHB Division	West South Central
Number of new building permits for MF	116

		Fuel Option			Total
		1	2	3	
		Elec. cooling, NG heating and NG water heating	All electricity	Elec. cooling, Heat pump heating and elec. water heating	
		19.5%	66.4%	14.1%	
Slab-on-grade (100%)	1-Story (2.6%)	0.51%	1.73%	0.37%	2.60%
	2-Story (89.1%)	17.37%	59.16%	12.56%	89.10%
	3-Story (8.3%)	1.62%	5.51%	1.17%	8.30%
Total		19.50%	66.40%	14.10%	100.00%



Number of Houses for each simulation

		Fuel Option			Total
		1	2	3	
		Elec. cooling, NG heating and NG water heating	All electricity	Elec. cooling, Heat pump heating and elec. water heating	
		19.5%	66.4%	14.1%	
Slab-on-grade (100%)	1-Story (2.6%)	1	2	0	3
	2-Story (89.1%)	20	69	15	103
	3-Story (8.3%)	2	6	1	10
Total		23	77	16	116

Precode Energy Use for each option (per house)

		Fuel Option						
		1		2		3		
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating		
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	
Slab-on-grade	1-Story	5,756	239	8,413	0	8,376	0	
	2-Story	5,684	214	7,901	0	7,901	0	
	3-Story	5,732	206	7,812	0	7,813	0	
Total		17,172	658	24,126	0	24,090	0	

Code compliant Energy Use for each option (per house)

		Fuel Option						
		1		2		3		
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating		
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	
Slab-on-grade	1-Story	5,436	200	8,164	0	8,122	0	
	2-Story	5,428	173	7,693	0	7,695	0	
	3-Story	5,477	165	7,596	0	7,599	0	
Total		16,340	537	23,452	0	23,415	0	

Precode Total Energy Use (For total houses in a County)

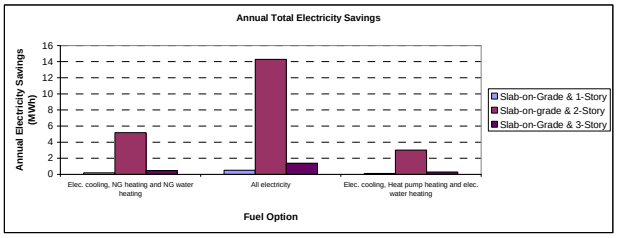
		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	3	141	17	0	4	0	24	141
	2-Story	115	4,308	542	0	115	0	772	4,308
	3-Story	11	386	50	0	11	0	71	386
Total		129	4,835	609	0	129	0	867	4,835

Code compliant Total Energy Use (For total houses in a County)

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	3	117	16	0	3	0	23	117
	2-Story	109	3,487	528	0	112	0	749	3,487
	3-Story	10	309	49	0	10	0	69	309
Total		123	3,913	593	0	126	0	842	3,913

Total Energy Savings Due to the Code Adoption

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	0	23	0	0	0	0	1	23
	2-Story	5	821	14	0	3	0	22	821
	3-Story	0	77	1	0	0	0	2	77
Total		6	922	16	0	3	0	25	922



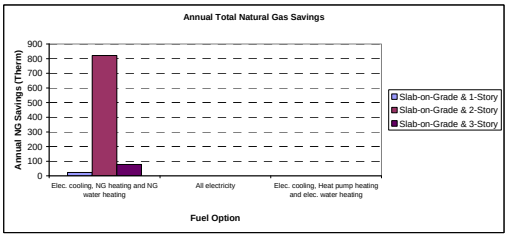


Table 100: Code and Pre-code Annual Simulation Results for Smith County (Multi-Family).

Precode Avg. OSD Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	23.26	0.52	28.37	0.00	28.37	0.00
	2-Story	21.91	0.49	26.38	0.00	26.38	0.00
	3-Story	21.78	0.48	26.02	0.00	26.02	0.00
Total		66.93	1.49	80.77	0.00	80.77	0.00

Code compliant Avg. OSD Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	21.74	0.40	26.84	0.00	26.84	0.00
	2-Story	20.78	0.37	25.25	0.00	25.25	0.00
	3-Story	20.67	0.36	24.93	0.00	24.93	0.00
Total		63.19	1.12	77.03	0.00	77.03	0.00

Precode Avg. OSD Total Energy Use (For total houses in a County)

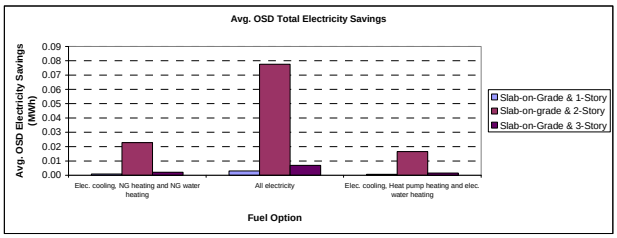
		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	0.01	0.31	0.06	0.00	0.01	0.00	0.08	0.31
	2-Story	0.44	9.82	1.81	0.00	0.38	0.00	2.64	9.82
	3-Story	0.04	0.89	0.17	0.00	0.04	0.00	0.24	0.89
Total		0.52	11.02	2.03	0.00	0.43	0.00	2.96	11.02

Code compliant Avg. OSD Total Energy Use (For total houses in a County)

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	0.01	0.24	0.05	0.00	0.01	0.00	0.08	0.24
	2-Story	0.42	7.40	1.73	0.00	0.37	0.00	2.52	7.40
	3-Story	0.04	0.67	0.16	0.00	0.03	0.00	0.23	0.67
Total		0.47	8.30	1.95	0.00	0.41	0.00	2.83	8.30

Total Energy Savings Due to the Code Adoption

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Savings (kWh)	NG Savings (Therm)	Elec. Savings (kWh)	NG Savings (Therm)	Elec. Savings (kWh)	NG Savings (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	0.00	0.07	0.00	0.00	0.00	0.00	0.00	0.07
	2-Story	0.02	2.42	0.08	0.00	0.02	0.00	0.12	2.42
	3-Story	0.00	0.23	0.01	0.00	0.00	0.00	0.01	0.23
Total		0.03	2.71	0.09	0.00	0.02	0.00	0.13	2.71



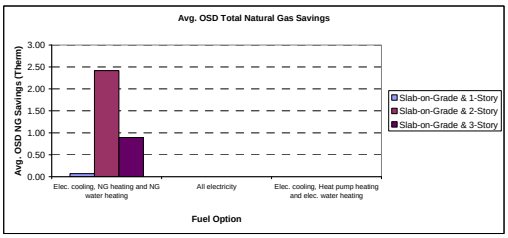


Table 101: Code and Pre-code Average OSD Simulation Results for Smith County (Multi-Family).

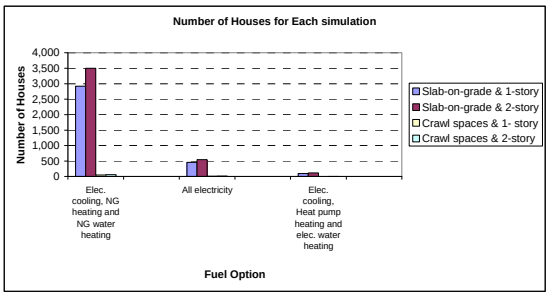
Table 102: Code and Pre-code Simulation Results for Individual Residence for Travis County (Single-Family and Multi-Family).

County	SF or MF	Precode or Code-compliant	Options			Simulation #	Annual Elec. (kWh/yr)	Annual NG (Therms/yr)	Avg. OSD Elec. (kWh/day) (Aug. 19)	Avg. OSD NG (Therm/day) (Aug. 19)	Total Annual (Elec. + NG) (MBtu)	Annual Elec.Savings (kWh/yr)	Annual NG Savings (Therms/yr)	Avg. OSD Elec. Savings (kWh/day) (Aug. 19)	Avg. OSD NG Savings (Therm/day) (Aug. 19)	Total Annual Savings (Elec. + NG) (MBtu)
Travis	SF	Precode	Slab-on-grade	Fuel Option 1	1-story	1	16154	366	70.2103	0.730761	91.71					
					2-story	2	15225	354	66.3631	0.730761	87.39					
				Fuel Option 2	1-story	3	20935	0	78.7041	0	71.45					
					2-story	4	19791	0	74.857	0	67.55					
				Fuel Option 3	1-story	5	20696	0	78.7041	0	70.63					
					2-story	6	19623	0	74.857	0	66.97					
			Crawl Space	Fuel Option 1	1-story	7	16700	356	70.7676	0.730761	92.59					
					2-story	8	15986	345	66.9592	0.730761	89.07					
				Fuel Option 2	1-story	9	21311	0	79.2613	0	72.73					
					2-story	10	20397	0	75.453	0	69.62					
				Fuel Option 3	1-story	11	21118	0	79.2613	0	72.08					
					2-story	12	20264	0	75.453	0	69.16					
		Code - Compliant	Slab-on-grade	Fuel Option 1	1-story	13	13767	295	58.3643	0.610761	76.45	2,387	71	11.85	0.12	15.26
					2-story	14	13186	294	56.3179	0.610761	74.41	2,039	60	10.05	0.12	12.98
				Fuel Option 2	1-story	15	18036	0	66.8582	0	61.56	2,899	0	11.85	0.00	9.89
					2-story	16	17447	0	64.8118	0	59.55	2,344	0	10.05	0.00	8.00
				Fuel Option 3	1-story	17	17971	0	66.8582	0	61.34	2,725	0	11.85	0.00	9.29
					2-story	18	17388	0	64.8118	0	59.35	2,235	0	10.05	0.00	7.62
			Crawl Space	Fuel Option 1	1-story	19	14438	287	58.9437	0.610761	77.94	2,262	69	11.82	0.12	14.65
					2-story	20	14029	285	56.93	0.610761	76.42	1,957	60	10.03	0.12	12.65
				Fuel Option 2	1-story	21	18577	0	67.4377	0	63.4	2,734	0	11.82	0.00	9.33
					2-story	22	18146	0	65.4239	0	61.93	2,251	0	10.03	0.00	7.69
				Fuel Option 3	1-story	23	18534	0	67.4377	0	63.26	2,584	0	11.82	0.00	8.82
					2-story	24	18106	0	65.4239	0	61.79	2,158	0	10.03	0.00	7.37
	MF	Precode	Slab-on-grade	Fuel Option 1	1-story	1	6366	208.5	25.77575	0.500135	42.565					
					2-story	2	6220.5	192.75	23.91965	0.46762	40.4975					
					3-story	3	6247.333333	187.66667	23.604	0.456781667	40.085					
				Fuel Option 2	1-story	4	8510.5	0	30.481	0	29.045					
					2-story	5	8086.75	0	28.03675	0	27.6					
					3-story	6	8023.833333	0	27.52516667	0	27.385					
				Fuel Option 3	1-story	7	8509	0	30.481	0	29.04					
					2-story	8	8086.25	0	28.03675	0	27.5975					
					3-story	9	8024.166667	0	27.52516667	0	27.38666667					
		Code - Compliant	Slab-on-grade	Fuel Option 1	1-story	10	5969.5	166	24.0956	0.3801365	36.965	397	43	1.68	0.12	5.60
					2-story	11	5894	149.75	22.6385	0.34762	35.0975	327	43	1.28	0.12	5.40
					3-story	12	5926	144.66667	22.36966667	0.336781667	34.69666667	321	43	1.23	0.12	5.39
				Fuel Option 2	1-story	13	8134	0	28.80095	0	27.76	377	0	1.68	0.00	1.29
					2-story	14	7774.25	0	26.75575	0	26.5325	313	0	1.28	0.00	1.07
					3-story	15	7715.5	0	26.29083333	0	26.33333333	308	0	1.23	0.00	1.05
				Fuel Option 3	1-story	16	8135.5	0	28.80095	0	27.765	374	0	1.68	0.00	1.28
					2-story	17	7777.5	0	26.75575	0	26.545	309	0	1.28	0.00	1.05
					3-story	18	7717.833333	0	26.29083333	0	26.34	306	0	1.23	0.00	1.05

Prototype of the simulation result for one county

County Name	Travis
Division (East or West Texas)	West Texas
Number of new building permits for SFD	7,757

		Fuel Option			Total
		1	2	3	
		Elec. cooling, NG heating and NG water heating	All electricity	Elec. cooling, Heat pump heating and elec. water heating	
		84.1%	13.1%	2.8%	
Slab-on-grade (98.3%)	1-Story (45.5%)	37.61%	5.86%	1.25%	44.73%
	2-Story (54.5%)	45.06%	7.02%	1.50%	53.57%
Crawl spaces (1.7%)	1-Story (45.5%)	0.65%	0.10%	0.02%	0.77%
	2-Story (54.5%)	0.78%	0.12%	0.03%	0.93%
Total		84.10%	13.10%	2.80%	100.00%



Number of Houses for each simulation

		Fuel Option			Total
		1	2	3	
		Elec. cooling, NG heating and NG water heating	All electricity	Elec. cooling, Heat pump heating and elec. water heating	
		84.1%	13.1%	2.8%	
Slab-on-grade (98.3%)	1-Story (45.5%)	2,918	454	97	3,469
	2-Story (54.5%)	3,495	544	116	4,156
Crawl spaces (1.7%)	1-Story (45.5%)	50	8	2	60
	2-Story (54.5%)	60	9	2	72
Total		6,524	1,016	217	7,757

Precode Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	16,154	366	20,935	0	20,696	0
	2-Story	15,225	354	19,791	0	19,623	0
Crawl spaces	1-Story	16,700	356	21,311	0	21,118	0
	2-Story	15,986	345	20,397	0	20,264	0
Total		64,065	1,421	82,434	0	81,701	0

Code compliant Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	13,767	295	18,036	0	17,971	0
	2-Story	13,186	294	17,447	0	17,388	0
Crawl spaces	1-Story	14,438	287	18,577	0	18,534	0
	2-Story	14,029	285	18,146	0	18,106	0
Total		55,420	1,161	72,206	0	71,999	0

Precode Total Energy Use (For total houses in a County)

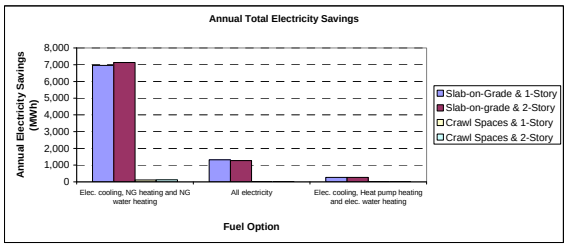
		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	47,134	1,067,913	9,515	0	2,010	0	58,659	1,067,913
	2-Story	53,210	1,237,209	10,774	0	2,263	0	66,268	1,237,209
Crawl spaces	1-Story	843	17,964	168	0	35	0	1,046	17,964
	2-Story	966	20,852	192	0	41	0	1,199	20,852
Total		102,153	2,343,938	20,649	0	4,370	0	127,172	2,343,938

Code compliant Total Energy Use (For total houses in a County)

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	40,169	860,749	8,197	0	1,746	0	50,112	860,749
	2-Story	46,084	1,027,513	9,498	0	2,023	0	57,606	1,027,513
Crawl spaces	1-Story	729	14,482	146	0	31	0	906	14,482
	2-Story	848	17,226	171	0	36	0	1,055	17,226
Total		87,830	1,919,970	18,012	0	3,837	0	109,679	1,919,970

Total Energy Savings Due to the Code Adoption

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)
Slab-on-grade	1-Story	6,965	207,163	1,318	0	265	0	8,547	207,163
	2-Story	7,126	209,696	1,276	0	260	0	8,662	209,696
Crawl spaces	1-Story	114	3,482	21	0	4	0	140	3,482
	2-Story	118	3,626	21	0	4	0	144	3,626
Total		14,323	423,968	2,636	0	533	0	17,493	423,968



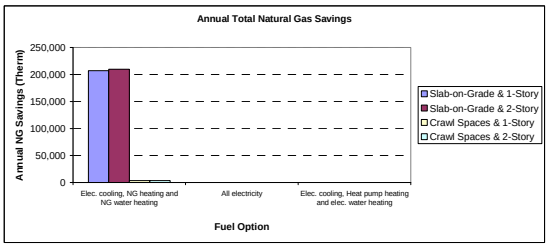


Table 103: Code and Pre-code Annual Simulation Results for Travis County (Single-Family).

Precode Avg. OSD Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	70.21	0.73	78.70	0.00	78.70	0.00
	2-Story	66.36	0.73	74.86	0.00	74.86	0.00
Crawl spaces	1-Story	70.77	0.73	79.26	0.00	79.26	0.00
	2-Story	66.96	0.73	75.45	0.00	75.45	0.00
Total		274.30	2.92	308.28	0.00	308.28	0.00

Code compliant Avg. OSD Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	58.36	0.61	66.86	0.00	66.86	0.00
	2-Story	56.32	0.61	64.81	0.00	64.81	0.00
Crawl spaces	1-Story	58.94	0.61	67.44	0.00	67.44	0.00
	2-Story	56.93	0.61	65.42	0.00	65.42	0.00
Total		230.56	2.44	264.53	0.00	264.53	0.00

Precode Avg. OSD Total Energy Use (For total houses in a County)

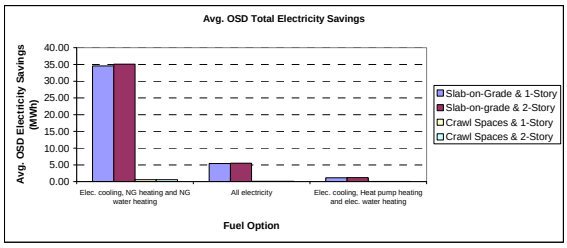
		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	204.86	2,132.21	35.77	0.00	7.65	0.00	248.28	2,132.21
	2-Story	231.94	2,553.97	40.75	0.00	8.71	0.00	281.40	2,553.97
Crawl spaces	1-Story	3.57	36.87	0.62	0.00	0.13	0.00	4.33	36.87
	2-Story	4.05	44.17	0.71	0.00	0.15	0.00	4.91	44.17
Total		444.41	4,767.22	77.86	0.00	16.64	0.00	538.91	4,767.22

Code compliant Avg. OSD Total Energy Use (For total houses in a County)

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	170.30	1,782.08	30.39	0.00	6.49	0.00	207.18	1,782.08
	2-Story	196.83	2,134.57	35.28	0.00	7.54	0.00	239.65	2,134.57
Crawl spaces	1-Story	2.97	30.82	0.53	0.00	0.11	0.00	3.62	30.82
	2-Story	3.44	36.92	0.62	0.00	0.13	0.00	4.19	36.92
Total		373.54	3,984.39	66.82	0.00	14.28	0.00	454.64	3,984.39

Avg. OSD Total Energy Savings Due to the Code Adoption

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)
Slab-on-grade	1-Story	34.56	350.14	5.38	0.00	1.15	0.00	41.10	350.14
	2-Story	35.11	419.39	5.47	0.00	1.17	0.00	41.74	419.39
Crawl spaces	1-Story	0.60	6.06	0.09	0.00	0.02	0.00	0.71	6.06
	2-Story	0.61	7.25	0.09	0.00	0.02	0.00	0.72	7.25
Total		70.87	782.84	11.04	0.00	2.36	0.00	84.27	782.84



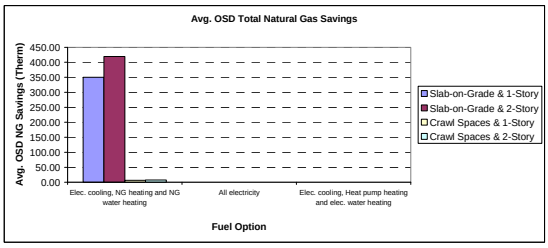
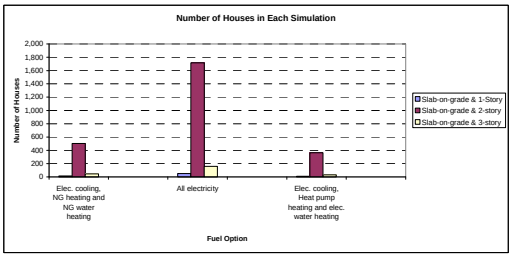


Table 104: Code and Pre-code Average OSD Simulation Results for Travis County (Single-Family).

The simulation result for one county

County Name	Travis
NAHB Division	West South Central
Number of new building permits for MF	2,901

		Fuel Option			Total
		1	2	3	
		Elec. cooling, NG heating and NG water heating	All electricity	Elec. cooling, Heat pump heating and elec. water heating	
		19.5%	66.4%	14.1%	
Slab-on-grade (100%)	1-Story (2.6%)	0.51%	1.73%	0.37%	2.60%
	2-Story (89.1%)	17.37%	59.16%	12.56%	89.10%
	3-Story (8.3%)	1.62%	5.51%	1.17%	8.30%
Total		19.50%	66.40%	14.10%	100.00%



Number of Houses for each simulation

		Fuel Option			Total
		1	2	3	
		Elec. cooling, NG heating and NG water heating	All electricity	Elec. cooling, Heat pump heating and elec. water heating	
		19.5%	66.4%	14.1%	
Slab-on-grade (100%)	1-Story (2.6%)	15	50	11	75
	2-Story (89.1%)	504	1,716	364	2,585
	3-Story (8.3%)	47	160	34	241
Total		566	1,926	409	2,901

Precode Energy Use for each option (per house)

		Fuel Option						
		1		2		3		
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating		
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	
Slab-on-grade	1-Story	6,366	209	8,511	0	8,509	0	
	2-Story	6,221	193	8,087	0	8,086	0	
	3-Story	6,247	188	8,024	0	8,024	0	
Total		18,834	589	24,621	0	24,619	0	

Code compliant Energy Use for each option (per house)

		Fuel Option						
		1		2		3		
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating		
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	
Slab-on-grade	1-Story	5,970	166	8,134	0	8,136	0	
	2-Story	5,894	155	7,774	0	7,778	0	
	3-Story	5,926	145	7,716	0	7,718	0	
Total		17,790	460	23,624	0	23,631	0	

Precode Total Energy Use (For total houses in a County)

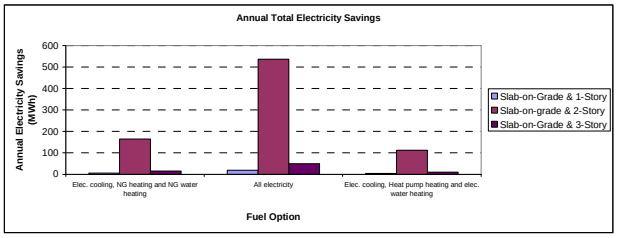
		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	94	3,067	426	0	90	0	610	3,067
	2-Story	3,135	97,153	13,879	0	2,947	0	19,962	97,153
	3-Story	293	8,811	1,283	0	272	0	1,849	8,811
Total		3,522	109,031	15,588	0	3,310	0	22,421	109,031

Code compliant Total Energy Use (For total houses in a County)

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	88	2,442	407	0	87	0	582	2,442
	2-Story	2,971	75,479	13,343	0	2,835	0	19,149	75,479
	3-Story	278	6,792	1,234	0	262	0	1,774	6,792
Total		3,337	84,713	14,984	0	3,183	0	21,504	84,713

Total Energy Savings Due to the Code Adoption

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	6	625	19	0	4	0	29	625
	2-Story	165	21,673	536	0	113	0	813	21,673
	3-Story	15	2,019	49	0	10	0	75	2,019
Total		185	24,318	604	0	127	0	917	24,318



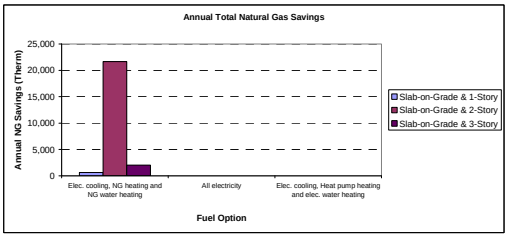


Table 105: Code and Pre-code Annual Simulation Results for Travis County (Multi-Family).

Precode Avg. OSD Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	25.78	0.50	30.48	0.00	30.48	0.00
	2-Story	23.92	0.47	28.04	0.00	28.04	0.00
	3-Story	23.60	0.46	27.53	0.00	27.53	0.00
Total		73.30	1.42	86.04	0.00	86.04	0.00

Code compliant Avg. OSD Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	24.10	0.38	28.80	0.00	28.80	0.00
	2-Story	22.64	0.35	26.76	0.00	26.76	0.00
	3-Story	22.37	0.34	26.29	0.00	26.29	0.00
Total		69.10	1.06	81.85	0.00	81.85	0.00

Precode Avg. OSD Total Energy Use (For total houses in a County)

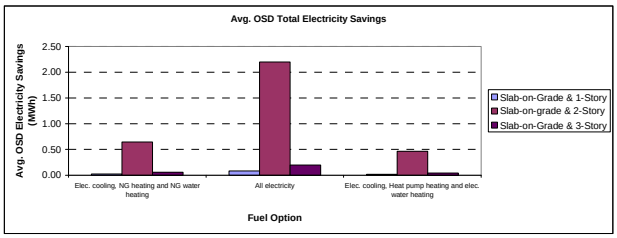
		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	0.38	7.36	1.53	0.00	0.32	0.00	2.23	7.36
	2-Story	12.06	235.70	48.12	0.00	10.22	0.00	70.39	235.70
	3-Story	1.11	21.45	4.40	0.00	0.93	0.00	6.44	21.45
Total		13.54	264.50	54.05	0.00	11.48	0.00	79.07	264.50

Code compliant Avg. OSD Total Energy Use (For total houses in a County)

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	0.35	5.59	1.44	0.00	0.31	0.00	2.10	5.59
	2-Story	11.41	175.21	45.92	0.00	9.75	0.00	67.08	175.21
	3-Story	1.05	15.81	4.20	0.00	0.89	0.00	6.15	15.81
Total		12.82	196.62	51.57	0.00	10.95	0.00	75.33	196.62

Total Energy Savings Due to the Code Adoption

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Savings (kWh)	NG Savings (Therm)	Elec. Savings (kWh)	NG Savings (Therm)	Elec. Savings (kWh)	NG Savings (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	0.02	1.76	0.08	0.00	0.02	0.00	0.13	1.76
	2-Story	0.65	60.48	2.20	0.00	0.47	0.00	3.31	60.48
	3-Story	0.06	5.63	0.20	0.00	0.04	0.00	0.30	5.63
Total		0.73	67.88	2.48	0.00	0.53	0.00	3.74	67.88



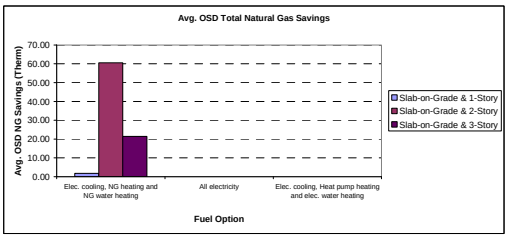


Table 106: Code and Pre-code Average OSD Simulation Results for Travis County (Multi-Family).

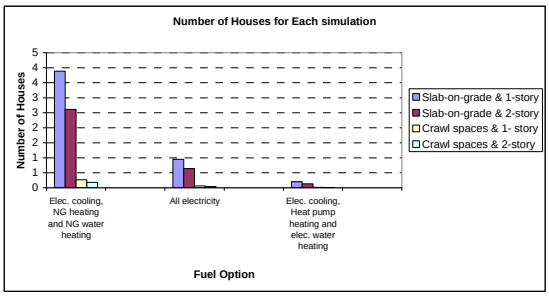
County	SF or MF	Precode or Code-compliant	Options			Simulation #	Annual Elec. (kWh/yr)	Annual NG (Therms/yr)	Avg. OSD Elec. (kWh/day) (Aug. 19)	Avg. OSD NG (Therm/day) (Aug. 19)	Total Annual (Elec. + NG) (MBtu)	Annual Elec.Savings (kWh/yr)	Annual NG Savings (Therms/yr)	Avg. OSD Elec. Savings (kWh/day) (Aug. 19)	Avg. OSD NG Savings (Therm/day) (Aug. 19)	Total Annual Savings (Elec. + NG) (MBtu)
Upshur	SF	Precode	Slab-on-grade	Fuel Option 1	1-story	1	12798	480	55.9594	0.772833	91.68					
					2-story	2	12036	470	52.1915	0.772833	88.07					
				Fuel Option 2	1-story	3	19614	0	65.1825	0	66.94					
					2-story	4	18644	0	61.4146	0	63.63					
				Fuel Option 3	1-story	5	18968	0	65.1825	0	64.74					
					2-story	6	18086	0	61.4146	0	61.73					
			Crawl Space	Fuel Option 1	1-story	7	13523	445	57.885	0.772833	90.67					
					2-story	8	12945	426	54.5279	0.772833	86.79					
				Fuel Option 2	1-story	9	19694	0	67.1081	0	67.22					
					2-story	10	18752	0	63.751	0	64					
				Fuel Option 3	1-story	11	19251	0	67.1081	0	65.7					
					2-story	12	18425	0	63.751	0	62.88					
		Code - Compliant	Slab-on-grade	Fuel Option 1	1-story	13	11347	410	48.0973	0.652833	79.74	1,451	70	7.86	0.12	11.94
					2-story	14	10797	410	45.0379	0.652833	77.86	1,239	60	7.15	0.12	10.21
				Fuel Option 2	1-story	15	17614	0	57.3205	0	60.12	2,000	0	7.86	0.00	6.82
					2-story	16	17045	0	54.2611	0	58.17	1,599	0	7.15	0.00	5.46
				Fuel Option 3	1-story	17	17212	0	57.3205	0	58.74	1,756	0	7.86	0.00	6.00
					2-story	18	16674	0	54.2611	0	56.91	1,412	0	7.15	0.00	4.82
			Crawl Space	Fuel Option 1	1-story	19	12131	368	50.2573	0.652833	78.2	1,392	77	7.63	0.12	12.47
					2-story	20	11735	357	47.699	0.652833	75.79	1,210	69	6.83	0.12	11.00
				Fuel Option 2	1-story	21	17647	0	59.4804	0	60.23	2,047	0	7.63	0.00	6.99
					2-story	22	17049	0	56.9222	0	58.19	1,703	0	6.83	0.00	5.81
				Fuel Option 3	1-story	23	17465	0	59.4804	0	59.61	1,786	0	7.63	0.00	6.09
					2-story	24	16919	0	56.9222	0	57.74	1,506	0	6.83	0.00	5.14
	MF	Precode	Slab-on-grade	Fuel Option 1	1-story	1	5788	239	23.40135	0.522435	43.63					
					2-story	2	5722	213.25	22.0921	0.4871325	40.865					
					3-story	3	5771.333333	205.33333	21.9385	0.475365	40.23833333					
				Fuel Option 2	1-story	4	8444.5	0	28.51075	0	28.82					
					2-story	5	7934	0	26.56275	0	27.0775					
					3-story	6	7846.833333	0	26.19633333	0	26.78					
				Fuel Option 3	1-story	7	8406	0	28.51075	0	28.69					
					2-story	8	7934	0	26.56275	0	27.0775					
					3-story	9	7846.5	0	26.19633333	0	26.78					
		Code - Compliant	Slab-on-grade	Fuel Option 1	1-story	10	5469.5	194	21.7698	0.4024375	38.09	319	45	1.63	0.12	5.54
					2-story	11	5476.75	168.25	20.84205	0.3671325	35.515	245	45	1.25	0.12	5.35
					3-story	12	5533.333333	160.16667	20.73316667	0.355365	34.89833333	238	45	1.21	0.12	5.34
				Fuel Option 2	1-story	13	8105	0	26.87915	0	27.665	340	0	1.63	0.00	1.16
					2-story	14	7661.5	0	25.31275	0	26.1475	273	0	1.25	0.00	0.93
					3-story	15	7581.166667	0	24.991	0	25.875	266	0	1.21	0.00	0.91
				Fuel Option 3	1-story	16	8084.5	0	26.87915	0	27.595	322	0	1.63	0.00	1.10
					2-story	17	7673.25	0	25.31275	0	26.19	261	0	1.25	0.00	0.89
					3-story	18	7590.833333	0	24.991	0	25.90833333	256	0	1.21	0.00	0.87

Table 107: Code and Pre-code Simulation Results for Individual Residence for Upshur County (Single-Family and Multi-Family).

Prototype of the simulation result for one county

County Name	Upshur
Division (East or West Texas)	East Texas
Number of new building permits for SFD	9

		Fuel Option 1	Fuel Option 2	Fuel Option 3	Total
		Elec. cooling, NG heating and NG water heating	All electricity	Elec. cooling, Heat pump heating and elec. water heating	
		77.1%	18.9%	4.0%	
Slab-on-grade (93.6%)	1-Story (59.8%)	43.16%	10.58%	2.24%	55.97%
	2-Story (40.2%)	29.01%	7.11%	1.51%	37.63%
Crawl spaces (6.4%)	1-Story (59.8%)	2.95%	0.72%	0.15%	3.83%
	2-Story (39.2%)	1.98%	0.49%	0.10%	2.57%
Total		77.10%	18.90%	4.00%	100.00%



Number of Houses for each simulation

		Fuel Option 1	Fuel Option 2	Fuel Option 3	Total
		Elec. cooling, NG heating and NG water heating	All electricity	Elec. cooling, Heat pump heating and elec. water heating	
		77.1%	18.9%	4.0%	
Slab-on-grade (93.6%)	1-Story (59.8%)	4	1	0	5
	2-Story (40.2%)	3	1	0	3
Crawl spaces (6.4%)	1-Story (59.8%)	0	0	0	0
	2-Story (39.2%)	0	0	0	0
Total		7	2	0	9

Precode Energy Use for each option (per house)

		Fuel Option 1		Fuel Option 2		Fuel Option 3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	12,798	480	19,614	0	18,968	0
	2-Story	12,038	470	18,644	0	18,086	0
Crawl spaces	1-Story	13,523	445	19,694	0	19,251	0
	2-Story	12,945	426	18,752	0	18,425	0
Total		51,302	1,821	76,704	0	74,730	0

Code compliant Energy Use for each option (per house)

		Fuel Option 1		Fuel Option 2		Fuel Option 3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	11,347	410	17,614	0	17,212	0
	2-Story	10,797	410	17,045	0	16,674	0
Crawl spaces	1-Story	12,131	368	17,647	0	17,465	0
	2-Story	11,735	357	17,049	0	16,919	0
Total		46,010	1,545	69,355	0	68,270	0

Precode Total Energy Use (For total houses in a County)

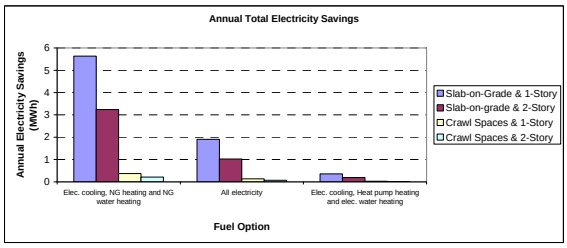
		Fuel Option 1		Fuel Option 2		Fuel Option 3		Total	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	50	1,864	19	0	4	0	72	1,864
	2-Story	31	1,227	12	0	2	0	46	1,227
Crawl spaces	1-Story	4	118	1	0	0	0	5	118
	2-Story	2	76	1	0	0	0	3	76
Total		87	3,286	33	0	7	0	126	3,286

Code compliant Total Energy Use (For total houses in a County)

		Fuel Option 1		Fuel Option 2		Fuel Option 3		Total	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	44	1,592	17	0	3	0	64	1,592
	2-Story	28	1,070	11	0	2	0	41	1,070
Crawl spaces	1-Story	3	98	1	0	0	0	5	98
	2-Story	2	64	1	0	0	0	3	64
Total		78	2,824	30	0	6	0	113	2,824

Total Energy Savings Due to the Code Adoption

		Fuel Option 1		Fuel Option 2		Fuel Option 3		Total	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)
Slab-on-grade	1-Story	6	272	2	0	0	0	8	272
	2-Story	3	157	1	0	0	0	4	157
Crawl spaces	1-Story	0	20	0	0	0	0	1	20
	2-Story	0	12	0	0	0	0	0	12
Total		9	461	3	0	1	0	13	461



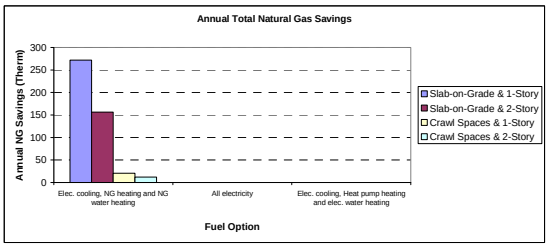


Table 108: Code and Pre-code Annual Simulation Results for Upshur County (Single-Family).

Precode Avg. OSD Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	55.96	0.77	65.18	0.00	65.18	0.00
	2-Story	52.19	0.77	61.41	0.00	61.41	0.00
Crawl spaces	1-Story	57.89	0.77	67.11	0.00	67.11	0.00
	2-Story	54.53	0.77	63.75	0.00	63.75	0.00
Total		220.56	3.09	257.46	0.00	257.46	0.00

Code compliant Avg. OSD Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	48.10	0.65	57.32	0.00	57.32	0.00
	2-Story	45.04	0.65	54.26	0.00	54.26	0.00
Crawl spaces	1-Story	50.26	0.65	59.48	0.00	59.48	0.00
	2-Story	47.70	0.65	56.92	0.00	56.92	0.00
Total		191.09	2.61	227.98	0.00	227.98	0.00

Precode Avg. OSD Total Energy Use (For total houses in a County)

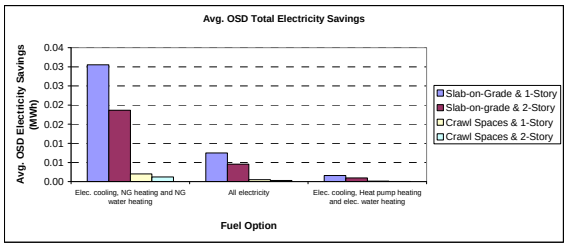
		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	0.22	3.00	0.06	0.00	0.01	0.00	0.29	3.00
	2-Story	0.14	2.02	0.04	0.00	0.01	0.00	0.18	2.02
Crawl spaces	1-Story	0.02	0.21	0.00	0.00	0.00	0.00	0.02	0.21
	2-Story	0.01	0.14	0.00	0.00	0.00	0.00	0.01	0.14
Total		0.38	5.36	0.11	0.00	0.02	0.00	0.51	5.36

Code compliant Avg. OSD Total Energy Use (For total houses in a County)

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	0.19	2.54	0.05	0.00	0.01	0.00	0.25	2.54
	2-Story	0.12	1.70	0.03	0.00	0.01	0.00	0.16	1.70
Crawl spaces	1-Story	0.01	0.17	0.00	0.00	0.00	0.00	0.02	0.17
	2-Story	0.01	0.12	0.00	0.00	0.00	0.00	0.01	0.12
Total		0.33	4.53	0.10	0.00	0.02	0.00	0.44	4.53

Avg. OSD Total Energy Savings Due to the Code Adoption

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)
Slab-on-grade	1-Story	0.03	0.47	0.01	0.00	0.00	0.00	0.04	0.47
	2-Story	0.02	0.31	0.00	0.00	0.00	0.00	0.02	0.31
Crawl spaces	1-Story	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.03
	2-Story	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.02
Total		0.05	0.83	0.01	0.00	0.00	0.00	0.07	0.83



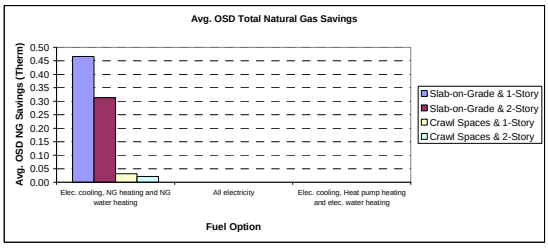
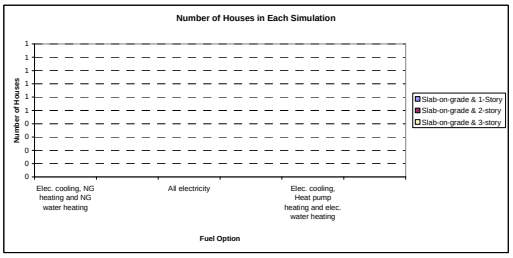


Table 109: Code and Pre-code Average OSD Simulation Results for Upshur County (Single-Family).

The simulation result for one county

County Name	Upshur
NAHB Division	West South Central
Number of new building permits for MF	0

		Fuel Option			Total
		1	2	3	
		Elec. cooling, NG heating and NG water heating	All electricity	Elec. cooling, Heat pump heating and elec. water heating	
		19.5%	66.4%	14.1%	
Slab-on-grade (100%)	1-Story (2.6%)	0.51%	1.73%	0.37%	2.60%
	2-Story (89.1%)	17.37%	59.16%	12.56%	89.10%
	3-Story (8.3%)	1.62%	5.51%	1.17%	8.30%
Total		19.50%	66.40%	14.10%	100.00%



Number of Houses for each simulation

		Fuel Option			Total
		1	2	3	
		Elec. cooling, NG heating and NG water heating	All electricity	Elec. cooling, Heat pump heating and elec. water heating	
		19.5%	66.4%	14.1%	
Slab-on-grade (100%)	1-Story (2.6%)	0	0	0	0
	2-Story (89.1%)	0	0	0	0
	3-Story (8.3%)	0	0	0	0
Total		0	0	0	0

Precode Energy Use for each option (per house)

		Fuel Option						
		1		2		3		
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating		
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	
Slab-on-grade	1-Story	5,788	239	8,445	0	8,406	0	
	2-Story	5,722	213	7,934	0	7,934	0	
	3-Story	5,771	205	7,847	0	7,847	0	
Total		17,281	658	24,225	0	24,187	0	

Code compliant Energy Use for each option (per house)

		Fuel Option						
		1		2		3		
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating		
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	
Slab-on-grade	1-Story	5,470	194	8,105	0	8,065	0	
	2-Story	5,477	168	7,662	0	7,673	0	
	3-Story	5,533	160	7,581	0	7,591	0	
Total		16,480	522	23,348	0	23,349	0	

Precode Total Energy Use (For total houses in a County)

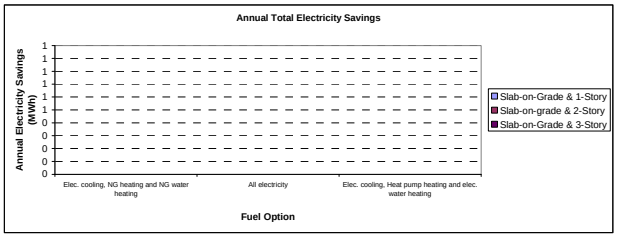
		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	0	0	0	0	0	0	0	0
	2-Story	0	0	0	0	0	0	0	0
	3-Story	0	0	0	0	0	0	0	0
Total		0	0	0	0	0	0	0	0

Code compliant Total Energy Use (For total houses in a County)

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	0	0	0	0	0	0	0	0
	2-Story	0	0	0	0	0	0	0	0
	3-Story	0	0	0	0	0	0	0	0
Total		0	0	0	0	0	0	0	0

Total Energy Savings Due to the Code Adoption

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	0	0	0	0	0	0	0	0
	2-Story	0	0	0	0	0	0	0	0
	3-Story	0	0	0	0	0	0	0	0
Total		0	0	0	0	0	0	0	0



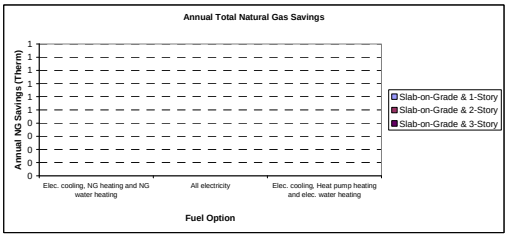


Table 110: Code and Pre-code Annual Simulation Results for Upshur County (Multi-Family).

Precode Avg. OSD Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	23.40	0.52	28.51	0.00	28.51	0.00
	2-Story	22.09	0.49	26.56	0.00	26.56	0.00
	3-Story	21.94	0.48	26.20	0.00	26.20	0.00
Total		67.43	1.49	81.27	0.00	81.27	0.00

Code compliant Avg. OSD Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	21.77	0.40	26.88	0.00	26.88	0.00
	2-Story	20.84	0.37	25.31	0.00	25.31	0.00
	3-Story	20.73	0.36	24.99	0.00	24.99	0.00
Total		63.35	1.12	77.18	0.00	77.18	0.00

Precode Avg. OSD Total Energy Use (For total houses in a County)

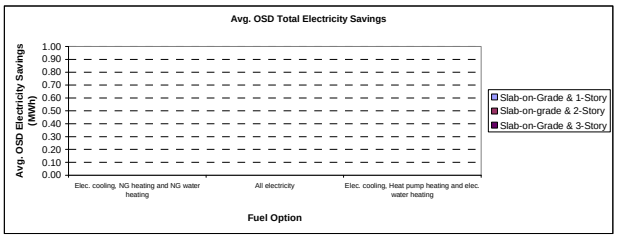
		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	2-Story	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3-Story	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Code compliant Avg. OSD Total Energy Use (For total houses in a County)

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	2-Story	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3-Story	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Total Energy Savings Due to the Code Adoption

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Savings (kWh)	NG Savings (Therm)	Elec. Savings (kWh)	NG Savings (Therm)	Elec. Savings (kWh)	NG Savings (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	2-Story	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3-Story	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00



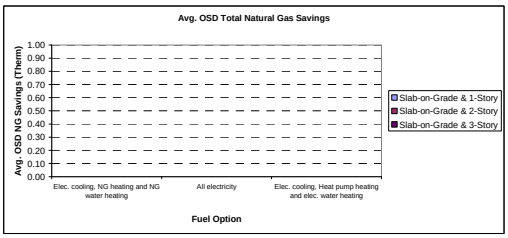


Table 111: Code and Pre-code Average OSD Simulation Results for Upshur County (Multi-Family).

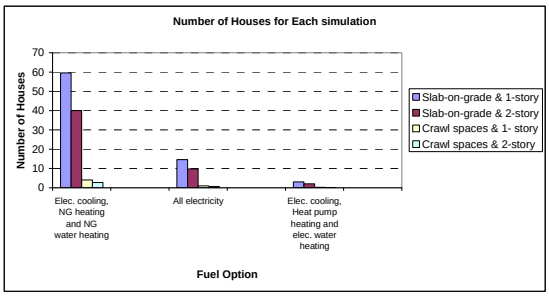
Table 112: Code and Pre-code Simulation Results for Individual Residence for Victoria County (Single-Family and Multi-Family).

County	SF or MF	Precode or Code-compliant	Options			Simulation #	Annual Elec. (kWh/yr)	Annual NG (Therms/yr)	Avg. OSD Elec. (kWh/day) (Aug. 19)	Avg. OSD NG (Therm/day) (Aug. 19)	Total Annual (Elec. + NG) (MBtu)	Annual Elec.Savings (kWh/yr)	Annual NG Savings (Therms/yr)	Avg. OSD Elec. Savings (kWh/day) (Aug. 19)	Avg. OSD NG Savings (Therm/day) (Aug. 19)	Total Annual Savings (Elec. + NG) (MBtu)
Victoria	SF	Precode	Slab-on-grade	Fuel Option 1	1-story	1	13590	377	57.6186	0.754464	84.13					
					2-story	2	12904	367	54.4305	0.754464	80.72					
				Fuel Option 2	1-story	3	18572	0	66.4933	0	63.38					
					2-story	4	17689	0	63.3051	0	60.37					
				Fuel Option 3	1-story	5	18311	0	66.4933	0	62.5					
					2-story	6	17486	0	63.3051	0	59.68					
			Crawl Space	Fuel Option 1	1-story	7	14219	371	58.8853	0.754464	85.64					
					2-story	8	13717	361	55.9231	0.754464	82.87					
				Fuel Option 2	1-story	9	19095	0	67.7598	0	65.17					
					2-story	10	18398	0	64.7977	0	62.79					
				Fuel Option 3	1-story	11	18854	0	67.7598	0	64.35					
					2-story	12	18214	0	64.7977	0	62.16					
		Code - Compliant	Slab-on-grade	Fuel Option 1	1-story	13	12145	331	50.7253	0.634464	74.56	1,445	46	6.89	0.12	9.57
					2-story	14	11589	322	47.9074	0.634464	71.75	1,315	45	6.52	0.12	8.97
				Fuel Option 2	1-story	15	17055	0	59.5998	0	58.21	1,517	0	6.89	0.00	5.17
					2-story	16	16328	0	56.782	0	55.73	1,361	0	6.52	0.00	4.64
				Fuel Option 3	1-story	17	16848	0	59.5998	0	57.5	1,463	0	6.89	0.00	5.00
					2-story	18	16168	0	56.782	0	55.18	1,318	0	6.52	0.00	4.50
			Crawl Space	Fuel Option 1	1-story	19	12798	324	52.1405	0.634464	76.07	1,421	47	6.74	0.12	9.57
					2-story	20	12393	314	49.5464	0.634464	73.74	1,324	47	6.38	0.12	9.13
				Fuel Option 2	1-story	21	17593	0	61.0151	0	60.04	1,502	0	6.74	0.00	5.13
					2-story	22	17015	0	58.421	0	58.07	1,383	0	6.38	0.00	4.72
				Fuel Option 3	1-story	23	17402	0	61.0151	0	59.39	1,452	0	6.74	0.00	4.96
					2-story	24	16873	0	58.421	0	57.59	1,341	0	6.38	0.00	4.57
	MF	Precode	Slab-on-grade	Fuel Option 1	1-story	1	6113	212	24.1253	0.5127	42.05					
					2-story	2	6068.5	196.25	22.94365	0.4786125	40.3275					
					3-story	3	6115	191.16667	22.80266667	0.46725	39.98333333					
				Fuel Option 2	1-story	4	8318	0	29.04155	0	28.39					
					2-story	5	7995.25	0	27.24525	0	27.2875					
					3-story	6	7952	0	26.8995	0	27.14					
				Fuel Option 3	1-story	7	8310.5	0	29.04155	0	28.365					
					2-story	8	7989.75	0	27.24525	0	27.2675					
					3-story	9	7945.166667	0	26.8995	0	27.11666667					
		Code - Compliant	Slab-on-grade	Fuel Option 1	1-story	10	5767.5	170.5	22.6723	0.392701	36.71	346	42	1.45	0.12	5.34
					2-story	11	5779.75	154.25	21.82195	0.3586125	35.16	289	42	1.12	0.12	5.17
					3-story	12	5825.833333	149.16667	21.698	0.34725	34.79333333	289	42	1.10	0.12	5.19
				Fuel Option 2	1-story	13	8007.5	0	27.5885	0	27.33	311	0	1.45	0.00	1.06
					2-story	14	7737.5	0	26.12375	0	26.4075	258	0	1.12	0.00	0.88
					3-story	15	7691.666667	0	25.79483333	0	26.25166667	260	0	1.10	0.00	0.89
				Fuel Option 3	1-story	16	7997	0	27.5885	0	27.295	314	0	1.45	0.00	1.07
					2-story	17	7727.5	0	26.12375	0	26.3725	262	0	1.12	0.00	0.90
					3-story	18	7684.833333	0	25.79483333	0	26.22833333	260	0	1.10	0.00	0.89

Prototype of the simulation result for one county

County Name	Victoria
Division (East or West Texas)	East Texas
Number of new building permits for SFD	138

		Fuel Option			Total
		1	2	3	
		Elec. cooling, NG heating and NG water heating	All electricity	Elec. cooling, Heat pump heating and elec. water heating	
		77.1%	18.9%	4.0%	
Slab-on-grade (93.6%)	1-Story (59.8%)	43.16%	10.58%	2.24%	55.97%
	2-Story (40.2%)	29.01%	7.11%	1.51%	37.63%
Crawl spaces (6.4%)	1-Story (59.8%)	2.95%	0.72%	0.15%	3.83%
	2-Story (39.2%)	1.98%	0.49%	0.10%	2.57%
Total		77.10%	18.90%	4.00%	100.00%



Number of Houses for each simulation

		Fuel Option			Total
		1	2	3	
		Elec. cooling, NG heating and NG water heating	All electricity	Elec. cooling, Heat pump heating and elec. water heating	
		77.1%	18.9%	4.0%	
Slab-on-grade (93.6%)	1-Story (59.8%)	60	15	3	77
	2-Story (40.2%)	40	10	2	52
Crawl spaces (6.4%)	1-Story (59.8%)	4	1	0	5
	2-Story (39.2%)	3	1	0	4
Total		106	26	6	138

Precode Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	13,590	377	18,572	0	18,311	0
	2-Story	12,904	367	17,689	0	17,486	0
Crawl spaces	1-Story	14,219	371	19,095	0	18,854	0
	2-Story	13,717	361	18,398	0	18,214	0
Total		54,430	1,476	73,754	0	72,865	0

Code compliant Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	12,145	331	17,055	0	16,848	0
	2-Story	11,589	322	16,328	0	16,168	0
Crawl spaces	1-Story	12,798	324	17,593	0	17,402	0
	2-Story	12,393	314	17,015	0	16,873	0
Total		48,925	1,291	67,991	0	67,291	0

Precode Total Energy Use (For total houses in a County)

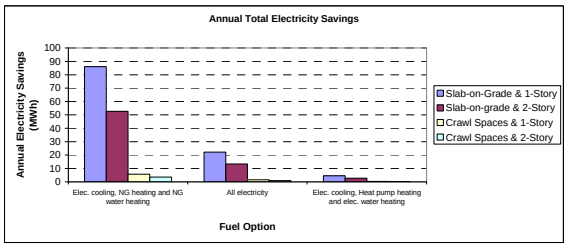
		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	809	22,452	271	0	57	0	1,137	22,452
	2-Story	517	14,693	174	0	36	0	727	14,693
Crawl spaces	1-Story	58	1,511	19	0	4	0	81	1,511
	2-Story	38	988	12	0	3	0	52	988
Total		1,421	39,643	476	0	99	0	1,997	39,643

Code compliant Total Energy Use (For total houses in a County)

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	723	19,712	249	0	52	0	1,024	19,712
	2-Story	464	12,891	160	0	34	0	658	12,891
Crawl spaces	1-Story	52	1,319	18	0	4	0	73	1,319
	2-Story	34	860	11	0	2	0	48	860
Total		1,273	34,782	438	0	92	0	1,803	34,782

Total Energy Savings Due to the Code Adoption

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)
Slab-on-grade	1-Story	86	2,739	22	0	5	0	113	2,739
	2-Story	53	1,802	13	0	3	0	69	1,802
Crawl spaces	1-Story	6	191	1	0	0	0	8	191
	2-Story	4	129	1	0	0	0	5	129
Total		148	4,861	38	0	8	0	194	4,861



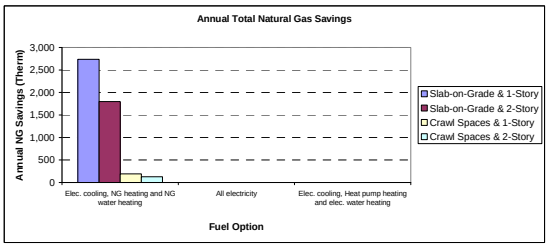


Table 113: Code and Pre-code Annual Simulation Results for Victoria County (Single-Family).

Precode Avg. OSD Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	57.62	0.75	66.49	0.00	66.49	0.00
	2-Story	54.43	0.75	63.31	0.00	63.31	0.00
Crawl spaces	1-Story	58.89	0.75	67.76	0.00	67.76	0.00
	2-Story	55.92	0.75	64.80	0.00	64.80	0.00
Total		226.86	3.02	262.36	0.00	262.36	0.00

Code compliant Avg. OSD Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	50.73	0.63	59.60	0.00	59.60	0.00
	2-Story	47.91	0.63	56.78	0.00	56.78	0.00
Crawl spaces	1-Story	52.14	0.63	61.02	0.00	61.02	0.00
	2-Story	49.55	0.63	58.42	0.00	58.42	0.00
Total		200.32	2.54	235.82	0.00	235.82	0.00

Precode Avg. OSD Total Energy Use (For total houses in a County)

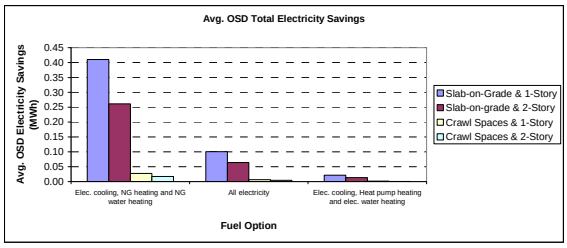
		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	3.43	44.93	0.97	0.00	0.21	0.00	4.61	44.93
	2-Story	2.18	30.20	0.62	0.00	0.13	0.00	2.93	30.20
Crawl spaces	1-Story	0.24	3.07	0.07	0.00	0.01	0.00	0.32	3.07
	2-Story	0.15	2.07	0.04	0.00	0.01	0.00	0.21	2.07
Total		6.00	80.27	1.70	0.00	0.36	0.00	8.07	80.27

Code compliant Avg. OSD Total Energy Use (For total houses in a County)

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	3.02	37.78	0.87	0.00	0.18	0.00	4.08	37.78
	2-Story	1.92	25.40	0.56	0.00	0.12	0.00	2.59	25.40
Crawl spaces	1-Story	0.21	2.58	0.06	0.00	0.01	0.00	0.29	2.58
	2-Story	0.14	1.74	0.04	0.00	0.01	0.00	0.18	1.74
Total		5.29	67.51	1.53	0.00	0.32	0.00	7.14	67.51

Avg. OSD Total Energy Savings Due to the Code Adoption

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)
Slab-on-grade	1-Story	0.41	7.15	0.10	0.00	0.02	0.00	0.53	7.15
	2-Story	0.26	4.80	0.06	0.00	0.01	0.00	0.34	4.80
Crawl spaces	1-Story	0.03	0.49	0.01	0.00	0.00	0.00	0.04	0.49
	2-Story	0.02	0.33	0.00	0.00	0.00	0.00	0.02	0.33
Total		0.72	12.77	0.18	0.00	0.04	0.00	0.93	12.77



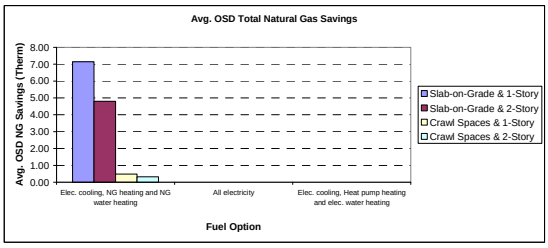
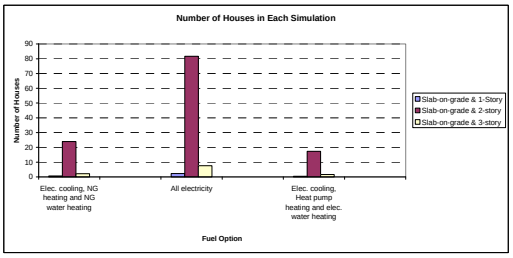


Table 114: Code and Pre-code Average OSD Simulation Results for Victoria County (Single-Family).

The simulation result for one county

County Name	Victoria
NAHB Division	West South Central
Number of new building permits for MF	138

		Fuel Option			Total
		1	2	3	
		Elec. cooling, NG heating and NG water heating	All electricity	Elec. cooling, Heat pump heating and elec. water heating	
		19.5%	66.4%	14.1%	
Slab-on-grade (100%)	1-Story (2.6%)	0.51%	1.73%	0.37%	2.60%
	2-Story (89.1%)	17.37%	59.16%	12.56%	89.10%
	3-Story (8.3%)	1.62%	5.51%	1.17%	8.30%
Total		19.50%	66.40%	14.10%	100.00%



Number of Houses for each simulation

		Fuel Option			Total
		1	2	3	
		Elec. cooling, NG heating and NG water heating	All electricity	Elec. cooling, Heat pump heating and elec. water heating	
		19.5%	66.4%	14.1%	
Slab-on-grade (100%)	1-Story (2.6%)	1	2	1	4
	2-Story (89.1%)	24	82	17	123
	3-Story (8.3%)	2	8	2	11
Total		27	92	19	138

Precode Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	6,113	212	8,318	0	8,311	0
	2-Story	6,065	196	7,995	0	7,990	0
	3-Story	6,119	191	7,952	0	7,945	0
Total		18,297	599	24,265	0	24,245	0

Code compliant Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	5,768	171	8,008	0	7,997	0
	2-Story	5,780	154	7,738	0	7,728	0
	3-Story	5,826	149	7,692	0	7,685	0
Total		17,373	474	23,437	0	23,409	0

Precode Total Energy Use (For total houses in a County)

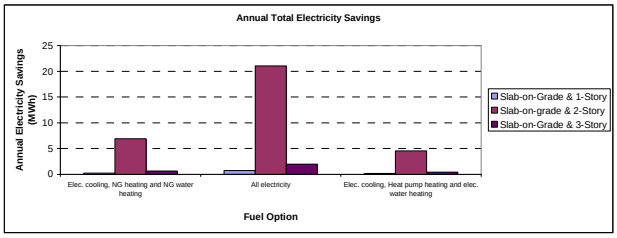
		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	4	148	20	0	4	0	28	148
	2-Story	146	4,705	653	0	139	0	937	4,705
	3-Story	14	427	60	0	13	0	87	427
Total		163	5,281	733	0	156	0	1,052	5,281

Code compliant Total Energy Use (For total houses in a County)

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	4	119	19	0	4	0	27	119
	2-Story	139	3,698	632	0	134	0	904	3,698
	3-Story	13	333	58	0	12	0	84	333
Total		156	4,151	709	0	150	0	1,015	4,151

Total Energy Savings Due to the Code Adoption

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	0	29	1	0	0	0	1	29
	2-Story	7	1,007	21	0	5	0	33	1,007
	3-Story	1	94	2	0	0	0	3	94
Total		8	1,130	24	0	5	0	37	1,130



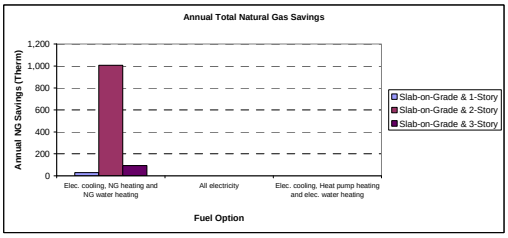


Table 115: Code and Pre-code Annual Simulation Results for Victoria County (Multi-Family).

Precode Avg. OSD Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	24.13	0.51	29.04	0.00	29.04	0.00
	2-Story	22.94	0.48	27.25	0.00	27.25	0.00
	3-Story	22.80	0.47	26.90	0.00	26.90	0.00
Total		69.87	1.46	83.19	0.00	83.19	0.00

Code compliant Avg. OSD Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	22.67	0.39	27.59	0.00	27.59	0.00
	2-Story	21.82	0.36	26.12	0.00	26.12	0.00
	3-Story	21.70	0.35	25.79	0.00	25.79	0.00
Total		66.19	1.10	79.51	0.00	79.51	0.00

Precode Avg. OSD Total Energy Use (For total houses in a County)

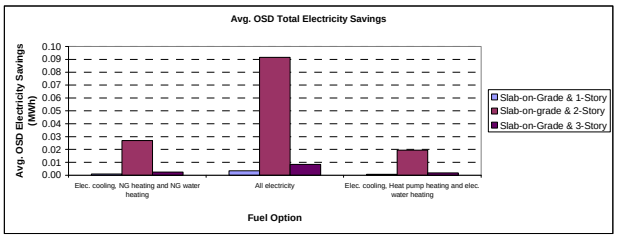
		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	0.02	0.36	0.07	0.00	0.01	0.00	0.10	0.36
	2-Story	0.55	11.48	2.22	0.00	0.47	0.00	3.25	11.48
	3-Story	0.05	1.04	0.20	0.00	0.04	0.00	0.30	1.04
Total		0.62	12.88	2.50	0.00	0.53	0.00	3.65	12.88

Code compliant Avg. OSD Total Energy Use (For total houses in a County)

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	0.02	0.27	0.07	0.00	0.01	0.00	0.10	0.27
	2-Story	0.52	8.60	2.13	0.00	0.45	0.00	3.11	8.60
	3-Story	0.05	0.78	0.20	0.00	0.04	0.00	0.29	0.78
Total		0.59	9.65	2.39	0.00	0.51	0.00	3.49	9.65

Total Energy Savings Due to the Code Adoption

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Savings (kWh)	NG Savings (Therm)	Elec. Savings (kWh)	NG Savings (Therm)	Elec. Savings (kWh)	NG Savings (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	0.00	0.08	0.00	0.00	0.00	0.00	0.01	0.08
	2-Story	0.03	2.88	0.09	0.00	0.02	0.00	0.14	2.88
	3-Story	0.00	0.27	0.01	0.00	0.00	0.00	0.01	0.27
Total		0.03	3.23	0.10	0.00	0.02	0.00	0.16	3.23



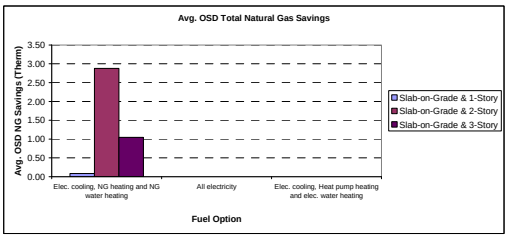


Table 116: Code and Pre-code Average OSD Simulation Results for Victoria County (Multi-Family).

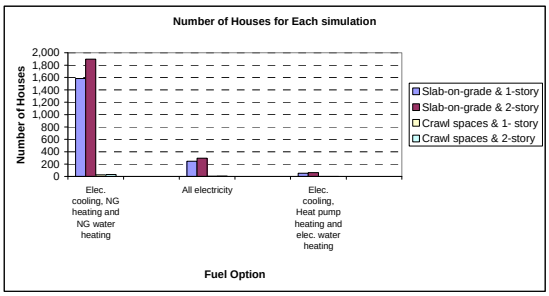
Table 117: Code and Pre-code Simulation Results for Individual Residence for Williamson County (Single-Family and Multi-Family).

County	SF or MF	Precode or Code-compliant	Options			Simulation #	Annual Elec. (kWh/yr)	Annual NG (Therms/yr)	Avg. OSD Elec. (kWh/day) (Aug. 19)	Avg. OSD NG (Therm/day) (Aug. 19)	Total Annual (Elec. + NG) (MBtu)	Annual Elec.Savings (kWh/yr)	Annual NG Savings (Therms/yr)	Avg. OSD Elec. Savings (kWh/day) (Aug. 19)	Avg. OSD NG Savings (Therm/day) (Aug. 19)	Total Annual Savings (Elec. + NG) (MBtu)
Williamson	SF	Precode	Slab-on-grade	Fuel Option 1	1-story	1	16172	366	70.2475	0.730761	91.77					
					2-story	2	15241	354	66.3988	0.730761	87.43					
				Fuel Option 2	1-story	3	20951	0	78.7414	0	71.51					
					2-story	4	19805	0	74.8928	0	67.59					
				Fuel Option 3	1-story	5	20712	0	78.7414	0	70.69					
					2-story	6	19638	0	74.8928	0	67.02					
			Crawl Space	Fuel Option 1	1-story	7	16718	356	70.8051	0.730761	92.65					
					2-story	8	16003	345	66.9955	0.730761	89.13					
				Fuel Option 2	1-story	9	21328	0	79.2989	0	72.79					
					2-story	10	20413	0	75.4894	0	69.67					
				Fuel Option 3	1-story	11	21135	0	79.2989	0	72.13					
					2-story	12	20280	0	75.4894	0	69.22					
		Code - Compliant	Slab-on-grade	Fuel Option 1	1-story	13	13777	295	58.3838	0.610761	76.48	2,395	71	11.86	0.12	15.29
					2-story	14	13196	294	56.3372	0.610761	74.43	2,045	60	10.06	0.12	13.00
				Fuel Option 2	1-story	15	18045	0	66.8777	0	61.59	2,906	0	11.86	0.00	9.92
					2-story	16	17454	0	64.831	0	59.57	2,351	0	10.06	0.00	8.02
				Fuel Option 3	1-story	17	17981	0	66.8777	0	61.37	2,731	0	11.86	0.00	9.32
					2-story	18	17395	0	64.831	0	59.37	2,243	0	10.06	0.00	7.65
			Crawl Space	Fuel Option 1	1-story	19	14449	287	58.9633	0.610761	77.97	2,269	69	11.84	0.12	14.68
					2-story	20	14040	285	56.9497	0.610761	76.45	1,963	60	10.05	0.12	12.68
				Fuel Option 2	1-story	21	18586	0	67.4572	0	63.43	2,742	0	11.84	0.00	9.36
					2-story	22	18155	0	65.4436	0	61.96	2,258	0	10.05	0.00	7.71
				Fuel Option 3	1-story	23	18543	0	67.4572	0	63.29	2,592	0	11.84	0.00	8.84
					2-story	24	18115	0	65.4436	0	61.82	2,165	0	10.05	0.00	7.40
	MF	Precode	Slab-on-grade	Fuel Option 1	1-story	1	6366	208.5	25.77575	0.500135	42.565					
					2-story	2	6220.5	192.75	23.91965	0.46762	40.4975					
					3-story	3	6247.333333	187.66667	23.604	0.456781667	40.085					
				Fuel Option 2	1-story	4	8510.5	0	30.481	0	29.045					
					2-story	5	8086.75	0	28.03675	0	27.6					
					3-story	6	8023.833333	0	27.52516667	0	27.385					
				Fuel Option 3	1-story	7	8509	0	30.481	0	29.04					
					2-story	8	8086.25	0	28.03675	0	27.5975					
					3-story	9	8024.166667	0	27.52516667	0	27.38666667					
		Code - Compliant	Slab-on-grade	Fuel Option 1	1-story	10	5969.5	166	24.0956	0.3801365	36.965	397	43	1.68	0.12	5.60
					2-story	11	5894	149.75	22.6385	0.34762	35.0975	327	43	1.28	0.12	5.40
					3-story	12	5926	144.66667	22.36966667	0.336781667	34.69666667	321	43	1.23	0.12	5.39
				Fuel Option 2	1-story	13	8134	0	28.80095	0	27.76	377	0	1.68	0.00	1.29
					2-story	14	7774.25	0	26.75575	0	26.5325	313	0	1.28	0.00	1.07
					3-story	15	7715.5	0	26.29083333	0	26.33333333	308	0	1.23	0.00	1.05
				Fuel Option 3	1-story	16	8135.5	0	28.80095	0	27.765	374	0	1.68	0.00	1.28
					2-story	17	7777.5	0	26.75575	0	26.545	309	0	1.28	0.00	1.05
					3-story	18	7717.833333	0	26.29083333	0	26.34	306	0	1.23	0.00	1.05

Prototype of the simulation result for one county

County Name	Williamson
Division (East or West Texas)	West Texas
Number of new building permits for SFD	4,209

		Fuel Option			Total
		1	2	3	
		Elec. cooling, NG heating and NG water heating	All electricity	Elec. cooling, Heat pump heating and elec. water heating	
		84.1%	13.1%	2.8%	
Slab-on-grade (98.3%)	1-Story (45.5%)	37.61%	5.86%	1.25%	44.73%
	2-Story (54.5%)	45.06%	7.02%	1.50%	53.57%
Crawl spaces (1.7%)	1-Story (45.5%)	0.65%	0.10%	0.02%	0.77%
	2-Story (54.5%)	0.78%	0.12%	0.03%	0.93%
Total		84.10%	13.10%	2.80%	100.00%



Number of Houses for each simulation

		Fuel Option			Total
		1	2	3	
		Elec. cooling, NG heating and NG water heating	All electricity	Elec. cooling, Heat pump heating and elec. water heating	
		84.1%	13.1%	2.8%	
Slab-on-grade (98.3%)	1-Story (45.5%)	1,583	247	53	1,883
	2-Story (54.5%)	1,896	295	63	2,255
Crawl spaces (1.7%)	1-Story (45.5%)	27	4	1	33
	2-Story (54.5%)	33	5	1	39
Total		3,540	551	118	4,209

Precode Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	16,172	366	20,951	0	20,712	0
	2-Story	15,241	354	19,805	0	19,638	0
Crawl spaces	1-Story	16,718	356	21,328	0	21,135	0
	2-Story	16,003	345	20,413	0	20,280	0
Total		64,134	1,421	82,497	0	81,765	0

Code compliant Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	13,777	295	18,045	0	17,981	0
	2-Story	13,196	294	17,454	0	17,395	0
Crawl spaces	1-Story	14,449	287	18,586	0	18,543	0
	2-Story	14,040	285	18,155	0	18,115	0
Total		55,462	1,161	72,240	0	72,034	0

Precode Total Energy Use (For total houses in a County)

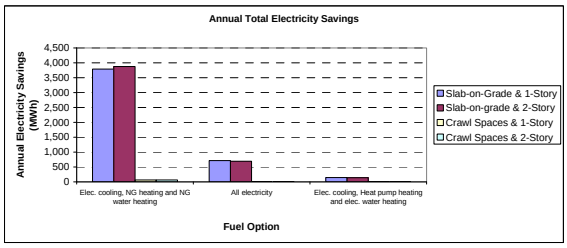
		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	25,604	579,457	5,167	0	1,092	0	31,862	579,457
	2-Story	28,903	671,318	5,850	0	1,240	0	35,993	671,318
Crawl spaces	1-Story	458	9,747	91	0	19	0	568	9,747
	2-Story	525	11,315	104	0	22	0	651	11,315
Total		55,489	1,271,836	11,212	0	2,373	0	69,074	1,271,836

Code compliant Total Energy Use (For total houses in a County)

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	21,812	467,048	4,450	0	948	0	27,210	467,048
	2-Story	25,025	557,535	5,156	0	1,098	0	31,279	557,535
Crawl spaces	1-Story	396	7,858	79	0	17	0	492	7,858
	2-Story	460	9,347	93	0	20	0	573	9,347
Total		47,693	1,041,788	9,778	0	2,083	0	59,553	1,041,788

Total Energy Savings Due to the Code Adoption

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)
Slab-on-grade	1-Story	3,792	112,408	717	0	144	0	4,652	112,408
	2-Story	3,878	113,783	694	0	142	0	4,714	113,783
Crawl spaces	1-Story	62	1,889	12	0	2	0	76	1,889
	2-Story	64	1,968	12	0	2	0	78	1,968
Total		7,796	230,048	1,434	0	290	0	9,521	230,048



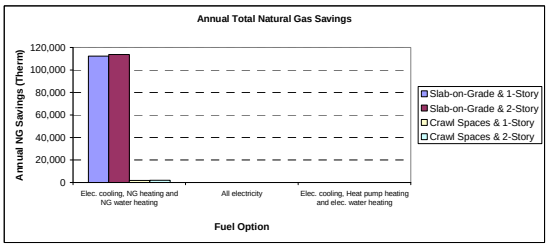


Table 118: Code and Pre-code Annual Simulation Results for Williamson County (Single-Family).

Precode Avg. OSD Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	70.25	0.73	78.74	0.00	78.74	0.00
	2-Story	66.40	0.73	74.89	0.00	74.89	0.00
Crawl spaces	1-Story	70.81	0.73	79.30	0.00	79.30	0.00
	2-Story	67.00	0.73	75.49	0.00	75.49	0.00
Total		274.45	2.92	308.42	0.00	308.42	0.00

Code compliant Avg. OSD Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	58.38	0.61	66.88	0.00	66.88	0.00
	2-Story	56.34	0.61	64.83	0.00	64.83	0.00
Crawl spaces	1-Story	58.96	0.61	67.46	0.00	67.46	0.00
	2-Story	56.95	0.61	65.44	0.00	65.44	0.00
Total		230.63	2.44	264.61	0.00	264.61	0.00

Precode Avg. OSD Total Energy Use (For total houses in a County)

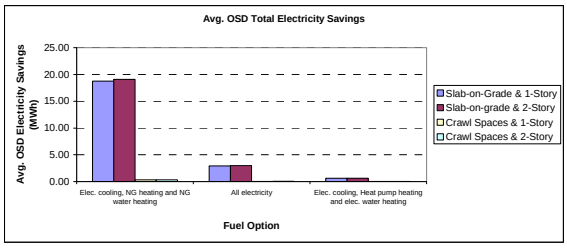
		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	111.22	1,156.95	19.42	0.00	4.15	0.00	134.79	1,156.95
	2-Story	125.92	1,385.80	22.12	0.00	4.73	0.00	152.77	1,385.80
Crawl spaces	1-Story	1.94	20.01	0.34	0.00	0.07	0.00	2.35	20.01
	2-Story	2.20	23.97	0.39	0.00	0.08	0.00	2.67	23.97
Total		241.27	2,586.73	42.27	0.00	9.03	0.00	292.57	2,586.73

Code compliant Avg. OSD Total Energy Use (For total houses in a County)

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	92.43	966.97	16.49	0.00	3.53	0.00	112.45	966.97
	2-Story	106.84	1,158.23	19.15	0.00	4.09	0.00	130.08	1,158.23
Crawl spaces	1-Story	1.61	16.72	0.29	0.00	0.06	0.00	1.96	16.72
	2-Story	1.87	20.03	0.33	0.00	0.07	0.00	2.27	20.03
Total		202.75	2,161.95	36.27	0.00	7.75	0.00	246.77	2,161.95

Avg. OSD Total Energy Savings Due to the Code Adoption

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)
Slab-on-grade	1-Story	18.78	189.99	2.93	0.00	0.63	0.00	22.33	189.99
	2-Story	19.08	227.57	2.97	0.00	0.64	0.00	22.69	227.57
Crawl spaces	1-Story	0.32	3.29	0.05	0.00	0.01	0.00	0.39	3.29
	2-Story	0.33	3.94	0.05	0.00	0.01	0.00	0.39	3.94
Total		38.52	424.77	6.00	0.00	1.28	0.00	45.80	424.77



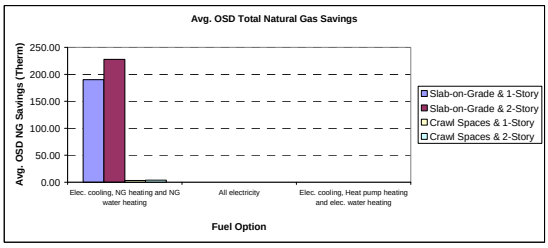
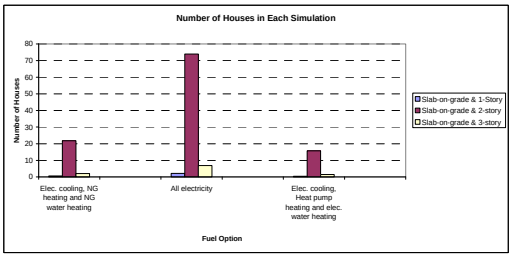


Table 119: Code and Pre-code Average OSD Simulation Results for Williamson County (Single-Family).

The simulation result for one county

County Name	Williamson
NAHB Division	West South Central
Number of new building permits for MF	125

		Fuel Option			Total
		1	2	3	
		Elec. cooling, NG heating and NG water heating	All electricity	Elec. cooling, Heat pump heating and elec. water heating	
		19.5%	66.4%	14.1%	
Slab-on-grade (100%)	1-Story (2.6%)	0.51%	1.73%	0.37%	2.60%
	2-Story (89.1%)	17.37%	59.16%	12.56%	89.10%
	3-Story (8.3%)	1.62%	5.51%	1.17%	8.30%
Total		19.50%	66.40%	14.10%	100.00%



Number of Houses for each simulation

		Fuel Option			Total
		1	2	3	
		Elec. cooling, NG heating and NG water heating	All electricity	Elec. cooling, Heat pump heating and elec. water heating	
		19.5%	66.4%	14.1%	
Slab-on-grade (100%)	1-Story (2.6%)	1	2	0	3
	2-Story (89.1%)	22	74	16	111
	3-Story (8.3%)	2	7	1	10
Total		24	83	18	125

Precode Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	6,366	209	8,511	0	8,509	0
	2-Story	6,221	193	8,087	0	8,086	0
	3-Story	6,247	188	8,024	0	8,024	0
Total		18,834	589	24,621	0	24,619	0

Code compliant Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	5,970	166	8,134	0	8,136	0
	2-Story	5,894	150	7,774	0	7,778	0
	3-Story	5,926	145	7,716	0	7,718	0
Total		17,790	460	23,624	0	23,631	0

Precode Total Energy Use (For total houses in a County)

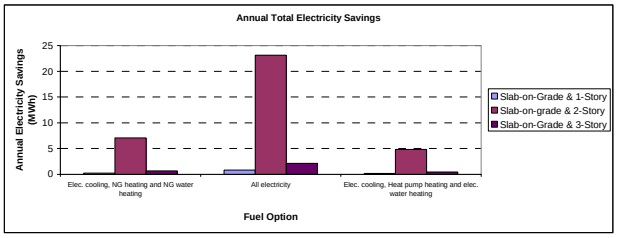
		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	4	132	18	0	4	0	26	132
	2-Story	135	4,186	598	0	127	0	860	4,186
	3-Story	13	380	55	0	12	0	80	380
Total		152	4,698	672	0	143	0	966	4,698

Code compliant Total Energy Use (For total houses in a County)

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	4	105	18	0	4	0	25	105
	2-Story	128	3,252	575	0	122	0	825	3,252
	3-Story	12	293	53	0	11	0	76	293
Total		144	3,650	646	0	137	0	927	3,650

Total Energy Savings Due to the Code Adoption

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	0	27	1	0	0	0	1	27
	2-Story	7	934	23	0	5	0	35	934
	3-Story	1	87	2	0	0	0	3	87
Total		8	1,048	26	0	5	0	40	1,048



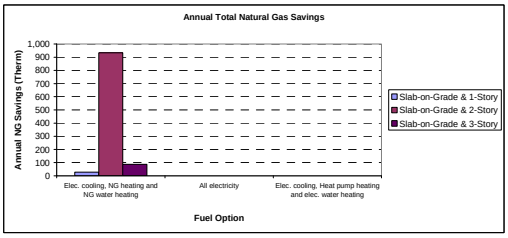


Table 120: Code and Pre-code Annual Simulation Results for Williamson County (Multi-Family).

Precode Avg. OSD Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	25.78	0.50	30.48	0.00	30.48	0.00
	2-Story	23.92	0.47	28.04	0.00	28.04	0.00
	3-Story	23.60	0.46	27.53	0.00	27.53	0.00
Total		73.30	1.42	86.04	0.00	86.04	0.00

Code compliant Avg. OSD Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	24.10	0.38	28.80	0.00	28.80	0.00
	2-Story	22.64	0.35	26.76	0.00	26.76	0.00
	3-Story	22.37	0.34	26.29	0.00	26.29	0.00
Total		69.10	1.06	81.85	0.00	81.85	0.00

Precode Avg. OSD Total Energy Use (For total houses in a County)

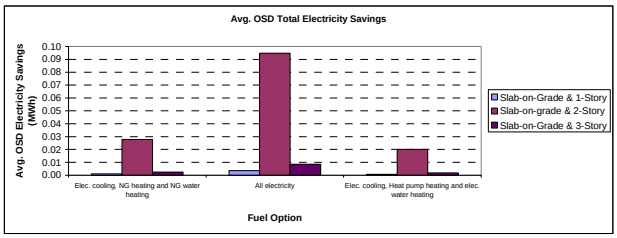
		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	0.02	0.32	0.07	0.00	0.01	0.00	0.10	0.32
	2-Story	0.52	10.16	2.07	0.00	0.44	0.00	3.03	10.16
	3-Story	0.05	0.92	0.19	0.00	0.04	0.00	0.28	0.92
Total		0.58	11.40	2.33	0.00	0.49	0.00	3.41	11.40

Code compliant Avg. OSD Total Energy Use (For total houses in a County)

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	0.02	0.24	0.06	0.00	0.01	0.00	0.09	0.24
	2-Story	0.49	7.55	1.98	0.00	0.42	0.00	2.89	7.55
	3-Story	0.05	0.68	0.18	0.00	0.04	0.00	0.26	0.68
Total		0.55	8.47	2.22	0.00	0.47	0.00	3.25	8.47

Total Energy Savings Due to the Code Adoption

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Savings (kWh)	NG Savings (Therm)	Elec. Savings (kWh)	NG Savings (Therm)	Elec. Savings (kWh)	NG Savings (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	0.00	0.08	0.00	0.00	0.00	0.00	0.01	0.08
	2-Story	0.03	2.61	0.09	0.00	0.02	0.00	0.14	2.61
	3-Story	0.00	0.24	0.01	0.00	0.00	0.00	0.01	0.24
Total		0.03	2.92	0.11	0.00	0.02	0.00	0.16	2.92



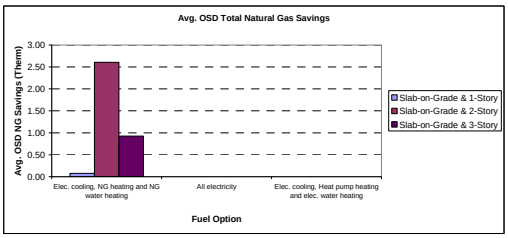


Table 121: Code and Pre-code Average OSD Simulation Results for Williamson County (Multi-Family).

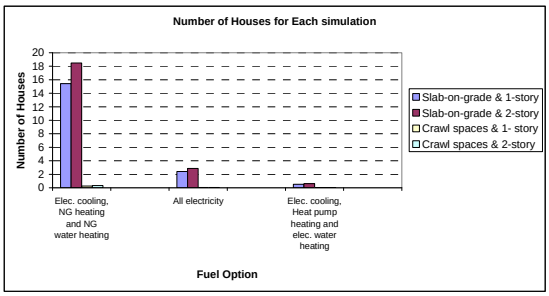
County	SF or MF	Precode or Code-compliant	Options			Simulation #	Annual Elec. (kWh/yr)	Annual NG (Therms/yr)	Avg. OSD Elec. (kWh/day) (Aug. 19)	Avg. OSD NG (Therm/day) (Aug. 19)	Total Annual (Elec. + NG) (MBtu)	Annual Elec.Savings (kWh/yr)	Annual NG Savings (Therms/yr)	Avg. OSD Elec. Savings (kWh/day) (Aug. 19)	Avg. OSD NG Savings (Therm/day) (Aug. 19)	Total Annual Savings (Elec. + NG) (MBtu)
Wilson	SF	Precode	Slab-on-grade	Fuel Option 1	1-story	1	15030	390	65.1105	0.742873	90.28					
					2-story	2	14227	376	61.6957	0.742873	86.2					
				Fuel Option 2	1-story	3	20247	0	73.8041	0	69.1					
					2-story	4	19184	0	70.3891	0	65.48					
				Fuel Option 3	1-story	5	19902	0	73.8041	0	67.92					
					2-story	6	18927	0	70.3891	0	64.6					
			Crawl Space	Fuel Option 1	1-story	7	15611	379	66.0399	0.742873	91.23					
					2-story	8	15003	366	62.769	0.742873	87.75					
				Fuel Option 2	1-story	9	20650	0	74.7333	0	70.48					
					2-story	10	19783	0	71.4625	0	67.52					
				Fuel Option 3	1-story	11	20362	0	74.7333	0	69.49					
					2-story	12	19570	0	71.4625	0	66.79					
		Code - Compliant	Slab-on-grade	Fuel Option 1	1-story	13	13081	321	55.5191	0.622873	76.74	1,949	69	9.59	0.12	13.54
					2-story	14	12507	314	52.9271	0.622873	74.1	1,720	62	8.77	0.12	12.10
				Fuel Option 2	1-story	15	17810	0	64.2127	0	60.79	2,437	0	9.59	0.00	8.31
					2-story	16	17108	0	61.6206	0	58.39	2,076	0	8.77	0.00	7.09
				Fuel Option 3	1-story	17	17676	0	64.2127	0	60.33	2,226	0	9.59	0.00	7.59
					2-story	18	16993	0	61.6206	0	58	1,934	0	8.77	0.00	6.60
			Crawl Space	Fuel Option 1	1-story	19	13727	311	56.5587	0.622873	77.97	1,884	68	9.48	0.12	13.26
					2-story	20	13301	305	54.0916	0.622873	75.91	1,702	61	8.68	0.12	11.84
				Fuel Option 2	1-story	21	18297	0	65.2523	0	62.45	2,353	0	9.48	0.00	8.03
					2-story	22	17755	0	62.785	0	60.6	2,028	0	8.68	0.00	6.92
				Fuel Option 3	1-story	23	18167	0	65.2523	0	62	2,195	0	9.48	0.00	7.49
					2-story	24	17653	0	62.785	0	60.25	1,917	0	8.68	0.00	6.54
	MF	Precode	Slab-on-grade	Fuel Option 1	1-story	1	6066.5	212	24.3152	0.506555	41.92					
					2-story	2	5996	195.5	22.93265	0.4732375	40.0225					
					3-story	3	6033.833333	190.33333	22.72316667	0.462131667	39.62833333					
				Fuel Option 2	1-story	4	8274	0	29.1311	0	28.24					
					2-story	5	7910.25	0	27.1465	0	26.9975					
					3-story	6	7855	0	26.73633333	0	26.80833333					
				Fuel Option 3	1-story	7	8273.5	0	29.1311	0	28.235					
					2-story	8	7912.25	0	27.1465	0	27.005					
					3-story	9	7855.5	0	26.73633333	0	26.81					
		Code - Compliant	Slab-on-grade	Fuel Option 1	1-story	10	5730	171	22.8377	0.386557	36.635	337	41	1.48	0.12	5.29
					2-story	11	5711.25	154	21.7828	0.3532375	34.8825	285	42	1.15	0.12	5.14
					3-story	12	5750.833333	148.33333	21.61416667	0.342131667	34.45833333	283	42	1.11	0.12	5.17
				Fuel Option 2	1-story	13	7976.5	0	27.6536	0	27.225	298	0	1.48	0.00	1.02
					2-story	14	7657.75	0	25.99675	0	26.135	253	0	1.15	0.00	0.86
					3-story	15	7599.333333	0	25.6275	0	25.93666667	256	0	1.11	0.00	0.87
				Fuel Option 3	1-story	16	7973	0	27.6536	0	27.21	301	0	1.48	0.00	1.03
					2-story	17	7659.75	0	25.99675	0	26.1425	253	0	1.15	0.00	0.86
					3-story	18	7599.333333	0	25.6275	0	25.93666667	256	0	1.11	0.00	0.87

Table 122: Code and Pre-code Simulation Results for Individual Residence for Wilson County (Single-Family and Multi-Family).

Prototype of the simulation result for one county

County Name	Wilson
Division (East or West Texas)	West Texas
Number of new building permits for SFD	41

		Fuel Option 1	Fuel Option 2	Fuel Option 3	Total
		Elec. cooling, NG heating and NG water heating	All electricity	Elec. cooling, Heat pump heating and elec. water heating	
		84.1%	13.1%	2.8%	
Slab-on-grade (98.3%)	1-Story (45.5%)	37.61%	5.86%	1.25%	44.73%
	2-Story (54.5%)	45.06%	7.02%	1.50%	53.57%
Crawl spaces (1.7%)	1-Story (45.5%)	0.65%	0.10%	0.02%	0.77%
	2-Story (54.5%)	0.78%	0.12%	0.03%	0.93%
Total		84.10%	13.10%	2.80%	100.00%



Number of Houses for each simulation

		Fuel Option 1	Fuel Option 2	Fuel Option 3	Total
		Elec. cooling, NG heating and NG water heating	All electricity	Elec. cooling, Heat pump heating and elec. water heating	
		84.1%	13.1%	2.8%	
Slab-on-grade (98.3%)	1-Story (45.5%)	15	2	1	18
	2-Story (54.5%)	18	3	1	22
Crawl spaces (1.7%)	1-Story (45.5%)	0	0	0	0
	2-Story (54.5%)	0	0	0	0
Total		34	5	1	41

Precode Energy Use for each option (per house)

		Fuel Option 1		Fuel Option 2		Fuel Option 3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	15,030	390	20,247	0	19,902	0
	2-Story	14,227	376	19,184	0	18,927	0
Crawl spaces	1-Story	15,611	379	20,650	0	20,362	0
	2-Story	15,003	366	19,783	0	19,570	0
Total		59,871	1,511	79,864	0	78,761	0

Code compliant Energy Use for each option (per house)

		Fuel Option 1		Fuel Option 2		Fuel Option 3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	13,081	321	17,810	0	17,676	0
	2-Story	12,507	314	17,108	0	16,993	0
Crawl spaces	1-Story	13,727	311	18,297	0	18,167	0
	2-Story	13,301	305	17,755	0	17,653	0
Total		52,616	1,251	70,970	0	70,489	0

Precode Total Energy Use (For total houses in a County)

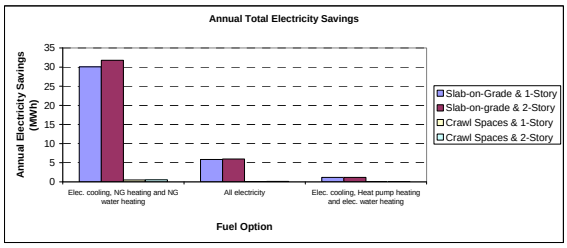
		Fuel Option 1		Fuel Option 2		Fuel Option 3		Total	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	232	6,015	49	0	10	0	291	6,015
	2-Story	263	6,946	55	0	12	0	330	6,946
Crawl spaces	1-Story	4	101	1	0	0	0	5	101
	2-Story	5	117	1	0	0	0	6	117
Total		504	13,178	106	0	22	0	631	13,178

Code compliant Total Energy Use (For total houses in a County)

		Fuel Option 1		Fuel Option 2		Fuel Option 3		Total	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	202	4,951	43	0	9	0	254	4,951
	2-Story	231	5,800	49	0	10	0	291	5,800
Crawl spaces	1-Story	4	83	1	0	0	0	5	83
	2-Story	4	97	1	0	0	0	5	97
Total		441	10,931	94	0	20	0	554	10,931

Total Energy Savings Due to the Code Adoption

		Fuel Option 1		Fuel Option 2		Fuel Option 3		Total	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)
Slab-on-grade	1-Story	30	1,064	6	0	1	0	37	1,064
	2-Story	32	1,145	6	0	1	0	39	1,145
Crawl spaces	1-Story	1	18	0	0	0	0	1	18
	2-Story	1	19	0	0	0	0	1	19
Total		63	2,247	12	0	2	0	77	2,247



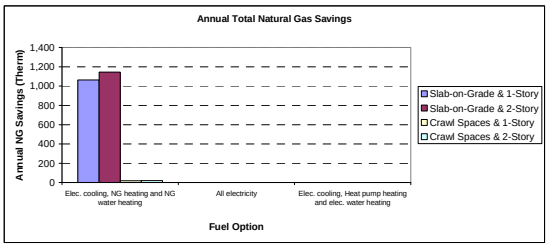


Table 123: Code and Pre-code Annual Simulation Results for Wilson County (Single-Family).

Precode Avg. OSD Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	65.11	0.74	73.80	0.00	73.80	0.00
	2-Story	61.70	0.74	70.39	0.00	70.39	0.00
Crawl spaces	1-Story	66.04	0.74	74.73	0.00	74.73	0.00
	2-Story	62.77	0.74	71.46	0.00	71.46	0.00
Total		255.62	2.97	290.39	0.00	290.39	0.00

Code compliant Avg. OSD Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	55.52	0.62	64.21	0.00	64.21	0.00
	2-Story	52.93	0.62	61.62	0.00	61.62	0.00
Crawl spaces	1-Story	56.56	0.62	65.25	0.00	65.25	0.00
	2-Story	54.09	0.62	62.79	0.00	62.79	0.00
Total		219.10	2.49	253.87	0.00	253.87	0.00

Precode Avg. OSD Total Energy Use (For total houses in a County)

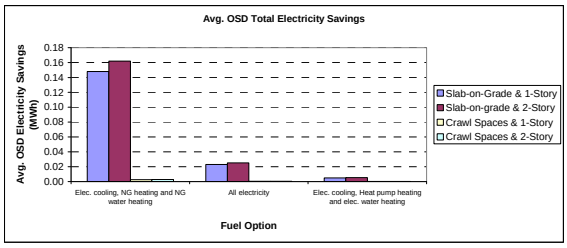
		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	1.00	11.46	0.18	0.00	0.04	0.00	1.22	11.46
	2-Story	1.14	13.72	0.20	0.00	0.04	0.00	1.39	13.72
Crawl spaces	1-Story	0.02	0.20	0.00	0.00	0.00	0.00	0.02	0.20
	2-Story	0.02	0.24	0.00	0.00	0.00	0.00	0.02	0.24
Total		2.18	25.62	0.39	0.00	0.08	0.00	2.65	25.62

Code compliant Avg. OSD Total Energy Use (For total houses in a County)

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	0.86	9.61	0.15	0.00	0.03	0.00	1.04	9.61
	2-Story	0.98	11.51	0.18	0.00	0.04	0.00	1.19	11.51
Crawl spaces	1-Story	0.02	0.17	0.00	0.00	0.00	0.00	0.02	0.17
	2-Story	0.02	0.20	0.00	0.00	0.00	0.00	0.02	0.20
Total		1.87	21.48	0.34	0.00	0.07	0.00	2.28	21.48

Avg. OSD Total Energy Savings Due to the Code Adoption

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)
Slab-on-grade	1-Story	0.15	1.85	0.02	0.00	0.00	0.00	0.18	1.85
	2-Story	0.16	2.22	0.03	0.00	0.01	0.00	0.19	2.22
Crawl spaces	1-Story	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.03
	2-Story	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.04
Total		0.32	4.14	0.05	0.00	0.01	0.00	0.37	4.14



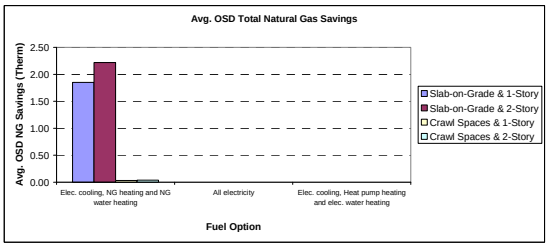
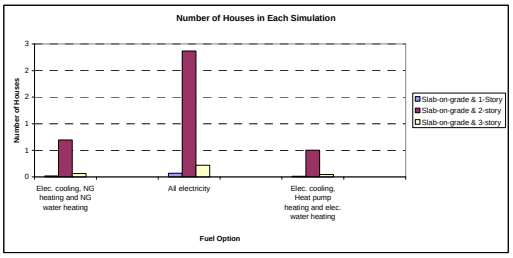


Table 124: Code and Pre-code Average OSD Simulation Results for Wilson County (Single-Family).

The simulation result for one county

County Name	Wilson
NAHB Division	West South Central
Number of new building permits for MF	4

		Fuel Option			Total
		1	2	3	
		Elec. cooling, NG heating and NG water heating	All electricity	Elec. cooling, Heat pump heating and elec. water heating	
		19.5%	66.4%	14.1%	
Slab-on-grade (100%)	1-Story (2.6%)	0.51%	1.73%	0.37%	2.60%
	2-Story (89.1%)	17.37%	59.16%	12.56%	89.10%
	3-Story (8.3%)	1.62%	5.51%	1.17%	8.30%
Total		19.50%	66.40%	14.10%	100.00%



Number of Houses for each simulation

		Fuel Option			Total
		1	2	3	
		Elec. cooling, NG heating and NG water heating	All electricity	Elec. cooling, Heat pump heating and elec. water heating	
		19.5%	66.4%	14.1%	
Slab-on-grade (100%)	1-Story (2.6%)	0	0	0	0
	2-Story (89.1%)	1	2	1	4
	3-Story (8.3%)	0	0	0	0
Total		1	3	1	4

Precode Energy Use for each option (per house)

		Fuel Option						
		1		2		3		
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating		
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	
Slab-on-grade	1-Story	6,067	212	8,274	0	8,274	0	
	2-Story	5,996	196	7,910	0	7,912	0	
	3-Story	6,034	190	7,858	0	7,856	0	
Total		18,096	598	24,039	0	24,041	0	

Code compliant Energy Use for each option (per house)

		Fuel Option						
		1		2		3		
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating		
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	
Slab-on-grade	1-Story	5,730	171	7,972	0	7,972	0	
	2-Story	5,711	154	7,658	0	7,660	0	
	3-Story	5,751	148	7,599	0	7,599	0	
Total		17,192	473	23,234	0	23,232	0	

Precode Total Energy Use (For total houses in a County)

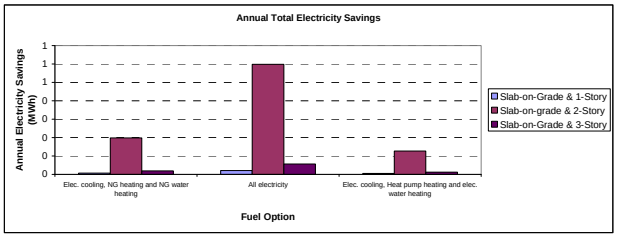
		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	0	4	1	0	0	0	1	4
	2-Story	4	136	19	0	4	0	27	136
	3-Story	0	12	2	0	0	0	2	12
Total		5	152	21	0	4	0	30	152

Code compliant Total Energy Use (For total houses in a County)

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	0	3	1	0	0	0	1	3
	2-Story	4	107	18	0	4	0	26	107
	3-Story	0	10	2	0	0	0	2	10
Total		4	120	20	0	4	0	29	120

Total Energy Savings Due to the Code Adoption

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	0	1	0	0	0	0	0	1
	2-Story	0	29	1	0	0	0	1	29
	3-Story	0	3	0	0	0	0	0	3
Total		0	32	1	0	0	0	1	32



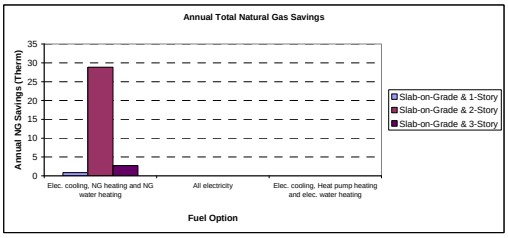


Table 125: Code and Pre-code Annual Simulation Results for Wilson County (Multi-Family).

Precode Avg. OSD Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	24.32	0.51	29.13	0.00	29.13	0.00
	2-Story	22.93	0.47	27.15	0.00	27.15	0.00
	3-Story	22.72	0.46	26.74	0.00	26.74	0.00
Total		69.97	1.44	83.01	0.00	83.01	0.00

Code compliant Avg. OSD Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	22.84	0.39	27.65	0.00	27.65	0.00
	2-Story	21.78	0.35	26.00	0.00	26.00	0.00
	3-Story	21.61	0.34	25.63	0.00	25.63	0.00
Total		66.23	1.08	79.28	0.00	79.28	0.00

Precode Avg. OSD Total Energy Use (For total houses in a County)

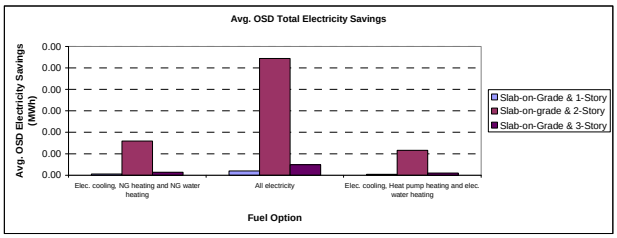
		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.01
	2-Story	0.02	0.33	0.06	0.00	0.01	0.00	0.09	0.33
	3-Story	0.00	0.03	0.01	0.00	0.00	0.00	0.01	0.03
Total		0.02	0.37	0.07	0.00	0.02	0.00	0.11	0.37

Code compliant Avg. OSD Total Energy Use (For total houses in a County)

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.01
	2-Story	0.02	0.25	0.06	0.00	0.01	0.00	0.09	0.25
	3-Story	0.00	0.02	0.01	0.00	0.00	0.00	0.01	0.02
Total		0.02	0.28	0.07	0.00	0.01	0.00	0.10	0.28

Total Energy Savings Due to the Code Adoption

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Savings (kWh)	NG Savings (Therm)	Elec. Savings (kWh)	NG Savings (Therm)	Elec. Savings (kWh)	NG Savings (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	2-Story	0.00	0.08	0.00	0.00	0.00	0.00	0.00	0.08
	3-Story	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.01
Total		0.00	0.09	0.00	0.00	0.00	0.00	0.00	0.09



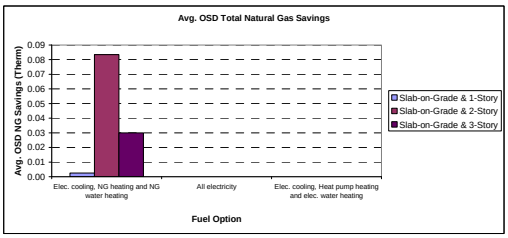


Table 126: Code and Pre-code Average OSD Simulation Results for Wilson County (Multi-Family).

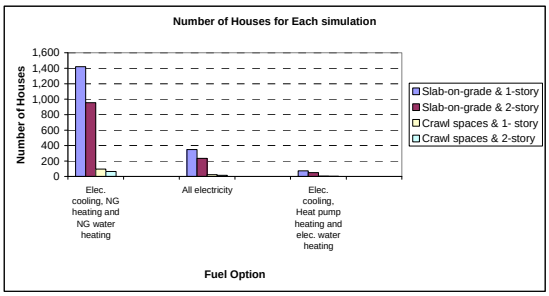
Table 127: Code and Pre-code Simulation Results for Individual Residence for Brazoria County (Single-Family and Multi-Family).

County	SF or MF	Precode or Code-compliant	Options			Simulation #	Annual Elec. (kWh/yr)	Annual NG (Therms/yr)	Avg. OSD Elec. (kWh/day) (Aug. 19)	Avg. OSD NG (Therm/day) (Aug. 19)	Total Annual (Elec. + NG) (MBtu)	Annual Elec.Savings (kWh/yr)	Annual NG Savings (Therms/yr)	Avg. OSD Elec. Savings (kWh/day) (Aug. 19)	Avg. OSD NG Savings (Therm/day) (Aug. 19)	Total Annual Savings (Elec. + NG) (MBtu)
Brazoria	SF	Precode	Slab-on-grade	Fuel Option 1	1-story	1	14234	363	59.9069	0.738051	84.91					
					2-story	2	13413	351	56.4719	0.738051	80.83					
				Fuel Option 2	1-story	3	18952	0	68.5217	0	64.68					
					2-story	4	17899	0	65.0868	0	61.09					
				Fuel Option 3	1-story	5	18763	0	68.5217	0	64.04					
					2-story	6	17786	0	65.0868	0	60.7					
			Crawl Space	Fuel Option 1	1-story	7	14885	352	60.6244	0.738051	86.03					
					2-story	8	14281	342	57.2948	0.738051	82.9					
				Fuel Option 2	1-story	9	19420	0	69.2392	0	66.28					
					2-story	10	18614	0	65.9097	0	63.53					
				Fuel Option 3	1-story	11	19277	0	69.2392	0	65.79					
					2-story	12	18523	0	65.9097	0	63.22					
		Code - Compliant	Slab-on-grade	Fuel Option 1	1-story	13	12525	317	52.5506	0.618051	74.41	1,709	46	7.36	0.12	10.50
					2-story	14	11890	306	49.5025	0.618051	71.2	1,523	45	6.97	0.12	9.63
				Fuel Option 2	1-story	15	17173	0	61.1656	0	58.61	1,779	0	7.36	0.00	6.07
					2-story	16	16352	0	58.1174	0	55.81	1,547	0	6.97	0.00	5.28
				Fuel Option 3	1-story	17	17043	0	61.1656	0	58.17	1,720	0	7.36	0.00	5.87
					2-story	18	16263	0	58.1174	0	55.5	1,523	0	6.97	0.00	5.20
			Crawl Space	Fuel Option 1	1-story	19	13202	305	53.3404	0.618051	75.55	1,683	47	7.28	0.12	10.48
					2-story	20	12726	295	50.4034	0.618051	72.98	1,555	47	6.89	0.12	9.92
				Fuel Option 2	1-story	21	17655	0	61.9552	0	60.26	1,765	0	7.28	0.00	6.02
					2-story	22	17008	0	59.0183	0	58.05	1,606	0	6.89	0.00	5.48
				Fuel Option 3	1-story	23	17563	0	61.9552	0	59.94	1,714	0	7.28	0.00	5.85
					2-story	24	16947	0	59.0183	0	57.84	1,576	0	6.89	0.00	5.38
	MF	Precode	Slab-on-grade	Fuel Option 1	1-story	1	6343.5	209	24.94285	0.504	42.525					
					2-story	2	6229	192.75	23.298675	0.471	40.5275					
					3-story	3	6270.833333	187.5	23.04266667	0.460001667	40.15833333					
				Fuel Option 2	1-story	4	8492	0	29.7152	0	28.985					
					2-story	5	8095	0	27.4745	0	27.6275					
					3-story	6	8045.5	0	27.01966667	0	27.45833333					
				Fuel Option 3	1-story	7	8491	0	29.7152	0	28.98					
					2-story	8	8095.75	0	27.4745	0	27.63					
					3-story	9	8046.333333	0	27.01966667	0	27.46166667					
		Code - Compliant	Slab-on-grade	Fuel Option 1	1-story	10	5936	166.5	23.3975	0.384001	36.93	408	43	1.55	0.12	5.60
					2-story	11	5894	150.25	22.1195	0.351	35.14	335	43	1.18	0.12	5.39
					3-story	12	5940	145	21.9065	0.340001667	34.76833333	331	43	1.14	0.12	5.39
				Fuel Option 2	1-story	13	8113.5	0	28.16985	0	27.69	379	0	1.55	0.00	1.30
					2-story	14	7781.75	0	26.29525	0	26.56	313	0	1.18	0.00	1.07
					3-story	15	7734.333333	0	25.8835	0	26.39666667	311	0	1.14	0.00	1.06
				Fuel Option 3	1-story	16	8113	0	28.16985	0	27.69	378	0	1.55	0.00	1.29
					2-story	17	7782.5	0	26.29525	0	26.5625	313	0	1.18	0.00	1.07
					3-story	18	7733.666667	0	25.8835	0	26.395	313	0	1.14	0.00	1.07

Prototype of the simulation result for one county

County Name	Brazoria
Division (East or West Texas)	East Texas
Number of new building permits for SFD	3,288

		Fuel Option 1	Fuel Option 2	Fuel Option 3	Total
		Elec. cooling, NG heating and NG water heating	All electricity	Elec. cooling, Heat pump heating and elec. water heating	
		77.1%	18.9%	4.0%	
Slab-on-grade (93.6%)	1-Story (59.8%)	43.16%	10.58%	2.24%	55.97%
	2-Story (40.2%)	29.01%	7.11%	1.51%	37.63%
Crawl spaces (6.4%)	1-Story (59.8%)	2.95%	0.72%	0.15%	3.83%
	2-Story (39.2%)	1.98%	0.49%	0.10%	2.57%
Total		77.10%	18.90%	4.00%	100.00%



Number of Houses for each simulation

		Fuel Option 1	Fuel Option 2	Fuel Option 3	Total
		Elec. cooling, NG heating and NG water heating	All electricity	Elec. cooling, Heat pump heating and elec. water heating	
		77.1%	18.9%	4.0%	
Slab-on-grade (93.6%)	1-Story (59.8%)	1,419	348	74	1,840
	2-Story (40.2%)	954	234	49	1,237
Crawl spaces (6.4%)	1-Story (59.8%)	97	24	5	126
	2-Story (39.2%)	65	16	3	85
Total		2,535	621	132	3,288

Precode Energy Use for each option (per house)

		Fuel Option 1		Fuel Option 2		Fuel Option 3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	14,234	363	18,952	0	18,763	0
	2-Story	13,413	351	17,899	0	17,786	0
Crawl spaces	1-Story	14,885	352	19,420	0	19,277	0
	2-Story	14,281	342	18,614	0	18,523	0
Total		56,813	1,408	74,885	0	74,349	0

Code compliant Energy Use for each option (per house)

		Fuel Option 1		Fuel Option 2		Fuel Option 3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	12,525	317	17,173	0	17,043	0
	2-Story	11,890	306	16,352	0	16,263	0
Crawl spaces	1-Story	13,202	305	17,655	0	17,563	0
	2-Story	12,726	295	17,008	0	16,947	0
Total		50,343	1,223	68,188	0	67,816	0

Precode Total Energy Use (For total houses in a County)

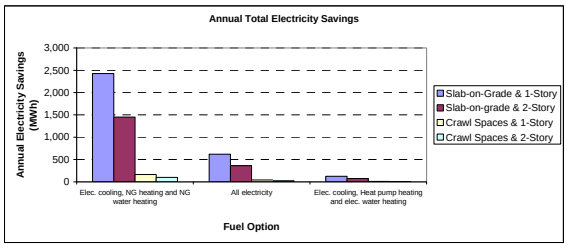
		Fuel Option 1		Fuel Option 2		Fuel Option 3		Total	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	20,197	515,074	6,592	0	1,381	0	28,171	515,074
	2-Story	12,794	334,808	4,185	0	880	0	17,860	334,808
Crawl spaces	1-Story	1,444	34,152	463	0	97	0	2,003	34,152
	2-Story	931	22,306	298	0	63	0	1,292	22,306
Total		35,367	906,339	11,537	0	2,421	0	49,325	906,339

Code compliant Total Energy Use (For total houses in a County)

		Fuel Option 1		Fuel Option 2		Fuel Option 3		Total	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	17,772	449,803	5,973	0	1,255	0	25,000	449,803
	2-Story	11,341	291,883	3,824	0	805	0	15,970	291,883
Crawl spaces	1-Story	1,281	29,592	420	0	88	0	1,789	29,592
	2-Story	830	19,240	272	0	57	0	1,159	19,240
Total		31,225	790,519	10,489	0	2,205	0	43,918	790,519

Total Energy Savings Due to the Code Adoption

		Fuel Option 1		Fuel Option 2		Fuel Option 3		Total	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)
Slab-on-grade	1-Story	2,425	65,271	619	0	127	0	3,170	65,271
	2-Story	1,453	42,924	362	0	75	0	1,890	42,924
Crawl spaces	1-Story	163	4,560	42	0	9	0	214	4,560
	2-Story	101	3,065	26	0	5	0	132	3,065
Total		4,142	115,821	1,048	0	216	0	5,407	115,821



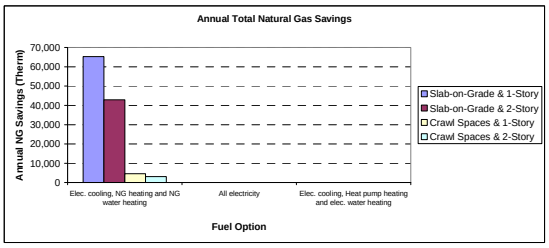


Table 128: Code and Pre-code Annual Simulation Results for Brazoria County (Single-Family).

Precode Precode Avg. OSD Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	59.91	0.74	68.52	0.00	68.52	0.00
	2-Story	56.47	0.74	65.09	0.00	65.09	0.00
Crawl spaces	1-Story	60.62	0.74	69.24	0.00	69.24	0.00
	2-Story	57.29	0.74	65.91	0.00	65.91	0.00
Total		234.30	2.95	268.76	0.00	268.76	0.00

Code compliant Precode Avg. OSD Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	52.55	0.62	61.17	0.00	61.17	0.00
	2-Story	49.50	0.62	58.12	0.00	58.12	0.00
Crawl spaces	1-Story	53.34	0.62	61.96	0.00	61.96	0.00
	2-Story	50.40	0.62	59.02	0.00	59.02	0.00
Total		205.80	2.47	240.26	0.00	240.26	0.00

Precode Precode Avg. OSD Total Energy Use (For total houses in a County)

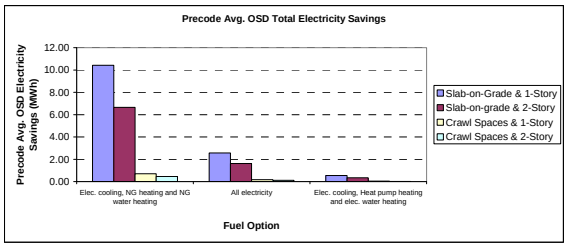
		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	85.00	1,047.25	23.83	0.00	5.04	0.00	113.88	1,047.25
	2-Story	53.87	704.00	15.22	0.00	3.22	0.00	72.31	704.00
Crawl spaces	1-Story	5.88	71.61	1.65	0.00	0.35	0.00	7.88	71.61
	2-Story	3.74	48.14	1.05	0.00	0.22	0.00	5.01	48.14
Total		148.49	1,870.99	41.75	0.00	8.84	0.00	199.08	1,870.99

Code compliant Precode Avg. OSD Total Energy Use (For total houses in a County)

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	74.57	876.98	21.28	0.00	4.50	0.00	100.34	876.98
	2-Story	47.22	589.54	13.59	0.00	2.88	0.00	63.68	589.54
Crawl spaces	1-Story	5.18	59.96	1.47	0.00	0.31	0.00	6.96	59.96
	2-Story	3.29	40.31	0.94	0.00	0.20	0.00	4.43	40.31
Total		130.25	1,566.79	37.28	0.00	7.89	0.00	175.42	1,566.79

Precode Avg. OSD Total Energy Savings Due to the Code Adoption

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)
Slab-on-grade	1-Story	10.44	170.27	2.56	0.00	0.54	0.00	13.54	170.27
	2-Story	6.65	114.46	1.63	0.00	0.34	0.00	8.62	114.46
Crawl spaces	1-Story	0.71	11.64	0.17	0.00	0.04	0.00	0.92	11.64
	2-Story	0.45	7.83	0.11	0.00	0.02	0.00	0.58	7.83
Total		18.24	304.21	4.47	0.00	0.95	0.00	23.66	304.21



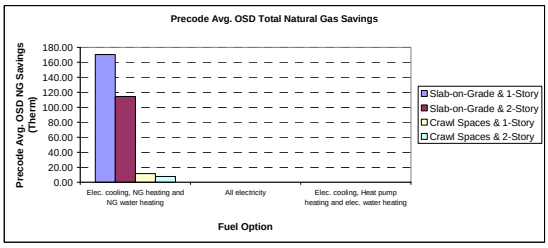
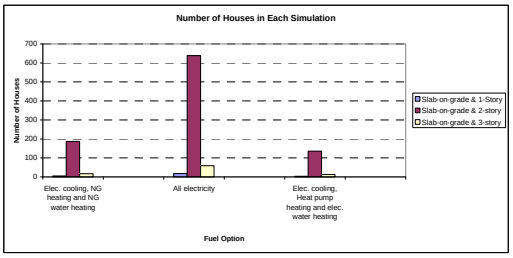


Table 129: Code and Pre-code Average OSD Simulation Results for Brazoria County (Single-Family).

The simulation result for one county

County Name	Brazoria
NAHB Division	West South Central
Number of new building permits for MF	1,079

		Fuel Option			Total
		1	2	3	
		Elec. cooling, NG heating and NG water heating	All electricity	Elec. cooling, Heat pump heating and elec. water heating	
		19.5%	66.4%	14.1%	
Slab-on-grade (100%)	1-Story (2.6%)	0.51%	1.73%	0.37%	2.60%
	2-Story (89.1%)	17.37%	59.16%	12.56%	89.10%
	3-Story (8.3%)	1.62%	5.51%	1.17%	8.30%
Total		19.50%	66.40%	14.10%	100.00%



Number of Houses for each simulation

		Fuel Option			Total
		1	2	3	
		Elec. cooling, NG heating and NG water heating	All electricity	Elec. cooling, Heat pump heating and elec. water heating	
		19.5%	66.4%	14.1%	
Slab-on-grade (100%)	1-Story (2.6%)	5	19	4	28
	2-Story (89.1%)	187	638	136	961
	3-Story (8.3%)	17	59	13	90
Total		210	716	152	1,079

Precode Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	6,344	209	8,492	0	8,491	0
	2-Story	6,229	193	8,095	0	8,096	0
	3-Story	6,271	188	8,046	0	8,046	0
Total		18,843	589	24,633	0	24,633	0

Code compliant Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	5,936	167	8,114	0	8,113	0
	2-Story	5,894	150	7,782	0	7,783	0
	3-Story	5,940	145	7,734	0	7,734	0
Total		17,770	462	23,630	0	23,629	0

Precode Total Energy Use (For total houses in a County)

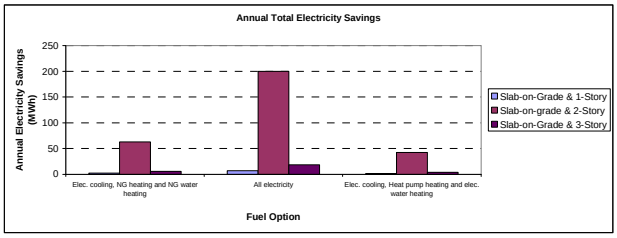
		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	35	1,143	158	0	34	0	226	1,143
	2-Story	1,168	36,135	5,168	0	1,097	0	7,433	36,135
	3-Story	110	3,274	478	0	102	0	690	3,274
Total		1,312	40,553	5,804	0	1,233	0	8,349	40,553

Code compliant Total Energy Use (For total houses in a County)

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	32	911	151	0	32	0	216	911
	2-Story	1,105	28,167	4,968	0	1,055	0	7,127	28,167
	3-Story	104	2,532	460	0	98	0	661	2,532
Total		1,241	31,611	5,579	0	1,185	0	8,005	31,611

Total Energy Savings Due to the Code Adoption

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	2	232	7	0	1	0	11	232
	2-Story	63	7,968	200	0	42	0	305	7,968
	3-Story	6	742	19	0	4	0	28	742
Total		71	8,942	226	0	48	0	344	8,942



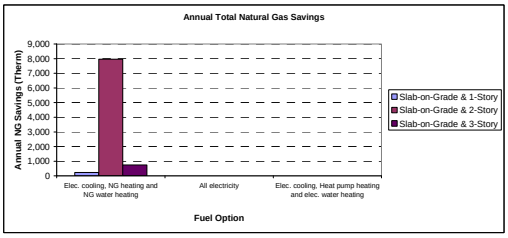


Table 130: Code and Pre-code Annual Simulation Results for Brazoria County (Multi-Family).

Precode Avg. OSD Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	24.94	0.50	29.72	0.00	29.72	0.00
	2-Story	23.30	0.47	27.47	0.00	27.47	0.00
	3-Story	23.04	0.46	27.02	0.00	27.02	0.00
Total		71.28	1.44	84.21	0.00	84.21	0.00

Code compliant Avg. OSD Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	23.40	0.38	28.17	0.00	28.17	0.00
	2-Story	22.12	0.35	26.30	0.00	26.30	0.00
	3-Story	21.91	0.34	25.88	0.00	25.88	0.00
Total		67.42	1.06	80.35	0.00	80.35	0.00

Precode Avg. OSD Total Energy Use (For total houses in a County)

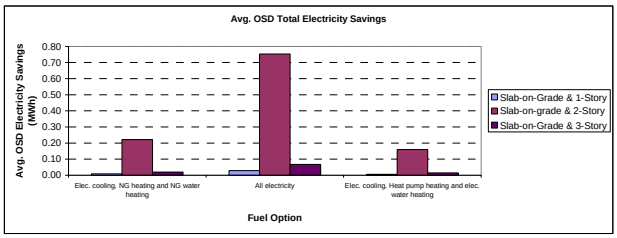
		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	0.14	2.76	0.55	0.00	0.12	0.00	0.81	2.76
	2-Story	4.37	88.30	17.54	0.00	3.72	0.00	25.63	88.30
	3-Story	0.40	8.03	1.61	0.00	0.34	0.00	2.35	8.03
Total		4.91	99.09	19.70	0.00	4.18	0.00	28.79	99.09

Code compliant Avg. OSD Total Energy Use (For total houses in a County)

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	0.13	2.10	0.52	0.00	0.11	0.00	0.76	2.10
	2-Story	4.15	65.80	16.79	0.00	3.56	0.00	24.50	65.80
	3-Story	0.38	5.94	1.54	0.00	0.33	0.00	2.25	5.94
Total		4.66	73.84	18.85	0.00	4.00	0.00	27.51	73.84

Total Energy Savings Due to the Code Adoption

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Savings (kWh)	NG Savings (Therm)	Elec. Savings (kWh)	NG Savings (Therm)	Elec. Savings (kWh)	NG Savings (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	0.01	0.66	0.03	0.00	0.01	0.00	0.04	0.66
	2-Story	0.22	22.50	0.75	0.00	0.16	0.00	1.13	22.50
	3-Story	0.02	2.10	0.07	0.00	0.01	0.00	0.10	2.10
Total		0.25	25.25	0.85	0.00	0.18	0.00	1.28	25.25



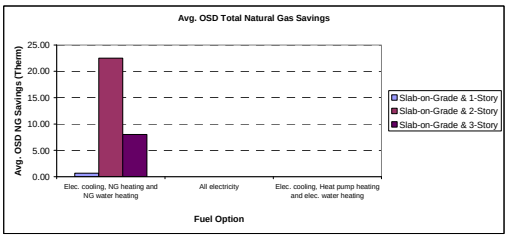


Table 131: Code and Pre-code Average OSD Simulation Results for Brazoria County (Multi-Family).

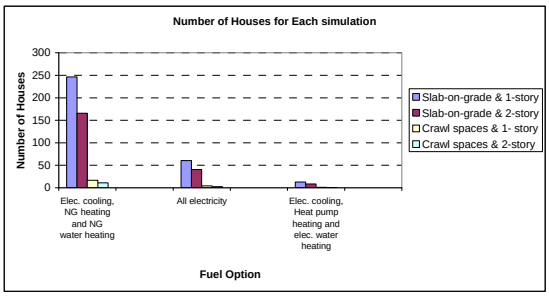
County	SF or MF	Precode or Code-compliant	Options			Simulation #	Annual Elec. (kWh/yr)	Annual NG (Therms/yr)	Avg. OSD Elec. (kWh/day) (Aug. 19)	Avg. OSD NG (Therm/day) (Aug. 19)	Total Annual (Elec. + NG) (MBtu)	Annual Elec.Savings (kWh/yr)	Annual NG Savings (Therms/yr)	Avg. OSD Elec. Savings (kWh/day) (Aug. 19)	Avg. OSD NG Savings (Therm/day) (Aug. 19)	Total Annual Savings (Elec. + NG) (MBtu)
Chambers	SF	Precode	Slab-on-grade	Fuel Option 1	1-story	1	14332	365	59.9294	0.749138	85.45					
					2-story	2	13470	357	56.5302	0.749138	81.67					
				Fuel Option 2	1-story	3	19089	0	68.7235	0	65.15					
					2-story	4	18071	0	65.3243	0	61.68					
				Fuel Option 3	1-story	5	18858	0	68.7235	0	64.36					
					2-story	6	17890	0	65.3243	0	61.06					
			Crawl Space	Fuel Option 1	1-story	7	15028	356	61.0488	0.749138	86.94					
					2-story	8	14398	347	57.8648	0.749138	83.87					
				Fuel Option 2	1-story	9	19633	0	69.8428	0	67.01					
					2-story	10	18837	0	66.6589	0	64.29					
				Fuel Option 3	1-story	11	19449	0	69.8428	0	66.38					
					2-story	12	18703	0	66.6589	0	63.83					
		Code - Compliant	Slab-on-grade	Fuel Option 1	1-story	13	12537	319	52.3199	0.629138	74.7	1,795	46	7.61	0.12	10.75
					2-story	14	11869	313	49.2548	0.629138	71.84	1,601	44	7.28	0.12	9.83
				Fuel Option 2	1-story	15	17236	0	61.114	0	58.83	1,853	0	7.61	0.00	6.32
					2-story	16	16455	0	58.0488	0	56.16	1,616	0	7.28	0.00	5.52
				Fuel Option 3	1-story	17	17058	0	61.114	0	58.22	1,800	0	7.61	0.00	6.14
					2-story	18	16319	0	58.0488	0	55.7	1,571	0	7.28	0.00	5.36
			Crawl Space	Fuel Option 1	1-story	19	13266	310	53.5548	0.629138	76.27	1,762	46	7.49	0.12	10.67
					2-story	20	12763	303	50.693	0.629138	73.82	1,635	44	7.17	0.12	10.05
				Fuel Option 2	1-story	21	17807	0	62.3488	0	60.77	1,826	0	7.49	0.00	6.24
					2-story	22	17176	0	59.487	0	58.62	1,661	0	7.17	0.00	5.67
				Fuel Option 3	1-story	23	17664	0	62.3488	0	60.29	1,785	0	7.49	0.00	6.09
					2-story	24	17068	0	59.487	0	58.25	1,635	0	7.17	0.00	5.58
	MF	Precode	Slab-on-grade	Fuel Option 1	1-story	1	16081	366	70.002	0.730761	91.5					
					2-story	2	15157	355	66.1566	0.730761	87.21					
				Fuel Option 2	1-story	3	20868	0	78.4958	0	71.22					
					2-story	4	19731	0	74.6505	0	67.34					
				Fuel Option 3	1-story	5	20632	0	78.4958	0	70.42					
					2-story	6	19565	0	74.6505	0	66.77					
					3-story	7	16624	356	70.5569	0.730761	92.38					
					1-story	8	15912	346	66.7492	0.730761	88.86					
					2-story	9	21242	0	79.0506	0	72.5					
					3-story	10	20330	0	75.243	0	69.39					
		Code - Compliant	Slab-on-grade	Fuel Option 1	1-story	11	21050	0	79.0506	0	71.84	-4,249	366	-5.24	0.73	22.11
					2-story	12	20197	0	75.243	0	68.93	-5,893	355	-12.89	0.73	15.37
					3-story	13	13831	303	59.2534	0.610761	77.47	671	0	3.25	0.00	2.29
				Fuel Option 2	1-story	14	13173	297	56.4198	0.610761	74.67	5,900	-303	15.40	-0.61	-10.13
					2-story	15	18241	0	67.7472	0	62.26	7,459	-297	22.08	-0.61	-4.25
					3-story	16	17484	0	64.9136	0	59.67	1,324	0	6.90	0.00	4.51
				Fuel Option 3	1-story	17	18141	0	67.7472	0	61.91	-860	356	5.64	0.73	32.71
					2-story	18	17408	0	64.9136	0	59.41	-2,229	346	-1.00	0.73	26.95
					3-story							3,834	0	14.14	0.00	13.09

Table 132: Code and Pre-code Simulation Results for Individual Residence for Chambers County (Single-Family and Multi-Family).

Prototype of the simulation result for one county

County Name	Chambers
Division (East or West Texas)	East Texas
Number of new building permits for SFD	571

		Fuel Option 1	Fuel Option 2	Fuel Option 3	Total
		Elec. cooling, NG heating and NG water heating	All electricity	Elec. cooling, Heat pump heating and elec. water heating	
		77.1%	18.9%	4.0%	
Slab-on-grade (93.6%)	1-Story (59.8%)	43.16%	10.58%	2.24%	55.97%
	2-Story (40.2%)	29.01%	7.11%	1.51%	37.63%
Crawl spaces (6.4%)	1-Story (59.8%)	2.95%	0.72%	0.15%	3.83%
	2-Story (39.2%)	1.98%	0.49%	0.10%	2.57%
Total		77.10%	18.90%	4.00%	100.00%



Number of Houses for each simulation

		Fuel Option 1	Fuel Option 2	Fuel Option 3	Total
		Elec. cooling, NG heating and NG water heating	All electricity	Elec. cooling, Heat pump heating and elec. water heating	
		77.1%	18.9%	4.0%	
Slab-on-grade (93.6%)	1-Story (59.8%)	246	60	13	320
	2-Story (40.2%)	166	41	9	215
Crawl spaces (6.4%)	1-Story (59.8%)	17	4	1	22
	2-Story (39.2%)	11	3	1	15
Total		440	108	23	571

Precode Energy Use for each option (per house)

		Fuel Option 1		Fuel Option 2		Fuel Option 3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	14,332	365	19,089	0	18,858	0
	2-Story	13,470	357	18,071	0	17,890	0
Crawl spaces	1-Story	15,028	356	19,633	0	19,449	0
	2-Story	14,398	347	18,837	0	18,703	0
Total		57,228	1,425	75,630	0	74,900	0

Code compliant Energy Use for each option (per house)

		Fuel Option 1		Fuel Option 2		Fuel Option 3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	12,537	319	17,236	0	17,058	0
	2-Story	11,869	313	16,455	0	16,319	0
Crawl spaces	1-Story	13,266	310	17,807	0	17,664	0
	2-Story	12,763	303	17,176	0	17,068	0
Total		50,435	1,245	68,674	0	68,109	0

Precode Total Energy Use (For total houses in a County)

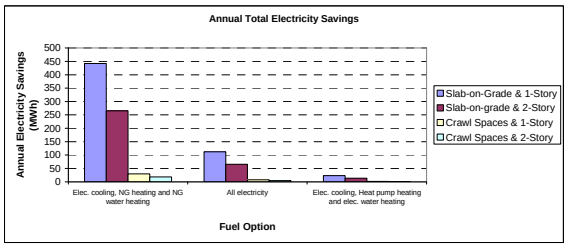
		Fuel Option 1		Fuel Option 2		Fuel Option 3		Total	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	3,532	89,942	1,153	0	241	0	4,926	89,942
	2-Story	2,231	59,137	734	0	154	0	3,119	59,137
Crawl spaces	1-Story	253	5,998	81	0	17	0	351	5,998
	2-Story	163	3,930	52	0	11	0	226	3,930
Total		6,179	159,007	2,020	0	423	0	8,622	159,007

Code compliant Total Energy Use (For total houses in a County)

		Fuel Option 1		Fuel Option 2		Fuel Option 3		Total	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	3,089	78,606	1,041	0	218	0	4,349	78,606
	2-Story	1,966	51,849	668	0	140	0	2,775	51,849
Crawl spaces	1-Story	224	5,223	74	0	15	0	313	5,223
	2-Story	145	3,432	48	0	10	0	202	3,432
Total		5,423	139,110	1,831	0	384	0	7,638	139,110

Total Energy Savings Due to the Code Adoption

		Fuel Option 1		Fuel Option 2		Fuel Option 3		Total	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)
Slab-on-grade	1-Story	442	11,335	112	0	23	0	577	11,335
	2-Story	265	7,289	66	0	14	0	344	7,289
Crawl spaces	1-Story	30	775	8	0	2	0	39	775
	2-Story	19	498	5	0	1	0	24	498
Total		756	19,897	190	0	39	0	984	19,897



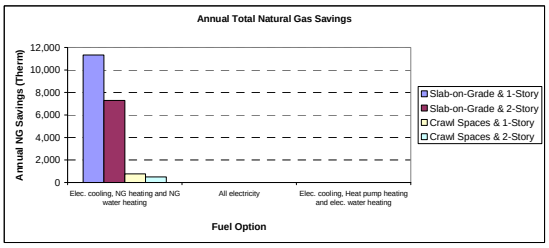


Table 133: Code and Pre-code Annual Simulation Results for Chambers County (Single-Family).

Precode Precode Avg. OSD Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	59.93	0.75	68.72	0.00	68.72	0.00
	2-Story	56.53	0.75	65.32	0.00	65.32	0.00
Crawl spaces	1-Story	61.05	0.75	69.84	0.00	69.84	0.00
	2-Story	57.86	0.75	66.66	0.00	66.66	0.00
Total		235.37	3.00	270.55	0.00	270.55	0.00

Code compliant Precode Avg. OSD Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	52.32	0.63	61.11	0.00	61.11	0.00
	2-Story	49.25	0.63	58.05	0.00	58.05	0.00
Crawl spaces	1-Story	53.55	0.63	62.35	0.00	62.35	0.00
	2-Story	50.69	0.63	59.49	0.00	59.49	0.00
Total		205.82	2.52	241.00	0.00	241.00	0.00

Precode Precode Avg. OSD Total Energy Use (For total houses in a County)

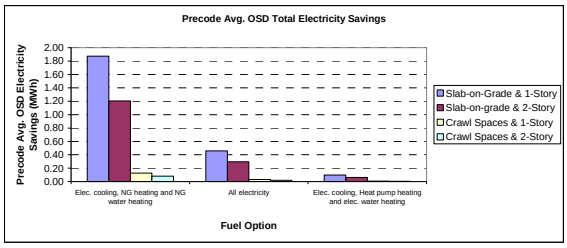
		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	14.77	184.60	4.15	0.00	0.88	0.00	19.80	184.60
	2-Story	9.36	124.09	2.65	0.00	0.56	0.00	12.58	124.09
Crawl spaces	1-Story	1.03	12.62	0.29	0.00	0.06	0.00	1.38	12.62
	2-Story	0.66	8.49	0.19	0.00	0.04	0.00	0.88	8.49
Total		25.82	329.80	7.28	0.00	1.54	0.00	34.63	329.80

Code compliant Precode Avg. OSD Total Energy Use (For total houses in a County)

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	12.89	155.03	3.69	0.00	0.78	0.00	17.37	155.03
	2-Story	8.16	104.22	2.36	0.00	0.50	0.00	11.02	104.22
Crawl spaces	1-Story	0.90	10.60	0.26	0.00	0.05	0.00	1.21	10.60
	2-Story	0.57	7.13	0.17	0.00	0.03	0.00	0.77	7.13
Total		22.53	276.97	6.47	0.00	1.37	0.00	30.37	276.97

Precode Avg. OSD Total Energy Savings Due to the Code Adoption

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)
Slab-on-grade	1-Story	1.88	29.57	0.46	0.00	0.10	0.00	2.43	29.57
	2-Story	1.21	19.88	0.30	0.00	0.06	0.00	1.56	19.88
Crawl spaces	1-Story	0.13	2.02	0.03	0.00	0.01	0.00	0.16	2.02
	2-Story	0.08	1.36	0.02	0.00	0.00	0.00	0.11	1.36
Total		3.29	52.83	0.81	0.00	0.17	0.00	4.26	52.83



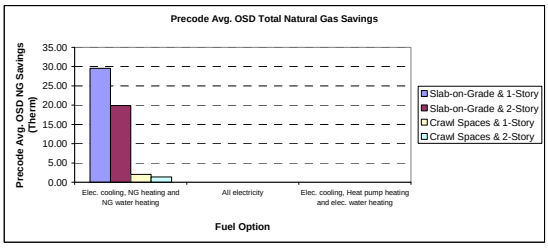
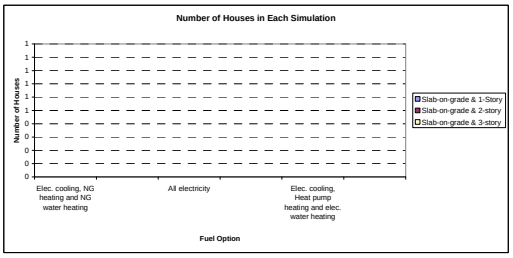


Table 134: Code and Pre-code Average OSD Simulation Results for Chambers County (Single-Family).

The simulation result for one county

County Name	Chambers
NAHB Division	West South Central
Number of new building permits for MF	0

		Fuel Option			Total
		1	2	3	
		Elec. cooling, NG heating and NG water heating	All electricity	Elec. cooling, Heat pump heating and elec. water heating	
		19.5%	66.4%	14.1%	
Slab-on-grade (100%)	1-Story (2.6%)	0.51%	1.73%	0.37%	2.60%
	2-Story (89.1%)	17.37%	59.16%	12.56%	89.10%
	3-Story (8.3%)	1.62%	5.51%	1.17%	8.30%
Total		19.50%	66.40%	14.10%	100.00%



Number of Houses for each simulation

		Fuel Option			Total
		1	2	3	
		Elec. cooling, NG heating and NG water heating	All electricity	Elec. cooling, Heat pump heating and elec. water heating	
		19.5%	66.4%	14.2%	
Slab-on-grade (100%)	1-Story (2.6%)	0	0	0	0
	2-Story (89.1%)	0	0	0	0
	3-Story (8.3%)	0	0	0	0
Total		0	0	0	0

Precode Energy Use for each option (per house)

		Fuel Option						
		1		2		3		
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating		
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	
Slab-on-grade	1-Story	16,081	366	19,731	0	16,624	356	
	2-Story	15,157	355	20,632	0	15,912	346	
	3-Story	20,868	0	19,565	0	21,242	0	
Total		52,106	721	59,928	0	53,778	702	

Code compliant Energy Use for each option (per house)

		Fuel Option						
		1		2		3		
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating		
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	
Slab-on-grade	1-Story	20,330	0	13,831	303	17,484	0	
	2-Story	21,050	0	13,173	297	18,141	0	
	3-Story	20,197	0	18,241	0	17,408	0	
Total		61,577	0	45,245	600	53,033	0	

Precode Total Energy Use (For total houses in a County)

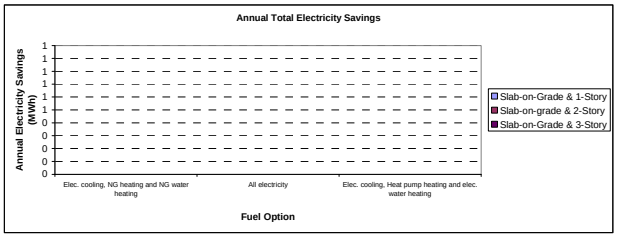
		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	0	0	0	0	0	0	0	0
	2-Story	0	0	0	0	0	0	0	0
	3-Story	0	0	0	0	0	0	0	0
Total		0	0	0	0	0	0	0	0

Code compliant Total Energy Use (For total houses in a County)

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	0	0	0	0	0	0	0	0
	2-Story	0	0	0	0	0	0	0	0
	3-Story	0	0	0	0	0	0	0	0
Total		0	0	0	0	0	0	0	0

Total Energy Savings Due to the Code Adoption

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	0	0	0	0	0	0	0	0
	2-Story	0	0	0	0	0	0	0	0
	3-Story	0	0	0	0	0	0	0	0
Total		0	0	0	0	0	0	0	0



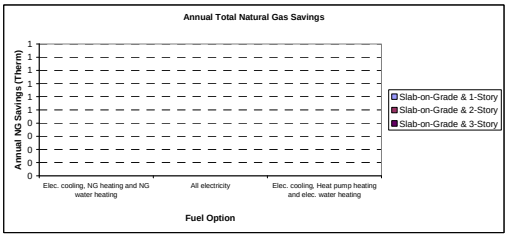


Table 135: Code and Pre-code Annual Simulation Results for Chambers County (Multi-Family).

Precode Avg. OSD Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	70.00	0.73	74.65	0.00	70.56	0.73
	2-Story	66.16	0.73	78.50	0.00	66.75	0.73
	3-Story	78.50	0.00	74.65	0.00	79.05	0.00
Total		214.65	1.46	227.80	0.00	216.36	1.46

Code compliant Avg. OSD Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	75.24	0.00	59.25	0.61	64.91	0.00
	2-Story	79.05	0.00	56.42	0.61	67.75	0.00
	3-Story	75.24	0.00	67.75	0.00	64.91	0.00
Total		229.54	0.00	183.42	1.22	197.57	0.00

Precode Avg. OSD Total Energy Use (For total houses in a County)

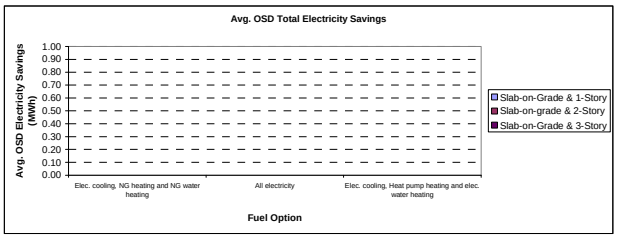
		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	2-Story	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3-Story	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Code compliant Avg. OSD Total Energy Use (For total houses in a County)

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	2-Story	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3-Story	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Total Energy Savings Due to the Code Adoption

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Savings (kWh)	NG Savings (Therm)	Elec. Savings (kWh)	NG Savings (Therm)	Elec. Savings (kWh)	NG Savings (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	2-Story	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3-Story	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00



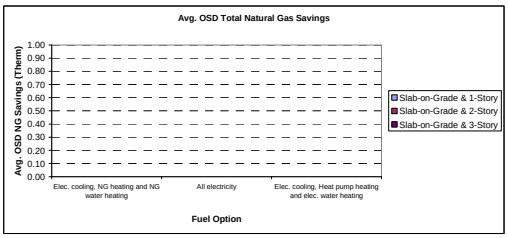


Table 136: Code and Pre-code Average OSD Simulation Results for Chambers County (Multi-Family).

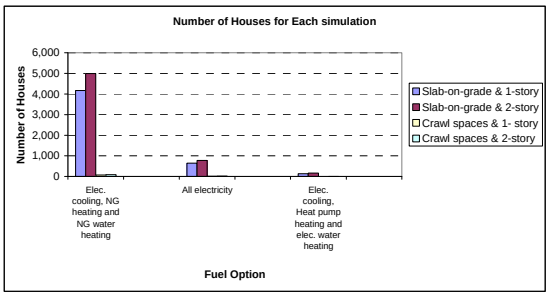
County	SF or MF	Precode or Code-compliant	Options			Simulation #	Annual Elec. (kWh/yr)	Annual NG (Therms/yr)	Avg. OSD Elec. (kWh/day) (Aug. 19)	Avg. OSD NG (Therm/day) (Aug. 19)	Total Annual (Elec. + NG) (MBtu)	Annual Elec.Savings (kWh/yr)	Annual NG Savings (Therms/yr)	Avg. OSD Elec. Savings (kWh/day) (Aug. 19)	Avg. OSD NG Savings (Therm/day) (Aug. 19)	Total Annual Savings (Elec. + NG) (MBtu)
Collin	SF	Precode	Slab-on-grade	Fuel Option 1	1-story	1	15620	505	73.2763	0.725762	103.79					
					2-story	2	14741	496	69.6917	0.725762	99.96					
				Fuel Option 2	1-story	3	23014	0	81.7223	0	78.55					
					2-story	4	21958	0	78.1378	0	74.94					
				Fuel Option 3	1-story	5	21986	0	81.7223	0	75.04					
					2-story	6	21014	0	78.1378	0	71.72					
			Crawl Space	Fuel Option 1	1-story	7	16170	482	74.1035	0.725762	103.36					
					2-story	8	15480	467	70.523	0.725762	99.51					
				Fuel Option 2	1-story	9	23123	0	82.5495	0	78.92					
					2-story	10	22129	0	78.969	0	75.53					
				Fuel Option 3	1-story	11	22259	0	82.5495	0	75.97					
					2-story	12	21377	0	78.969	0	72.96					
		Code - Compliant	Slab-on-grade	Fuel Option 1	1-story	13	13492	385	60.1434	0.605762	84.58	2,128	120	13.13	0.12	19.21
					2-story	14	12977	390	58.1082	0.605762	83.25	1,764	106	11.58	0.12	16.71
				Fuel Option 2	1-story	15	19370	0	68.5895	0	66.11	3,644	0	13.13	0.00	12.44
					2-story	16	18925	0	66.5543	0	64.59	3,033	0	11.58	0.00	10.35
				Fuel Option 3	1-story	17	18963	0	68.5895	0	64.72	3,023	0	13.13	0.00	10.32
					2-story	18	18496	0	66.5543	0	63.13	2,518	0	11.58	0.00	8.59
			Crawl Space	Fuel Option 1	1-story	19	13950	369	60.9595	0.605762	84.55	2,220	113	13.14	0.12	18.81
					2-story	20	13552	367	58.9302	0.605762	82.91	1,928	100	11.59	0.12	16.60
				Fuel Option 2	1-story	21	19547	0	69.4057	0	66.71	3,576	0	13.14	0.00	12.21
					2-story	22	19097	0	67.3763	0	65.18	3,032	0	11.59	0.00	10.35
				Fuel Option 3	1-story	23	19224	0	69.4057	0	65.61	3,035	0	13.14	0.00	10.36
					2-story	24	18783	0	67.3763	0	64.11	2,594	0	11.59	0.00	8.85
	MF	Precode	Slab-on-grade	Fuel Option 1	1-story	1	6177.5	244	26.48875	0.4974865	45.505					
					2-story	2	6026.5	221	24.75305	0.4653	42.68					
				Fuel Option 2	3-story	3	6040	213.83333	24.47516667	0.454573333	41.99333333					
					1-story	4	8939.5	0	31.1676	0	30.51					
					2-story	5	8380.75	0	28.847	0	28.6025					
					3-story	6	8267.5	0	28.37416667	0	28.21666667					
				Fuel Option 3	1-story	7	8847.5	0	31.1676	0	30.195					
					2-story	8	8324.5	0	28.847	0	28.4125					
					3-story	9	8214.833333	0	28.37416667	0	28.03666667					
		Code - Compliant	Slab-on-grade	Fuel Option 1	1-story	10	5836	205.5	24.807	0.3774865	40.46	342	39	1.68	0.12	5.05
					2-story	11	5754	181.5	23.4804	0.3453	37.7825	273	40	1.27	0.12	4.90
					3-story	12	5770.666667	173.83333	23.2485	0.334573333	37.07333333	269	40	1.23	0.12	4.92
				Fuel Option 2	1-story	13	8678	0	29.48585	0	29.615	262	0	1.68	0.00	0.90
					2-story	14	8171.5	0	27.5745	0	27.89	209	0	1.27	0.00	0.71
					3-story	15	8055.666667	0	27.14766667	0	27.49333333	212	0	1.23	0.00	0.72
				Fuel Option 3	1-story	16	8572	0	29.48585	0	29.255	276	0	1.68	0.00	0.94
					2-story	17	8110.25	0	27.5745	0	27.68	214	0	1.27	0.00	0.73
					3-story	18	7999.5	0	27.14766667	0	27.30166667	215	0	1.23	0.00	0.73

Table 137: Code and Pre-code Simulation Results for Individual Residence for Collin County (Single-Family and Multi-Family).

Prototype of the simulation result for one county

County Name	Collin
Division (East or West Texas)	West Texas
Number of new building permits for SFD	11,079

		Fuel Option			Total
		1	2	3	
		Elec. cooling, NG heating and NG water heating	All electricity	Elec. cooling, Heat pump heating and elec. water heating	
		84.1%	13.1%	2.8%	
Slab-on-grade (98.3%)	1-Story (45.5%)	37.61%	5.86%	1.25%	44.73%
	2-Story (54.5%)	45.06%	7.02%	1.50%	53.57%
Crawl spaces (1.7%)	1-Story (45.5%)	0.65%	0.10%	0.02%	0.77%
	2-Story (54.5%)	0.78%	0.12%	0.03%	0.93%
Total		84.10%	13.10%	2.80%	100.00%



Number of Houses for each simulation

		Fuel Option			Total
		1	2	3	
		Elec. cooling, NG heating and NG water heating	All electricity	Elec. cooling, Heat pump heating and elec. water heating	
		84.1%	13.1%	2.8%	
Slab-on-grade (98.3%)	1-Story (45.5%)	4,167	649	139	4,955
	2-Story (54.5%)	4,992	778	166	5,935
Crawl spaces (1.7%)	1-Story (45.5%)	72	11	2	86
	2-Story (54.5%)	86	13	3	103
Total		9,317	1,451	310	11,079

Precode Energy Use for each option (per house)

		Fuel Option						
		1		2		3		
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating		
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	
Slab-on-grade	1-Story	15,620	505	23,014	0	21,986	0	
	2-Story	14,741	496	21,958	0	21,014	0	
Crawl spaces	1-Story	16,170	482	23,123	0	22,259	0	
	2-Story	15,480	467	22,129	0	21,377	0	
Total		62,011	1,950	90,224	0	86,636	0	

Code compliant Energy Use for each option (per house)

		Fuel Option						
		1		2		3		
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating		
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	
Slab-on-grade	1-Story	13,492	385	19,370	0	18,963	0	
	2-Story	12,977	390	18,925	0	18,496	0	
Crawl spaces	1-Story	13,950	369	19,547	0	19,224	0	
	2-Story	13,552	367	19,097	0	18,783	0	
Total		53,971	1,511	76,939	0	75,466	0	

Precode Total Energy Use (For total houses in a County)

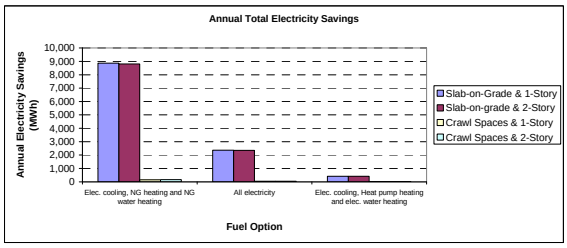
		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	65,094	2,104,519	14,939	0	3,050	0	83,084	2,104,519
	2-Story	73,582	2,475,872	17,073	0	3,492	0	94,148	2,475,872
Crawl spaces	1-Story	1,165	34,738	260	0	53	0	1,478	34,738
	2-Story	1,336	40,314	298	0	61	0	1,695	40,314
Total		141,178	4,655,444	32,570	0	6,658	0	180,406	4,655,444

Code compliant Total Energy Use (For total houses in a County)

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	56,226	1,604,435	12,574	0	2,631	0	71,431	1,604,435
	2-Story	64,777	1,946,754	14,715	0	3,074	0	82,566	1,946,754
Crawl spaces	1-Story	1,005	26,594	219	0	46	0	1,271	26,594
	2-Story	1,170	31,682	257	0	54	0	1,481	31,682
Total		123,178	3,609,465	27,765	0	5,805	0	156,748	3,609,465

Total Energy Savings Due to the Code Adoption

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)
Slab-on-grade	1-Story	8,868	500,084	2,365	0	419	0	11,653	500,084
	2-Story	8,805	529,118	2,358	0	418	0	11,582	529,118
Crawl spaces	1-Story	160	8,144	40	0	7	0	207	8,144
	2-Story	166	8,633	41	0	7	0	215	8,633
Total		18,000	1,045,978	4,805	0	853	0	23,657	1,045,978



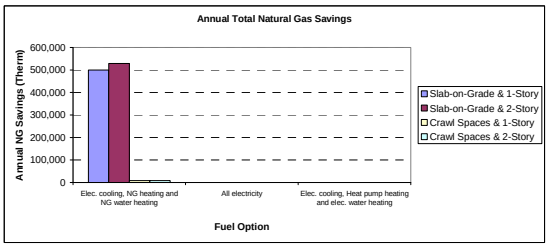


Table 138: Code and Pre-code Annual Simulation Results for Collin County (Single-Family).

Precode Precode Avg. OSD Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	73.28	0.73	81.72	0.00	81.72	0.00
	2-Story	69.69	0.73	78.14	0.00	78.14	0.00
Crawl spaces	1-Story	74.10	0.73	82.55	0.00	82.55	0.00
	2-Story	70.52	0.73	78.97	0.00	78.97	0.00
Total		287.59	2.90	321.38	0.00	321.38	0.00

Code compliant Precode Avg. OSD Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	60.14	0.61	68.59	0.00	68.59	0.00
	2-Story	58.11	0.61	66.55	0.00	66.55	0.00
Crawl spaces	1-Story	60.96	0.61	69.41	0.00	69.41	0.00
	2-Story	58.93	0.61	67.38	0.00	67.38	0.00
Total		238.14	2.42	271.93	0.00	271.93	0.00

Precode Precode Avg. OSD Total Energy Use (For total houses in a County)

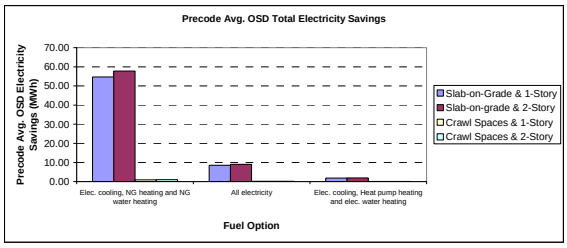
		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	305.37	3,024.51	53.05	0.00	11.34	0.00	369.76	3,024.51
	2-Story	347.88	3,622.77	60.76	0.00	12.99	0.00	421.62	3,622.77
Crawl spaces	1-Story	5.34	52.31	0.93	0.00	0.20	0.00	6.47	52.31
	2-Story	6.09	62.65	1.06	0.00	0.23	0.00	7.38	62.65
Total		664.68	6,762.24	115.79	0.00	24.75	0.00	805.22	6,762.24

Code compliant Precode Avg. OSD Total Energy Use (For total houses in a County)

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	250.64	2,524.43	44.52	0.00	9.52	0.00	304.68	2,524.43
	2-Story	290.06	3,023.77	51.75	0.00	11.06	0.00	352.87	3,023.77
Crawl spaces	1-Story	4.39	43.66	0.78	0.00	0.17	0.00	5.34	43.66
	2-Story	5.09	52.29	0.91	0.00	0.19	0.00	6.19	52.29
Total		550.18	5,644.15	97.96	0.00	20.94	0.00	669.07	5,644.15

Precode Avg. OSD Total Energy Savings Due to the Code Adoption

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)
Slab-on-grade	1-Story	54.73	500.08	8.52	0.00	1.82	0.00	65.08	500.08
	2-Story	57.82	599.00	9.01	0.00	1.93	0.00	68.75	599.00
Crawl spaces	1-Story	0.95	8.65	0.15	0.00	0.03	0.00	1.13	8.65
	2-Story	1.00	10.36	0.16	0.00	0.03	0.00	1.19	10.36
Total		114.50	1,118.09	17.84	0.00	3.81	0.00	136.15	1,118.09



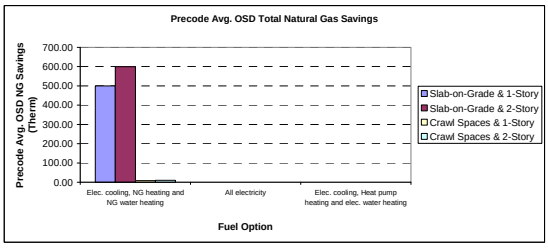
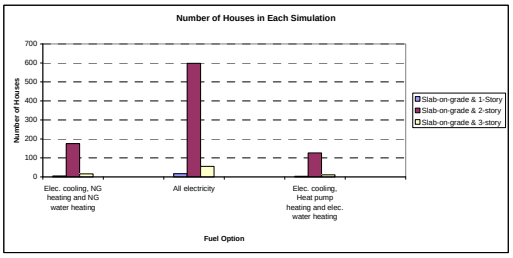


Table 139: Code and Pre-code Average OSD Simulation Results for Collin County (Single-Family).

The simulation result for one county

County Name	Collin
NAHB Division	West South Central
Number of new building permits for MF	1,011

		Fuel Option			Total
		1	2	3	
		Elec. cooling, NG heating and NG water heating	All electricity	Elec. cooling, Heat pump heating and elec. water heating	
		19.5%	66.4%	14.1%	
Slab-on-grade (100%)	1-Story (2.6%)	0.51%	1.73%	0.37%	2.60%
	2-Story (89.1%)	17.37%	59.16%	12.56%	89.10%
	3-Story (8.3%)	1.62%	5.51%	1.17%	8.30%
Total		19.50%	66.40%	14.10%	100.00%



Number of Houses for each simulation

		Fuel Option			Total
		1	2	3	
		Elec. cooling, NG heating and NG water heating	All electricity	Elec. cooling, Heat pump heating and elec. water heating	
		19.5%	66.4%	14.2%	
Slab-on-grade (100%)	1-Story (2.6%)	5	17	4	26
	2-Story (89.1%)	176	598	127	901
	3-Story (8.3%)	16	56	12	84
Total		197	671	143	1,011

Precode Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	6,178	244	8,940	0	8,848	0
	2-Story	6,027	221	8,381	0	8,325	0
	3-Story	6,040	214	8,268	0	8,215	0
Total		18,244	679	25,588	0	25,387	0

Code compliant Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	5,836	206	8,678	0	8,572	0
	2-Story	5,754	182	8,172	0	8,110	0
	3-Story	5,771	174	8,056	0	8,000	0
Total		17,361	561	24,905	0	24,682	0

Precode Total Energy Use (For total houses in a County)

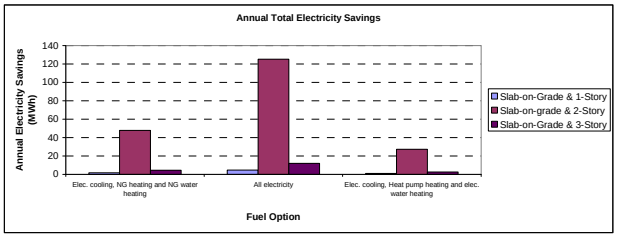
		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	32	1,251	156	0	33	0	220	1,251
	2-Story	1,059	38,820	5,013	0	1,057	0	7,129	38,820
	3-Story	99	3,499	461	0	97	0	657	3,499
Total		1,189	43,570	5,629	0	1,187	0	8,006	43,570

Code compliant Total Energy Use (For total houses in a County)

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	30	1,053	151	0	32	0	213	1,053
	2-Story	1,011	31,882	4,888	0	1,030	0	6,928	31,882
	3-Story	94	2,844	449	0	95	0	638	2,844
Total		1,135	35,779	5,488	0	1,157	0	7,780	35,779

Total Energy Savings Due to the Code Adoption

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	2	197	5	0	1	0	7	197
	2-Story	48	6,938	125	0	27	0	200	6,938
	3-Story	4	655	12	0	3	0	19	655
Total		54	7,790	142	0	31	0	226	7,790



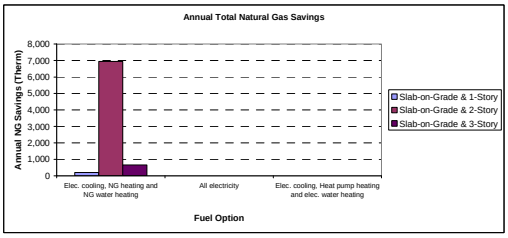


Table 140: Code and Pre-code Annual Simulation Results for Collin County (Multi-Family).

Precode Avg. OSD Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	26.49	0.50	31.17	0.00	31.17	0.00
	2-Story	24.75	0.47	28.85	0.00	28.85	0.00
	3-Story	24.48	0.45	28.37	0.00	28.37	0.00
Total		75.72	1.42	88.39	0.00	88.39	0.00

Code compliant Avg. OSD Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	24.81	0.38	29.49	0.00	29.49	0.00
	2-Story	23.48	0.35	27.57	0.00	27.57	0.00
	3-Story	23.25	0.33	27.15	0.00	27.15	0.00
Total		71.54	1.06	84.21	0.00	84.21	0.00

Precode Avg. OSD Total Energy Use (For total houses in a County)

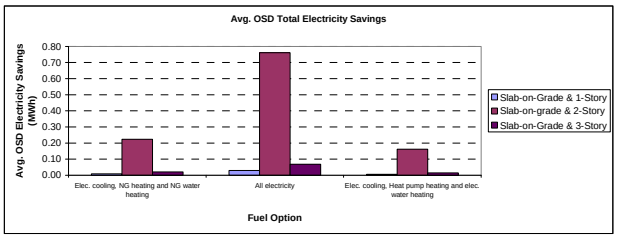
		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	0.14	2.55	0.54	0.00	0.12	0.00	0.80	2.55
	2-Story	4.35	81.73	17.25	0.00	3.66	0.00	25.27	81.73
	3-Story	0.40	7.44	1.58	0.00	0.34	0.00	2.32	7.44
Total		4.89	91.72	19.38	0.00	4.12	0.00	28.38	91.72

Code compliant Avg. OSD Total Energy Use (For total houses in a County)

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	0.13	1.93	0.51	0.00	0.11	0.00	0.75	1.93
	2-Story	4.12	60.65	16.49	0.00	3.50	0.00	24.12	60.65
	3-Story	0.38	5.47	1.51	0.00	0.32	0.00	2.21	5.47
Total		4.63	68.06	18.52	0.00	3.93	0.00	27.09	68.06

Total Energy Savings Due to the Code Adoption

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Savings (kWh)	NG Savings (Therm)	Elec. Savings (kWh)	NG Savings (Therm)	Elec. Savings (kWh)	NG Savings (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	0.01	0.62	0.03	0.00	0.01	0.00	0.04	0.62
	2-Story	0.22	21.08	0.76	0.00	0.16	0.00	1.15	21.08
	3-Story	0.02	1.96	0.07	0.00	0.01	0.00	0.10	1.96
Total		0.25	23.66	0.86	0.00	0.18	0.00	1.29	23.66



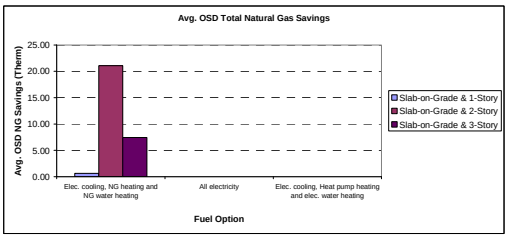


Table 141: Code and Pre-code Average OSD Simulation Results for Collin County (Multi-Family).

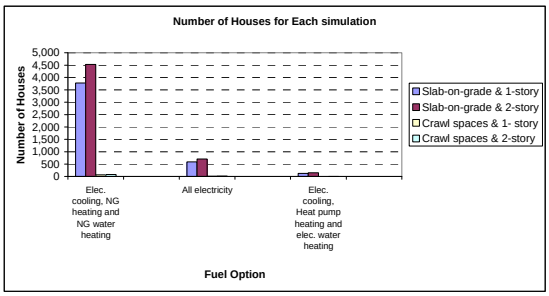
County	SF or MF	Precode or Code-compliant	Options			Simulation #	Annual Elec. (kWh/yr)	Annual NG (Therms/yr)	Avg. OSD Elec. (kWh/day) (Aug. 19)	Avg. OSD NG (Therm/day) (Aug. 19)	Total Annual (Elec. + NG) (MBtu)	Annual Elec.Savings (kWh/yr)	Annual NG Savings (Therms/yr)	Avg. OSD Elec. Savings (kWh/day) (Aug. 19)	Avg. OSD NG Savings (Therm/day) (Aug. 19)	Total Annual Savings (Elec. + NG) (MBtu)
Dallas	SF	Precode	Slab-on-grade	Fuel Option 1	1-story	1	15544	505	72.9044	0.725762	103.55					
					2-story	2	14671	497	69.3186	0.725762	99.78					
				Fuel Option 2	1-story	3	22940	0	81.3504	0	78.29					
					2-story	4	21895	0	77.7646	0	74.73					
				Fuel Option 3	1-story	5	21913	0	81.3504	0	74.79					
					2-story	6	20941	0	77.7646	0	71.47					
			Crawl Space	Fuel Option 1	1-story	7	16091	482	73.7265	0.725762	103.11					
					2-story	8	15404	467	70.142	0.725762	99.29					
				Fuel Option 2	1-story	9	23047	0	82.1725	0	78.66					
					2-story	10	22058	0	78.588	0	75.28					
				Fuel Option 3	1-story	11	22185	0	82.1725	0	75.72					
					2-story	12	21299	0	78.588	0	72.69					
		Code - Compliant	Slab-on-grade	Fuel Option 1	1-story	13	13322	412	60.649	0.605762	86.72	2,222	93	12.26	0.12	16.83
					2-story	14	12830	424	58.8309	0.605762	86.14	1,841	73	10.49	0.12	13.64
				Fuel Option 2	1-story	15	19711	0	69.0951	0	67.27	3,229	0	12.26	0.00	11.02
					2-story	16	19417	0	67.2769	0	66.27	2,478	0	10.49	0.00	8.46
				Fuel Option 3	1-story	17	19125	0	69.0951	0	65.27	2,788	0	12.26	0.00	9.52
					2-story	18	18776	0	67.2769	0	64.08	2,165	0	10.49	0.00	7.39
			Crawl Space	Fuel Option 1	1-story	19	13927	384	61.4608	0.605762	85.98	2,164	98	12.27	0.12	17.13
					2-story	20	13551	385	59.6428	0.605762	84.74	1,853	82	10.50	0.12	14.55
				Fuel Option 2	1-story	21	19801	0	69.907	0	67.58	3,246	0	12.27	0.00	11.08
					2-story	22	19429	0	68.0889	0	66.31	2,629	0	10.50	0.00	8.97
				Fuel Option 3	1-story	23	19390	0	69.907	0	66.18	2,795	0	12.27	0.00	9.54
					2-story	24	19018	0	68.0889	0	64.91	2,281	0	10.50	0.00	7.78
	MF	Precode	Slab-on-grade	Fuel Option 1	1-story	1	6177.5	244	26.48875	0.4974865	45.505					
					2-story	2	6026.5	221	24.75305	0.4653	42.68					
					3-story	3	6040	213.83333	24.47516667	0.454573333	41.99333333					
				Fuel Option 2	1-story	4	8939.5	0	31.1676	0	30.51					
					2-story	5	8380.75	0	28.847	0	28.6025					
					3-story	6	8267.5	0	28.37416667	0	28.21666667					
				Fuel Option 3	1-story	7	8847.5	0	31.1676	0	30.195					
					2-story	8	8324.5	0	28.847	0	28.4125					
					3-story	9	8214.833333	0	28.37416667	0	28.03666667					
		Code - Compliant	Slab-on-grade	Fuel Option 1	1-story	10	5836	205.5	24.807	0.3774865	40.46	342	39	1.68	0.12	5.05
					2-story	11	5754	181.5	23.4804	0.3453	37.7825	273	40	1.27	0.12	4.90
					3-story	12	5770.666667	173.83333	23.2485	0.334573333	37.07333333	269	40	1.23	0.12	4.92
				Fuel Option 2	1-story	13	8678	0	29.48585	0	29.615	262	0	1.68	0.00	0.90
					2-story	14	8171.5	0	27.5745	0	27.89	209	0	1.27	0.00	0.71
					3-story	15	8055.666667	0	27.14766667	0	27.49333333	212	0	1.23	0.00	0.72
				Fuel Option 3	1-story	16	8572	0	29.48585	0	29.255	276	0	1.68	0.00	0.94
					2-story	17	8110.25	0	27.5745	0	27.68	214	0	1.27	0.00	0.73
					3-story	18	7999.5	0	27.14766667	0	27.30166667	215	0	1.23	0.00	0.73

Table 142: Code and Pre-code Simulation Results for Individual Residence for Dallas County (Single-Family and Multi-Family).

Prototype of the simulation result for one county

County Name	Dallas
Division (East or West Texas)	West Texas
Number of new building permits for SFD	10,046

		Fuel Option			Total
		1	2	3	
		Elec. cooling, NG heating and NG water heating	All electricity	Elec. cooling, Heat pump heating and elec. water heating	
		84.1%	13.1%	2.8%	
Slab-on-grade (98.3%)	1-Story (45.5%)	37.61%	5.86%	1.25%	44.73%
	2-Story (54.5%)	45.06%	7.02%	1.50%	53.57%
Crawl spaces (1.7%)	1-Story (45.5%)	0.65%	0.10%	0.02%	0.77%
	2-Story (54.5%)	0.78%	0.12%	0.03%	0.93%
Total		84.10%	13.10%	2.80%	100.00%



Number of Houses for each simulation

		Fuel Option			Total
		1	2	3	
		Elec. cooling, NG heating and NG water heating	All electricity	Elec. cooling, Heat pump heating and elec. water heating	
		84.1%	13.1%	2.8%	
Slab-on-grade (98.3%)	1-Story (45.5%)	3,779	589	126	4,493
	2-Story (54.5%)	4,526	705	151	5,382
Crawl spaces (1.7%)	1-Story (45.5%)	65	10	2	78
	2-Story (54.5%)	78	12	3	93
Total		8,449	1,316	281	10,046

Precode Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	15,544	505	22,940	0	21,913	0
	2-Story	14,671	497	21,895	0	20,941	0
Crawl spaces	1-Story	16,091	482	23,047	0	22,185	0
	2-Story	15,404	467	22,058	0	21,299	0
Total		61,710	1,951	89,940	0	86,338	0

Code compliant Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	13,322	412	19,711	0	19,125	0
	2-Story	12,830	424	19,417	0	18,776	0
Crawl spaces	1-Story	13,927	384	19,801	0	19,390	0
	2-Story	13,551	385	19,429	0	19,018	0
Total		53,630	1,605	78,358	0	76,309	0

Precode Total Energy Use (For total houses in a County)

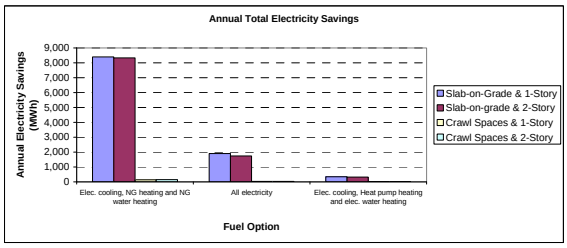
		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	58,738	1,908,295	13,503	0	2,757	0	74,997	1,908,295
	2-Story	66,405	2,249,550	15,437	0	3,156	0	84,997	2,249,550
Crawl spaces	1-Story	1,052	31,499	235	0	48	0	1,334	31,499
	2-Story	1,208	36,555	269	0	56	0	1,530	36,555
Total		127,400	4,225,899	29,443	0	6,016	0	162,859	4,225,899

Code compliant Total Energy Use (For total houses in a County)

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	50,341	1,556,866	11,602	0	2,406	0	64,349	1,556,866
	2-Story	58,072	1,919,133	13,693	0	2,829	0	74,591	1,919,133
Crawl spaces	1-Story	910	25,095	202	0	42	0	1,154	25,095
	2-Story	1,061	30,137	237	0	50	0	1,347	30,137
Total		110,384	3,531,230	25,730	0	5,327	0	141,442	3,531,230

Total Energy Savings Due to the Code Adoption

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)
Slab-on-grade	1-Story	8,396	351,429	1,901	0	351	0	10,648	351,429
	2-Story	8,333	330,417	1,747	0	326	0	10,406	330,417
Crawl spaces	1-Story	141	6,404	33	0	6	0	181	6,404
	2-Story	145	6,419	32	0	6	0	183	6,419
Total		17,016	694,668	3,713	0	689	0	21,418	694,668



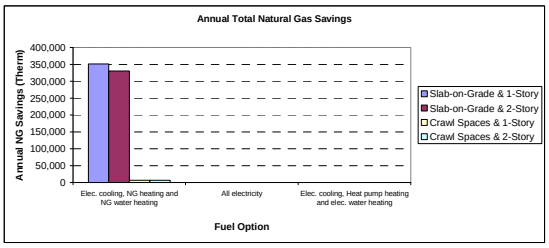


Table 143: Code and Pre-code Annual Simulation Results for Dallas County (Single-Family).

Precode Precode Avg. OSD Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	72.90	0.73	81.35	0.00	81.35	0.00
	2-Story	69.32	0.73	77.76	0.00	77.76	0.00
Crawl spaces	1-Story	73.73	0.73	82.17	0.00	82.17	0.00
	2-Story	70.14	0.73	78.59	0.00	78.59	0.00
Total		286.09	2.90	319.88	0.00	319.88	0.00

Code compliant Precode Avg. OSD Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	60.65	0.61	69.10	0.00	69.10	0.00
	2-Story	58.83	0.61	67.28	0.00	67.28	0.00
Crawl spaces	1-Story	61.46	0.61	69.91	0.00	69.91	0.00
	2-Story	59.64	0.61	68.09	0.00	68.09	0.00
Total		240.58	2.42	274.37	0.00	274.37	0.00

Precode Precode Avg. OSD Total Energy Use (For total houses in a County)

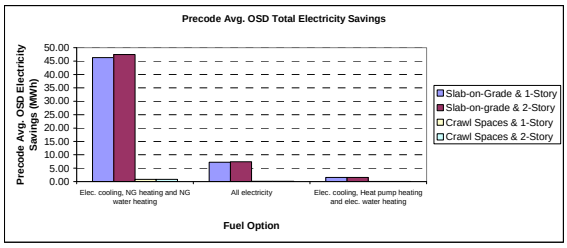
		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	275.49	2,742.51	47.88	0.00	10.23	0.00	333.61	2,742.51
	2-Story	313.75	3,284.99	54.83	0.00	11.72	0.00	380.30	3,284.99
Crawl spaces	1-Story	4.82	47.43	0.84	0.00	0.18	0.00	5.83	47.43
	2-Story	5.49	56.81	0.96	0.00	0.20	0.00	6.65	56.81
Total		599.55	6,131.74	104.51	0.00	22.34	0.00	726.40	6,131.74

Code compliant Precode Avg. OSD Total Energy Use (For total houses in a County)

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	229.18	2,289.05	40.67	0.00	8.69	0.00	278.54	2,289.05
	2-Story	266.28	2,741.83	47.43	0.00	10.14	0.00	323.86	2,741.83
Crawl spaces	1-Story	4.02	39.59	0.71	0.00	0.15	0.00	4.88	39.59
	2-Story	4.67	47.42	0.83	0.00	0.18	0.00	5.68	47.42
Total		504.15	5,117.89	89.65	0.00	19.16	0.00	612.96	5,117.89

Precode Avg. OSD Total Energy Savings Due to the Code Adoption

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)
Slab-on-grade	1-Story	46.31	453.46	7.21	0.00	1.54	0.00	55.07	453.46
	2-Story	47.47	543.15	7.39	0.00	1.58	0.00	56.44	543.15
Crawl spaces	1-Story	0.80	7.84	0.12	0.00	0.03	0.00	0.95	7.84
	2-Story	0.82	9.39	0.13	0.00	0.03	0.00	0.98	9.39
Total		95.40	1,013.84	14.86	0.00	3.18	0.00	113.44	1,013.84



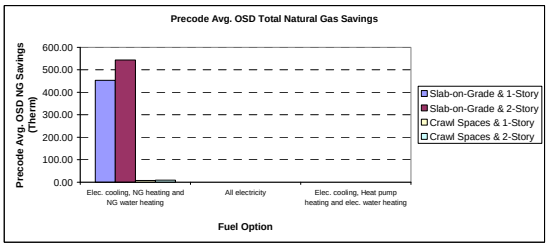
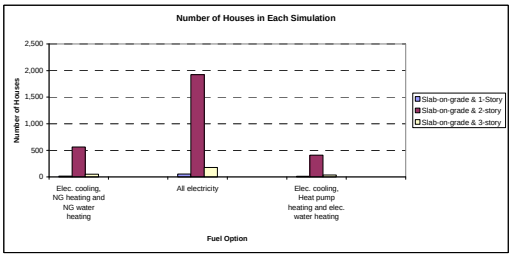


Table 144: Code and Pre-code Average OSD Simulation Results for Dallas County (Single-Family).

The simulation result for one county

County Name	Dallas
NAHB Division	West South Central
Number of new building permits for MF	3,251

		Fuel Option			Total
		1	2	3	
		Elec. cooling, NG heating and NG water heating	All electricity	Elec. cooling, Heat pump heating and elec. water heating	
		19.5%	66.4%	14.1%	
Slab-on-grade (100%)	1-Story (2.6%)	0.51%	1.73%	0.37%	2.60%
	2-Story (89.1%)	17.37%	59.16%	12.56%	89.10%
	3-Story (8.3%)	1.62%	5.51%	1.17%	8.30%
Total		19.50%	66.40%	14.10%	100.00%



Number of Houses for each simulation

		Fuel Option			Total
		1	2	3	
		Elec. cooling, NG heating and NG water heating	All electricity	Elec. cooling, Heat pump heating and elec. water heating	
		19.5%	66.4%	14.1%	
Slab-on-grade (100%)	1-Story (2.6%)	16	56	12	85
	2-Story (89.1%)	565	1,923	408	2,897
	3-Story (8.3%)	53	179	38	270
Total		634	2,159	458	3,251

Precode Energy Use for each option (per house)

		Fuel Option						
		1		2		3		
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating		
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	
Slab-on-grade	1-Story	6,178	244	8,940	0	8,849	0	
	2-Story	6,027	221	8,381	0	8,325	0	
	3-Story	6,040	214	8,268	0	8,215	0	
Total		18,244	679	25,588	0	25,387	0	

Code compliant Energy Use for each option (per house)

		Fuel Option						
		1		2		3		
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating		
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	
Slab-on-grade	1-Story	5,836	206	8,678	0	8,572	0	
	2-Story	5,754	182	8,172	0	8,110	0	
	3-Story	5,771	174	8,056	0	8,000	0	
Total		17,361	561	24,905	0	24,682	0	

Precode Total Energy Use (For total houses in a County)

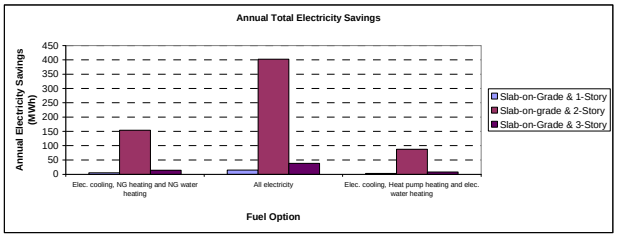
		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	102	4,022	502	0	105	0	709	4,022
	2-Story	3,404	124,831	16,119	0	3,400	0	22,923	124,831
	3-Story	318	11,251	1,481	0	313	0	2,112	11,251
Total		3,824	140,104	18,102	0	3,818	0	25,744	140,104

Code compliant Total Energy Use (For total houses in a County)

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	96	3,387	487	0	102	0	685	3,387
	2-Story	3,250	102,519	15,717	0	3,312	0	22,279	102,519
	3-Story	304	9,147	1,443	0	304	0	2,051	9,147
Total		3,650	115,053	17,647	0	3,719	0	25,016	115,053

Total Energy Savings Due to the Code Adoption

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	6	635	15	0	3	0	24	635
	2-Story	154	22,311	402	0	88	0	644	22,311
	3-Story	14	2,105	38	0	8	0	60	2,105
Total		174	25,051	455	0	99	0	728	25,051



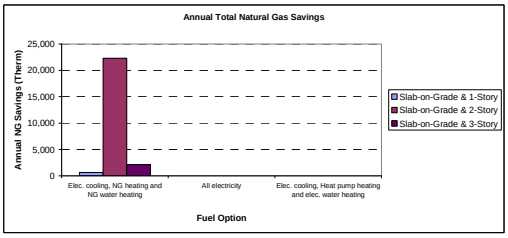


Table 145: Code and Pre-code Annual Simulation Results for Dallas County (Multi-Family).

Precode Avg. OSD Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	26.49	0.50	31.17	0.00	31.17	0.00
	2-Story	24.75	0.47	28.85	0.00	28.85	0.00
	3-Story	24.48	0.45	28.37	0.00	28.37	0.00
Total		75.72	1.42	88.39	0.00	88.39	0.00

Code compliant Avg. OSD Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	24.81	0.38	29.49	0.00	29.49	0.00
	2-Story	23.48	0.35	27.57	0.00	27.57	0.00
	3-Story	23.25	0.33	27.15	0.00	27.15	0.00
Total		71.54	1.06	84.21	0.00	84.21	0.00

Precode Avg. OSD Total Energy Use (For total houses in a County)

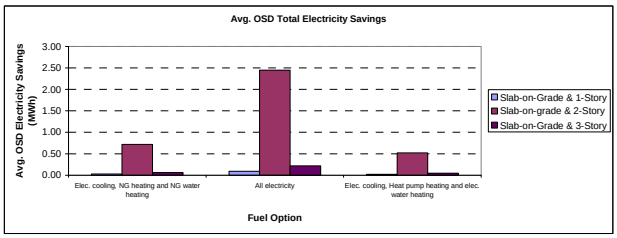
		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	0.44	8.20	1.75	0.00	0.37	0.00	2.56	8.20
	2-Story	13.98	262.82	55.48	0.00	11.78	0.00	81.25	262.82
	3-Story	1.29	23.92	5.08	0.00	1.08	0.00	7.45	23.92
Total		15.71	294.94	62.32	0.00	13.23	0.00	91.26	294.94

Code compliant Avg. OSD Total Energy Use (For total houses in a County)

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	0.41	6.22	1.65	0.00	0.35	0.00	2.42	6.22
	2-Story	13.26	195.04	53.04	0.00	11.26	0.00	77.56	195.04
	3-Story	1.22	17.60	4.86	0.00	1.03	0.00	7.12	17.60
Total		14.89	218.87	59.55	0.00	12.65	0.00	87.10	218.87

Total Energy Savings Due to the Code Adoption

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Savings (kWh)	NG Savings (Therm)	Elec. Savings (kWh)	NG Savings (Therm)	Elec. Savings (kWh)	NG Savings (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	0.03	1.98	0.09	0.00	0.02	0.00	0.14	1.98
	2-Story	0.72	67.78	2.45	0.00	0.52	0.00	3.69	67.78
	3-Story	0.06	6.31	0.22	0.00	0.05	0.00	0.33	6.31
Total		0.81	76.07	2.76	0.00	0.59	0.00	4.16	76.07



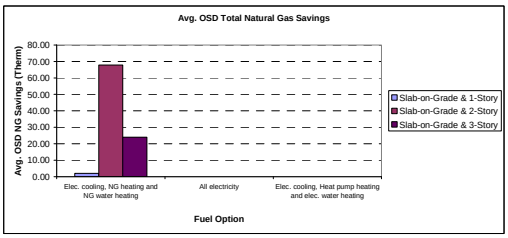


Table 146: Code and Pre-code Average OSD Simulation Results for Dallas County (Multi-Family).

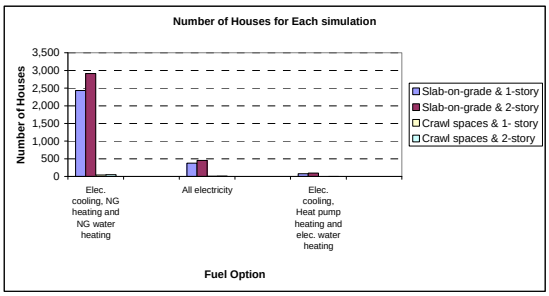
Table 147: Code and Pre-code Simulation Results for Individual Residence for Denton County (Single-Family and Multi-Family).

County	SF or MF	Precode or Code-compliant	Options			Simulation #	Annual Elec. (kWh/yr)	Annual NG (Therms/yr)	Avg. OSD Elec. (kWh/day) (Aug. 19)	Avg. OSD NG (Therm/day) (Aug. 19)	Total Annual (Elec. + NG) (MBtu)	Annual Elec.Savings (kWh/yr)	Annual NG Savings (Therms/yr)	Avg. OSD Elec. Savings (kWh/day) (Aug. 19)	Avg. OSD NG Savings (Therm/day) (Aug. 19)	Total Annual Savings (Elec. + NG) (MBtu)
Denton	SF	Precode	Slab-on-grade	Fuel Option 1	1-story	1	15590	505	73.1313	0.725762	103.67					
					2-story	2	14717	496	69.5525	0.725762	99.86					
				Fuel Option 2	1-story	3	22982	0	81.5774	0	78.44					
					2-story	4	21929	0	77.9986	0	74.84					
				Fuel Option 3	1-story	5	21952	0	81.5774	0	74.92					
					2-story	6	20986	0	77.9986	0	71.62					
			Crawl Space	Fuel Option 1	1-story	7	16140	482	73.9565	0.725762	103.25					
					2-story	8	15455	466	70.3802	0.725762	99.38					
				Fuel Option 2	1-story	9	23090	0	82.4026	0	78.81					
					2-story	10	22098	0	78.8262	0	75.42					
				Fuel Option 3	1-story	11	22224	0	82.4026	0	75.85					
					2-story	12	21348	0	78.8262	0	72.86					
		Code - Compliant	Slab-on-grade	Fuel Option 1	1-story	13	13475	385	60.0489	0.605762	84.52	2,115	120	13.08	0.12	19.15
					2-story	14	12962	390	58.0164	0.605762	83.19	1,755	106	11.54	0.12	16.67
				Fuel Option 2	1-story	15	19352	0	68.4949	0	66.05	3,630	0	13.08	0.00	12.39
					2-story	16	18908	0	66.4624	0	64.53	3,021	0	11.54	0.00	10.31
				Fuel Option 3	1-story	17	18945	0	68.4949	0	64.66	3,007	0	13.08	0.00	10.26
					2-story	18	18480	0	66.4624	0	63.07	2,506	0	11.54	0.00	8.55
			Crawl Space	Fuel Option 1	1-story	19	13932	369	60.8634	0.605762	84.47	2,208	113	13.09	0.12	18.78
					2-story	20	13537	366	58.8357	0.605762	82.84	1,918	100	11.54	0.12	16.54
				Fuel Option 2	1-story	21	19527	0	69.3095	0	66.65	3,563	0	13.09	0.00	12.16
					2-story	22	19077	0	67.2819	0	65.11	3,021	0	11.54	0.00	10.31
				Fuel Option 3	1-story	23	19204	0	69.3095	0	65.54	3,020	0	13.09	0.00	10.31
					2-story	24	18767	0	67.2819	0	64.05	2,581	0	11.54	0.00	8.81
	MF	Precode	Slab-on-grade	Fuel Option 1	1-story	1	6177.5	244	26.48875	0.4974865	45.505					
					2-story	2	6026.5	221	24.75305	0.4653	42.68					
					3-story	3	6040	213.83333	24.47516667	0.454573333	41.99333333					
				Fuel Option 2	1-story	4	8939.5	0	31.1676	0	30.51					
					2-story	5	8380.75	0	28.847	0	28.6025					
					3-story	6	8267.5	0	28.37416667	0	28.21666667					
				Fuel Option 3	1-story	7	8847.5	0	31.1676	0	30.195					
					2-story	8	8324.5	0	28.847	0	28.4125					
					3-story	9	8214.833333	0	28.37416667	0	28.03666667					
		Code - Compliant	Slab-on-grade	Fuel Option 1	1-story	10	5836.5	200	24.6313	0.3774865	39.915	341	44	1.86	0.12	5.59
					2-story	11	5758.5	176.25	23.293775	0.3453	37.285	268	45	1.46	0.12	5.40
					3-story	12	5778.666667	168.83333	23.05883333	0.334573333	36.60166667	261	45	1.42	0.12	5.39
				Fuel Option 2	1-story	13	8578.5	0	29.31015	0	29.28	361	0	1.86	0.00	1.23
					2-story	14	8085	0	27.38775	0	27.5925	296	0	1.46	0.00	1.01
					3-story	15	7976.5	0	26.95783333	0	27.22333333	291	0	1.42	0.00	0.99
				Fuel Option 3	1-story	16	8503.5	0	29.31015	0	29.02	344	0	1.86	0.00	1.18
					2-story	17	8045	0	27.38775	0	27.4575	280	0	1.46	0.00	0.96
					3-story	18	7939.333333	0	26.95783333	0	27.09666667	276	0	1.42	0.00	0.94

Prototype of the simulation result for one county

County Name	Denton
Division (East or West Texas)	West Texas
Number of new building permits for SFD	6,461

		Fuel Option			Total
		1	2	3	
		Elec. cooling, NG heating and NG water heating	All electricity	Elec. cooling, Heat pump heating and elec. water heating	
		84.1%	13.1%	2.8%	
Slab-on-grade (98.3%)	1-Story (45.5%)	37.61%	5.86%	1.25%	44.73%
	2-Story (54.5%)	45.06%	7.02%	1.50%	53.57%
Crawl spaces (1.7%)	1-Story (45.5%)	0.65%	0.10%	0.02%	0.77%
	2-Story (54.5%)	0.78%	0.12%	0.03%	0.93%
Total		84.10%	13.10%	2.80%	100.00%



Number of Houses for each simulation

		Fuel Option			Total
		1	2	3	
		Elec. cooling, NG heating and NG water heating	All electricity	Elec. cooling, Heat pump heating and elec. water heating	
		84.1%	13.1%	2.8%	
Slab-on-grade (98.3%)	1-Story (45.5%)	2,430	379	81	2,890
	2-Story (54.5%)	2,911	453	97	3,461
Crawl spaces (1.7%)	1-Story (45.5%)	42	7	1	50
	2-Story (54.5%)	50	8	2	60
Total		5,434	846	181	6,461

Precode Energy Use for each option (per house)

		Fuel Option						
		1		2		3		
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating		
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	
Slab-on-grade	1-Story	15,590	505	22,982	0	21,952	0	
	2-Story	14,717	496	21,929	0	20,986	0	
Crawl spaces	1-Story	16,140	482	23,090	0	22,224	0	
	2-Story	15,455	466	22,098	0	21,348	0	
Total		61,902	1,949	90,099	0	86,510	0	

Code compliant Energy Use for each option (per house)

		Fuel Option						
		1		2		3		
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating		
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	
Slab-on-grade	1-Story	13,475	385	19,352	0	18,945	0	
	2-Story	12,962	390	18,908	0	18,480	0	
Crawl spaces	1-Story	13,932	369	19,527	0	19,204	0	
	2-Story	13,537	366	19,077	0	18,767	0	
Total		53,906	1,510	76,864	0	75,396	0	

Precode Total Energy Use (For total houses in a County)

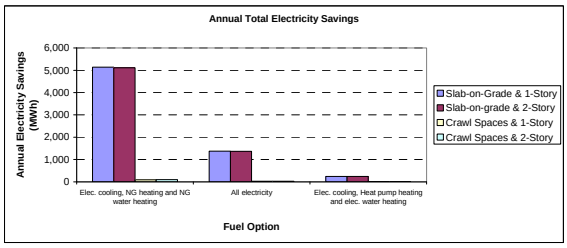
		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	37,888	1,227,304	8,700	0	1,776	0	48,365	1,227,304
	2-Story	42,842	1,443,868	9,944	0	2,034	0	54,819	1,443,868
Crawl spaces	1-Story	678	20,258	151	0	31	0	861	20,258
	2-Story	778	23,460	173	0	36	0	987	23,460
Total		82,186	2,714,890	18,968	0	3,877	0	105,031	2,714,890

Code compliant Total Energy Use (For total houses in a County)

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	32,748	935,667	7,326	0	1,533	0	41,607	935,667
	2-Story	37,733	1,135,299	8,574	0	1,791	0	48,097	1,135,299
Crawl spaces	1-Story	586	15,509	128	0	27	0	740	15,509
	2-Story	681	18,426	150	0	31	0	863	18,426
Total		71,748	2,104,901	16,177	0	3,382	0	91,307	2,104,901

Total Energy Savings Due to the Code Adoption

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)
Slab-on-grade	1-Story	5,140	291,637	1,374	0	243	0	6,758	291,637
	2-Story	5,109	308,569	1,370	0	243	0	6,722	308,569
Crawl spaces	1-Story	93	4,749	23	0	4	0	120	4,749
	2-Story	97	5,034	24	0	4	0	125	5,034
Total		10,438	609,989	2,791	0	495	0	13,724	609,989



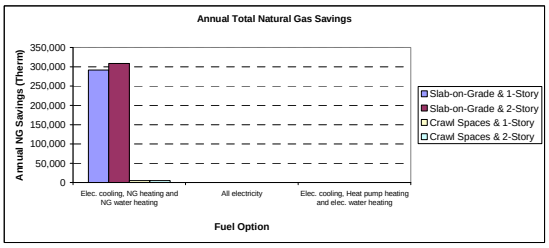


Table 148: Code and Pre-code Annual Simulation Results for Denton County (Single-Family).

Precode Precode Avg. OSD Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	73.13	0.73	81.58	0.00	81.58	0.00
	2-Story	69.55	0.73	78.00	0.00	78.00	0.00
Crawl spaces	1-Story	73.98	0.73	82.40	0.00	82.40	0.00
	2-Story	70.38	0.73	78.83	0.00	78.83	0.00
Total		287.02	2.90	320.80	0.00	320.80	0.00

Code compliant Precode Avg. OSD Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	60.05	0.61	68.49	0.00	68.49	0.00
	2-Story	58.02	0.61	66.46	0.00	66.46	0.00
Crawl spaces	1-Story	60.86	0.61	69.31	0.00	69.31	0.00
	2-Story	58.84	0.61	67.28	0.00	67.28	0.00
Total		237.76	2.42	271.55	0.00	271.55	0.00

Precode Precode Avg. OSD Total Energy Use (For total houses in a County)

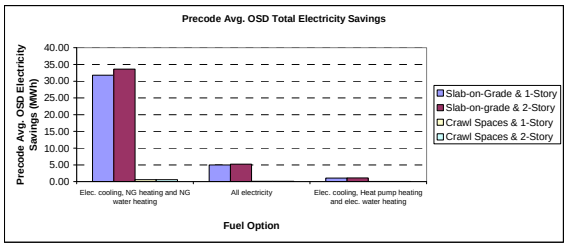
		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	177.73	1,763.82	30.88	0.00	6.60	0.00	215.21	1,763.82
	2-Story	202.47	2,112.71	35.37	0.00	7.56	0.00	245.40	2,112.71
Crawl spaces	1-Story	3.11	30.50	0.54	0.00	0.12	0.00	3.76	30.50
	2-Story	3.54	36.54	0.62	0.00	0.13	0.00	4.29	36.54
Total		386.85	3,943.57	67.41	0.00	14.41	0.00	468.67	3,943.57

Code compliant Precode Avg. OSD Total Energy Use (For total houses in a County)

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	145.94	1,472.19	25.93	0.00	5.54	0.00	177.41	1,472.19
	2-Story	168.89	1,763.39	30.14	0.00	6.44	0.00	205.47	1,763.39
Crawl spaces	1-Story	2.56	25.46	0.45	0.00	0.10	0.00	3.11	25.46
	2-Story	2.96	30.50	0.53	0.00	0.11	0.00	3.60	30.50
Total		320.34	3,291.53	57.05	0.00	12.19	0.00	389.59	3,291.53

Precode Avg. OSD Total Energy Savings Due to the Code Adoption

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)
Slab-on-grade	1-Story	31.79	291.64	4.95	0.00	1.06	0.00	37.81	291.64
	2-Story	33.58	349.32	5.23	0.00	1.12	0.00	39.93	349.32
Crawl spaces	1-Story	0.55	5.04	0.09	0.00	0.02	0.00	0.65	5.04
	2-Story	0.58	6.04	0.09	0.00	0.02	0.00	0.69	6.04
Total		66.51	652.04	10.36	0.00	2.21	0.00	79.08	652.04



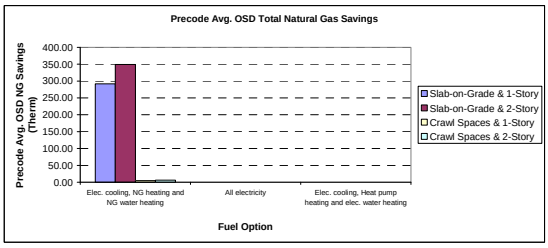
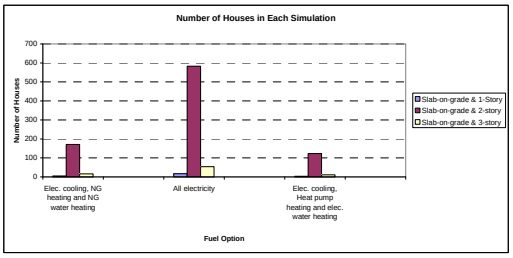


Table 149: Code and Pre-code Average OSD Simulation Results for Denton County (Single-Family).

The simulation result for one county

County Name	Denton
NAHB Division	West South Central
Number of new building permits for MF	985

		Fuel Option 1	Fuel Option 2	Fuel Option 3	Total
		Elec. cooling, NG heating and NG water heating	All electricity	Elec. cooling, Heat pump heating and elec. water heating	
		19.5%	66.4%	14.1%	
Slab-on-grade (100%)	1-Story (2.6%)	0.51%	1.73%	0.37%	2.60%
	2-Story (89.1%)	17.37%	59.16%	12.56%	89.10%
	3-Story (8.3%)	1.62%	5.51%	1.17%	8.30%
Total		19.50%	66.40%	14.10%	100.00%



Number of Houses for each simulation

		Fuel Option 1	Fuel Option 2	Fuel Option 3	Total
		Elec. cooling, NG heating and NG water heating	All electricity	Elec. cooling, Heat pump heating and elec. water heating	
		19.5%	66.4%	14.1%	
Slab-on-grade (100%)	1-Story (2.6%)	5	17	4	26
	2-Story (89.1%)	171	583	124	878
	3-Story (8.3%)	16	54	12	82
Total		192	654	139	985

Precode Energy Use for each option (per house)

		Fuel Option 1		Fuel Option 2		Fuel Option 3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	6,178	244	8,940	0	8,848	0
	2-Story	6,027	221	8,381	0	8,325	0
	3-Story	6,040	214	8,268	0	8,215	0
Total		18,244	679	25,588	0	25,387	0

Code compliant Energy Use for each option (per house)

		Fuel Option 1		Fuel Option 2		Fuel Option 3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	5,837	200	8,579	0	8,504	0
	2-Story	5,759	176	8,085	0	8,045	0
	3-Story	5,779	169	7,977	0	7,939	0
Total		17,374	545	24,640	0	24,488	0

Precode Total Energy Use (For total houses in a County)

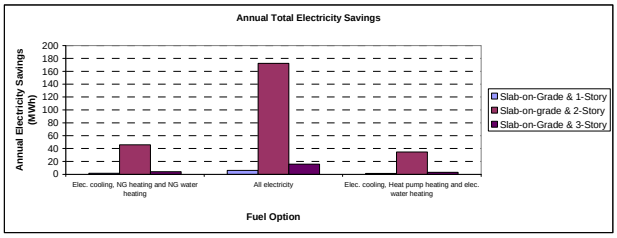
		Fuel Option 1		Fuel Option 2		Fuel Option 3		Total	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	31	1,219	152	0	32	0	215	1,219
	2-Story	1,031	37,822	4,884	0	1,030	0	6,945	37,822
	3-Story	96	3,409	449	0	95	0	640	3,409
Total		1,159	42,449	5,485	0	1,157	0	7,800	42,449

Code compliant Total Energy Use (For total houses in a County)

		Fuel Option 1		Fuel Option 2		Fuel Option 3		Total	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	29	999	146	0	31	0	206	999
	2-Story	986	30,163	4,712	0	996	0	6,693	30,163
	3-Story	92	2,692	433	0	92	0	617	2,692
Total		1,107	33,854	5,290	0	1,118	0	7,515	33,854

Total Energy Savings Due to the Code Adoption

		Fuel Option 1		Fuel Option 2		Fuel Option 3		Total	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	2	220	6	0	1	0	9	220
	2-Story	46	7,658	172	0	35	0	253	7,658
	3-Story	4	717	16	0	3	0	23	717
Total		52	8,596	194	0	39	0	285	8,596



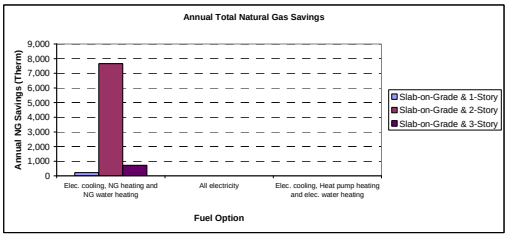


Table 150: Code and Pre-code Annual Simulation Results for Denton County (Multi-Family).

Precode Avg. OSD Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	26.49	0.50	31.17	0.00	31.17	0.00
	2-Story	24.75	0.47	28.85	0.00	28.85	0.00
	3-Story	24.48	0.45	28.37	0.00	28.37	0.00
Total		75.72	1.42	88.39	0.00	88.39	0.00

Code compliant Avg. OSD Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	24.63	0.38	29.31	0.00	29.31	0.00
	2-Story	23.29	0.35	27.39	0.00	27.39	0.00
	3-Story	23.06	0.33	26.96	0.00	26.96	0.00
Total		70.98	1.06	83.66	0.00	83.66	0.00

Precode Avg. OSD Total Energy Use (For total houses in a County)

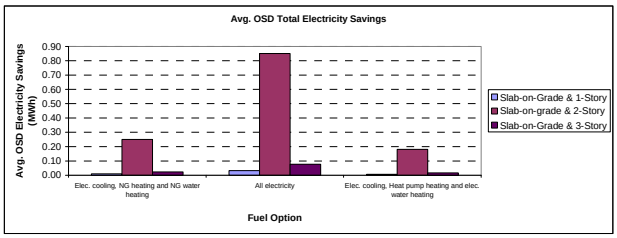
		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	0.13	2.48	0.53	0.00	0.11	0.00	0.77	2.48
	2-Story	4.24	79.63	16.81	0.00	3.57	0.00	24.62	79.63
	3-Story	0.39	7.25	1.54	0.00	0.33	0.00	2.26	7.25
Total		4.75	89.36	18.88	0.00	4.01	0.00	27.65	89.36

Code compliant Avg. OSD Total Energy Use (For total houses in a County)

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	0.12	1.89	0.50	0.00	0.11	0.00	0.73	1.89
	2-Story	3.99	59.09	15.96	0.00	3.39	0.00	23.34	59.09
	3-Story	0.37	5.33	1.46	0.00	0.31	0.00	2.14	5.33
Total		4.48	66.31	17.92	0.00	3.81	0.00	26.20	66.31

Total Energy Savings Due to the Code Adoption

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Savings (kWh)	NG Savings (Therm)	Elec. Savings (kWh)	NG Savings (Therm)	Elec. Savings (kWh)	NG Savings (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	0.01	0.60	0.03	0.00	0.01	0.00	0.05	0.60
	2-Story	0.25	20.54	0.85	0.00	0.18	0.00	1.28	20.54
	3-Story	0.02	1.91	0.08	0.00	0.02	0.00	0.12	1.91
Total		0.28	23.05	0.96	0.00	0.20	0.00	1.44	23.05



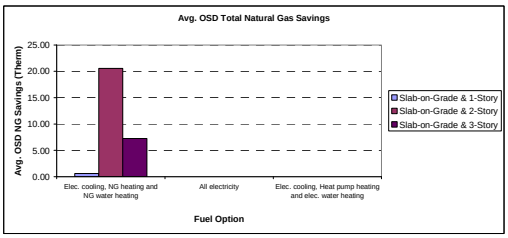


Table 151: Code and Pre-code Average OSD Simulation Results for Denton County (Multi-Family).

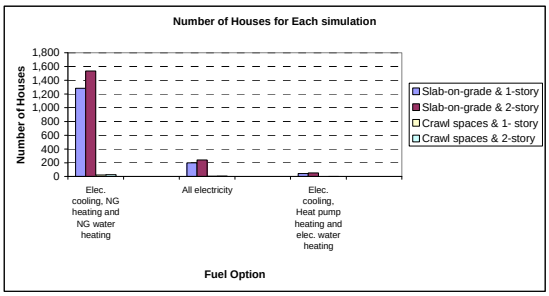
Table 152: Code and Pre-code Simulation Results for Individual Residence for El Paso County (Single-Family and Multi-Family).

County	SF or MF	Precode or Code-compliant	Options			Simulation #	Annual Elec. (kWh/yr)	Annual NG (Therms/yr)	Avg. OSD Elec. (kWh/day) (Aug. 19)	Avg. OSD NG (Therm/day) (Aug. 19)	Total Annual (Elec. + NG) (MBtu)	Annual Elec.Savings (kWh/yr)	Annual NG Savings (Therms/yr)	Avg. OSD Elec. Savings (kWh/day) (Aug. 19)	Avg. OSD NG Savings (Therm/day) (Aug. 19)	Total Annual Savings (Elec. + NG) (MBtu)
El Paso	SF	Precode	Slab-on-grade	Fuel Option 1	1-story	1	15389	493	59.7235	0.777168	101.86					
					2-story	2	14238	472	55.8607	0.777168	95.79					
				Fuel Option 2	1-story	3	22560	0	69.0291	0	76.99					
					2-story	4	20994	0	65.1662	0	71.65					
				Fuel Option 3	1-story	5	21800	0	69.0291	0	74.4					
					2-story	6	20366	0	65.1662	0	69.51					
			Crawl Space	Fuel Option 1	1-story	7	16274	458	61.4028	0.777168	101.37					
					2-story	8	15451	434	58.0225	0.777168	96.09					
				Fuel Option 2	1-story	9	22765	0	70.7084	0	77.69					
					2-story	10	21472	0	67.328	0	73.28					
				Fuel Option 3	1-story	11	22254	0	70.7084	0	75.95					
					2-story	12	21096	0	67.328	0	72					
		Code - Compliant	Slab-on-grade	Fuel Option 1	1-story	13	13086	360	49.6812	0.657168	80.65	2,303	133	10.04	0.12	21.21
					2-story	14	12374	357	47.2545	0.657168	77.91	1,864	115	8.61	0.12	17.88
				Fuel Option 2	1-story	15	18503	0	58.9867	0	63.15	4,057	0	10.04	0.00	13.84
					2-story	16	17734	0	56.5601	0	60.53	3,260	0	8.61	0.00	11.12
				Fuel Option 3	1-story	17	18350	0	58.9867	0	62.63	3,450	0	10.04	0.00	11.77
					2-story	18	17599	0	56.5601	0	60.06	2,767	0	8.61	0.00	9.45
			Crawl Space	Fuel Option 1	1-story	19	13849	340	51.1101	0.657168	81.24	2,425	118	10.29	0.12	20.13
					2-story	20	13360	334	49.0517	0.657168	79.02	2,091	100	8.97	0.12	17.07
				Fuel Option 2	1-story	21	18912	0	60.4156	0	64.55	3,853	0	10.29	0.00	13.14
					2-story	22	18315	0	58.3573	0	62.51	3,157	0	8.97	0.00	10.77
				Fuel Option 3	1-story	23	18841	0	60.4156	0	64.3	3,413	0	10.29	0.00	11.65
					2-story	24	18266	0	58.3573	0	62.34	2,830	0	8.97	0.00	9.66
	MF	Precode	Slab-on-grade	Fuel Option 1	1-story	1	5896.5	240	22.16195	0.524735	44.11					
					2-story	2	5788.75	214.5	20.822175	0.489145	41.21					
					3-story	3	5832.166667	206.66667	20.67366667	0.477281667	40.565					
				Fuel Option 2	1-story	4	8589.5	0	27.31695	0	29.315					
					2-story	5	8028.5	0	25.33275	0	27.4025					
					3-story	6	7932.833333	0	24.96933333	0	27.075					
				Fuel Option 3	1-story	7	8566	0	27.31695	0	29.235					
					2-story	8	8037.75	0	25.33275	0	27.4325					
					3-story	9	7946	0	24.96933333	0	27.12					
		Code - Compliant	Slab-on-grade	Fuel Option 1	1-story	10	5499.5	195.5	20.51145	0.4047365	38.345	397	45	1.65	0.12	5.77
					2-story	11	5479.5	170	19.55665	0.369145	35.6975	309	45	1.27	0.12	5.51
					3-story	12	5530.166667	161.83333	19.45533333	0.357281667	35.05833333	302	45	1.22	0.12	5.51
				Fuel Option 2	1-story	13	8179	0	25.66645	0	27.915	411	0	1.65	0.00	1.40
					2-story	14	7701	0	24.067275	0	26.2825	328	0	1.27	0.00	1.12
					3-story	15	7610.333333	0	23.75116667	0	25.97333333	323	0	1.22	0.00	1.10
				Fuel Option 3	1-story	16	8165.5	0	25.66645	0	27.87	401	0	1.65	0.00	1.37
					2-story	17	7717.75	0	24.067275	0	26.34	320	0	1.27	0.00	1.09
					3-story	18	7629.666667	0	23.75116667	0	26.04	316	0	1.22	0.00	1.08

Prototype of the simulation result for one county

County Name	El Paso
Division (East or West Texas)	West Texas
Number of new building permits for SFD	3,407

		Fuel Option			Total
		1	2	3	
		Elec. cooling, NG heating and NG water heating	All electricity	Elec. cooling, Heat pump heating and elec. water heating	
		84.1%	13.1%	2.8%	
Slab-on-grade (98.3%)	1-Story (45.5%)	37.61%	5.86%	1.25%	44.73%
	2-Story (54.5%)	45.06%	7.02%	1.50%	53.57%
Crawl spaces (1.7%)	1-Story (45.5%)	0.65%	0.10%	0.02%	0.77%
	2-Story (54.5%)	0.78%	0.12%	0.03%	0.93%
Total		84.10%	13.10%	2.80%	100.00%



Number of Houses for each simulation

		Fuel Option			Total
		1	2	3	
		Elec. cooling, NG heating and NG water heating	All electricity	Elec. cooling, Heat pump heating and elec. water heating	
		84.1%	13.1%	2.8%	
Slab-on-grade (98.3%)	1-Story (45.5%)	1,282	200	43	1,524
	2-Story (54.5%)	1,535	239	51	1,825
Crawl spaces (1.7%)	1-Story (45.5%)	22	3	1	26
	2-Story (54.5%)	27	4	1	32
Total		2,865	446	95	3,407

Precode Energy Use for each option (per house)

		Fuel Option						
		1		2		3		
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating		
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	
Slab-on-grade	1-Story	15,389	493	22,560	0	21,800	0	
	2-Story	14,238	472	20,994	0	20,366	0	
Crawl spaces	1-Story	16,274	458	22,765	0	22,254	0	
	2-Story	15,451	434	21,472	0	21,096	0	
Total		61,352	1,857	87,791	0	85,516	0	

Code compliant Energy Use for each option (per house)

		Fuel Option						
		1		2		3		
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating		
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	
Slab-on-grade	1-Story	13,086	360	18,503	0	18,350	0	
	2-Story	12,374	357	17,734	0	17,599	0	
Crawl spaces	1-Story	13,849	340	18,912	0	18,841	0	
	2-Story	13,360	334	18,315	0	18,266	0	
Total		52,669	1,391	73,464	0	73,056	0	

Precode Total Energy Use (For total houses in a County)

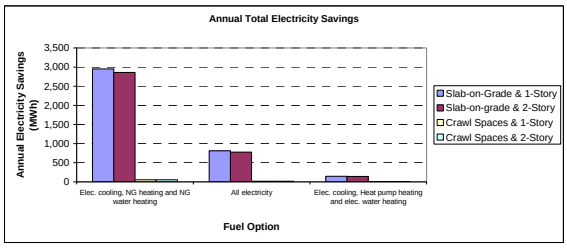
		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	19,722	631,800	4,503	0	930	0	25,155	631,800
	2-Story	21,856	724,536	5,020	0	1,041	0	27,918	724,536
Crawl spaces	1-Story	361	10,151	79	0	16	0	456	10,151
	2-Story	410	11,521	89	0	19	0	518	11,521
Total		42,349	1,378,009	9,691	0	2,006	0	54,045	1,378,009

Code compliant Total Energy Use (For total houses in a County)

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	16,770	461,355	3,694	0	783	0	21,247	461,355
	2-Story	18,995	548,007	4,240	0	899	0	24,134	548,007
Crawl spaces	1-Story	307	7,535	65	0	14	0	386	7,535
	2-Story	355	8,867	76	0	16	0	447	8,867
Total		36,426	1,025,765	8,075	0	1,712	0	46,214	1,025,765

Total Energy Savings Due to the Code Adoption

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)
Slab-on-grade	1-Story	2,951	170,445	810	0	147	0	3,908	170,445
	2-Story	2,861	176,529	779	0	141	0	3,782	176,529
Crawl spaces	1-Story	54	2,615	13	0	3	0	70	2,615
	2-Story	56	2,655	13	0	3	0	71	2,655
Total		5,922	352,244	1,616	0	294	0	7,831	352,244



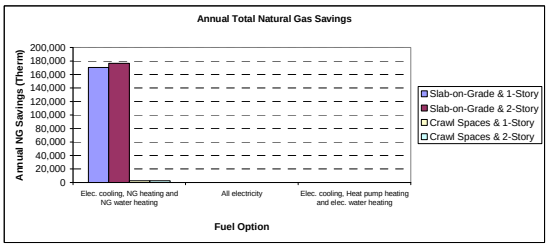


Table 153: Code and Pre-code Annual Simulation Results for El Paso County (Single-Family).

Precode Avg. OSD Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	59.72	0.78	69.03	0.00	69.03	0.00
	2-Story	55.86	0.78	65.17	0.00	65.17	0.00
Crawl spaces	1-Story	61.40	0.78	70.71	0.00	70.71	0.00
	2-Story	58.02	0.78	67.33	0.00	67.33	0.00
Total		235.01	3.11	272.23	0.00	272.23	0.00

Code compliant Avg. OSD Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	49.68	0.66	58.99	0.00	58.99	0.00
	2-Story	47.25	0.66	56.56	0.00	56.56	0.00
Crawl spaces	1-Story	51.11	0.66	60.42	0.00	60.42	0.00
	2-Story	49.05	0.66	58.36	0.00	58.36	0.00
Total		197.10	2.63	234.32	0.00	234.32	0.00

Precode Avg. OSD Total Energy Use (For total houses in a County)

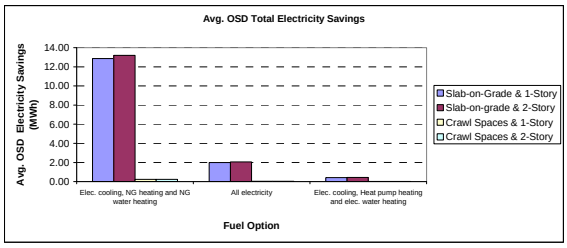
		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	76.54	995.97	13.78	0.00	2.95	0.00	93.26	995.97
	2-Story	85.75	1,192.98	15.58	0.00	3.33	0.00	104.66	1,192.98
Crawl spaces	1-Story	1.36	17.22	0.24	0.00	0.05	0.00	1.66	17.22
	2-Story	1.54	20.63	0.28	0.00	0.06	0.00	1.88	20.63
Total		165.19	2,226.81	29.88	0.00	6.39	0.00	201.46	2,226.81

Code compliant Avg. OSD Total Energy Use (For total houses in a County)

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	63.67	842.19	11.78	0.00	2.52	0.00	77.96	842.19
	2-Story	72.54	1,008.78	13.52	0.00	2.89	0.00	88.95	1,008.78
Crawl spaces	1-Story	1.13	14.56	0.21	0.00	0.04	0.00	1.39	14.56
	2-Story	1.30	17.45	0.24	0.00	0.05	0.00	1.60	17.45
Total		138.64	1,882.97	25.75	0.00	5.50	0.00	169.89	1,882.97

Avg. OSD Total Energy Savings Due to the Code Adoption

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)
Slab-on-grade	1-Story	12.87	153.79	2.00	0.00	0.43	0.00	15.30	153.79
	2-Story	13.21	184.20	2.08	0.00	0.44	0.00	15.71	184.20
Crawl spaces	1-Story	0.23	2.66	0.04	0.00	0.01	0.00	0.27	2.66
	2-Story	0.24	3.19	0.04	0.00	0.01	0.00	0.28	3.19
Total		26.55	343.83	4.14	0.00	0.88	0.00	31.57	343.83



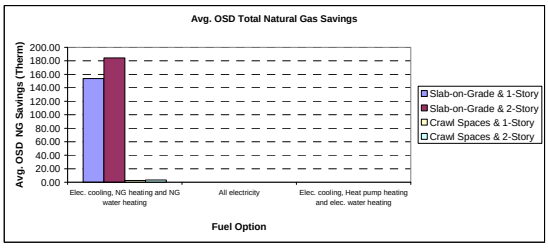
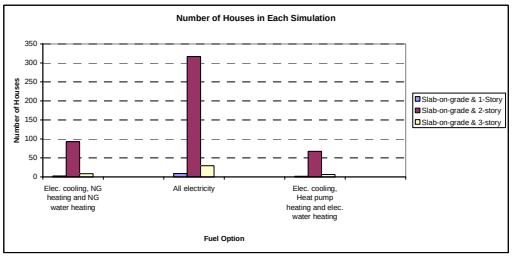


Table 154: Code and Pre-code Average OSD Simulation Results for El Paso County (Single-Family).

The simulation result for one county

County Name	El Paso
NAHB Division	West South Central
Number of new building permits for MF	535

		Fuel Option 1: Elec. cooling, NG heating and NG water heating	Fuel Option 2: All electricity	Fuel Option 3: Elec. cooling, Heat pump heating and elec. water heating	Total
		19.5%	66.4%	14.1%	
Slab-on-grade (100%)	1-Story (2.6%)	0.51%	1.73%	0.37%	2.60%
	2-Story (89.1%)	17.37%	59.16%	12.56%	89.10%
	3-Story (8.3%)	1.62%	5.51%	1.17%	8.30%
Total		19.50%	66.40%	14.10%	100.00%



Number of Houses for each simulation

		Fuel Option 1: Elec. cooling, NG heating and NG water heating	Fuel Option 2: All electricity	Fuel Option 3: Elec. cooling, Heat pump heating and elec. water heating	Total
		19.5%	66.4%	14.1%	
Slab-on-grade (100%)	1-Story (2.6%)	3	9	2	14
	2-Story (89.1%)	93	317	67	477
	3-Story (8.3%)	9	29	6	44
Total		104	355	75	535

Precode Energy Use for each option (per house)

		Fuel Option 1: Elec. cooling, NG heating and NG water heating		Fuel Option 2: All electricity		Fuel Option 3: Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	5,897	240	8,590	0	8,566	0
	2-Story	5,785	215	8,029	0	8,038	0
	3-Story	5,832	207	7,933	0	7,946	0
Total		17,517	661	24,551	0	24,550	0

Code compliant Energy Use for each option (per house)

		Fuel Option 1: Elec. cooling, NG heating and NG water heating		Fuel Option 2: All electricity		Fuel Option 3: Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	5,500	196	8,179	0	8,166	0
	2-Story	5,480	170	7,701	0	7,718	0
	3-Story	5,530	162	7,610	0	7,630	0
Total		16,509	527	23,490	0	23,513	0

Precode Total Energy Use (For total houses in a County)

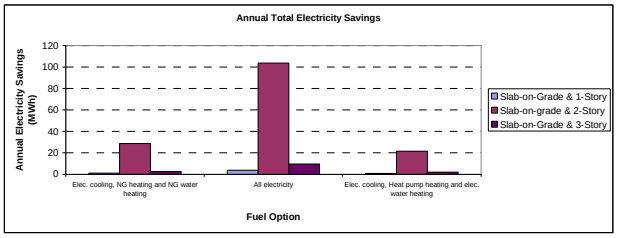
		Fuel Option 1: Elec. cooling, NG heating and NG water heating		Fuel Option 2: All electricity		Fuel Option 3: Elec. cooling, Heat pump heating and elec. water heating		Total	
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	16	651	79	0	17	0	112	651
	2-Story	538	19,939	2,541	0	540	0	3,619	19,939
	3-Story	51	1,790	234	0	50	0	334	1,790
Total		605	22,379	2,854	0	607	0	4,065	22,379

Code compliant Total Energy Use (For total houses in a County)

		Fuel Option 1: Elec. cooling, NG heating and NG water heating		Fuel Option 2: All electricity		Fuel Option 3: Elec. cooling, Heat pump heating and elec. water heating		Total	
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	15	530	76	0	16	0	106	530
	2-Story	509	15,802	2,438	0	519	0	3,466	15,802
	3-Story	48	1,401	224	0	48	0	320	1,401
Total		572	17,734	2,737	0	583	0	3,892	17,734

Total Energy Savings Due to the Code Adoption

		Fuel Option 1: Elec. cooling, NG heating and NG water heating		Fuel Option 2: All electricity		Fuel Option 3: Elec. cooling, Heat pump heating and elec. water heating		Total	
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	1	121	4	0	1	0	6	121
	2-Story	29	4,136	104	0	22	0	154	4,136
	3-Story	3	388	10	0	2	0	14	388
Total		32	4,645	117	0	24	0	174	4,645



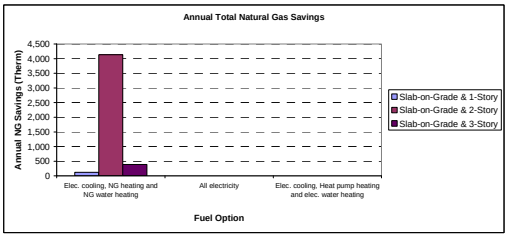


Table 155: Code and Pre-code Annual Simulation Results for El Paso County (Multi-Family).

Precode Avg. OSD Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	22.16	0.52	27.32	0.00	27.32	0.00
	2-Story	20.82	0.49	25.33	0.00	25.33	0.00
	3-Story	20.67	0.48	24.97	0.00	24.97	0.00
Total		63.66	1.49	77.62	0.00	77.62	0.00

Code compliant Avg. OSD Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	20.51	0.40	25.67	0.00	25.67	0.00
	2-Story	19.56	0.37	24.07	0.00	24.07	0.00
	3-Story	19.46	0.36	23.75	0.00	23.75	0.00
Total		59.52	1.13	73.48	0.00	73.48	0.00

Precode Avg. OSD Total Energy Use (For total houses in a County)

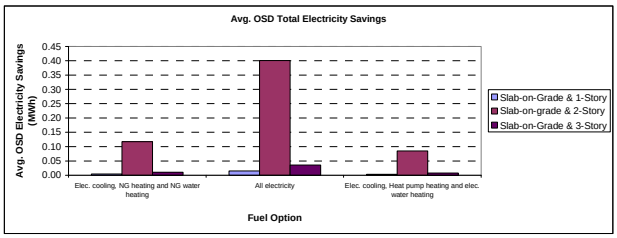
		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	0.06	1.42	0.25	0.00	0.05	0.00	0.37	1.42
	2-Story	1.94	45.47	8.02	0.00	1.70	0.00	11.66	45.47
	3-Story	0.18	4.13	0.74	0.00	0.16	0.00	1.07	4.13
Total		2.17	51.02	9.01	0.00	1.91	0.00	13.09	51.02

Code compliant Avg. OSD Total Energy Use (For total houses in a County)

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	0.06	1.10	0.24	0.00	0.05	0.00	0.34	1.10
	2-Story	1.82	34.31	7.62	0.00	1.62	0.00	11.05	34.31
	3-Story	0.17	3.05	0.70	0.00	0.15	0.00	1.02	3.05
Total		2.04	38.50	8.56	0.00	1.82	0.00	12.41	38.50

Total Energy Savings Due to the Code Adoption

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Savings (kWh)	NG Savings (Therm)	Elec. Savings (kWh)	NG Savings (Therm)	Elec. Savings (kWh)	NG Savings (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	0.00	0.33	0.02	0.00	0.00	0.00	0.02	0.33
	2-Story	0.12	11.15	0.40	0.00	0.09	0.00	0.60	11.15
	3-Story	0.01	1.04	0.04	0.00	0.01	0.00	0.05	1.04
Total		0.13	12.52	0.45	0.00	0.10	0.00	0.68	12.52



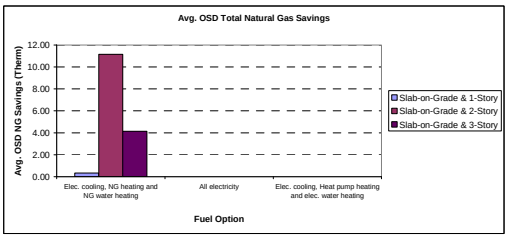


Table 156: Code and Pre-code Average OSD Simulation Results for El Paso County (Multi-Family).

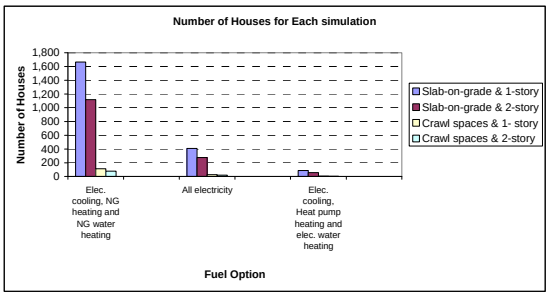
Table 157: Code and Pre-code Simulation Results for Individual Residence for Fort Bend County (Single-Family and Multi-Family).

County	SF or MF	Precode or Code-compliant	Options			Simulation #	Annual Elec. (kWh/yr)	Annual NG (Therms/yr)	Avg. OSD Elec. (kWh/day) (Aug. 19)	Avg. OSD NG (Therm/day) (Aug. 19)	Total Annual (Elec. + NG) (MBtu)	Annual Elec.Savings (kWh/yr)	Annual NG Savings (Therms/yr)	Avg. OSD Elec. Savings (kWh/day) (Aug. 19)	Avg. OSD NG Savings (Therm/day) (Aug. 19)	Total Annual Savings (Elec. + NG) (MBtu)
Fort Bend	SF	Precode	Slab-on-grade	Fuel Option 1	1-story	1	14254	363	59.9992	0.738051	84.97					
					2-story	2	13431	350	56.5638	0.738051	80.88					
				Fuel Option 2	1-story	3	18972	0	68.6141	0	64.75					
					2-story	4	17916	0	65.1786	0	61.15					
				Fuel Option 3	1-story	5	18781	0	68.6141	0	64.1					
					2-story	6	17803	0	65.1786	0	60.76					
			Crawl Space	Fuel Option 1	1-story	7	14907	352	60.7185	0.738051	86.09					
					2-story	8	14302	342	57.3892	0.738051	82.97					
				Fuel Option 2	1-story	9	19441	0	69.3333	0	66.35					
					2-story	10	18634	0	66.004	0	63.6					
				Fuel Option 3	1-story	11	19297	0	69.3333	0	65.86					
					2-story	12	18541	0	66.004	0	63.28					
		Code - Compliant	Slab-on-grade	Fuel Option 1	1-story	13	12537	317	52.6127	0.618051	74.44	1,717	46	7.39	0.12	10.53
					2-story	14	11902	306	49.5646	0.618051	71.22	1,529	44	7.00	0.12	9.66
				Fuel Option 2	1-story	15	17183	0	61.2276	0	58.64	1,789	0	7.39	0.00	6.11
					2-story	16	16361	0	58.1794	0	55.84	1,555	0	7.00	0.00	5.31
				Fuel Option 3	1-story	17	17053	0	61.2276	0	58.2	1,728	0	7.39	0.00	5.90
					2-story	18	16272	0	58.1794	0	55.54	1,531	0	7.00	0.00	5.22
			Crawl Space	Fuel Option 1	1-story	19	13215	305	53.4033	0.618051	75.58	1,692	47	7.32	0.12	10.51
					2-story	20	12739	295	50.4678	0.618051	73.01	1,563	47	6.92	0.12	9.96
				Fuel Option 2	1-story	21	17667	0	62.0181	0	60.3	1,774	0	7.32	0.00	6.05
					2-story	22	17019	0	59.0827	0	58.09	1,615	0	6.92	0.00	5.51
				Fuel Option 3	1-story	23	17572	0	62.0181	0	59.97	1,725	0	7.32	0.00	5.89
					2-story	24	16959	0	59.0827	0	57.88	1,582	0	6.92	0.00	5.40
	MF	Precode	Slab-on-grade	Fuel Option 1	1-story	1	6343.5	209	24.94285	0.504	42.525					
					2-story	2	6229	192.75	23.298675	0.471	40.5275					
					3-story	3	6270.833333	187.5	23.04266667	0.460001667	40.15833333					
				Fuel Option 2	1-story	4	8492	0	29.7152	0	28.985					
					2-story	5	8095	0	27.4745	0	27.6275					
					3-story	6	8045.5	0	27.01966667	0	27.45833333					
				Fuel Option 3	1-story	7	8491	0	29.7152	0	28.98					
					2-story	8	8095.75	0	27.4745	0	27.63					
					3-story	9	8046.333333	0	27.01966667	0	27.46166667					
		Code - Compliant	Slab-on-grade	Fuel Option 1	1-story	10	5936	166.5	23.3975	0.384001	36.93	408	43	1.55	0.12	5.60
					2-story	11	5894	150.25	22.1195	0.351	35.14	335	43	1.18	0.12	5.39
					3-story	12	5940	145	21.9065	0.340001667	34.76833333	331	43	1.14	0.12	5.39
				Fuel Option 2	1-story	13	8113.5	0	28.16985	0	27.69	379	0	1.55	0.00	1.30
					2-story	14	7781.75	0	26.29525	0	26.56	313	0	1.18	0.00	1.07
					3-story	15	7734.333333	0	25.8835	0	26.39666667	311	0	1.14	0.00	1.06
				Fuel Option 3	1-story	16	8113	0	28.16985	0	27.69	378	0	1.55	0.00	1.29
					2-story	17	7782.5	0	26.29525	0	26.5625	313	0	1.18	0.00	1.07
					3-story	18	7733.666667	0	25.8835	0	26.395	313	0	1.14	0.00	1.07

Prototype of the simulation result for one county

County Name	Fort Bend
Division (East or West Texas)	East Texas
Number of new building permits for SFD	3,858

		Fuel Option			Total
		1	2	3	
		Elec. cooling, NG heating and NG water heating	All electricity	Elec. cooling, Heat pump heating and elec. water heating	
		77.1%	18.9%	4.0%	
Slab-on-grade (93.6%)	1-Story (59.8%)	43.16%	10.58%	2.24%	55.97%
	2-Story (40.2%)	29.01%	7.11%	1.51%	37.63%
Crawl spaces (6.4%)	1-Story (59.8%)	2.95%	0.72%	0.15%	3.83%
	2-Story (39.2%)	1.98%	0.49%	0.10%	2.57%
Total		77.10%	18.90%	4.00%	100.00%



Number of Houses for each simulation

		Fuel Option			Total
		1	2	3	
		Elec. cooling, NG heating and NG water heating	All electricity	Elec. cooling, Heat pump heating and elec. water heating	
		77.1%	18.9%	4.0%	
Slab-on-grade (93.6%)	1-Story (59.8%)	1,665	408	86	2,159
	2-Story (40.2%)	1,119	274	58	1,452
Crawl spaces (6.4%)	1-Story (59.8%)	114	28	6	148
	2-Story (39.2%)	77	19	4	99
Total		2,975	729	154	3,858

Precode Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	14,254	363	18,972	0	18,781	0
	2-Story	13,431	350	17,916	0	17,803	0
Crawl spaces	1-Story	14,907	352	19,441	0	19,297	0
	2-Story	14,302	342	18,634	0	18,541	0
Total		56,894	1,407	74,963	0	74,422	0

Code compliant Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	12,537	317	17,183	0	17,053	0
	2-Story	11,902	306	16,361	0	16,272	0
Crawl spaces	1-Story	13,215	305	17,667	0	17,572	0
	2-Story	12,739	295	17,019	0	16,959	0
Total		50,393	1,223	68,230	0	67,856	0

Precode Total Energy Use (For total houses in a County)

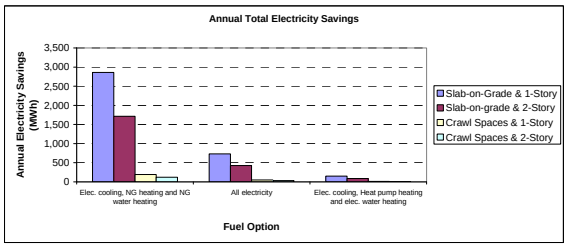
		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	23,732	604,366	7,743	0	1,622	0	33,097	604,366
	2-Story	15,032	391,730	4,915	0	1,034	0	20,982	391,730
Crawl spaces	1-Story	1,697	40,072	543	0	114	0	2,354	40,072
	2-Story	1,095	26,173	350	0	74	0	1,518	26,173
Total		41,556	1,062,341	13,551	0	2,844	0	57,950	1,062,341

Code compliant Total Energy Use (For total houses in a County)

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	20,873	527,780	7,013	0	1,473	0	29,359	527,780
	2-Story	13,321	342,484	4,489	0	945	0	18,755	342,484
Crawl spaces	1-Story	1,504	34,721	493	0	104	0	2,101	34,721
	2-Story	975	22,576	319	0	67	0	1,362	22,576
Total		36,673	927,561	12,314	0	2,589	0	51,577	927,561

Total Energy Savings Due to the Code Adoption

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)
Slab-on-grade	1-Story	2,859	76,586	730	0	149	0	3,738	76,586
	2-Story	1,711	49,246	427	0	89	0	2,227	49,246
Crawl spaces	1-Story	193	5,351	50	0	10	0	252	5,351
	2-Story	120	3,597	30	0	6	0	156	3,597
Total		4,882	134,780	1,237	0	255	0	6,373	134,780



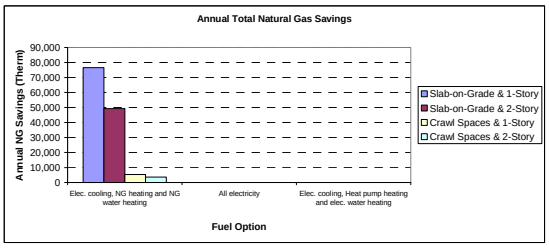


Table 158: Code and Pre-code Annual Simulation Results for Fort Bend County (Single-Family).

Precode Avg. OSD Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	60.00	0.74	68.61	0.00	68.61	0.00
	2-Story	56.56	0.74	65.18	0.00	65.18	0.00
Crawl spaces	1-Story	60.72	0.74	69.33	0.00	69.33	0.00
	2-Story	57.39	0.74	66.00	0.00	66.00	0.00
Total		234.67	2.95	269.13	0.00	269.13	0.00

Code compliant Avg. OSD Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	52.61	0.62	61.23	0.00	61.23	0.00
	2-Story	49.56	0.62	58.18	0.00	58.18	0.00
Crawl spaces	1-Story	53.40	0.62	62.02	0.00	62.02	0.00
	2-Story	50.47	0.62	59.08	0.00	59.08	0.00
Total		206.05	2.47	240.51	0.00	240.51	0.00

Precode Avg. OSD Total Energy Use (For total houses in a County)

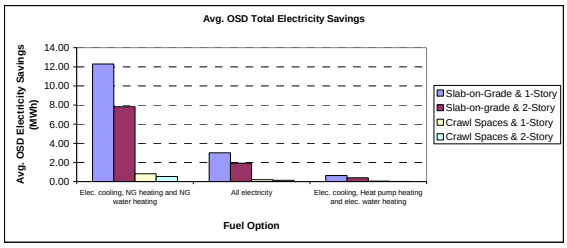
		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	99.89	1,228.80	28.00	0.00	5.93	0.00	133.82	1,228.80
	2-Story	63.31	826.05	17.88	0.00	3.78	0.00	84.98	826.05
Crawl spaces	1-Story	6.91	84.02	1.93	0.00	0.41	0.00	9.26	84.02
	2-Story	4.39	56.48	1.24	0.00	0.26	0.00	5.89	56.48
Total		174.51	2,195.35	49.06	0.00	10.38	0.00	233.95	2,195.35

Code compliant Avg. OSD Total Energy Use (For total houses in a County)

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	87.60	1,029.01	24.99	0.00	5.29	0.00	117.87	1,029.01
	2-Story	55.47	691.74	15.96	0.00	3.38	0.00	74.81	691.74
Crawl spaces	1-Story	6.08	70.36	1.73	0.00	0.37	0.00	8.18	70.36
	2-Story	3.86	47.30	1.11	0.00	0.23	0.00	5.21	47.30
Total		153.01	1,838.40	43.79	0.00	9.27	0.00	206.07	1,838.40

Avg. OSD Total Energy Savings Due to the Code Adoption

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)
Slab-on-grade	1-Story	12.30	199.79	3.01	0.00	0.64	0.00	15.95	199.79
	2-Story	7.83	134.31	1.93	0.00	0.41	0.00	10.16	134.31
Crawl spaces	1-Story	0.83	13.66	0.20	0.00	0.04	0.00	1.08	13.66
	2-Story	0.53	9.18	0.13	0.00	0.03	0.00	0.69	9.18
Total		21.49	356.94	5.27	0.00	1.12	0.00	27.88	356.94



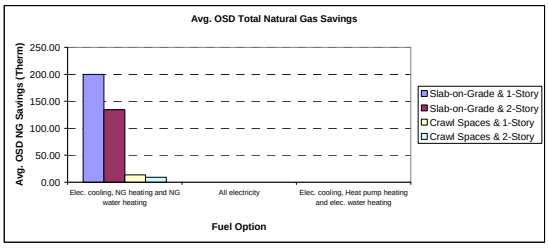
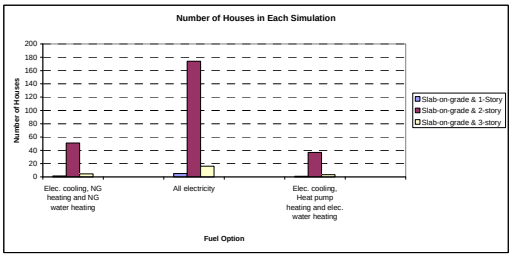


Table 159: Code and Pre-code Average OSD Simulation Results for Fort Bend County (Single-Family).

The simulation result for one county

County Name	Fort Bend
NAHB Division	West South Central
Number of new building permits for MF	294

		Fuel Option			Total
		1	2	3	
		Elec. cooling, NG heating and NG water heating	All electricity	Elec. cooling, Heat pump heating and elec. water heating	
		19.5%	66.4%	14.1%	
Slab-on-grade (100%)	1-Story (2.6%)	0.51%	1.73%	0.37%	2.60%
	2-Story (89.1%)	17.37%	59.16%	12.56%	89.10%
	3-Story (8.3%)	1.62%	5.51%	1.17%	8.30%
Total		19.50%	66.40%	14.10%	100.00%



Number of Houses for each simulation

		Fuel Option			Total
		1	2	3	
		Elec. cooling, NG heating and NG water heating	All electricity	Elec. cooling, Heat pump heating and elec. water heating	
		19.5%	66.4%	14.1%	
Slab-on-grade (100%)	1-Story (2.6%)	1	5	1	8
	2-Story (89.1%)	51	174	37	262
	3-Story (8.3%)	5	16	3	24
Total		57	195	41	294

Precode Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	6,344	209	8,492	0	8,491	0
	2-Story	6,229	193	8,095	0	8,096	0
	3-Story	6,271	188	8,046	0	8,046	0
Total		18,843	589	24,633	0	24,633	0

Code compliant Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	5,936	167	8,114	0	8,113	0
	2-Story	5,894	150	7,782	0	7,783	0
	3-Story	5,940	145	7,734	0	7,734	0
Total		17,770	462	23,630	0	23,629	0

Precode Total Energy Use (For total houses in a County)

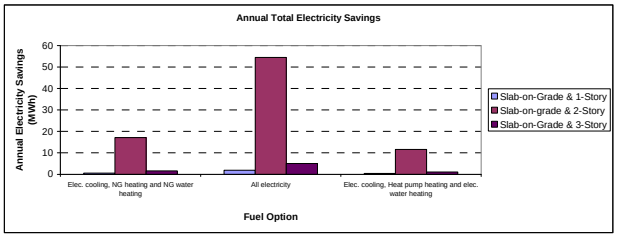
		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	9	312	43	0	9	0	62	312
	2-Story	318	9,846	1,408	0	299	0	2,025	9,846
	3-Story	30	892	130	0	28	0	188	892
Total		357	11,050	1,581	0	336	0	2,275	11,050

Code compliant Total Energy Use (For total houses in a County)

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	9	248	41	0	9	0	59	248
	2-Story	301	7,675	1,354	0	287	0	1,942	7,675
	3-Story	28	690	125	0	27	0	180	690
Total		338	8,613	1,520	0	323	0	2,181	8,613

Total Energy Savings Due to the Code Adoption

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	1	63	2	0	0	0	3	63
	2-Story	17	2,171	54	0	12	0	83	2,171
	3-Story	2	202	5	0	1	0	8	202
Total		19	2,437	61	0	13	0	94	2,437



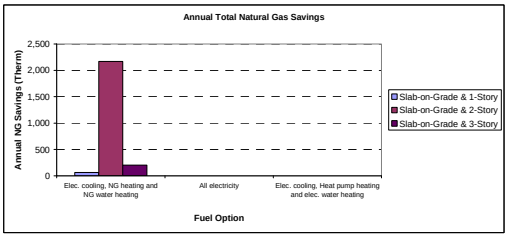


Table 160: Code and Pre-code Annual Simulation Results for Fort Bend County (Multi-Family).

Precode Avg. OSD Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	24.94	0.50	29.72	0.00	29.72	0.00
	2-Story	23.30	0.47	27.47	0.00	27.47	0.00
	3-Story	23.04	0.46	27.02	0.00	27.02	0.00
Total		71.28	1.44	84.21	0.00	84.21	0.00

Code compliant Avg. OSD Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	23.40	0.38	28.17	0.00	28.17	0.00
	2-Story	22.12	0.35	26.30	0.00	26.30	0.00
	3-Story	21.91	0.34	25.88	0.00	25.88	0.00
Total		67.42	1.06	80.35	0.00	80.35	0.00

Precode Avg. OSD Total Energy Use (For total houses in a County)

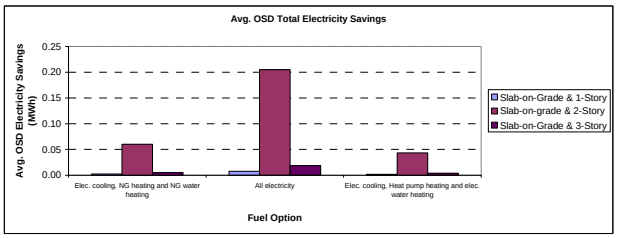
		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	0.04	0.75	0.15	0.00	0.03	0.00	0.22	0.75
	2-Story	1.19	24.06	4.78	0.00	1.01	0.00	6.98	24.06
	3-Story	0.11	2.19	0.44	0.00	0.09	0.00	0.64	2.19
Total		1.34	27.00	5.37	0.00	1.14	0.00	7.84	27.00

Code compliant Avg. OSD Total Energy Use (For total houses in a County)

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	0.03	0.57	0.14	0.00	0.03	0.00	0.21	0.57
	2-Story	1.13	17.93	4.57	0.00	0.97	0.00	6.67	17.93
	3-Story	0.10	1.62	0.42	0.00	0.09	0.00	0.61	1.62
Total		1.27	20.12	5.14	0.00	1.09	0.00	7.50	20.12

Total Energy Savings Due to the Code Adoption

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Savings (kWh)	NG Savings (Therm)	Elec. Savings (kWh)	NG Savings (Therm)	Elec. Savings (kWh)	NG Savings (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	0.00	0.18	0.01	0.00	0.00	0.00	0.01	0.18
	2-Story	0.06	6.13	0.21	0.00	0.04	0.00	0.31	6.13
	3-Story	0.01	0.57	0.02	0.00	0.00	0.00	0.03	0.57
Total		0.07	6.88	0.23	0.00	0.06	0.00	0.35	6.88



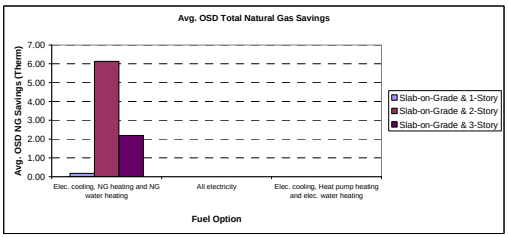


Table 161: Code and Pre-code Average OSD Simulation Results for Fort Bend County (Multi-Family).

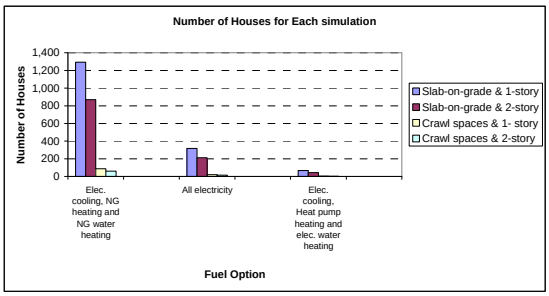
Table 162: Code and Pre-code Simulation Results for Individual Residence for Galveston County (Single-Family and Multi-Family).

County	SF or MF	Precode or Code-compliant	Options			Simulation #	Annual Elec. (kWh/yr)	Annual NG (Therms/yr)	Avg. OSD Elec. (kWh/day) (Aug. 19)	Avg. OSD NG (Therm/day) (Aug. 19)	Total Annual (Elec. + NG) (MBtu)	Annual Elec.Savings (kWh/yr)	Annual NG Savings (Therms/yr)	Avg. OSD Elec. Savings (kWh/day) (Aug. 19)	Avg. OSD NG Savings (Therm/day) (Aug. 19)	Total Annual Savings (Elec. + NG) (MBtu)
Galveston	SF	Precode	Slab-on-grade	Fuel Option 1	1-story	1	14238	363	59.9086	0.738051	84.93					
					2-story	2	13414	351	56.4709	0.738051	80.85					
				Fuel Option 2	1-story	3	18958	0	68.5234	0	64.7					
					2-story	4	17903	0	65.0858	0	61.1					
				Fuel Option 3	1-story	5	18768	0	68.5234	0	64.05					
					2-story	6	17789	0	65.0858	0	60.71					
			Crawl Space	Fuel Option 1	1-story	7	14889	352	60.6265	0.738051	86.06					
					2-story	8	14283	342	57.2944	0.738051	82.92					
				Fuel Option 2	1-story	9	19426	0	69.2413	0	66.3					
					2-story	10	18618	0	65.9091	0	63.54					
				Fuel Option 3	1-story	11	19283	0	69.2413	0	65.81					
					2-story	12	18526	0	65.9091	0	63.23					
		Code - Compliant	Slab-on-grade	Fuel Option 1	1-story	13	12527	317	52.5525	0.618051	74.43	1,711	46	7.36	0.12	10.50
					2-story	14	11891	306	49.5017	0.618051	71.21	1,523	45	6.97	0.12	9.64
				Fuel Option 2	1-story	15	17176	0	61.1673	0	58.62	1,782	0	7.36	0.00	6.08
					2-story	16	16354	0	58.1165	0	55.82	1,549	0	6.97	0.00	5.28
				Fuel Option 3	1-story	17	17046	0	61.1673	0	58.18	1,722	0	7.36	0.00	5.87
					2-story	18	16267	0	58.1165	0	55.52	1,522	0	6.97	0.00	5.19
			Crawl Space	Fuel Option 1	1-story	19	13204	305	53.3415	0.618051	75.56	1,685	47	7.29	0.12	10.50
					2-story	20	12726	296	50.4022	0.618051	73	1,557	46	6.89	0.12	9.92
				Fuel Option 2	1-story	21	17659	0	61.9564	0	60.27	1,767	0	7.28	0.00	6.03
					2-story	22	17011	0	59.017	0	58.06	1,607	0	6.89	0.00	5.48
				Fuel Option 3	1-story	23	17564	0	61.9564	0	59.95	1,719	0	7.28	0.00	5.86
					2-story	24	16950	0	59.017	0	57.85	1,576	0	6.89	0.00	5.38
	MF	Precode	Slab-on-grade	Fuel Option 1	1-story	1	6343.5	209	24.94285	0.504	42.525					
					2-story	2	6229	192.75	23.298675	0.471	40.5275					
					3-story	3	6270.833333	187.5	23.04266667	0.460001667	40.15833333					
				Fuel Option 2	1-story	4	8492	0	29.7152	0	28.985					
					2-story	5	8095	0	27.4745	0	27.6275					
					3-story	6	8045.5	0	27.01966667	0	27.45833333					
				Fuel Option 3	1-story	7	8491	0	29.7152	0	28.98					
					2-story	8	8095.75	0	27.4745	0	27.63					
					3-story	9	8046.333333	0	27.01966667	0	27.46166667					
		Code - Compliant	Slab-on-grade	Fuel Option 1	1-story	10	5936	166.5	23.3975	0.384001	36.93	408	43	1.55	0.12	5.60
					2-story	11	5894	150.25	22.1195	0.351	35.14	335	43	1.18	0.12	5.39
					3-story	12	5940	145	21.9065	0.340001667	34.76833333	331	43	1.14	0.12	5.39
				Fuel Option 2	1-story	13	8113.5	0	28.16985	0	27.69	379	0	1.55	0.00	1.30
					2-story	14	7781.75	0	26.29525	0	26.56	313	0	1.18	0.00	1.07
					3-story	15	7734.333333	0	25.8835	0	26.39666667	311	0	1.14	0.00	1.06
				Fuel Option 3	1-story	16	8113	0	28.16985	0	27.69	378	0	1.55	0.00	1.29
					2-story	17	7782.5	0	26.29525	0	26.5625	313	0	1.18	0.00	1.07
					3-story	18	7733.666667	0	25.8835	0	26.395	313	0	1.14	0.00	1.07

Prototype of the simulation result for one county

County Name	Galveston
Division (East or West Texas)	East Texas
Number of new building permits for SFD	2,995

		Fuel Option			Total
		1	2	3	
		Elec. cooling, NG heating and NG water heating	All electricity	Elec. cooling, Heat pump heating and elec. water heating	
		77.1%	18.9%	4.0%	
Slab-on-grade (93.6%)	1-Story (59.8%)	43.16%	10.58%	2.24%	55.97%
	2-Story (40.2%)	29.01%	7.11%	1.51%	37.63%
Crawl spaces (6.4%)	1-Story (59.8%)	2.95%	0.72%	0.15%	3.83%
	2-Story (39.2%)	1.98%	0.49%	0.10%	2.57%
Total		77.10%	18.90%	4.00%	100.00%



Number of Houses for each simulation

		Fuel Option			Total
		1	2	3	
		Elec. cooling, NG heating and NG water heating	All electricity	Elec. cooling, Heat pump heating and elec. water heating	
		77.1%	18.9%	4.0%	
Slab-on-grade (93.6%)	1-Story (59.8%)	1,292	317	67	1,676
	2-Story (40.2%)	869	213	45	1,127
Crawl spaces (6.4%)	1-Story (59.8%)	88	22	5	115
	2-Story (39.2%)	59	15	3	77
Total		2,309	566	120	2,995

Precode Energy Use for each option (per house)

		Fuel Option						
		1		2		3		
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating		
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	
Slab-on-grade	1-Story	14,238	363	18,958	0	18,768	0	
	2-Story	13,414	351	17,903	0	17,789	0	
Crawl spaces	1-Story	14,889	352	19,426	0	19,283	0	
	2-Story	14,283	342	18,618	0	18,526	0	
Total		56,824	1,408	74,905	0	74,366	0	

Code compliant Energy Use for each option (per house)

		Fuel Option						
		1		2		3		
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating		
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	
Slab-on-grade	1-Story	12,527	317	17,176	0	17,046	0	
	2-Story	11,891	306	16,354	0	16,267	0	
Crawl spaces	1-Story	13,204	305	17,659	0	17,564	0	
	2-Story	12,726	296	17,011	0	16,950	0	
Total		50,348	1,224	68,200	0	67,827	0	

Precode Total Energy Use (For total houses in a County)

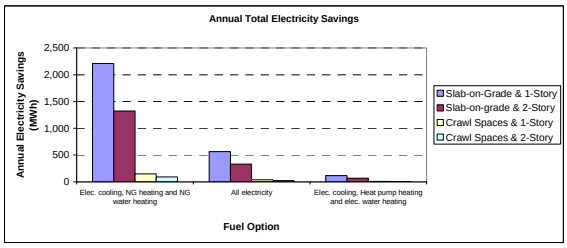
		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	18,403	469,175	6,007	0	1,258	0	25,668	469,175
	2-Story	11,655	304,972	3,813	0	802	0	16,270	304,972
Crawl spaces	1-Story	1,316	31,108	421	0	88	0	1,825	31,108
	2-Story	849	20,318	271	0	57	0	1,177	20,318
Total		32,222	825,574	10,512	0	2,206	0	44,940	825,574

Code compliant Total Energy Use (For total houses in a County)

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	16,191	409,720	5,442	0	1,143	0	22,776	409,720
	2-Story	10,332	265,873	3,483	0	733	0	14,548	265,873
Crawl spaces	1-Story	1,167	26,955	383	0	81	0	1,630	26,955
	2-Story	756	17,585	248	0	52	0	1,056	17,585
Total		28,446	720,133	9,556	0	2,009	0	40,010	720,133

Total Energy Savings Due to the Code Adoption

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)
Slab-on-grade	1-Story	2,211	59,455	565	0	115	0	2,892	59,455
	2-Story	1,323	39,099	330	0	69	0	1,722	39,099
Crawl spaces	1-Story	149	4,154	38	0	8	0	195	4,154
	2-Story	93	2,733	23	0	5	0	121	2,733
Total		3,776	105,440	956	0	197	0	4,929	105,440



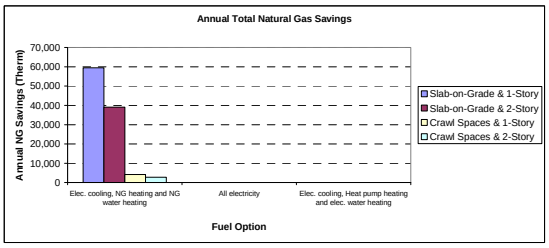


Table 163: Code and Pre-code Annual Simulation Results for Galveston County (Single-Family).

Precode Avg. OSD Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	59.91	0.74	68.52	0.00	68.52	0.00
	2-Story	56.47	0.74	65.09	0.00	65.09	0.00
Crawl spaces	1-Story	60.63	0.74	69.24	0.00	69.24	0.00
	2-Story	57.29	0.74	65.91	0.00	65.91	0.00
Total		234.30	2.95	268.76	0.00	268.76	0.00

Code compliant Avg. OSD Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	52.55	0.62	61.17	0.00	61.17	0.00
	2-Story	49.50	0.62	58.12	0.00	58.12	0.00
Crawl spaces	1-Story	53.34	0.62	61.96	0.00	61.96	0.00
	2-Story	50.40	0.62	59.02	0.00	59.02	0.00
Total		205.80	2.47	240.26	0.00	240.26	0.00

Precode Avg. OSD Total Energy Use (For total houses in a County)

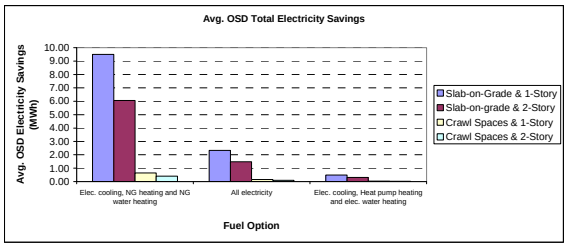
		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	77.43	953.93	21.71	0.00	4.59	0.00	103.74	953.93
	2-Story	49.07	641.27	13.86	0.00	2.93	0.00	65.86	641.27
Crawl spaces	1-Story	5.36	65.23	1.50	0.00	0.32	0.00	7.18	65.23
	2-Story	3.40	43.85	0.96	0.00	0.20	0.00	4.57	43.85
Total		135.26	1,704.27	38.03	0.00	8.05	0.00	181.34	1,704.27

Code compliant Avg. OSD Total Energy Use (For total houses in a County)

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	67.92	798.83	19.38	0.00	4.10	0.00	91.41	798.83
	2-Story	43.01	537.00	12.38	0.00	2.62	0.00	58.01	537.00
Crawl spaces	1-Story	4.71	54.62	1.34	0.00	0.28	0.00	6.34	54.62
	2-Story	2.99	36.72	0.86	0.00	0.18	0.00	4.04	36.72
Total		118.64	1,427.17	33.96	0.00	7.19	0.00	159.75	1,427.17

Avg. OSD Total Energy Savings Due to the Code Adoption

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)
Slab-on-grade	1-Story	9.51	155.10	2.33	0.00	0.49	0.00	12.33	155.10
	2-Story	6.06	104.26	1.48	0.00	0.31	0.00	7.85	104.26
Crawl spaces	1-Story	0.64	10.61	0.16	0.00	0.03	0.00	0.84	10.61
	2-Story	0.41	7.13	0.10	0.00	0.02	0.00	0.53	7.13
Total		16.62	277.10	4.07	0.00	0.86	0.00	21.55	277.10



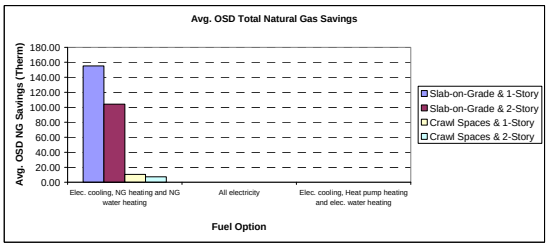
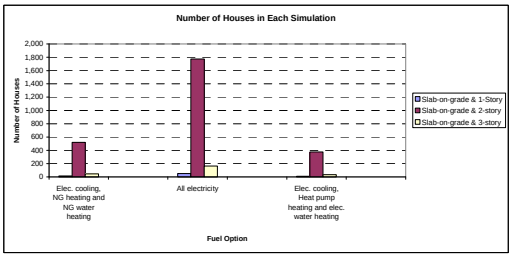


Table 164: Code and Pre-code Average OSD Simulation Results for Galveston County (Single-Family).

The simulation result for one county

County Name	Galveston
NAHB Division	West South Central
Number of new building permits for MF	2,995

		Fuel Option			Total
		1	2	3	
		Elec. cooling, NG heating and NG water heating	All electricity	Elec. cooling, Heat pump heating and elec. water heating	
		19.5%	66.4%	14.1%	
Slab-on-grade (100%)	1-Story (2.6%)	0.51%	1.73%	0.37%	2.60%
	2-Story (89.1%)	17.37%	59.16%	12.56%	89.10%
	3-Story (8.3%)	1.62%	5.51%	1.17%	8.30%
Total		19.50%	66.40%	14.10%	100.00%



Number of Houses for each simulation

		Fuel Option			Total
		1	2	3	
		Elec. cooling, NG heating and NG water heating	All electricity	Elec. cooling, Heat pump heating and elec. water heating	
		19.5%	66.4%	14.1%	
Slab-on-grade (100%)	1-Story (2.6%)	15	52	11	78
	2-Story (89.1%)	520	1,772	376	2,669
	3-Story (8.3%)	48	165	35	249
Total		584	1,989	422	2,995

Precode Energy Use for each option (per house)

		Fuel Option						
		1		2		3		
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating		
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	
Slab-on-grade	1-Story	6,344	209	8,492	0	8,491	0	
	2-Story	6,225	193	8,095	0	8,096	0	
	3-Story	6,271	188	8,046	0	8,046	0	
Total		18,843	589	24,633	0	24,633	0	

Code compliant Energy Use for each option (per house)

		Fuel Option						
		1		2		3		
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating		
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	
Slab-on-grade	1-Story	5,936	167	8,114	0	8,113	0	
	2-Story	5,894	150	7,782	0	7,783	0	
	3-Story	5,940	145	7,734	0	7,734	0	
Total		17,770	462	23,630	0	23,629	0	

Precode Total Energy Use (For total houses in a County)

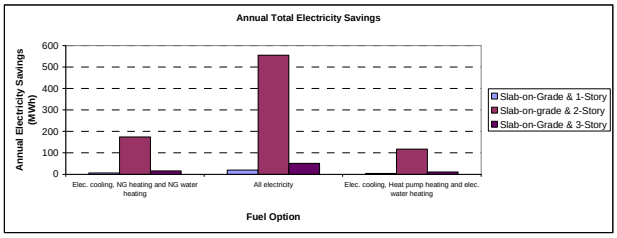
		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	96	3,174	439	0	93	0	629	3,174
	2-Story	3,241	100,301	14,344	0	3,046	0	20,631	100,301
	3-Story	304	9,089	1,328	0	282	0	1,914	9,089
Total		3,642	112,563	16,111	0	3,421	0	23,174	112,563

Code compliant Total Energy Use (For total houses in a County)

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	90	2,528	420	0	89	0	599	2,528
	2-Story	3,067	78,185	13,789	0	2,928	0	19,784	78,185
	3-Story	288	7,029	1,277	0	271	0	1,836	7,029
Total		3,445	87,742	15,485	0	3,288	0	22,218	87,742

Total Energy Savings Due to the Code Adoption

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	6	645	20	0	4	0	30	645
	2-Story	174	22,116	555	0	118	0	847	22,116
	3-Story	16	2,060	51	0	11	0	78	2,060
Total		197	24,821	626	0	133	0	956	24,821



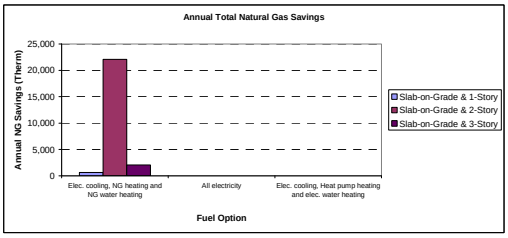


Table 165: Code and Pre-code Annual Simulation Results for Galveston County (Multi-Family).

Precode Avg. OSD Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	24.94	0.50	29.72	0.00	29.72	0.00
	2-Story	23.30	0.47	27.47	0.00	27.47	0.00
	3-Story	23.04	0.46	27.02	0.00	27.02	0.00
Total		71.28	1.44	84.21	0.00	84.21	0.00

Code compliant Avg. OSD Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	23.40	0.38	28.17	0.00	28.17	0.00
	2-Story	22.12	0.35	26.30	0.00	26.30	0.00
	3-Story	21.91	0.34	25.88	0.00	25.88	0.00
Total		67.42	1.06	80.35	0.00	80.35	0.00

Precode Avg. OSD Total Energy Use (For total houses in a County)

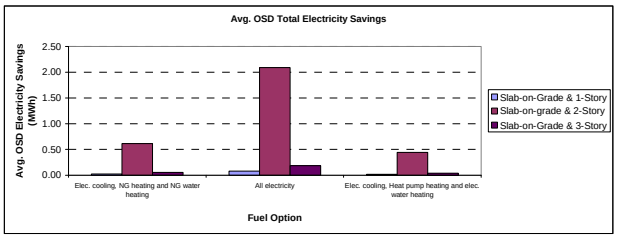
		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	0.38	7.65	1.54	0.00	0.33	0.00	2.24	7.65
	2-Story	12.12	245.09	48.68	0.00	10.34	0.00	71.14	245.09
	3-Story	1.12	22.30	4.46	0.00	0.95	0.00	6.52	22.30
Total		13.62	275.04	54.68	0.00	11.61	0.00	79.91	275.04

Code compliant Avg. OSD Total Energy Use (For total houses in a County)

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	0.36	5.83	1.46	0.00	0.31	0.00	2.12	5.83
	2-Story	11.51	182.65	46.59	0.00	9.89	0.00	68.00	182.65
	3-Story	1.06	16.48	4.27	0.00	0.91	0.00	6.24	16.48
Total		12.93	204.96	52.32	0.00	11.11	0.00	76.36	204.96

Total Energy Savings Due to the Code Adoption

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Savings (kWh)	NG Savings (Therm)	Elec. Savings (kWh)	NG Savings (Therm)	Elec. Savings (kWh)	NG Savings (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	0.02	1.82	0.08	0.00	0.02	0.00	0.12	1.82
	2-Story	0.61	62.44	2.09	0.00	0.44	0.00	3.15	62.44
	3-Story	0.06	5.82	0.19	0.00	0.04	0.00	0.28	5.82
Total		0.69	70.08	2.36	0.00	0.50	0.00	3.55	70.08



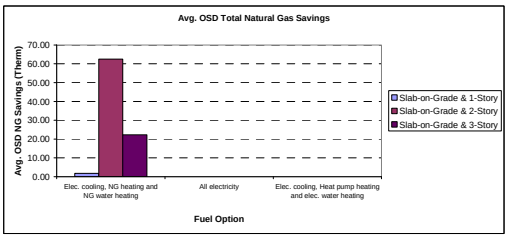


Table 166: Code and Pre-code Average OSD Simulation Results for Galveston County (Multi-Family).

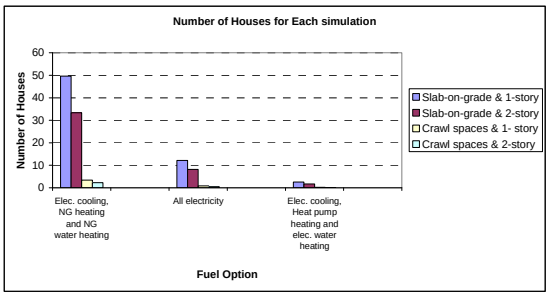
Table 167: Code and Pre-code Simulation Results for Individual Residence for Hardin County (Single-Family and Multi-Family).

County	SF or MF	Precode or Code-compliant	Options			Simulation #	Annual Elec. (kWh/yr)	Annual NG (Therms/yr)	Avg. OSD Elec. (kWh/day) (Aug. 19)	Avg. OSD NG (Therm/day) (Aug. 19)	Total Annual (Elec. + NG) (MBtu)	Annual Elec.Savings (kWh/yr)	Annual NG Savings (Therms/yr)	Avg. OSD Elec. Savings (kWh/day) (Aug. 19)	Avg. OSD NG Savings (Therm/day) (Aug. 19)	Total Annual Savings (Elec. + NG) (MBtu)
Hardin	SF	Precode	Slab-on-grade	Fuel Option 1	1-story	1	14366	366	60.067	0.749138	85.58					
					2-story	2	13500	357	56.6675	0.749138	81.79					
				Fuel Option 2	1-story	3	19126	0	68.8609	0	65.28					
					2-story	4	18105	0	65.4615	0	61.79					
				Fuel Option 3	1-story	5	18893	0	68.8609	0	64.48					
					2-story	6	17923	0	65.4615	0	61.17					
			Crawl Space	Fuel Option 1	1-story	7	15063	357	61.1889	0.749138	87.07					
					2-story	8	14430	347	58.0057	0.749138	84					
				Fuel Option 2	1-story	9	19670	0	69.983	0	67.13					
					2-story	10	18873	0	66.7998	0	64.41					
				Fuel Option 3	1-story	11	19485	0	69.983	0	66.5					
					2-story	12	18738	0	66.7998	0	63.95					
		Code - Compliant	Slab-on-grade	Fuel Option 1	1-story	13	12557	319	52.4082	0.629138	74.78	1,809	47	7.66	0.12	10.80
					2-story	14	11886	313	49.3429	0.629138	71.91	1,614	44	7.32	0.12	9.88
				Fuel Option 2	1-story	15	17259	0	61.2023	0	58.9	1,867	0	7.66	0.00	6.38
					2-story	16	16474	0	58.1369	0	56.23	1,631	0	7.32	0.00	5.56
				Fuel Option 3	1-story	17	17078	0	61.2023	0	58.29	1,815	0	7.66	0.00	6.19
					2-story	18	16337	0	58.1369	0	55.76	1,586	0	7.32	0.00	5.41
			Crawl Space	Fuel Option 1	1-story	19	13287	310	53.6457	0.629138	76.35	1,776	47	7.54	0.12	10.72
					2-story	20	12783	303	50.7841	0.629138	73.9	1,647	44	7.22	0.12	10.10
				Fuel Option 2	1-story	21	17830	0	62.4397	0	60.85	1,840	0	7.54	0.00	6.28
					2-story	22	17198	0	59.5782	0	58.7	1,675	0	7.22	0.00	5.71
				Fuel Option 3	1-story	23	17688	0	62.4397	0	60.37	1,797	0	7.54	0.00	6.13
					2-story	24	17091	0	59.5782	0	58.33	1,647	0	7.22	0.00	5.62
	MF	Precode	Slab-on-grade	Fuel Option 1	1-story	1	6362.5	210	24.90165	0.509875	42.725					
					2-story	2	6239.5	194.25	23.378575	0.4761425	40.73					
					3-story	3	6271.666667	189.16667	23.14116667	0.464898333	40.325					
				Fuel Option 2	1-story	4	8536.5	0	29.7733	0	29.135					
					2-story	5	8135.25	0	27.64125	0	27.765					
					3-story	6	8076.333333	0	27.20083333	0	27.565					
				Fuel Option 3	1-story	7	8530.5	0	29.7733	0	29.115					
					2-story	8	8129	0	27.64125	0	27.745					
					3-story	9	8071.333333	0	27.20083333	0	27.54666667					
		Code - Compliant	Slab-on-grade	Fuel Option 1	1-story	10	5925.5	168.5	23.24625	0.389877	37.06	437	42	1.66	0.12	5.67
					2-story	11	5879.5	152.25	22.096975	0.3561425	35.2825	360	42	1.28	0.12	5.45
					3-story	12	5923	147	21.94083333	0.344898333	34.91333333	349	42	1.20	0.12	5.41
				Fuel Option 2	1-story	13	8132.5	0	28.11785	0	27.755	404	0	1.66	0.00	1.38
					2-story	14	7801.25	0	26.3595	0	26.625	334	0	1.28	0.00	1.14
					3-story	15	7752.833333	0	26.0005	0	26.46	324	0	1.20	0.00	1.11
				Fuel Option 3	1-story	16	8124.5	0	28.11785	0	27.73	406	0	1.66	0.00	1.39
					2-story	17	7798	0	26.3595	0	26.615	331	0	1.28	0.00	1.13
					3-story	18	7748.666667	0	26.0005	0	26.445	323	0	1.20	0.00	1.10

Prototype of the simulation result for one county

County Name	Hardin
Division (East or West Texas)	East Texas
Number of new building permits for SFD	115

		Fuel Option 1	Fuel Option 2	Fuel Option 3	Total
		Elec. cooling, NG heating and NG water heating	All electricity	Elec. cooling, Heat pump heating and elec. water heating	
		77.1%	18.9%	4.0%	
Slab-on-grade (93.6%)	1-Story (59.8%)	43.16%	10.58%	2.24%	55.97%
	2-Story (40.2%)	29.01%	7.11%	1.51%	37.63%
Crawl spaces (6.4%)	1-Story (59.8%)	2.95%	0.72%	0.15%	3.83%
	2-Story (39.2%)	1.98%	0.49%	0.10%	2.57%
Total		77.10%	18.90%	4.00%	100.00%



Number of Houses for each simulation

		Fuel Option 1	Fuel Option 2	Fuel Option 3	Total
		Elec. cooling, NG heating and NG water heating	All electricity	Elec. cooling, Heat pump heating and elec. water heating	
		77.1%	18.9%	4.0%	
Slab-on-grade (93.6%)	1-Story (59.8%)	50	12	3	64
	2-Story (40.2%)	33	8	2	43
Crawl spaces (6.4%)	1-Story (59.8%)	3	1	0	4
	2-Story (39.2%)	2	1	0	3
Total		89	22	5	115

Precode Energy Use for each option (per house)

		Fuel Option 1		Fuel Option 2		Fuel Option 3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	14,368	366	19,126	0	18,893	0
	2-Story	13,500	357	18,105	0	17,923	0
Crawl spaces	1-Story	15,063	357	19,670	0	19,485	0
	2-Story	14,430	347	18,873	0	18,738	0
Total		57,359	1,427	75,774	0	75,039	0

Code compliant Energy Use for each option (per house)

		Fuel Option 1		Fuel Option 2		Fuel Option 3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	12,557	319	17,259	0	17,078	0
	2-Story	11,886	313	16,474	0	16,337	0
Crawl spaces	1-Story	13,287	310	17,830	0	17,688	0
	2-Story	12,783	303	17,198	0	17,091	0
Total		50,513	1,245	68,761	0	68,194	0

Precode Total Energy Use (For total houses in a County)

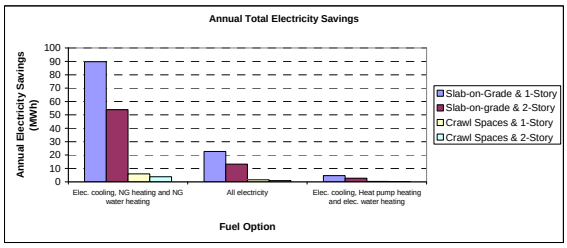
		Fuel Option 1		Fuel Option 2		Fuel Option 3		Total	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	713	18,164	233	0	49	0	994	18,164
	2-Story	450	11,910	148	0	31	0	629	11,910
Crawl spaces	1-Story	51	1,211	16	0	3	0	71	1,211
	2-Story	33	792	11	0	2	0	46	792
Total		1,247	32,077	408	0	85	0	1,740	32,077

Code compliant Total Energy Use (For total houses in a County)

		Fuel Option 1		Fuel Option 2		Fuel Option 3		Total	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	623	15,831	210	0	44	0	877	15,831
	2-Story	397	10,442	135	0	28	0	560	10,442
Crawl spaces	1-Story	45	1,052	15	0	3	0	63	1,052
	2-Story	29	691	10	0	2	0	41	691
Total		1,094	28,017	369	0	77	0	1,541	28,017

Total Energy Savings Due to the Code Adoption

		Fuel Option 1		Fuel Option 2		Fuel Option 3		Total	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)
Slab-on-grade	1-Story	90	2,333	23	0	5	0	117	2,333
	2-Story	54	1,468	13	0	3	0	70	1,468
Crawl spaces	1-Story	6	159	2	0	0	0	8	159
	2-Story	4	100	1	0	0	0	5	100
Total		153	4,060	39	0	8	0	200	4,060



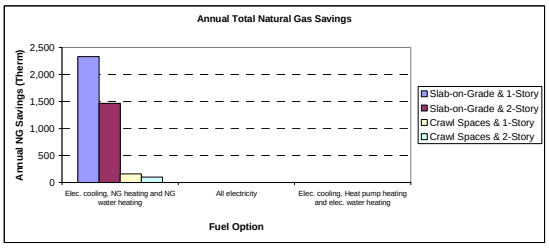


Table 168: Code and Pre-code Annual Simulation Results for Hardin County (Single-Family).

Precode Avg. OSD Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	60.07	0.75	68.86	0.00	68.86	0.00
	2-Story	56.67	0.75	65.46	0.00	65.46	0.00
Crawl spaces	1-Story	61.19	0.75	69.98	0.00	69.98	0.00
	2-Story	58.01	0.75	66.80	0.00	66.80	0.00
Total		235.93	3.00	271.11	0.00	271.11	0.00

Code compliant Avg. OSD Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	52.41	0.63	61.20	0.00	61.20	0.00
	2-Story	49.34	0.63	58.14	0.00	58.14	0.00
Crawl spaces	1-Story	53.65	0.63	62.44	0.00	62.44	0.00
	2-Story	50.78	0.63	59.58	0.00	59.58	0.00
Total		206.18	2.52	241.36	0.00	241.36	0.00

Precode Avg. OSD Total Energy Use (For total houses in a County)

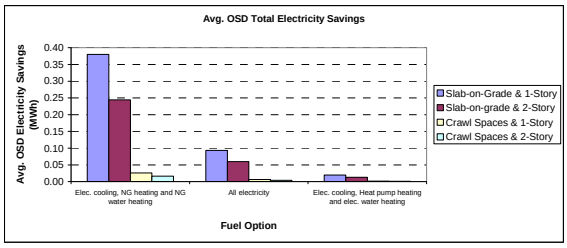
		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	2.98	37.18	0.84	0.00	0.18	0.00	4.00	37.18
	2-Story	1.89	24.99	0.54	0.00	0.11	0.00	2.54	24.99
Crawl spaces	1-Story	0.21	2.54	0.06	0.00	0.01	0.00	0.28	2.54
	2-Story	0.13	1.71	0.04	0.00	0.01	0.00	0.18	1.71
Total		5.21	66.42	1.47	0.00	0.31	0.00	6.99	66.42

Code compliant Avg. OSD Total Energy Use (For total houses in a County)

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	2.60	31.22	0.74	0.00	0.16	0.00	3.50	31.22
	2-Story	1.65	20.99	0.48	0.00	0.10	0.00	2.22	20.99
Crawl spaces	1-Story	0.18	2.13	0.05	0.00	0.01	0.00	0.24	2.13
	2-Story	0.12	1.44	0.03	0.00	0.01	0.00	0.16	1.44
Total		4.55	55.78	1.31	0.00	0.28	0.00	6.13	55.78

Avg. OSD Total Energy Savings Due to the Code Adoption

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)
Slab-on-grade	1-Story	0.38	5.96	0.09	0.00	0.02	0.00	0.49	5.96
	2-Story	0.24	4.00	0.06	0.00	0.01	0.00	0.32	4.00
Crawl spaces	1-Story	0.03	0.41	0.01	0.00	0.00	0.00	0.03	0.41
	2-Story	0.02	0.27	0.00	0.00	0.00	0.00	0.02	0.27
Total		0.67	10.64	0.16	0.00	0.03	0.00	0.86	10.64



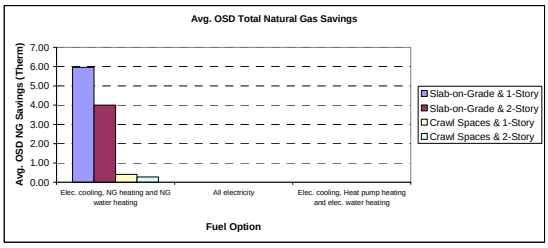
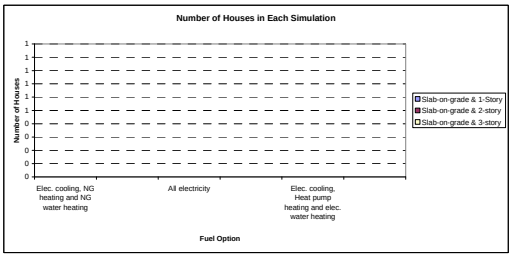


Table 169: Code and Pre-code Average OSD Simulation Results for Hardin County (Single-Family).

The simulation result for one county

County Name	Hardin
NAHB Division	West South Central
Number of new building permits for MF	0

		Fuel Option			Total
		1	2	3	
		Elec. cooling, NG heating and NG water heating	All electricity	Elec. cooling, Heat pump heating and elec. water heating	
		19.5%	66.4%	14.1%	
Slab-on-grade (100%)	1-Story (2.6%)	0.51%	1.73%	0.37%	2.60%
	2-Story (89.1%)	17.37%	59.16%	12.56%	89.10%
	3-Story (8.3%)	1.62%	5.51%	1.17%	8.30%
Total		19.50%	66.40%	14.10%	100.00%



Number of Houses for each simulation

		Fuel Option			Total
		1	2	3	
		Elec. cooling, NG heating and NG water heating	All electricity	Elec. cooling, Heat pump heating and elec. water heating	
		19.5%	66.4%	14.1%	
Slab-on-grade (100%)	1-Story (2.6%)	0	0	0	0
	2-Story (89.1%)	0	0	0	0
	3-Story (8.3%)	0	0	0	0
Total		0	0	0	0

Precode Energy Use for each option (per house)

		Fuel Option						
		1		2		3		
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating		
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	
Slab-on-grade	1-Story	6,363	210	8,537	0	8,531	0	
	2-Story	6,240	194	8,135	0	8,129	0	
	3-Story	6,272	189	8,076	0	8,071	0	
Total		18,874	593	24,748	0	24,731	0	

Code compliant Energy Use for each option (per house)

		Fuel Option						
		1		2		3		
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating		
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	
Slab-on-grade	1-Story	5,926	169	8,133	0	8,125	0	
	2-Story	5,889	152	7,801	0	7,798	0	
	3-Story	5,923	147	7,753	0	7,749	0	
Total		17,729	468	23,687	0	23,671	0	

Precode Total Energy Use (For total houses in a County)

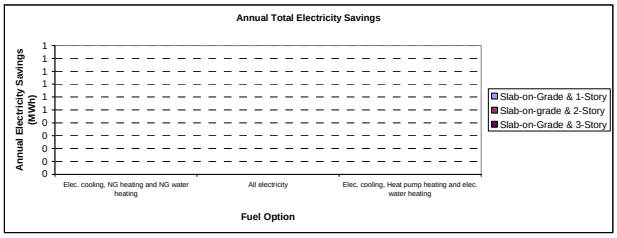
		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	0	0	0	0	0	0	0	0
	2-Story	0	0	0	0	0	0	0	0
	3-Story	0	0	0	0	0	0	0	0
Total		0	0	0	0	0	0	0	0

Code compliant Total Energy Use (For total houses in a County)

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	0	0	0	0	0	0	0	0
	2-Story	0	0	0	0	0	0	0	0
	3-Story	0	0	0	0	0	0	0	0
Total		0	0	0	0	0	0	0	0

Total Energy Savings Due to the Code Adoption

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	0	0	0	0	0	0	0	0
	2-Story	0	0	0	0	0	0	0	0
	3-Story	0	0	0	0	0	0	0	0
Total		0	0	0	0	0	0	0	0



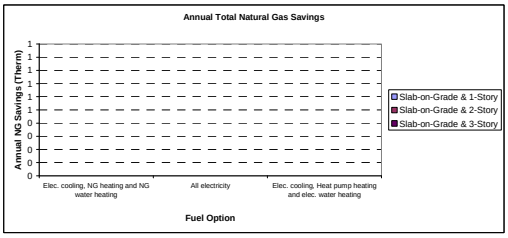


Table 170: Code and Pre-code Annual Simulation Results for Hardin County (Multi-Family).

Precode Avg. OSD Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	24.90	0.51	29.77	0.00	29.77	0.00
	2-Story	23.38	0.48	27.64	0.00	27.64	0.00
	3-Story	23.14	0.46	27.20	0.00	27.20	0.00
Total		71.42	1.45	84.62	0.00	84.62	0.00

Code compliant Avg. OSD Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	23.25	0.39	28.12	0.00	28.12	0.00
	2-Story	22.10	0.36	26.36	0.00	26.36	0.00
	3-Story	21.94	0.34	26.00	0.00	26.00	0.00
Total		67.29	1.09	80.48	0.00	80.48	0.00

Precode Avg. OSD Total Energy Use (For total houses in a County)

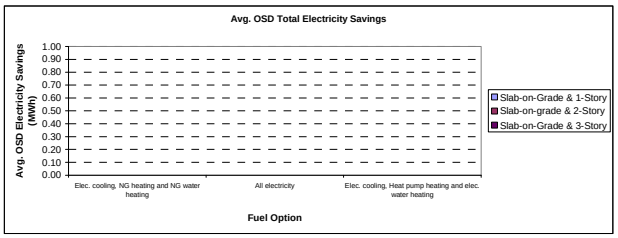
		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	2-Story	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3-Story	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Code compliant Avg. OSD Total Energy Use (For total houses in a County)

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	2-Story	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3-Story	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Total Energy Savings Due to the Code Adoption

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Savings (kWh)	NG Savings (Therm)	Elec. Savings (kWh)	NG Savings (Therm)	Elec. Savings (kWh)	NG Savings (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	2-Story	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3-Story	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00



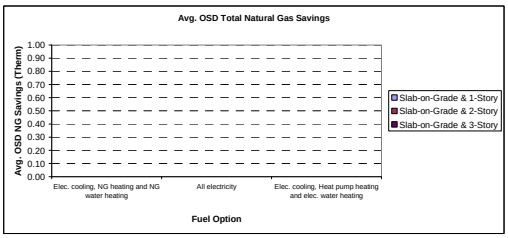


Table 171: Code and Pre-code Average OSD Simulation Results for Hardin County (Multi-Family).

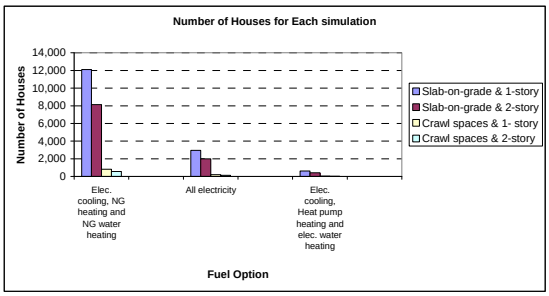
Table 172: Code and Pre-code Simulation Results for Individual Residence for Harris County (Single-Family and Multi-Family).

County	SF or MF	Precode or Code-compliant	Options			Simulation #	Annual Elec. (kWh/yr)	Annual NG (Therms/yr)	Avg. OSD Elec. (kWh/day) (Aug. 19)	Avg. OSD NG (Therm/day) (Aug. 19)	Total Annual (Elec. + NG) (MBtu)	Annual Elec.Savings (kWh/yr)	Annual NG Savings (Therms/yr)	Avg. OSD Elec. Savings (kWh/day) (Aug. 19)	Avg. OSD NG Savings (Therm/day) (Aug. 19)	Total Annual Savings (Elec. + NG) (MBtu)
Harris	SF	Precode	Slab-on-grade	Fuel Option 1	1-story	1	14254	363	59.9878	0.738051	84.98					
					2-story	2	13430	351	56.5507	0.738051	80.89					
				Fuel Option 2	1-story	3	18973	0	68.6027	0	64.75					
					2-story	4	17917	0	65.1655	0	61.15					
				Fuel Option 3	1-story	5	18783	0	68.6027	0	64.1					
					2-story	6	17803	0	65.1655	0	60.76					
			Crawl Space	Fuel Option 1	1-story	7	14906	352	60.7073	0.738051	86.1					
					2-story	8	14300	342	57.376	0.738051	82.97					
				Fuel Option 2	1-story	9	19442	0	69.3221	0	66.35					
					2-story	10	18634	0	65.991	0	63.6					
				Fuel Option 3	1-story	11	19297	0	69.3221	0	65.86					
					2-story	12	18541	0	65.991	0	63.28					
		Code - Compliant	Slab-on-grade	Fuel Option 1	1-story	13	12537	317	52.604	0.618051	74.45	1,717	46	7.38	0.12	10.53
					2-story	14	11900	306	49.5551	0.618051	71.23	1,530	45	7.00	0.12	9.66
				Fuel Option 2	1-story	15	17183	0	61.2189	0	58.65	1,790	0	7.38	0.00	6.10
					2-story	16	16362	0	58.1699	0	55.84	1,555	0	7.00	0.00	5.31
				Fuel Option 3	1-story	17	17053	0	61.2189	0	58.2	1,730	0	7.38	0.00	5.90
					2-story	18	16274	0	58.1699	0	55.54	1,529	0	7.00	0.00	5.22
			Crawl Space	Fuel Option 1	1-story	19	13214	305	53.3956	0.618051	75.59	1,692	47	7.31	0.12	10.51
					2-story	20	12737	296	50.4583	0.618051	73.03	1,563	46	6.92	0.12	9.94
				Fuel Option 2	1-story	21	17668	0	62.0104	0	60.3	1,774	0	7.31	0.00	6.05
					2-story	22	17020	0	59.0732	0	58.09	1,614	0	6.92	0.00	5.51
				Fuel Option 3	1-story	23	17573	0	62.0104	0	59.97	1,724	0	7.31	0.00	5.89
					2-story	24	16958	0	59.0732	0	57.88	1,583	0	6.92	0.00	5.40
	MF	Precode	Slab-on-grade	Fuel Option 1	1-story	1	6343.5	209	24.94285	0.504	42.525					
					2-story	2	6229	192.75	23.298675	0.471	40.5275					
					3-story	3	6270.833333	187.5	23.04266667	0.460001667	40.15833333					
				Fuel Option 2	1-story	4	8492	0	29.7152	0	28.985					
					2-story	5	8095	0	27.4745	0	27.6275					
					3-story	6	8045.5	0	27.01966667	0	27.45833333					
				Fuel Option 3	1-story	7	8491	0	29.7152	0	28.98					
					2-story	8	8095.75	0	27.4745	0	27.63					
					3-story	9	8046.333333	0	27.01966667	0	27.46166667					
		Code - Compliant	Slab-on-grade	Fuel Option 1	1-story	10	5936	166.5	23.3975	0.384001	36.93	408	43	1.55	0.12	5.60
					2-story	11	5894	150.25	22.1195	0.351	35.14	335	43	1.18	0.12	5.39
					3-story	12	5940	145	21.9065	0.340001667	34.76833333	331	43	1.14	0.12	5.39
				Fuel Option 2	1-story	13	8113.5	0	28.16985	0	27.69	379	0	1.55	0.00	1.30
					2-story	14	7781.75	0	26.29525	0	26.56	313	0	1.18	0.00	1.07
					3-story	15	7734.333333	0	25.8835	0	26.39666667	311	0	1.14	0.00	1.06
				Fuel Option 3	1-story	16	8113	0	28.16985	0	27.69	378	0	1.55	0.00	1.29
					2-story	17	7782.5	0	26.29525	0	26.5625	313	0	1.18	0.00	1.07
					3-story	18	7733.666667	0	25.8835	0	26.395	313	0	1.14	0.00	1.07

Prototype of the simulation result for one county

County Name	Harris
Division (East or West Texas)	East Texas
Number of new building permits for SFD	28,020

		Fuel Option			Total
		1	2	3	
		Elec. cooling, NG heating and NG water heating	All electricity	Elec. cooling, Heat pump heating and elec. water heating	
		77.1%	18.9%	4.0%	
Slab-on-grade (93.6%)	1-Story (59.8%)	43.16%	10.58%	2.24%	55.97%
	2-Story (40.2%)	29.01%	7.11%	1.51%	37.63%
Crawl spaces (6.4%)	1-Story (59.8%)	2.95%	0.72%	0.15%	3.83%
	2-Story (39.2%)	1.98%	0.49%	0.10%	2.57%
Total		77.10%	18.90%	4.00%	100.00%



Number of Houses for each simulation

		Fuel Option			Total
		1	2	3	
		Elec. cooling, NG heating and NG water heating	All electricity	Elec. cooling, Heat pump heating and elec. water heating	
		77.1%	18.9%	4.0%	
Slab-on-grade (93.6%)	1-Story (59.8%)	12,092	2,964	627	15,684
	2-Story (40.2%)	8,129	1,993	422	10,543
Crawl spaces (6.4%)	1-Story (59.8%)	827	203	43	1,072
	2-Story (39.2%)	556	136	29	721
Total		21,603	5,296	1,121	28,020

Precode Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	14,254	363	18,973	0	18,783	0
	2-Story	13,430	351	17,917	0	17,803	0
Crawl spaces	1-Story	14,906	352	19,442	0	19,297	0
	2-Story	14,300	342	18,634	0	18,541	0
Total		56,890	1,408	74,966	0	74,424	0

Code compliant Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	12,537	317	17,183	0	17,053	0
	2-Story	11,900	306	16,362	0	16,274	0
Crawl spaces	1-Story	13,214	305	17,668	0	17,573	0
	2-Story	12,737	296	17,020	0	16,958	0
Total		50,388	1,224	68,233	0	67,858	0

Precode Total Energy Use (For total houses in a County)

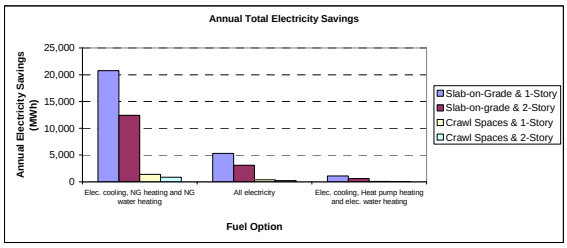
		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	172,369	4,389,410	56,240	0	11,783	0	240,383	4,389,410
	2-Story	109,169	2,853,195	35,702	0	7,508	0	152,380	2,853,195
Crawl spaces	1-Story	12,324	291,036	3,941	0	828	0	17,093	291,036
	2-Story	7,948	190,088	2,539	0	535	0	11,022	190,088
Total		301,802	7,723,729	98,421	0	20,654	0	420,877	7,723,729

Code compliant Total Energy Use (For total houses in a County)

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	151,598	3,833,176	50,934	0	10,698	0	213,230	3,833,176
	2-Story	96,732	2,487,401	32,604	0	6,863	0	136,199	2,487,401
Crawl spaces	1-Story	10,925	252,176	3,581	0	754	0	15,260	252,176
	2-Story	7,079	164,521	2,319	0	489	0	9,887	164,521
Total		266,335	6,737,274	89,438	0	18,804	0	374,577	6,737,274

Total Energy Savings Due to the Code Adoption

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)
Slab-on-grade	1-Story	20,762	556,234	5,306	0	1,085	0	27,153	556,234
	2-Story	12,437	365,794	3,099	0	645	0	16,180	365,794
Crawl spaces	1-Story	1,399	38,860	360	0	74	0	1,832	38,860
	2-Story	869	25,567	220	0	46	0	1,134	25,567
Total		35,467	986,455	8,984	0	1,850	0	46,300	986,455



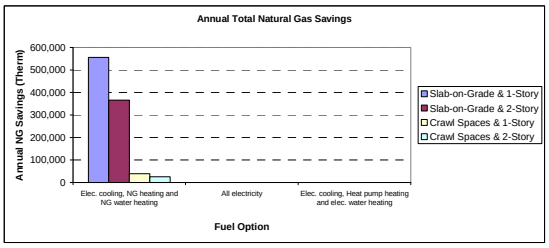


Table 173: Code and Pre-code Annual Simulation Results for Harris County (Single-Family).

Precode Avg. OSD Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	59.99	0.74	68.60	0.00	68.60	0.00
	2-Story	56.55	0.74	65.17	0.00	65.17	0.00
Crawl spaces	1-Story	60.71	0.74	69.32	0.00	69.32	0.00
	2-Story	57.38	0.74	65.99	0.00	65.99	0.00
Total		234.62	2.95	269.08	0.00	269.08	0.00

Code compliant Avg. OSD Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	52.60	0.62	61.22	0.00	61.22	0.00
	2-Story	49.56	0.62	58.17	0.00	58.17	0.00
Crawl spaces	1-Story	53.40	0.62	62.01	0.00	62.01	0.00
	2-Story	50.46	0.62	59.07	0.00	59.07	0.00
Total		206.01	2.47	240.47	0.00	240.47	0.00

Precode Avg. OSD Total Energy Use (For total houses in a County)

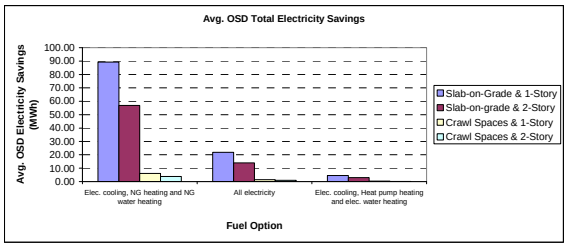
		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	725.37	8,924.54	203.35	0.00	43.04	0.00	971.76	8,924.54
	2-Story	459.69	5,999.44	129.85	0.00	27.48	0.00	617.02	5,999.44
Crawl spaces	1-Story	50.19	610.23	14.05	0.00	2.97	0.00	67.22	610.23
	2-Story	31.89	410.23	8.99	0.00	1.90	0.00	42.78	410.23
Total		1,267.15	15,944.43	356.25	0.00	75.40	0.00	1,698.79	15,944.43

Code compliant Avg. OSD Total Energy Use (For total houses in a County)

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	636.09	7,473.50	181.46	0.00	38.41	0.00	855.96	7,473.50
	2-Story	402.82	5,023.99	115.91	0.00	24.53	0.00	543.27	5,023.99
Crawl spaces	1-Story	44.15	511.01	12.57	0.00	2.66	0.00	59.38	511.01
	2-Story	28.05	343.52	8.05	0.00	1.70	0.00	37.80	343.52
Total		1,111.10	13,352.02	317.99	0.00	67.30	0.00	1,496.40	13,352.02

Avg. OSD Total Energy Savings Due to the Code Adoption

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)
Slab-on-grade	1-Story	89.29	1,451.04	21.89	0.00	4.63	0.00	115.80	1,451.04
	2-Story	56.87	975.45	13.94	0.00	2.95	0.00	73.76	975.45
Crawl spaces	1-Story	6.05	99.22	1.48	0.00	0.31	0.00	7.84	99.22
	2-Story	3.84	66.70	0.94	0.00	0.20	0.00	4.99	66.70
Total		156.04	2,592.41	38.25	0.00	8.10	0.00	202.39	2,592.41



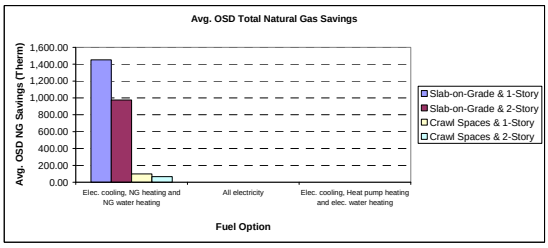
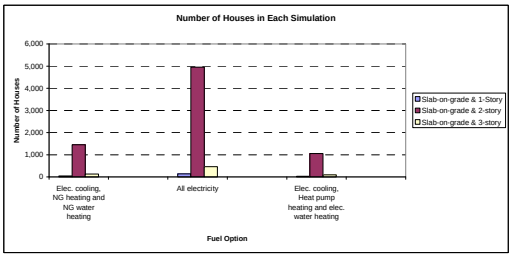


Table 174: Code and Pre-code Average OSD Simulation Results for Harris County (Single-Family).

The simulation result for one county

County Name	Harris
NAHB Division	West South Central
Number of new building permits for MF	8,375

		Fuel Option			Total
		1	2	3	
		Elec. cooling, NG heating and NG water heating	All electricity	Elec. cooling, Heat pump heating and elec. water heating	
		19.5%	66.4%	14.1%	
Slab-on-grade (100%)	1-Story (2.6%)	0.51%	1.73%	0.37%	2.60%
	2-Story (89.1%)	17.37%	59.16%	12.56%	89.10%
	3-Story (8.3%)	1.62%	5.51%	1.17%	8.30%
Total		19.50%	66.40%	14.10%	100.00%



Number of Houses for each simulation

		Fuel Option			Total
		1	2	3	
		Elec. cooling, NG heating and NG water heating	All electricity	Elec. cooling, Heat pump heating and elec. water heating	
		19.5%	66.4%	14.1%	
Slab-on-grade (100%)	1-Story (2.6%)	42	145	31	218
	2-Story (89.1%)	1,455	4,955	1,052	7,462
	3-Story (8.3%)	136	462	98	695
Total		1,633	5,561	1,181	8,375

Precode Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	6,344	209	8,492	0	8,491	0
	2-Story	6,225	193	8,095	0	8,096	0
	3-Story	6,271	188	8,046	0	8,046	0
Total		18,843	589	24,633	0	24,633	0

Code compliant Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	5,936	167	8,114	0	8,113	0
	2-Story	5,894	150	7,782	0	7,783	0
	3-Story	5,940	145	7,734	0	7,734	0
Total		17,770	462	23,630	0	23,629	0

Precode Total Energy Use (For total houses in a County)

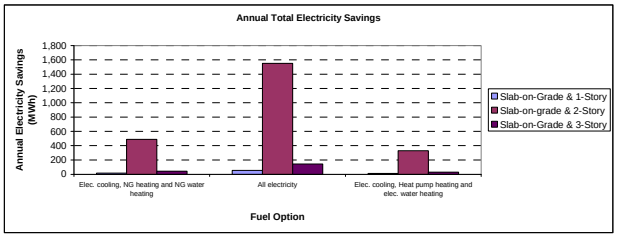
		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	269	8,874	1,228	0	261	0	1,758	8,874
	2-Story	9,064	280,473	40,110	0	8,518	0	57,691	280,473
	3-Story	850	25,416	3,714	0	789	0	5,352	25,416
Total		10,183	314,763	45,051	0	9,567	0	64,801	314,763

Code compliant Total Energy Use (For total houses in a County)

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	252	7,070	1,173	0	249	0	1,674	7,070
	2-Story	8,576	218,631	38,557	0	8,188	0	55,322	218,631
	3-Story	805	19,655	3,570	0	758	0	5,133	19,655
Total		9,634	245,355	43,300	0	9,196	0	62,130	245,355

Total Energy Savings Due to the Code Adoption

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	17	1,805	55	0	12	0	84	1,805
	2-Story	487	61,842	1,552	0	330	0	2,369	61,842
	3-Story	45	5,761	144	0	31	0	219	5,761
Total		550	69,408	1,750	0	372	0	2,672	69,408



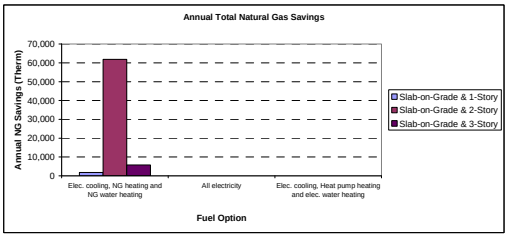


Table 175: Code and Pre-code Annual Simulation Results for Harris County (Multi-Family).

Precode Avg. OSD Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	24.94	0.50	29.72	0.00	29.72	0.00
	2-Story	23.30	0.47	27.47	0.00	27.47	0.00
	3-Story	23.04	0.46	27.02	0.00	27.02	0.00
Total		71.28	1.44	84.21	0.00	84.21	0.00

Code compliant Avg. OSD Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	23.40	0.38	28.17	0.00	28.17	0.00
	2-Story	22.12	0.35	26.30	0.00	26.30	0.00
	3-Story	21.91	0.34	25.88	0.00	25.88	0.00
Total		67.42	1.06	80.35	0.00	80.35	0.00

Precode Avg. OSD Total Energy Use (For total houses in a County)

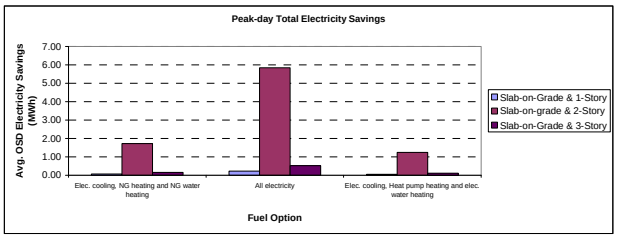
		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	1.06	21.40	4.30	0.00	0.91	0.00	6.27	21.40
	2-Story	33.90	685.36	136.13	0.00	28.91	0.00	198.94	685.36
	3-Story	3.12	62.35	12.47	0.00	2.65	0.00	18.24	62.35
Total		38.08	769.11	152.90	0.00	32.47	0.00	223.45	769.11

Code compliant Avg. OSD Total Energy Use (For total houses in a County)

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	0.99	16.31	4.07	0.00	0.86	0.00	5.93	16.31
	2-Story	32.19	510.75	130.29	0.00	27.67	0.00	190.14	510.75
	3-Story	2.97	46.05	11.95	0.00	2.54	0.00	17.45	46.05
Total		36.15	573.14	146.31	0.00	31.07	0.00	213.53	573.14

Total Energy Savings Due to the Code Adoption

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Savings (kWh)	NG Savings (Therm)	Elec. Savings (kWh)	NG Savings (Therm)	Elec. Savings (kWh)	NG Savings (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	0.07	5.10	0.22	0.00	0.05	0.00	0.34	5.10
	2-Story	1.72	174.61	5.84	0.00	1.24	0.00	8.80	174.61
	3-Story	0.15	16.27	0.52	0.00	0.11	0.00	0.79	16.27
Total		1.94	195.97	6.59	0.00	1.40	0.00	9.93	195.97



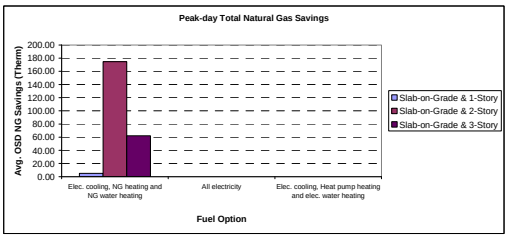


Table 176: Code and Pre-code Average OSD Simulation Results for Harris County (Multi-Family).

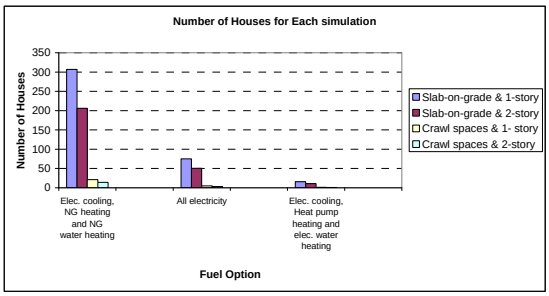
County	SF or MF	Precode or Code-compliant	Options			Simulation #	Annual Elec. (kWh/yr)	Annual NG (Therms/yr)	Avg. OSD Elec. (kWh/day) (Aug. 19)	Avg. OSD NG (Therm/day) (Aug. 19)	Total Annual (Elec. + NG) (MBtu)	Annual Elec.Savings (kWh/yr)	Annual NG Savings (Therms/yr)	Avg. OSD Elec. Savings (kWh/day) (Aug. 19)	Avg. OSD NG Savings (Therm/day) (Aug. 19)	Total Annual Savings (Elec. + NG) (MBtu)
Jefferson	SF	Precode	Slab-on-grade	Fuel Option 1	1-story	1	14322	366	59.8858	0.749138	85.45					
					2-story	2	13460	357	56.4859	0.749138	81.67					
				Fuel Option 2	1-story	3	19086	0	68.6798	0	65.14					
					2-story	4	18070	0	65.2798	0	61.67					
				Fuel Option 3	1-story	5	18854	0	68.6798	0	64.35					
					2-story	6	17889	0	65.2798	0	61.06					
			Crawl Space	Fuel Option 1	1-story	7	15017	357	61.004	0.749138	86.94					
					2-story	8	14386	348	57.8191	0.749138	83.86					
				Fuel Option 2	1-story	9	19629	0	69.7979	0	66.99					
					2-story	10	18832	0	66.6131	0	64.27					
				Fuel Option 3	1-story	11	19445	0	69.7979	0	66.37					
					2-story	12	18697	0	66.6131	0	63.81					
		Code - Compliant	Slab-on-grade	Fuel Option 1	1-story	13	12532	320	52.2891	0.629138	74.73	1,790	46	7.60	0.12	10.72
					2-story	14	11863	314	49.2228	0.629138	71.86	1,597	43	7.26	0.12	9.81
				Fuel Option 2	1-story	15	17239	0	61.0831	0	58.84	1,847	0	7.60	0.00	6.30
					2-story	16	16456	0	58.0169	0	56.16	1,614	0	7.26	0.00	5.51
				Fuel Option 3	1-story	17	17057	0	61.0831	0	58.21	1,797	0	7.60	0.00	6.14
					2-story	18	16318	0	58.0169	0	55.69	1,571	0	7.26	0.00	5.37
			Crawl Space	Fuel Option 1	1-story	19	13259	310	53.5229	0.629138	76.28	1,758	47	7.48	0.12	10.66
					2-story	20	12755	303	50.6597	0.629138	73.83	1,631	45	7.16	0.12	10.03
				Fuel Option 2	1-story	21	17806	0	62.3168	0	60.77	1,823	0	7.48	0.00	6.22
					2-story	22	17174	0	59.4537	0	58.62	1,658	0	7.16	0.00	5.65
				Fuel Option 3	1-story	23	17662	0	62.3168	0	60.28	1,783	0	7.48	0.00	6.09
					2-story	24	17067	0	59.4537	0	58.25	1,630	0	7.16	0.00	5.56
	MF	Precode	Slab-on-grade	Fuel Option 1	1-story	1	6362.5	210	24.90165	0.509875	42.725					
					2-story	2	6239.5	194.25	23.378575	0.4761425	40.73					
					3-story	3	6271.666667	189.16667	23.14116667	0.464998333	40.325					
				Fuel Option 2	1-story	4	8536.5	0	29.7733	0	29.135					
					2-story	5	8135.25	0	27.64125	0	27.765					
					3-story	6	8076.333333	0	27.20083333	0	27.565					
				Fuel Option 3	1-story	7	8530.5	0	29.7733	0	29.115					
					2-story	8	8129	0	27.64125	0	27.745					
					3-story	9	8071.333333	0	27.20083333	0	27.54666667					
		Code - Compliant	Slab-on-grade	Fuel Option 1	1-story	10	5925.5	168.5	23.24625	0.389877	37.06	437	42	1.66	0.12	5.67
					2-story	11	5879.5	152.25	22.096975	0.3561425	35.2825	360	42	1.28	0.12	5.45
					3-story	12	5923	147	21.94083333	0.344898333	34.91333333	349	42	1.20	0.12	5.41
				Fuel Option 2	1-story	13	8132.5	0	28.11785	0	27.755	404	0	1.66	0.00	1.38
					2-story	14	7801.25	0	26.3595	0	26.625	334	0	1.28	0.00	1.14
					3-story	15	7752.833333	0	26.0005	0	26.46	324	0	1.20	0.00	1.11
				Fuel Option 3	1-story	16	8124.5	0	28.11785	0	27.73	406	0	1.66	0.00	1.39
					2-story	17	7798	0	26.3595	0	26.615	331	0	1.28	0.00	1.13
					3-story	18	7748.666667	0	26.0005	0	26.445	323	0	1.20	0.00	1.10

Table 177: Code and Pre-code Simulation Results for Individual Residence for Jefferson County (Single-Family and Multi-Family).

Prototype of the simulation result for one county

County Name	Jefferson
Division (East or West Texas)	East Texas
Number of new building permits for SFD	711

		Fuel Option			Total
		1	2	3	
		Elec. cooling, NG heating and NG water heating	All electricity	Elec. cooling, Heat pump heating and elec. water heating	
		77.1%	18.9%	4.0%	
Slab-on-grade (93.6%)	1-Story (59.8%)	43.16%	10.58%	2.24%	55.97%
	2-Story (40.2%)	29.01%	7.11%	1.51%	37.63%
Crawl spaces (6.4%)	1-Story (59.8%)	2.95%	0.72%	0.15%	3.83%
	2-Story (39.2%)	1.98%	0.49%	0.10%	2.57%
Total		77.10%	18.90%	4.00%	100.00%



Number of Houses for each simulation

		Fuel Option			Total
		1	2	3	
		Elec. cooling, NG heating and NG water heating	All electricity	Elec. cooling, Heat pump heating and elec. water heating	
		77.1%	18.9%	4.0%	
Slab-on-grade (93.6%)	1-Story (59.8%)	307	75	16	398
	2-Story (40.2%)	206	51	11	268
Crawl spaces (6.4%)	1-Story (59.8%)	21	5	1	27
	2-Story (39.2%)	14	3	1	18
Total		548	134	28	711

Precode Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	14,322	366	19,086	0	18,854	0
	2-Story	13,460	357	18,070	0	17,889	0
Crawl spaces	1-Story	15,017	357	19,629	0	19,445	0
	2-Story	14,386	348	18,832	0	18,697	0
Total		57,185	1,428	75,617	0	74,885	0

Code compliant Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	12,532	320	17,239	0	17,057	0
	2-Story	11,863	314	16,456	0	16,318	0
Crawl spaces	1-Story	13,259	310	17,806	0	17,662	0
	2-Story	12,755	303	17,174	0	17,067	0
Total		50,409	1,247	68,675	0	68,104	0

Precode Total Energy Use (For total houses in a County)

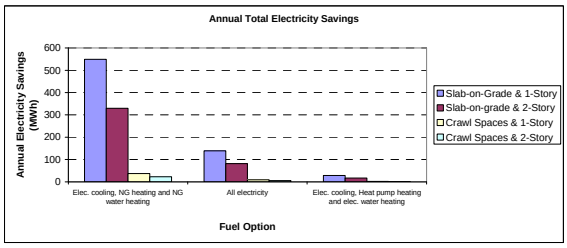
		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	4,394	112,301	1,436	0	300	0	6,130	112,301
	2-Story	2,778	73,637	914	0	191	0	3,881	73,637
Crawl spaces	1-Story	315	7,490	101	0	21	0	437	7,490
	2-Story	203	4,908	65	0	14	0	282	4,908
Total		7,689	198,335	2,515	0	526	0	10,730	198,335

Code compliant Total Energy Use (For total houses in a County)

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	3,845	98,186	1,297	0	272	0	5,413	98,186
	2-Story	2,447	64,767	832	0	175	0	3,454	64,767
Crawl spaces	1-Story	278	6,504	92	0	19	0	389	6,504
	2-Story	180	4,273	59	0	12	0	252	4,273
Total		6,750	173,731	2,280	0	478	0	9,508	173,731

Total Energy Savings Due to the Code Adoption

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)
Slab-on-grade	1-Story	549	14,114	139	0	29	0	717	14,114
	2-Story	329	8,869	82	0	17	0	428	8,869
Crawl spaces	1-Story	37	986	9	0	2	0	48	986
	2-Story	23	635	6	0	1	0	30	635
Total		939	24,604	236	0	49	0	1,223	24,604



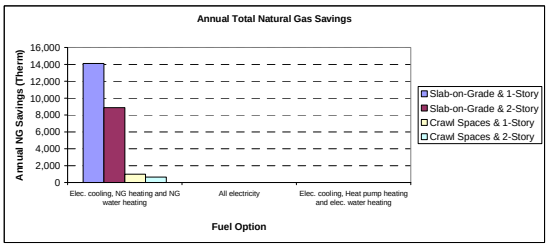


Table 178: Code and Pre-code Annual Simulation Results for Jefferson County (Single-Family).

Precode Avg. OSD Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	59.89	0.75	68.68	0.00	68.68	0.00
	2-Story	56.49	0.75	65.28	0.00	65.28	0.00
Crawl spaces	1-Story	61.02	0.75	69.80	0.00	69.80	0.00
	2-Story	57.82	0.75	66.61	0.00	66.61	0.00
Total		235.19	3.00	270.37	0.00	270.37	0.00

Code compliant Avg. OSD Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	52.29	0.63	61.08	0.00	61.08	0.00
	2-Story	49.22	0.63	58.02	0.00	58.02	0.00
Crawl spaces	1-Story	53.52	0.63	62.32	0.00	62.32	0.00
	2-Story	50.66	0.63	59.45	0.00	59.45	0.00
Total		205.69	2.52	240.87	0.00	240.87	0.00

Precode Avg. OSD Total Energy Use (For total houses in a County)

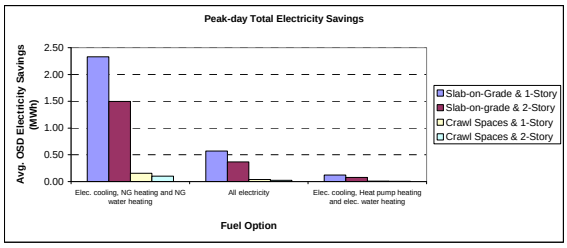
		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	18.37	229.86	5.17	0.00	1.09	0.00	24.63	229.86
	2-Story	11.65	154.52	3.30	0.00	0.70	0.00	15.65	154.52
Crawl spaces	1-Story	1.28	15.72	0.36	0.00	0.08	0.00	1.71	15.72
	2-Story	0.82	10.57	0.23	0.00	0.05	0.00	1.09	10.57
Total		32.12	410.66	9.06	0.00	1.92	0.00	43.09	410.66

Code compliant Avg. OSD Total Energy Use (For total houses in a County)

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	16.04	193.04	4.59	0.00	0.97	0.00	21.61	193.04
	2-Story	10.15	129.77	2.93	0.00	0.62	0.00	13.71	129.77
Crawl spaces	1-Story	1.12	13.20	0.32	0.00	0.07	0.00	1.51	13.20
	2-Story	0.71	8.87	0.21	0.00	0.04	0.00	0.96	8.87
Total		28.03	344.88	8.05	0.00	1.70	0.00	37.79	344.88

Avg. OSD Total Energy Savings Due to the Code Adoption

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)
Slab-on-grade	1-Story	2.33	36.82	0.57	0.00	0.12	0.00	3.02	36.82
	2-Story	1.50	24.75	0.37	0.00	0.08	0.00	1.94	24.75
Crawl spaces	1-Story	0.16	2.52	0.04	0.00	0.01	0.00	0.20	2.52
	2-Story	0.10	1.69	0.02	0.00	0.01	0.00	0.13	1.69
Total		4.09	65.78	1.00	0.00	0.21	0.00	5.30	65.78



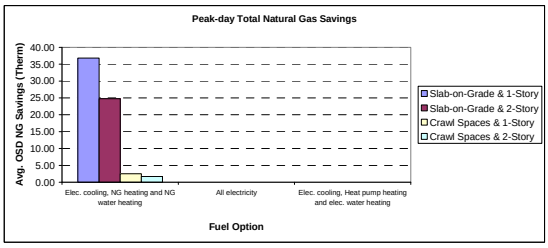
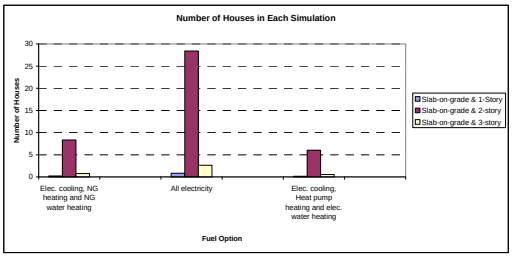


Table 179: Code and Pre-code Average OSD Simulation Results for Jefferson County (Single-Family).

The simulation result for one county

County Name	Jefferson
NAHB Division	West South Central
Number of new building permits for MF	48

		Fuel Option			Total
		1	2	3	
		Elec. cooling, NG heating and NG water heating	All electricity	Elec. cooling, Heat pump heating and elec. water heating	
		19.5%	66.4%	14.1%	
Slab-on-grade (100%)	1-Story (2.6%)	0.51%	1.73%	0.37%	2.60%
	2-Story (89.1%)	17.37%	59.16%	12.56%	89.10%
	3-Story (8.3%)	1.62%	5.51%	1.17%	8.30%
Total		19.50%	66.40%	14.10%	100.00%



Number of Houses for each simulation

		Fuel Option			Total
		1	2	3	
		Elec. cooling, NG heating and NG water heating	All electricity	Elec. cooling, Heat pump heating and elec. water heating	
		19.5%	66.4%	14.1%	
Slab-on-grade (100%)	1-Story (2.6%)	0	1	0	1
	2-Story (89.1%)	8	28	6	43
	3-Story (8.3%)	1	3	1	4
Total		9	32	7	48

Precode Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	6,363	210	8,537	0	8,531	0
	2-Story	6,240	194	8,135	0	8,129	0
	3-Story	6,272	189	8,076	0	8,071	0
Total		18,874	593	24,748	0	24,731	0

Code compliant Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	5,926	169	8,133	0	8,125	0
	2-Story	5,889	152	7,801	0	7,798	0
	3-Story	5,923	147	7,753	0	7,749	0
Total		17,738	468	23,687	0	23,671	0

Precode Total Energy Use (For total houses in a County)

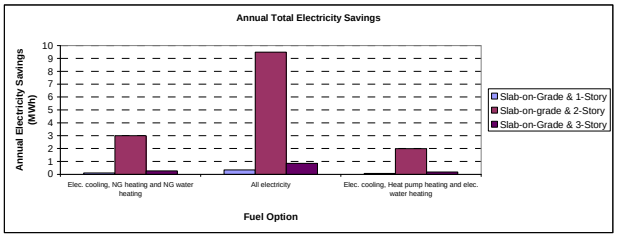
		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	2	51	7	0	2	0	10	51
	2-Story	52	1,620	231	0	49	0	332	1,620
	3-Story	5	147	21	0	5	0	31	147
Total		58	1,818	259	0	56	0	373	1,818

Code compliant Total Energy Use (For total houses in a County)

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	1	41	7	0	1	0	10	41
	2-Story	49	1,270	222	0	47	0	318	1,270
	3-Story	5	114	21	0	4	0	29	114
Total		55	1,425	249	0	53	0	357	1,425

Total Energy Savings Due to the Code Adoption

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	0	10	0	0	0	0	1	10
	2-Story	3	350	9	0	2	0	14	350
	3-Story	0	33	1	0	0	0	1	33
Total		3	393	11	0	2	0	16	393



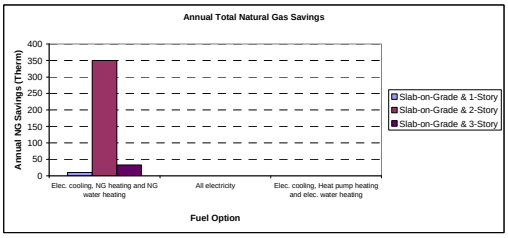


Table 180: Code and Pre-code Annual Simulation Results for Jefferson County (Multi-Family).

Precode Avg. OSD Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	24.90	0.51	29.77	0.00	29.77	0.00
	2-Story	23.38	0.48	27.64	0.00	27.64	0.00
	3-Story	23.14	0.46	27.20	0.00	27.20	0.00
Total		71.42	1.45	84.62	0.00	84.62	0.00

Code compliant Avg. OSD Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	23.25	0.39	28.12	0.00	28.12	0.00
	2-Story	22.10	0.36	26.36	0.00	26.36	0.00
	3-Story	21.94	0.34	26.00	0.00	26.00	0.00
Total		67.29	1.09	80.48	0.00	80.48	0.00

Precode Avg. OSD Total Energy Use (For total houses in a County)

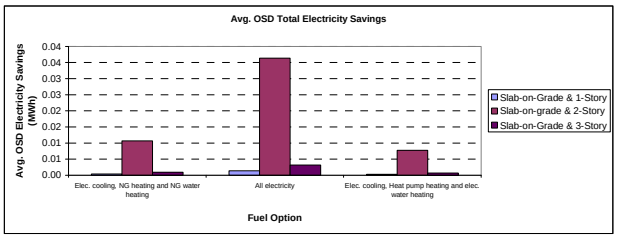
		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	0.01	0.12	0.02	0.00	0.01	0.00	0.04	0.12
	2-Story	0.19	3.97	0.78	0.00	0.17	0.00	1.15	3.97
	3-Story	0.02	0.36	0.07	0.00	0.02	0.00	0.11	0.36
Total		0.22	4.46	0.88	0.00	0.19	0.00	1.29	4.46

Code compliant Avg. OSD Total Energy Use (For total houses in a County)

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	0.01	0.09	0.02	0.00	0.00	0.00	0.03	0.09
	2-Story	0.18	2.97	0.75	0.00	0.16	0.00	1.09	2.97
	3-Story	0.02	0.27	0.07	0.00	0.01	0.00	0.10	0.27
Total		0.21	3.33	0.84	0.00	0.18	0.00	1.23	3.33

Total Energy Savings Due to the Code Adoption

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Savings (kWh)	NG Savings (Therm)	Elec. Savings (kWh)	NG Savings (Therm)	Elec. Savings (kWh)	NG Savings (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.03
	2-Story	0.01	1.00	0.04	0.00	0.01	0.00	0.05	1.00
	3-Story	0.00	0.09	0.00	0.00	0.00	0.00	0.00	0.09
Total		0.01	1.12	0.04	0.00	0.01	0.00	0.06	1.12



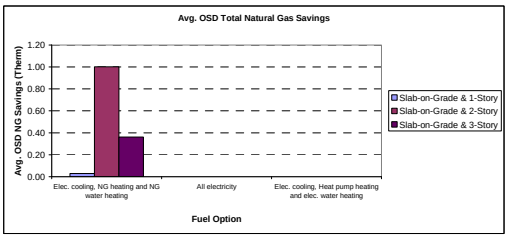


Table 181: Code and Pre-code Average OSD Simulation Results for Jefferson County (Multi-Family).

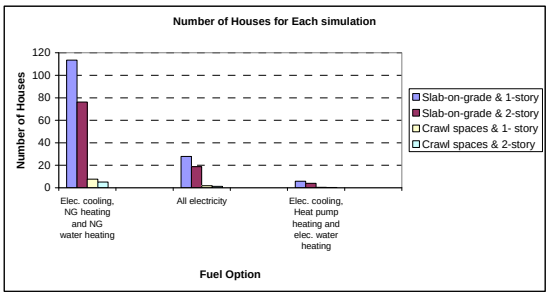
Table 182: Code and Pre-code Simulation Results for Individual Residence for Liberty County (Single-Family and Multi-Family).

County	SF or MF	Precode or Code-compliant	Options			Simulation #	Annual Elec. (kWh/yr)	Annual NG (Therms/yr)	Avg. OSD Elec. (kWh/day) (Aug. 19)	Avg. OSD NG (Therm/day) (Aug. 19)	Total Annual (Elec. + NG) (MBtu)	Annual Elec.Savings (kWh/yr)	Annual NG Savings (Therms/yr)	Avg. OSD Elec. Savings (kWh/day) (Aug. 19)	Avg. OSD NG Savings (Therm/day) (Aug. 19)	Total Annual Savings (Elec. + NG) (MBtu)
Liberty	SF	Precode	Slab-on-grade	Fuel Option 1	1-story	1	14381	365	60.1312	0.749138	85.6					
					2-story	2	13516	357	56.731	0.749138	81.8					
				Fuel Option 2	1-story	3	19135	0	68.9254	0	65.31					
					2-story	4	18114	0	65.5251	0	61.82					
				Fuel Option 3	1-story	5	18905	0	68.9254	0	64.52					
					2-story	6	17932	0	65.5251	0	61.2					
			Crawl Space	Fuel Option 1	1-story	7	15080	356	61.2545	0.749138	87.09					
					2-story	8	14449	347	58.071	0.749138	84.02					
				Fuel Option 2	1-story	9	19681	0	70.0486	0	67.17					
					2-story	10	18884	0	66.865	0	64.45					
				Fuel Option 3	1-story	11	19498	0	70.0486	0	66.55					
					2-story	12	18750	0	66.865	0	63.99					
		Code - Compliant	Slab-on-grade	Fuel Option 1	1-story	13	12566	319	52.4516	0.629138	74.77	1,815	46	7.68	0.12	10.83
					2-story	14	11895	313	49.3847	0.629138	71.91	1,621	44	7.35	0.12	9.89
				Fuel Option 2	1-story	15	17262	0	61.2457	0	58.91	1,873	0	7.68	0.00	6.40
					2-story	16	16477	0	58.1788	0	56.24	1,637	0	7.35	0.00	5.58
				Fuel Option 3	1-story	17	17084	0	61.2457	0	58.31	1,821	0	7.68	0.00	6.21
					2-story	18	16342	0	58.1788	0	55.77	1,590	0	7.35	0.00	5.43
			Crawl Space	Fuel Option 1	1-story	19	13298	310	53.6906	0.629138	76.35	1,782	46	7.56	0.12	10.74
					2-story	20	12794	302	50.8276	0.629138	73.91	1,655	45	7.24	0.12	10.11
				Fuel Option 2	1-story	21	17835	0	62.4847	0	60.87	1,846	0	7.56	0.00	6.30
					2-story	22	17204	0	59.6216	0	58.72	1,680	0	7.24	0.00	5.73
				Fuel Option 3	1-story	23	17694	0	62.4847	0	60.39	1,804	0	7.56	0.00	6.16
					2-story	24	17095	0	59.6216	0	58.34	1,655	0	7.24	0.00	5.65
	MF	Precode	Slab-on-grade	Fuel Option 1	1-story	1	6362.5	210	24.90165	0.509875	42.725					
					2-story	2	6239.5	194.25	23.378575	0.4761425	40.73					
					3-story	3	6271.666667	189.16667	23.14116667	0.464898333	40.325					
				Fuel Option 2	1-story	4	8536.5	0	29.7733	0	29.135					
					2-story	5	8135.25	0	27.64125	0	27.765					
					3-story	6	8076.333333	0	27.20083333	0	27.565					
				Fuel Option 3	1-story	7	8530.5	0	29.7733	0	29.115					
					2-story	8	8129	0	27.64125	0	27.745					
					3-story	9	8071.333333	0	27.20083333	0	27.54666667					
		Code - Compliant	Slab-on-grade	Fuel Option 1	1-story	10	5925.5	168.5	23.24625	0.389877	37.06	437	42	1.66	0.12	5.67
					2-story	11	5879.5	152.25	22.096975	0.3561425	35.2825	360	42	1.28	0.12	5.45
					3-story	12	5923	147	21.94083333	0.344898333	34.91333333	349	42	1.20	0.12	5.41
				Fuel Option 2	1-story	13	8132.5	0	28.11785	0	27.755	404	0	1.66	0.00	1.38
					2-story	14	7801.25	0	26.3595	0	26.625	334	0	1.28	0.00	1.14
					3-story	15	7752.833333	0	26.0005	0	26.46	324	0	1.20	0.00	1.11
				Fuel Option 3	1-story	16	8124.5	0	28.11785	0	27.73	406	0	1.66	0.00	1.39
					2-story	17	7798	0	26.3595	0	26.615	331	0	1.28	0.00	1.13
					3-story	18	7748.666667	0	26.0005	0	26.445	323	0	1.20	0.00	1.10

Prototype of the simulation result for one county

County Name	Liberty
Division (East or West Texas)	East Texas
Number of new building permits for SFD	263

		Fuel Option 1	Fuel Option 2	Fuel Option 3	Total
		Elec. cooling, NG heating and NG water heating	All electricity	Elec. cooling, Heat pump heating and elec. water heating	
		77.1%	18.9%	4.0%	
Slab-on-grade (93.6%)	1-Story (59.8%)	43.16%	10.58%	2.24%	55.97%
	2-Story (40.2%)	29.01%	7.11%	1.51%	37.63%
Crawl spaces (6.4%)	1-Story (59.8%)	2.95%	0.72%	0.15%	3.83%
	2-Story (39.2%)	1.98%	0.49%	0.10%	2.57%
Total		77.10%	18.90%	4.00%	100.00%



Number of Houses for each simulation

		Fuel Option 1	Fuel Option 2	Fuel Option 3	Total
		Elec. cooling, NG heating and NG water heating	All electricity	Elec. cooling, Heat pump heating and elec. water heating	
		77.1%	18.9%	4.0%	
Slab-on-grade (93.6%)	1-Story (59.8%)	113	28	6	147
	2-Story (40.2%)	76	19	4	99
Crawl spaces (6.4%)	1-Story (59.8%)	8	2	0	10
	2-Story (39.2%)	5	1	0	7
Total		203	50	11	263

Precode Energy Use for each option (per house)

		Fuel Option 1		Fuel Option 2		Fuel Option 3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	14,381	365	19,135	0	18,905	0
	2-Story	13,516	357	18,114	0	17,932	0
Crawl spaces	1-Story	15,080	356	19,681	0	19,498	0
	2-Story	14,449	347	18,884	0	18,750	0
Total		57,426	1,425	75,814	0	75,085	0

Code compliant Energy Use for each option (per house)

		Fuel Option 1		Fuel Option 2		Fuel Option 3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	12,566	319	17,262	0	17,084	0
	2-Story	11,895	313	16,477	0	16,342	0
Crawl spaces	1-Story	13,298	310	17,835	0	17,694	0
	2-Story	12,794	302	17,204	0	17,095	0
Total		50,553	1,244	68,778	0	68,215	0

Precode Total Energy Use (For total houses in a County)

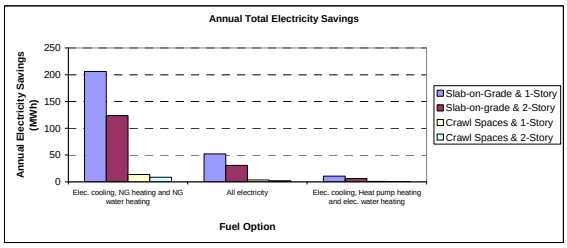
		Fuel Option 1		Fuel Option 2		Fuel Option 3		Total	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	1,632	41,427	532	0	111	0	2,276	41,427
	2-Story	1,031	27,238	339	0	71	0	1,441	27,238
Crawl spaces	1-Story	117	2,763	37	0	8	0	162	2,763
	2-Story	75	1,810	24	0	5	0	105	1,810
Total		2,856	73,238	933	0	195	0	3,984	73,238

Code compliant Total Energy Use (For total houses in a County)

		Fuel Option 1		Fuel Option 2		Fuel Option 3		Total	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	1,426	36,206	480	0	101	0	2,007	36,206
	2-Story	908	23,881	308	0	65	0	1,280	23,881
Crawl spaces	1-Story	103	2,406	34	0	7	0	144	2,406
	2-Story	67	1,576	22	0	5	0	93	1,576
Total		2,504	64,068	844	0	177	0	3,525	64,068

Total Energy Savings Due to the Code Adoption

		Fuel Option 1		Fuel Option 2		Fuel Option 3		Total	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)
Slab-on-grade	1-Story	206	5,221	52	0	11	0	269	5,221
	2-Story	124	3,357	31	0	6	0	161	3,357
Crawl spaces	1-Story	14	357	4	0	1	0	18	357
	2-Story	9	235	2	0	0	0	11	235
Total		352	9,170	88	0	18	0	459	9,170



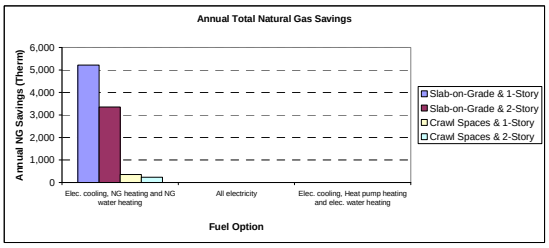


Table 183: Code and Pre-code Annual Simulation Results for Liberty County (Single-Family).

Precode Avg. OSD Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	60.13	0.75	68.93	0.00	68.93	0.00
	2-Story	56.73	0.75	65.53	0.00	65.53	0.00
Crawl spaces	1-Story	61.25	0.75	70.05	0.00	70.05	0.00
	2-Story	58.07	0.75	66.87	0.00	66.87	0.00
Total		236.19	3.00	271.36	0.00	271.36	0.00

Code compliant Avg. OSD Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	52.45	0.63	61.25	0.00	61.25	0.00
	2-Story	49.38	0.63	58.18	0.00	58.18	0.00
Crawl spaces	1-Story	53.69	0.63	62.48	0.00	62.48	0.00
	2-Story	50.83	0.63	59.62	0.00	59.62	0.00
Total		206.35	2.52	241.53	0.00	241.53	0.00

Precode Avg. OSD Total Energy Use (For total houses in a County)

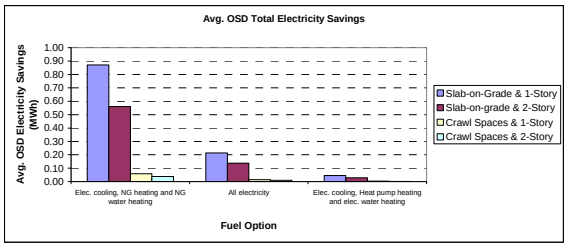
		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	6.82	85.03	1.92	0.00	0.41	0.00	9.15	85.03
	2-Story	4.33	57.16	1.23	0.00	0.26	0.00	5.81	57.16
Crawl spaces	1-Story	0.48	5.81	0.13	0.00	0.03	0.00	0.64	5.81
	2-Story	0.30	3.91	0.09	0.00	0.02	0.00	0.41	3.91
Total		11.93	151.90	3.36	0.00	0.71	0.00	16.01	151.90

Code compliant Avg. OSD Total Energy Use (For total houses in a County)

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	5.95	71.41	1.70	0.00	0.36	0.00	8.02	71.41
	2-Story	3.77	48.00	1.09	0.00	0.23	0.00	5.09	48.00
Crawl spaces	1-Story	0.42	4.88	0.12	0.00	0.03	0.00	0.56	4.88
	2-Story	0.27	3.28	0.08	0.00	0.02	0.00	0.36	3.28
Total		10.40	127.57	2.99	0.00	0.63	0.00	14.02	127.57

Avg. OSD Total Energy Savings Due to the Code Adoption

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)
Slab-on-grade	1-Story	0.87	13.62	0.21	0.00	0.05	0.00	1.13	13.62
	2-Story	0.56	9.16	0.14	0.00	0.03	0.00	0.73	9.16
Crawl spaces	1-Story	0.06	0.93	0.01	0.00	0.00	0.00	0.08	0.93
	2-Story	0.04	0.63	0.01	0.00	0.00	0.00	0.05	0.63
Total		1.53	24.33	0.37	0.00	0.08	0.00	1.98	24.33



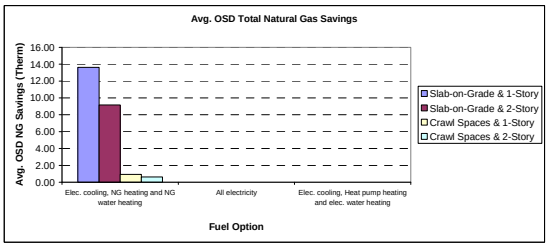
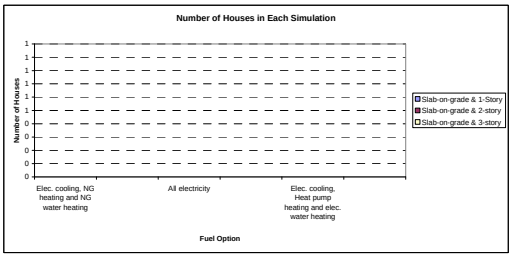


Table 184: Code and Pre-code Average OSD Simulation Results for Liberty County (Single-Family).

The simulation result for one county

County Name	Liberty
NAHB Division	West South Central
Number of new building permits for MF	0

		Fuel Option			Total
		1	2	3	
		Elec. cooling, NG heating and NG water heating	All electricity	Elec. cooling, Heat pump heating and elec. water heating	
		19.5%	66.4%	14.1%	
Slab-on-grade (100%)	1-Story (2.6%)	0.51%	1.73%	0.37%	2.60%
	2-Story (89.1%)	17.37%	59.16%	12.56%	89.10%
	3-Story (8.3%)	1.62%	5.51%	1.17%	8.30%
Total		19.50%	66.40%	14.10%	100.00%



Number of Houses for each simulation

		Fuel Option			Total
		1	2	3	
		Elec. cooling, NG heating and NG water heating	All electricity	Elec. cooling, Heat pump heating and elec. water heating	
		19.5%	66.4%	14.1%	
Slab-on-grade (100%)	1-Story (2.6%)	0	0	0	0
	2-Story (89.1%)	0	0	0	0
	3-Story (8.3%)	0	0	0	0
Total		0	0	0	0

Precode Energy Use for each option (per house)

		Fuel Option						
		1		2		3		
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating		
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	
Slab-on-grade	1-Story	6,363	210	8,537	0	8,531	0	
	2-Story	6,240	194	8,135	0	8,129	0	
	3-Story	6,272	189	8,076	0	8,071	0	
Total		18,874	593	24,748	0	24,731	0	

Code compliant Energy Use for each option (per house)

		Fuel Option						
		1		2		3		
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating		
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	
Slab-on-grade	1-Story	5,926	169	8,133	0	8,125	0	
	2-Story	5,889	152	7,801	0	7,798	0	
	3-Story	5,923	147	7,753	0	7,749	0	
Total		17,729	468	23,687	0	23,671	0	

Precode Total Energy Use (For total houses in a County)

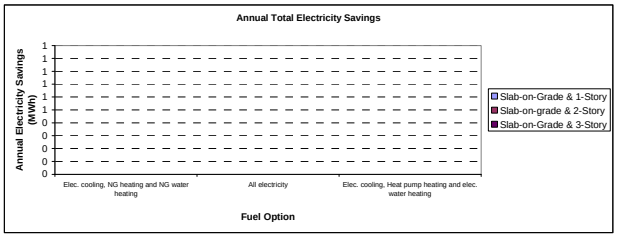
		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	0	0	0	0	0	0	0	0
	2-Story	0	0	0	0	0	0	0	0
	3-Story	0	0	0	0	0	0	0	0
Total		0	0	0	0	0	0	0	0

Code compliant Total Energy Use (For total houses in a County)

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	0	0	0	0	0	0	0	0
	2-Story	0	0	0	0	0	0	0	0
	3-Story	0	0	0	0	0	0	0	0
Total		0	0	0	0	0	0	0	0

Total Energy Savings Due to the Code Adoption

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	0	0	0	0	0	0	0	0
	2-Story	0	0	0	0	0	0	0	0
	3-Story	0	0	0	0	0	0	0	0
Total		0	0	0	0	0	0	0	0



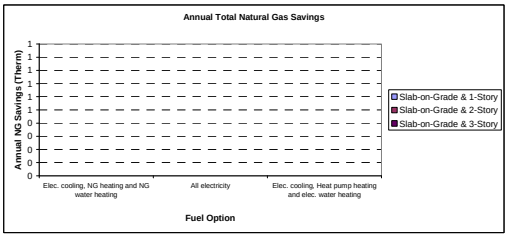


Table 185: Code and Pre-code Annual Simulation Results for Liberty County (Multi-Family).

Precode Avg. OSD Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	24.90	0.51	29.77	0.00	29.77	0.00
	2-Story	23.38	0.48	27.64	0.00	27.64	0.00
	3-Story	23.14	0.46	27.20	0.00	27.20	0.00
Total		71.42	1.45	84.62	0.00	84.62	0.00

Code compliant Avg. OSD Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	23.25	0.39	28.12	0.00	28.12	0.00
	2-Story	22.10	0.36	26.36	0.00	26.36	0.00
	3-Story	21.94	0.34	26.00	0.00	26.00	0.00
Total		67.28	1.09	80.48	0.00	80.48	0.00

Precode Avg. OSD Total Energy Use (For total houses in a County)

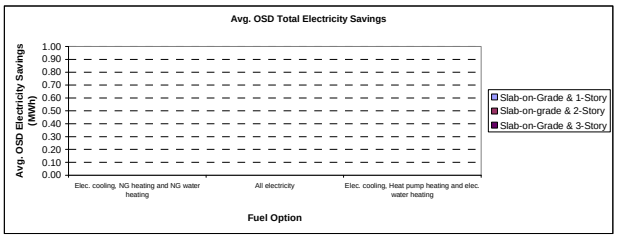
		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	2-Story	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3-Story	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Code compliant Avg. OSD Total Energy Use (For total houses in a County)

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	2-Story	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3-Story	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Total Energy Savings Due to the Code Adoption

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Savings (kWh)	NG Savings (Therm)	Elec. Savings (kWh)	NG Savings (Therm)	Elec. Savings (kWh)	NG Savings (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	2-Story	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3-Story	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00



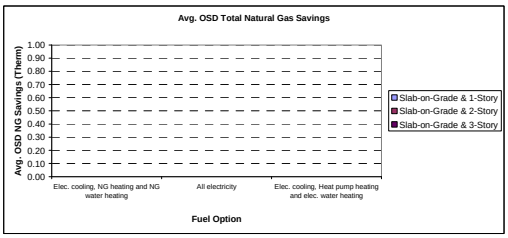


Table 186: Code and Pre-code Average OSD Simulation Results for Liberty County (Multi-Family).

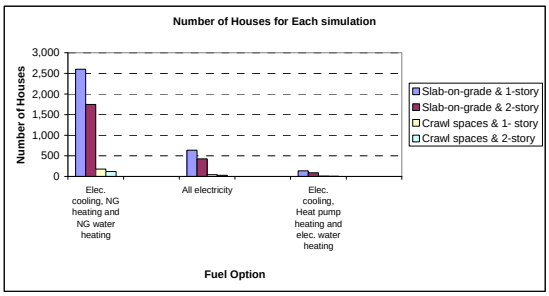
Table 187: Code and Pre-code Simulation Results for Individual Residence for Montgomery County (Single-Family and Multi-Family).

County	SF or MF	Precode or Code-compliant	Options			Simulation #	Annual Elec. (kWh/yr)	Annual NG (Therms/yr)	Avg. OSD Elec. (kWh/day) (Aug. 19)	Avg. OSD NG (Therm/day) (Aug. 19)	Total Annual (Elec. + NG) (MBtu)	Annual Elec.Savings (kWh/yr)	Annual NG Savings (Therms/yr)	Avg. OSD Elec. Savings (kWh/day) (Aug. 19)	Avg. OSD NG Savings (Therm/day) (Aug. 19)	Total Annual Savings (Elec. + NG) (MBtu)
Montgomery	SF	Precode	Slab-on-grade	Fuel Option 1	1-story	1	14290	363	60.1404	0.738051	85.09					
					2-story	2	13463	350	56.7035	0.738051	80.98					
				Fuel Option 2	1-story	3	19007	0	68.7554	0	64.87					
					2-story	4	17947	0	65.3184	0	61.25					
				Fuel Option 3	1-story	5	18815	0	68.7554	0	64.21					
					2-story	6	17834	0	65.3184	0	60.87					
			Crawl Space	Fuel Option 1	1-story	7	14944	352	60.8623	0.738051	86.23					
					2-story	8	14338	342	57.5327	0.738051	83.08					
				Fuel Option 2	1-story	9	19477	0	69.4772	0	66.48					
					2-story	10	18669	0	66.1476	0	63.72					
				Fuel Option 3	1-story	11	19334	0	69.4772	0	65.99					
					2-story	12	18574	0	66.1476	0	63.39					
		Code - Compliant	Slab-on-grade	Fuel Option 1	1-story	13	12556	316	52.6997	0.618051	74.49	1,734	47	7.44	0.12	10.60
					2-story	14	11919	306	49.6527	0.618051	71.28	1,544	44	7.05	0.12	9.70
				Fuel Option 2	1-story	15	17200	0	61.3145	0	58.7	1,807	0	7.44	0.00	6.17
					2-story	16	16377	0	58.2675	0	55.9	1,570	0	7.05	0.00	5.35
				Fuel Option 3	1-story	17	17070	0	61.3145	0	58.26	1,745	0	7.44	0.00	5.95
					2-story	18	16289	0	58.2675	0	55.59	1,545	0	7.05	0.00	5.28
			Crawl Space	Fuel Option 1	1-story	19	13236	305	53.4929	0.618051	75.64	1,708	47	7.37	0.12	10.59
					2-story	20	12760	295	50.5599	0.618051	73.07	1,578	47	6.97	0.12	10.01
				Fuel Option 2	1-story	21	17686	0	62.1077	0	60.36	1,791	0	7.37	0.00	6.12
					2-story	22	17038	0	59.1747	0	58.15	1,631	0	6.97	0.00	5.57
				Fuel Option 3	1-story	23	17591	0	62.1077	0	60.04	1,743	0	7.37	0.00	5.95
					2-story	24	16979	0	59.1747	0	57.95	1,595	0	6.97	0.00	5.44
	MF	Precode	Slab-on-grade	Fuel Option 1	1-story	1	6343.5	209	24.94285	0.504	42.525					
					2-story	2	6229	192.75	23.298675	0.471	40.5275					
					3-story	3	6270.833333	187.5	23.04266667	0.460001667	40.15833333					
				Fuel Option 2	1-story	4	8492	0	29.7152	0	28.985					
					2-story	5	8095	0	27.4745	0	27.6275					
					3-story	6	8045.5	0	27.01966667	0	27.45833333					
				Fuel Option 3	1-story	7	8491	0	29.7152	0	28.98					
					2-story	8	8095.75	0	27.4745	0	27.63					
					3-story	9	8046.333333	0	27.01966667	0	27.46166667					
		Code - Compliant	Slab-on-grade	Fuel Option 1	1-story	10	5936	166.5	23.3975	0.384001	36.93	408	43	1.55	0.12	5.60
					2-story	11	5894	150.25	22.1195	0.351	35.14	335	43	1.18	0.12	5.39
					3-story	12	5940	145	21.9065	0.340001667	34.76833333	331	43	1.14	0.12	5.39
				Fuel Option 2	1-story	13	8113.5	0	28.16985	0	27.69	379	0	1.55	0.00	1.30
					2-story	14	7781.75	0	26.29525	0	26.56	313	0	1.18	0.00	1.07
					3-story	15	7734.333333	0	25.8835	0	26.39666667	311	0	1.14	0.00	1.06
				Fuel Option 3	1-story	16	8113	0	28.16985	0	27.69	378	0	1.55	0.00	1.29
					2-story	17	7782.5	0	26.29525	0	26.5625	313	0	1.18	0.00	1.07
					3-story	18	7733.666667	0	25.8835	0	26.395	313	0	1.14	0.00	1.07

Prototype of the simulation result for one county

County Name	Montgomery
Division (East or West Texas)	East Texas
Number of new building permits for SFD	6,023

		Fuel Option			Total
		1	2	3	
		Elec. cooling, NG heating and NG water heating	All electricity	Elec. cooling, Heat pump heating and elec. water heating	
		77.1%	18.9%	4.0%	
Slab-on-grade (93.6%)	1-Story (59.8%)	43.16%	10.58%	2.24%	55.97%
	2-Story (40.2%)	29.01%	7.11%	1.51%	37.63%
Crawl spaces (6.4%)	1-Story (59.8%)	2.95%	0.72%	0.15%	3.83%
	2-Story (39.2%)	1.98%	0.49%	0.10%	2.57%
Total		77.10%	18.90%	4.00%	100.00%



Number of Houses for each simulation

		Fuel Option			Total
		1	2	3	
		Elec. cooling, NG heating and NG water heating	All electricity	Elec. cooling, Heat pump heating and elec. water heating	
		77.1%	18.9%	4.0%	
Slab-on-grade (93.6%)	1-Story (59.8%)	2,599	637	135	3,371
	2-Story (40.2%)	1,747	428	91	2,266
Crawl spaces (6.4%)	1-Story (59.8%)	178	44	9	231
	2-Story (39.2%)	119	29	6	155
Total		4,644	1,138	241	6,023

Precode Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	14,290	363	19,007	0	18,815	0
	2-Story	13,463	350	17,947	0	17,834	0
Crawl spaces	1-Story	14,944	352	19,477	0	19,334	0
	2-Story	14,338	342	18,669	0	18,574	0
Total		57,035	1,407	75,100	0	74,557	0

Code compliant Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	12,556	316	17,200	0	17,070	0
	2-Story	11,919	306	16,377	0	16,289	0
Crawl spaces	1-Story	13,236	305	17,686	0	17,591	0
	2-Story	12,760	295	17,038	0	16,979	0
Total		50,471	1,222	68,301	0	67,929	0

Precode Total Energy Use (For total houses in a County)

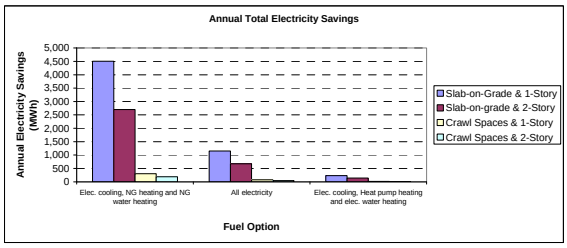
		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	37,143	943,520	12,111	0	2,537	0	51,791	943,520
	2-Story	23,524	611,557	7,687	0	1,617	0	32,828	611,557
Crawl spaces	1-Story	2,656	62,559	848	0	178	0	3,683	62,559
	2-Story	1,713	40,860	547	0	115	0	2,375	40,860
Total		65,036	1,658,496	21,193	0	4,447	0	90,676	1,658,496

Code compliant Total Energy Use (For total houses in a County)

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	32,638	821,356	10,959	0	2,302	0	45,897	821,356
	2-Story	20,826	534,676	7,015	0	1,477	0	29,317	534,676
Crawl spaces	1-Story	2,352	54,206	771	0	162	0	3,285	54,206
	2-Story	1,524	35,245	499	0	105	0	2,129	35,245
Total		57,339	1,445,483	19,243	0	4,046	0	80,628	1,445,483

Total Energy Savings Due to the Code Adoption

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)
Slab-on-grade	1-Story	4,507	122,164	1,151	0	235	0	5,894	122,164
	2-Story	2,698	76,881	672	0	140	0	3,510	76,881
Crawl spaces	1-Story	304	8,353	78	0	16	0	398	8,353
	2-Story	189	5,615	48	0	10	0	246	5,615
Total		7,697	213,014	1,950	0	401	0	10,048	213,014



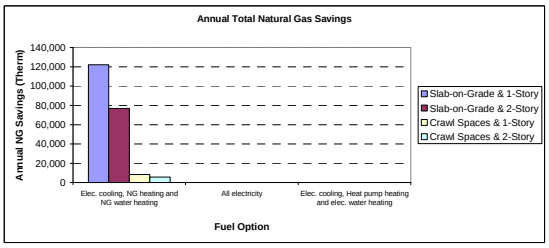


Table 188: Code and Pre-code Annual Simulation Results for Montgomery County (Single-Family).

Precode Avg. OSD Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	60.14	0.74	68.76	0.00	68.76	0.00
	2-Story	56.70	0.74	65.32	0.00	65.32	0.00
Crawl spaces	1-Story	60.88	0.74	69.48	0.00	69.48	0.00
	2-Story	57.53	0.74	66.15	0.00	66.15	0.00
Total		235.24	2.95	269.70	0.00	269.70	0.00

Code compliant Avg. OSD Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	52.70	0.62	61.31	0.00	61.31	0.00
	2-Story	49.65	0.62	58.27	0.00	58.27	0.00
Crawl spaces	1-Story	53.49	0.62	62.11	0.00	62.11	0.00
	2-Story	50.56	0.62	59.17	0.00	59.17	0.00
Total		206.41	2.47	240.86	0.00	240.86	0.00

Precode Avg. OSD Total Energy Use (For total houses in a County)

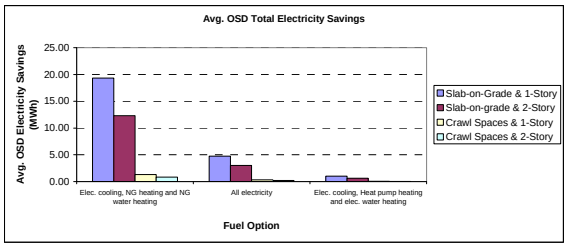
		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	156.32	1,918.36	43.81	0.00	9.27	0.00	209.40	1,918.36
	2-Story	99.08	1,289.60	27.98	0.00	5.92	0.00	132.98	1,289.60
Crawl spaces	1-Story	10.82	131.17	3.03	0.00	0.64	0.00	14.48	131.17
	2-Story	6.87	88.18	1.94	0.00	0.41	0.00	9.22	88.18
Total		273.09	3,427.31	76.75	0.00	16.24	0.00	366.08	3,427.31

Code compliant Avg. OSD Total Energy Use (For total houses in a County)

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	136.98	1,606.46	39.07	0.00	8.27	0.00	184.31	1,606.46
	2-Story	86.76	1,079.92	24.96	0.00	5.28	0.00	117.00	1,079.92
Crawl spaces	1-Story	9.51	109.84	2.71	0.00	0.57	0.00	12.79	109.84
	2-Story	6.04	73.84	1.73	0.00	0.37	0.00	8.14	73.84
Total		239.28	2,870.06	68.46	0.00	14.49	0.00	322.24	2,870.06

Avg. OSD Total Energy Savings Due to the Code Adoption

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)
Slab-on-grade	1-Story	19.34	311.91	4.74	0.00	1.00	0.00	25.08	311.91
	2-Story	12.32	209.68	3.02	0.00	0.64	0.00	15.98	209.68
Crawl spaces	1-Story	1.31	21.33	0.32	0.00	0.07	0.00	1.70	21.33
	2-Story	0.83	14.34	0.20	0.00	0.04	0.00	1.08	14.34
Total		33.80	557.25	8.29	0.00	1.75	0.00	43.84	557.25



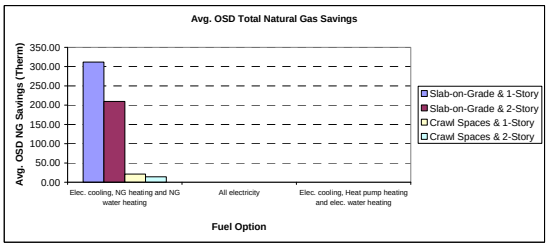
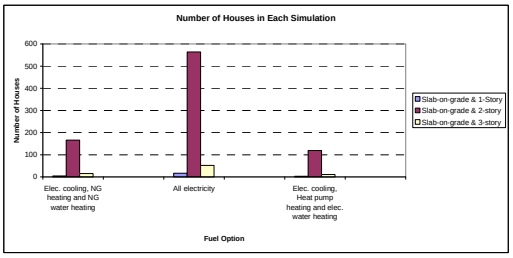


Table 189: Code and Pre-code Average OSD Simulation Results for Montgomery County (Single-Family).

The simulation result for one county

County Name	Montgomery
NAHB Division	West South Central
Number of new building permits for MF	954

		Fuel Option			Total
		1	2	3	
		Elec. cooling, NG heating and NG water heating	All electricity	Elec. cooling, Heat pump heating and elec. water heating	
		19.5%	66.4%	14.1%	
Slab-on-grade (100%)	1-Story (2.6%)	0.51%	1.73%	0.37%	2.60%
	2-Story (89.1%)	17.37%	59.16%	12.56%	89.10%
	3-Story (8.3%)	1.62%	5.51%	1.17%	8.30%
Total		19.50%	66.40%	14.10%	100.00%



Number of Houses for each simulation

		Fuel Option			Total
		1	2	3	
		Elec. cooling, NG heating and NG water heating	All electricity	Elec. cooling, Heat pump heating and elec. water heating	
		19.5%	66.4%	14.1%	
Slab-on-grade (100%)	1-Story (2.6%)	5	16	3	25
	2-Story (89.1%)	166	564	120	850
	3-Story (8.3%)	15	53	11	79
Total		186	633	135	954

Precode Energy Use for each option (per house)

		Fuel Option						
		1		2		3		
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating		
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	
Slab-on-grade	1-Story	6,344	209	8,492	0	8,491	0	
	2-Story	6,229	193	8,095	0	8,096	0	
	3-Story	6,271	188	8,046	0	8,046	0	
Total		18,843	589	24,633	0	24,633	0	

Code compliant Energy Use for each option (per house)

		Fuel Option						
		1		2		3		
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating		
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	
Slab-on-grade	1-Story	5,936	167	8,114	0	8,113	0	
	2-Story	5,894	150	7,782	0	7,783	0	
	3-Story	5,940	145	7,734	0	7,734	0	
Total		17,770	462	23,630	0	23,629	0	

Precode Total Energy Use (For total houses in a County)

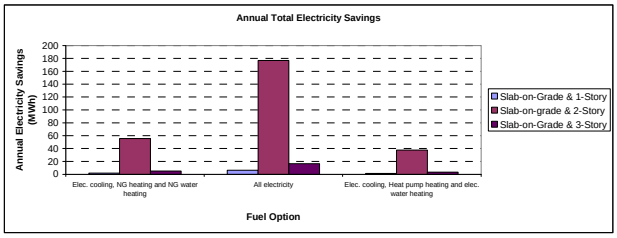
		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	31	1,011	140	0	30	0	200	1,011
	2-Story	1,032	31,949	4,569	0	970	0	6,572	31,949
	3-Story	97	2,895	423	0	90	0	610	2,895
Total		1,160	35,855	5,132	0	1,090	0	7,382	35,855

Code compliant Total Energy Use (For total houses in a County)

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	29	805	134	0	28	0	191	805
	2-Story	977	24,904	4,392	0	933	0	6,302	24,904
	3-Story	92	2,239	407	0	86	0	585	2,239
Total		1,097	27,949	4,932	0	1,047	0	7,077	27,949

Total Energy Savings Due to the Code Adoption

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	2	206	6	0	1	0	10	206
	2-Story	56	7,044	177	0	38	0	270	7,044
	3-Story	5	656	16	0	3	0	23	656
Total		63	7,906	199	0	42	0	304	7,906



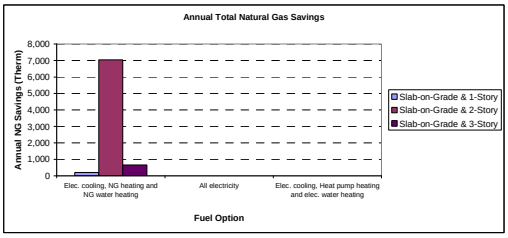


Table 190: Code and Pre-code Annual Simulation Results for Montgomery County (Multi-Family).

Precode Avg. OSD Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	24.94	0.50	29.72	0.00	29.72	0.00
	2-Story	23.30	0.47	27.47	0.00	27.47	0.00
	3-Story	23.04	0.46	27.02	0.00	27.02	0.00
Total		71.28	1.44	84.21	0.00	84.21	0.00

Code compliant Avg. OSD Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	23.40	0.38	28.17	0.00	28.17	0.00
	2-Story	22.12	0.35	26.30	0.00	26.30	0.00
	3-Story	21.91	0.34	25.88	0.00	25.88	0.00
Total		67.42	1.06	80.35	0.00	80.35	0.00

Precode Avg. OSD Total Energy Use (For total houses in a County)

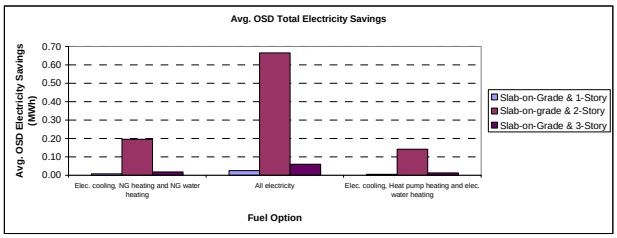
		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	0.12	2.44	0.49	0.00	0.10	0.00	0.71	2.44
	2-Story	3.86	78.07	15.51	0.00	3.29	0.00	22.66	78.07
	3-Story	0.36	7.10	1.42	0.00	0.30	0.00	2.08	7.10
Total		4.34	87.61	17.42	0.00	3.70	0.00	25.45	87.61

Code compliant Avg. OSD Total Energy Use (For total houses in a County)

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	0.11	1.86	0.46	0.00	0.10	0.00	0.68	1.86
	2-Story	3.67	58.18	14.84	0.00	3.15	0.00	21.66	58.18
	3-Story	0.34	5.25	1.36	0.00	0.29	0.00	1.99	5.25
Total		4.13	65.29	16.67	0.00	3.54	0.00	24.32	65.29

Total Energy Savings Due to the Code Adoption

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Savings (kWh)	NG Savings (Therm)	Elec. Savings (kWh)	NG Savings (Therm)	Elec. Savings (kWh)	NG Savings (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	0.01	0.58	0.03	0.00	0.01	0.00	0.04	0.58
	2-Story	0.20	19.89	0.67	0.00	0.14	0.00	1.00	19.89
	3-Story	0.02	1.85	0.06	0.00	0.01	0.00	0.09	1.85
Total		0.22	22.32	0.75	0.00	0.16	0.00	1.13	22.32



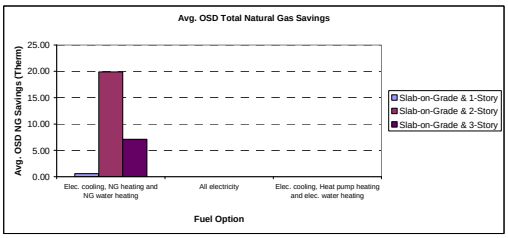


Table 191: Code and Pre-code Average OSD Simulation Results for Montgomery County (Multi-Family).

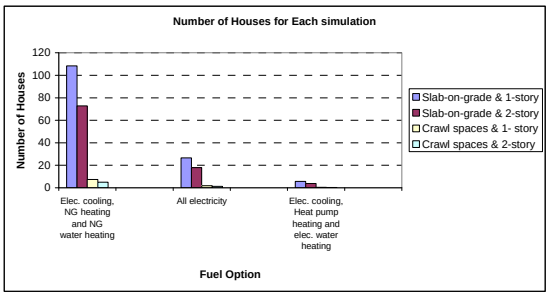
Table 192: Code and Pre-code Simulation Results for Individual Residence for Orange County (Single-Family and Multi-Family).

County	SF or MF	Precode or Code-compliant	Options			Simulation #	Annual Elec. (kWh/yr)	Annual NG (Therms/yr)	Avg. OSD Elec. (kWh/day) (Aug. 19)	Avg. OSD NG (Therm/day) (Aug. 19)	Total Annual (Elec. + NG) (MBtu)	Annual Elec.Savings (kWh/yr)	Annual NG Savings (Therms/yr)	Avg. OSD Elec. Savings (kWh/day) (Aug. 19)	Avg. OSD NG Savings (Therm/day) (Aug. 19)	Total Annual Savings (Elec. + NG) (MBtu)
Orange	SF	Precode	Slab-on-grade	Fuel Option 1	1-story	1	14330	366	59.9205	0.749138	85.51					
					2-story	2	13467	358	56.5222	0.749138	81.73					
				Fuel Option 2	1-story	3	19099	0	68.7145	0	65.19					
					2-story	4	18082	0	65.3162	0	61.71					
				Fuel Option 3	1-story	5	18865	0	68.7145	0	64.39					
					2-story	6	17901	0	65.3162	0	61.1					
			Crawl Space	Fuel Option 1	1-story	7	15025	357	61.0389	0.749138	86.99					
					2-story	8	14391	348	57.8558	0.749138	83.91					
				Fuel Option 2	1-story	9	19640	0	69.833	0	67.03					
					2-story	10	18842	0	66.6497	0	64.31					
				Fuel Option 3	1-story	11	19456	0	69.833	0	66.4					
					2-story	12	18708	0	66.6497	0	63.85					
		Code - Compliant	Slab-on-grade	Fuel Option 1	1-story	13	12537	320	52.31	0.629138	74.77	1,793	46	7.61	0.12	10.74
					2-story	14	11867	314	49.2463	0.629138	71.9	1,600	44	7.28	0.12	9.83
				Fuel Option 2	1-story	15	17247	0	61.1041	0	58.86	1,852	0	7.61	0.00	6.33
					2-story	16	16464	0	58.0403	0	56.19	1,618	0	7.28	0.00	5.52
				Fuel Option 3	1-story	17	17064	0	61.1041	0	58.24	1,801	0	7.61	0.00	6.15
					2-story	18	16325	0	58.0403	0	55.72	1,576	0	7.28	0.00	5.38
			Crawl Space	Fuel Option 1	1-story	19	13264	311	53.5441	0.629138	76.33	1,761	46	7.49	0.12	10.66
					2-story	20	12759	303	50.6836	0.629138	73.86	1,632	45	7.17	0.12	10.05
				Fuel Option 2	1-story	21	17815	0	62.3382	0	60.8	1,825	0	7.49	0.00	6.23
					2-story	22	17181	0	59.4776	0	58.64	1,661	0	7.17	0.00	5.67
				Fuel Option 3	1-story	23	17670	0	62.3382	0	60.31	1,786	0	7.49	0.00	6.09
					2-story	24	17077	0	59.4776	0	58.28	1,631	0	7.17	0.00	5.57
	MF	Precode	Slab-on-grade	Fuel Option 1	1-story	1	6362.5	210	24.90165	0.509875	42.725					
					2-story	2	6239.5	194.25	23.378575	0.4761425	40.73					
					3-story	3	6271.666667	189.16667	23.14116667	0.464898333	40.325					
				Fuel Option 2	1-story	4	8536.5	0	29.7733	0	29.135					
					2-story	5	8135.25	0	27.64125	0	27.765					
					3-story	6	8076.333333	0	27.20083333	0	27.565					
				Fuel Option 3	1-story	7	8530.5	0	29.7733	0	29.115					
					2-story	8	8129	0	27.64125	0	27.745					
					3-story	9	8071.333333	0	27.20083333	0	27.54666667					
		Code - Compliant	Slab-on-grade	Fuel Option 1	1-story	10	5925.5	168.5	23.24625	0.389877	37.06	437	42	1.66	0.12	5.67
					2-story	11	5879.5	152.25	22.096975	0.3561425	35.2825	360	42	1.28	0.12	5.45
					3-story	12	5923	147	21.94083333	0.344898333	34.91333333	349	42	1.20	0.12	5.41
				Fuel Option 2	1-story	13	8132.5	0	28.11785	0	27.755	404	0	1.66	0.00	1.38
					2-story	14	7801.25	0	26.3595	0	26.625	334	0	1.28	0.00	1.14
					3-story	15	7752.833333	0	26.0005	0	26.46	324	0	1.20	0.00	1.11
				Fuel Option 3	1-story	16	8124.5	0	28.11785	0	27.73	406	0	1.66	0.00	1.39
					2-story	17	7798	0	26.3595	0	26.615	331	0	1.28	0.00	1.13
					3-story	18	7748.666667	0	26.0005	0	26.445	323	0	1.20	0.00	1.10

Prototype of the simulation result for one county

County Name	Orange
Division (East or West Texas)	East Texas
Number of new building permits for SFD	251

		Fuel Option			Total
		1	2	3	
		Elec. cooling, NG heating and NG water heating	All electricity	Elec. cooling, Heat pump heating and elec. water heating	
		77.1%	18.9%	4.0%	
Slab-on-grade (93.6%)	1-Story (59.8%)	43.16%	10.58%	2.24%	55.97%
	2-Story (40.2%)	29.01%	7.11%	1.51%	37.63%
Crawl spaces (6.4%)	1-Story (59.8%)	2.95%	0.72%	0.15%	3.83%
	2-Story (39.2%)	1.98%	0.49%	0.10%	2.57%
Total		77.10%	18.90%	4.00%	100.00%



Number of Houses for each simulation

		Fuel Option			Total
		1	2	3	
		Elec. cooling, NG heating and NG water heating	All electricity	Elec. cooling, Heat pump heating and elec. water heating	
		77.1%	18.9%	4.0%	
Slab-on-grade (93.6%)	1-Story (59.8%)	108	27	6	140
	2-Story (40.2%)	73	18	4	94
Crawl spaces (6.4%)	1-Story (59.8%)	7	2	0	10
	2-Story (39.2%)	5	1	0	6
Total		194	47	10	251

Precode Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	14,330	366	19,099	0	18,865	0
	2-Story	13,467	358	18,082	0	17,901	0
Crawl spaces	1-Story	15,025	357	19,640	0	19,456	0
	2-Story	14,391	348	18,842	0	18,708	0
Total		57,213	1,429	75,663	0	74,930	0

Code compliant Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	12,537	320	17,247	0	17,064	0
	2-Story	11,867	314	16,464	0	16,325	0
Crawl spaces	1-Story	13,264	311	17,815	0	17,670	0
	2-Story	12,759	303	17,181	0	17,077	0
Total		50,427	1,248	68,707	0	68,136	0

Precode Total Energy Use (For total houses in a County)

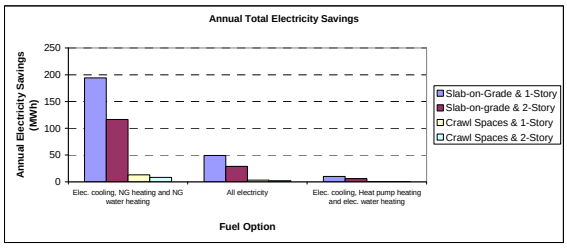
		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	1,552	39,645	507	0	106	0	2,165	39,645
	2-Story	981	26,068	323	0	68	0	1,371	26,068
Crawl spaces	1-Story	111	2,644	36	0	7	0	154	2,644
	2-Story	72	1,733	23	0	5	0	99	1,733
Total		2,716	70,090	889	0	186	0	3,790	70,090

Code compliant Total Energy Use (For total houses in a County)

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	1,358	34,662	458	0	96	0	1,912	34,662
	2-Story	864	22,864	294	0	62	0	1,220	22,864
Crawl spaces	1-Story	98	2,303	32	0	7	0	137	2,303
	2-Story	64	1,509	21	0	4	0	89	1,509
Total		2,384	61,339	805	0	169	0	3,358	61,339

Total Energy Savings Due to the Code Adoption

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)
Slab-on-grade	1-Story	194	4,983	49	0	10	0	254	4,983
	2-Story	117	3,204	29	0	6	0	151	3,204
Crawl spaces	1-Story	13	341	3	0	1	0	17	341
	2-Story	8	224	2	0	0	0	11	224
Total		332	8,751	83	0	17	0	432	8,751



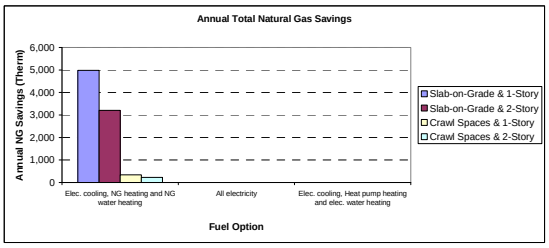


Table 193: Code and Pre-code Annual Simulation Results for Orange County (Single-Family).

Precode Avg. OSD Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	59.92	0.75	68.71	0.00	68.71	0.00
	2-Story	56.52	0.75	65.32	0.00	65.32	0.00
Crawl spaces	1-Story	61.04	0.75	69.83	0.00	69.83	0.00
	2-Story	57.86	0.75	66.65	0.00	66.65	0.00
Total		235.34	3.00	270.51	0.00	270.51	0.00

Code compliant Avg. OSD Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	52.31	0.63	61.10	0.00	61.10	0.00
	2-Story	49.25	0.63	58.04	0.00	58.04	0.00
Crawl spaces	1-Story	53.54	0.63	62.34	0.00	62.34	0.00
	2-Story	50.68	0.63	59.48	0.00	59.48	0.00
Total		205.78	2.52	240.96	0.00	240.96	0.00

Precode Avg. OSD Total Energy Use (For total houses in a County)

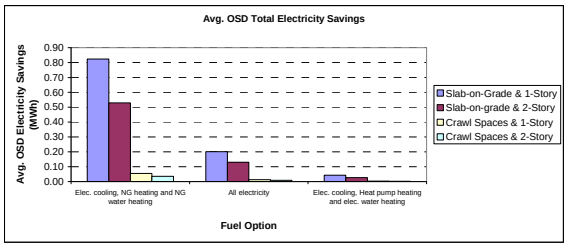
		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	6.49	81.15	1.82	0.00	0.39	0.00	8.70	81.15
	2-Story	4.12	54.55	1.17	0.00	0.25	0.00	5.53	54.55
Crawl spaces	1-Story	0.45	5.55	0.13	0.00	0.03	0.00	0.61	5.55
	2-Story	0.29	3.73	0.08	0.00	0.02	0.00	0.39	3.73
Total		11.35	144.97	3.20	0.00	0.68	0.00	15.22	144.97

Code compliant Avg. OSD Total Energy Use (For total houses in a County)

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	5.67	68.15	1.62	0.00	0.34	0.00	7.63	68.15
	2-Story	3.59	45.81	1.04	0.00	0.22	0.00	4.84	45.81
Crawl spaces	1-Story	0.40	4.66	0.11	0.00	0.02	0.00	0.53	4.66
	2-Story	0.25	3.13	0.07	0.00	0.02	0.00	0.34	3.13
Total		9.90	121.75	2.84	0.00	0.60	0.00	13.35	121.75

Avg. OSD Total Energy Savings Due to the Code Adoption

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)
Slab-on-grade	1-Story	0.82	13.00	0.20	0.00	0.04	0.00	1.07	13.00
	2-Story	0.53	8.74	0.13	0.00	0.03	0.00	0.69	8.74
Crawl spaces	1-Story	0.08	0.89	0.01	0.00	0.00	0.00	0.07	0.89
	2-Story	0.04	0.60	0.01	0.00	0.00	0.00	0.05	0.60
Total		1.45	23.22	0.35	0.00	0.07	0.00	1.87	23.22



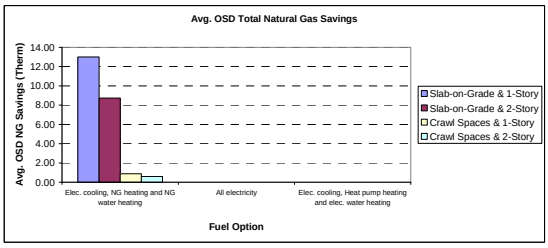
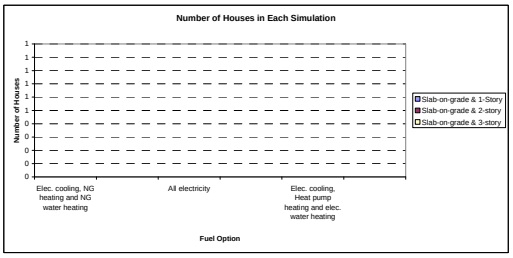


Table 194: Code and Pre-code Average OSD Simulation Results for Orange County (Single-Family).

The simulation result for one county

County Name	Orange
NAHB Division	West South Central
Number of new building permits for MF	0

		Fuel Option			Total
		1	2	3	
		Elec. cooling, NG heating and NG water heating	All electricity	Elec. cooling, Heat pump heating and elec. water heating	
		19.5%	66.4%	14.1%	
Slab-on-grade (100%)	1-Story (2.6%)	0.51%	1.73%	0.37%	2.60%
	2-Story (89.1%)	17.37%	59.16%	12.56%	89.10%
	3-Story (8.3%)	1.62%	5.51%	1.17%	8.30%
Total		19.50%	66.40%	14.10%	100.00%



Number of Houses for each simulation

		Fuel Option			Total
		1	2	3	
		Elec. cooling, NG heating and NG water heating	All electricity	Elec. cooling, Heat pump heating and elec. water heating	
		19.5%	66.4%	14.1%	
Slab-on-grade (100%)	1-Story (2.6%)	0	0	0	0
	2-Story (89.1%)	0	0	0	0
	3-Story (8.3%)	0	0	0	0
Total		0	0	0	0

Precode Energy Use for each option (per house)

		Fuel Option						
		1		2		3		
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating		
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	
Slab-on-grade	1-Story	6,363	210	8,537	0	8,531	0	
	2-Story	6,240	194	8,135	0	8,129	0	
	3-Story	6,272	189	8,076	0	8,071	0	
Total		18,874	593	24,748	0	24,731	0	

Code compliant Energy Use for each option (per house)

		Fuel Option						
		1		2		3		
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating		
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	
Slab-on-grade	1-Story	5,926	169	8,133	0	8,125	0	
	2-Story	5,889	152	7,801	0	7,798	0	
	3-Story	5,923	147	7,753	0	7,749	0	
Total		17,729	468	23,687	0	23,671	0	

Precode Total Energy Use (For total houses in a County)

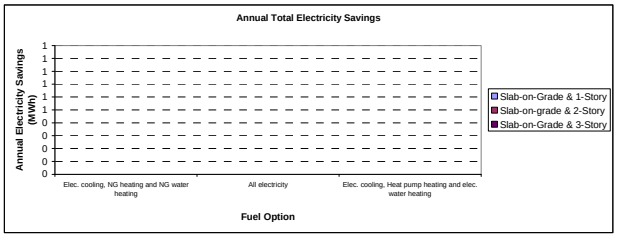
		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	0	0	0	0	0	0	0	0
	2-Story	0	0	0	0	0	0	0	0
	3-Story	0	0	0	0	0	0	0	0
Total		0	0	0	0	0	0	0	0

Code compliant Total Energy Use (For total houses in a County)

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	0	0	0	0	0	0	0	0
	2-Story	0	0	0	0	0	0	0	0
	3-Story	0	0	0	0	0	0	0	0
Total		0	0	0	0	0	0	0	0

Total Energy Savings Due to the Code Adoption

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	0	0	0	0	0	0	0	0
	2-Story	0	0	0	0	0	0	0	0
	3-Story	0	0	0	0	0	0	0	0
Total		0	0	0	0	0	0	0	0



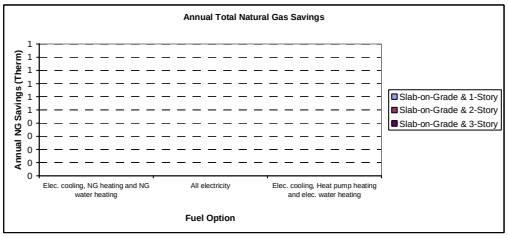


Table 195: Code and Pre-code Annual Simulation Results for Orange County (Multi-Family).

Precode Avg. OSD Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	24.90	0.51	29.77	0.00	29.77	0.00
	2-Story	23.38	0.48	27.64	0.00	27.64	0.00
	3-Story	23.14	0.46	27.20	0.00	27.20	0.00
Total		71.42	1.45	84.62	0.00	84.62	0.00

Code compliant Avg. OSD Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	23.25	0.39	28.12	0.00	28.12	0.00
	2-Story	22.10	0.36	26.36	0.00	26.36	0.00
	3-Story	21.94	0.34	26.00	0.00	26.00	0.00
Total		67.29	1.09	80.48	0.00	80.48	0.00

Precode Avg. OSD Total Energy Use (For total houses in a County)

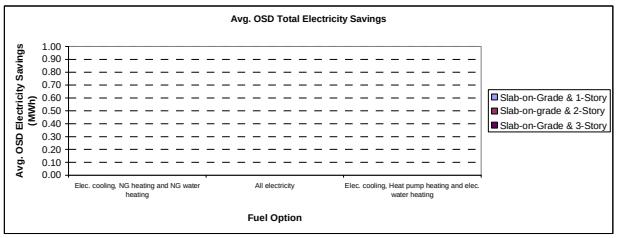
		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	2-Story	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3-Story	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Code compliant Avg. OSD Total Energy Use (For total houses in a County)

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	2-Story	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3-Story	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Total Energy Savings Due to the Code Adoption

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Savings (kWh)	NG Savings (Therm)	Elec. Savings (kWh)	NG Savings (Therm)	Elec. Savings (kWh)	NG Savings (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	2-Story	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3-Story	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00



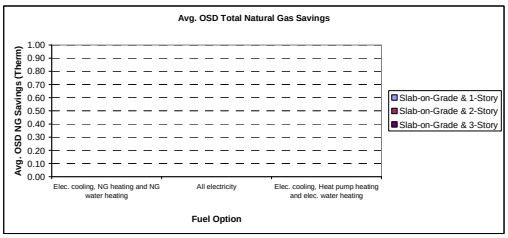


Table 196: Code and Pre-code Average OSD Simulation Results for Orange County (Multi-Family).

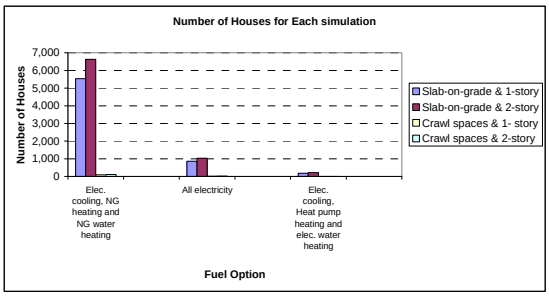
Table 197: Code and Pre-code Simulation Results for Individual Residence for Tarrant County (Single-Family and Multi-Family).

County	SF or MF	Precode or Code-compliant	Options			Simulation #	Annual Elec. (kWh/yr)	Annual NG (Therms/yr)	Avg. OSD Elec. (kWh/day) (Aug. 19)	Avg. OSD NG (Therm/day) (Aug. 19)	Total Annual (Elec. + NG) (MBtu)	Annual Elec.Savings (kWh/yr)	Annual NG Savings (Therms/yr)	Avg. OSD Elec. Savings (kWh/day) (Aug. 19)	Avg. OSD NG Savings (Therm/day) (Aug. 19)	Total Annual Savings (Elec. + NG) (MBtu)
Tarrant	SF	Precode	Slab-on-grade	Fuel Option 1	1-story	1	15553	505	72.9509	0.725762	103.55					
					2-story	2	14682	496	69.3702	0.725762	99.75					
				Fuel Option 2	1-story	3	22943	0	81.397	0	78.3					
					2-story	4	21896	0	77.8163	0	74.73					
				Fuel Option 3	1-story	5	21912	0	81.397	0	74.79					
					2-story	6	20940	0	77.8163	0	71.47					
			Crawl Space	Fuel Option 1	1-story	7	16101	482	73.7735	0.725762	103.11					
					2-story	8	15418	467	70.194	0.725762	99.27					
				Fuel Option 2	1-story	9	23049	0	82.2197	0	78.67					
					2-story	10	22062	0	78.6401	0	75.3					
				Fuel Option 3	1-story	11	22184	0	82.2197	0	75.71					
					2-story	12	21303	0	78.6401	0	72.71					
		Code - Compliant	Slab-on-grade	Fuel Option 1	1-story	13	13327	412	60.6811	0.605762	86.7	2,226	93	12.27	0.12	16.85
					2-story	14	12837	423	58.8682	0.605762	86.11	1,845	73	10.50	0.12	13.64
				Fuel Option 2	1-story	15	19710	0	69.1272	0	67.27	3,233	0	12.27	0.00	11.03
					2-story	16	19414	0	67.3143	0	66.26	2,482	0	10.50	0.00	8.47
				Fuel Option 3	1-story	17	19125	0	69.1272	0	65.27	2,787	0	12.27	0.00	9.52
					2-story	18	18771	0	67.3143	0	64.07	2,169	0	10.50	0.00	7.40
			Crawl Space	Fuel Option 1	1-story	19	13934	384	61.4937	0.605762	85.97	2,167	98	12.28	0.12	17.14
					2-story	20	13560	384	59.6806	0.605762	84.72	1,858	83	10.51	0.12	14.55
				Fuel Option 2	1-story	21	19803	0	69.9398	0	67.59	3,246	0	12.28	0.00	11.08
					2-story	22	19429	0	68.1267	0	66.31	2,633	0	10.51	0.00	8.99
				Fuel Option 3	1-story	23	19392	0	69.9398	0	66.18	2,792	0	12.28	0.00	9.53
					2-story	24	19019	0	68.1267	0	64.91	2,284	0	10.51	0.00	7.80
	MF	Precode	Slab-on-grade	Fuel Option 1	1-story	1	6177.5	244	26.48875	0.4974865	45.505					
					2-story	2	6026.5	221	24.75305	0.4653	42.68					
					3-story	3	6040	213.83333	24.47516667	0.454573333	41.99333333					
				Fuel Option 2	1-story	4	8939.5	0	31.1676	0	30.51					
					2-story	5	8380.75	0	28.847	0	28.6025					
					3-story	6	8267.5	0	28.37416667	0	28.21666667					
				Fuel Option 3	1-story	7	8847.5	0	31.1676	0	30.195					
					2-story	8	8324.5	0	28.847	0	28.4125					
					3-story	9	8214.833333	0	28.37416667	0	28.03666667					
		Code - Compliant	Slab-on-grade	Fuel Option 1	1-story	10	5836	205.5	24.807	0.3774865	40.46	342	39	1.68	0.12	5.05
					2-story	11	5754	181.5	23.4804	0.3453	37.7825	273	40	1.27	0.12	4.90
					3-story	12	5770.666667	173.83333	23.2485	0.334573333	37.07333333	269	40	1.23	0.12	4.92
				Fuel Option 2	1-story	13	8678	0	29.48585	0	29.615	262	0	1.68	0.00	0.90
					2-story	14	8171.5	0	27.5745	0	27.89	209	0	1.27	0.00	0.71
					3-story	15	8055.666667	0	27.14766667	0	27.49333333	212	0	1.23	0.00	0.72
				Fuel Option 3	1-story	16	8572	0	29.48585	0	29.255	276	0	1.68	0.00	0.94
					2-story	17	8110.25	0	27.5745	0	27.68	214	0	1.27	0.00	0.73
					3-story	18	7999.5	0	27.14766667	0	27.30166667	215	0	1.23	0.00	0.73

Prototype of the simulation result for one county

County Name	Tarrant
Division (East or West Texas)	West Texas
Number of new building permits for SFD	14,705

		Fuel Option			Total
		1	2	3	
		Elec. cooling, NG heating and NG water heating	All electricity	Elec. cooling, Heat pump heating and elec. water heating	
		84.1%	13.1%	2.8%	
Slab-on-grade (98.3%)	1-Story (45.5%)	37.61%	5.86%	1.25%	44.73%
	2-Story (54.5%)	45.06%	7.02%	1.50%	53.57%
Crawl spaces (1.7%)	1-Story (45.5%)	0.65%	0.10%	0.02%	0.77%
	2-Story (54.5%)	0.78%	0.12%	0.03%	0.93%
Total		84.10%	13.10%	2.80%	100.00%



Number of Houses for each simulation

		Fuel Option			Total
		1	2	3	
		Elec. cooling, NG heating and NG water heating	All electricity	Elec. cooling, Heat pump heating and elec. water heating	
		84.1%	13.1%	2.8%	
Slab-on-grade (98.3%)	1-Story (45.5%)	5,531	862	184	6,577
	2-Story (54.5%)	6,625	1,032	221	7,878
Crawl spaces (1.7%)	1-Story (45.5%)	96	15	3	114
	2-Story (54.5%)	115	18	4	136
Total		12,367	1,926	412	14,705

Precode Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	15,553	505	22,943	0	21,912	0
	2-Story	14,682	496	21,896	0	20,940	0
Crawl spaces	1-Story	16,101	482	23,049	0	22,184	0
	2-Story	15,418	467	22,062	0	21,303	0
Total		61,754	1,950	89,950	0	86,339	0

Code compliant Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	13,327	412	19,710	0	19,125	0
	2-Story	12,837	423	19,414	0	18,771	0
Crawl spaces	1-Story	13,934	384	19,803	0	19,392	0
	2-Story	13,560	384	19,429	0	19,019	0
Total		53,658	1,603	78,356	0	76,307	0

Precode Total Energy Use (For total houses in a County)

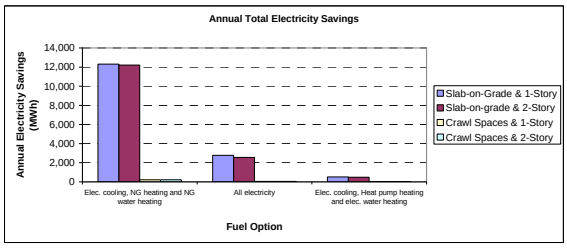
		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	86,028	2,793,298	19,767	0	4,035	0	109,831	2,793,298
	2-Story	97,274	3,286,193	22,597	0	4,619	0	124,490	3,286,190
Crawl spaces	1-Story	1,540	46,107	343	0	71	0	1,954	46,107
	2-Story	1,767	53,509	394	0	81	0	2,242	53,509
Total		186,609	6,179,104	43,102	0	8,806	0	238,517	6,179,104

Code compliant Total Energy Use (For total houses in a County)

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	73,715	2,278,889	16,982	0	3,522	0	94,219	2,278,889
	2-Story	85,050	2,802,537	20,036	0	4,141	0	109,228	2,802,537
Crawl spaces	1-Story	1,333	36,733	295	0	62	0	1,690	36,733
	2-Story	1,554	43,998	347	0	73	0	1,973	43,998
Total		161,652	5,162,157	37,659	0	7,797	0	207,108	5,162,157

Total Energy Savings Due to the Code Adoption

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)
Slab-on-grade	1-Story	12,313	514,409	2,786	0	513	0	15,611	514,409
	2-Story	12,224	483,653	2,561	0	478	0	15,264	483,653
Crawl spaces	1-Story	207	9,374	48	0	9	0	265	9,374
	2-Story	213	9,510	47	0	9	0	269	9,510
Total		24,957	1,016,947	5,442	0	1,009	0	31,408	1,016,947



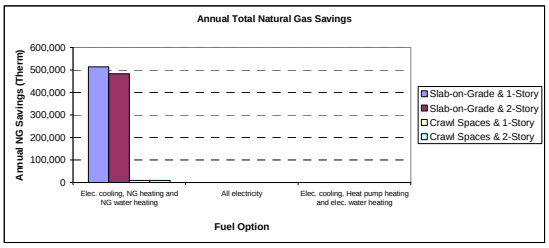


Table 198: Code and Pre-code Annual Simulation Results for Tarrant County (Single-Family).

Precode Avg. OSD Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	72.95	0.73	81.40	0.00	81.40	0.00
	2-Story	69.37	0.73	77.82	0.00	77.82	0.00
Crawl spaces	1-Story	73.77	0.73	82.22	0.00	82.22	0.00
	2-Story	70.19	0.73	78.64	0.00	78.64	0.00
Total		286.29	2.90	320.07	0.00	320.07	0.00

Code compliant Avg. OSD Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	60.68	0.61	69.13	0.00	69.13	0.00
	2-Story	58.87	0.61	67.31	0.00	67.31	0.00
Crawl spaces	1-Story	61.49	0.61	69.94	0.00	69.94	0.00
	2-Story	59.68	0.61	68.13	0.00	68.13	0.00
Total		240.72	2.42	274.51	0.00	274.51	0.00

Precode Avg. OSD Total Energy Use (For total houses in a County)

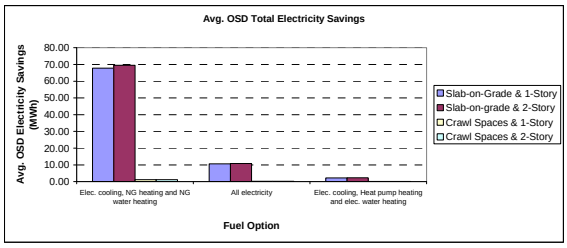
		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	403.51	4,014.40	70.13	0.00	14.99	0.00	488.63	4,014.40
	2-Story	459.60	4,808.45	80.31	0.00	17.16	0.00	557.08	4,808.45
Crawl spaces	1-Story	7.06	69.42	1.23	0.00	0.26	0.00	8.54	69.42
	2-Story	8.04	83.16	1.40	0.00	0.30	0.00	9.75	83.16
Total		878.22	8,975.43	153.07	0.00	32.72	0.00	1,064.00	8,975.43

Code compliant Avg. OSD Total Energy Use (For total houses in a County)

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	335.64	3,350.64	59.56	0.00	12.73	0.00	407.93	3,350.64
	2-Story	390.02	4,013.41	69.47	0.00	14.85	0.00	474.34	4,013.41
Crawl spaces	1-Story	5.88	57.95	1.04	0.00	0.22	0.00	7.15	57.95
	2-Story	6.84	69.41	1.22	0.00	0.26	0.00	8.31	69.41
Total		738.38	7,491.40	131.29	0.00	28.06	0.00	897.74	7,491.40

Avg. OSD Total Energy Savings Due to the Code Adoption

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)
Slab-on-grade	1-Story	67.87	663.75	10.57	0.00	2.26	0.00	80.70	663.75
	2-Story	69.58	795.05	10.84	0.00	2.32	0.00	82.73	795.05
Crawl spaces	1-Story	1.17	11.48	0.18	0.00	0.04	0.00	1.40	11.48
	2-Story	1.20	13.75	0.19	0.00	0.04	0.00	1.43	13.75
Total		139.83	1,484.03	21.78	0.00	4.66	0.00	166.26	1,484.03



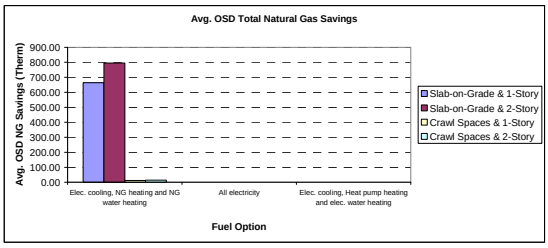
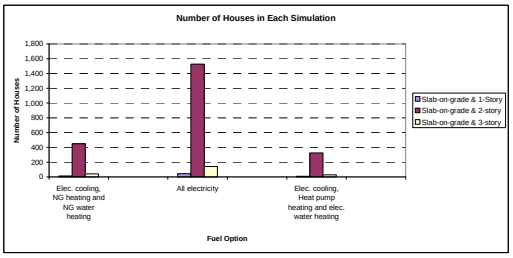


Table 199: Code and Pre-code Average OSD Simulation Results for Tarrant County (Single-Family).

The simulation result for one county

County Name	Tarrant
NAHB Division	West South Central
Number of new building permits for MF	2,583

		Fuel Option			Total
		1	2	3	
		Elec. cooling, NG heating and NG water heating	All electricity	Elec. cooling, Heat pump heating and elec. water heating	
		19.5%	66.4%	14.1%	
Slab-on-grade (100%)	1-Story (2.6%)	0.51%	1.73%	0.37%	2.60%
	2-Story (89.1%)	17.37%	59.16%	12.56%	89.10%
	3-Story (8.3%)	1.62%	5.51%	1.17%	8.30%
Total		19.50%	66.40%	14.10%	100.00%



Number of Houses for each simulation

		Fuel Option			Total
		1	2	3	
		Elec. cooling, NG heating and NG water heating	All electricity	Elec. cooling, Heat pump heating and elec. water heating	
		19.5%	66.4%	14.1%	
Slab-on-grade (100%)	1-Story (2.6%)	13	45	9	67
	2-Story (89.1%)	449	1,528	325	2,301
	3-Story (8.3%)	42	142	30	214
Total		504	1,715	364	2,583

Precode Energy Use for each option (per house)

		Fuel Option						
		1		2		3		
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating		
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	
Slab-on-grade	1-Story	6,178	244	8,940	0	8,849	0	
	2-Story	6,027	221	8,381	0	8,325	0	
	3-Story	6,040	214	8,268	0	8,215	0	
Total		18,244	679	25,588	0	25,387	0	

Code compliant Energy Use for each option (per house)

		Fuel Option						
		1		2		3		
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating		
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	
Slab-on-grade	1-Story	5,836	206	8,678	0	8,572	0	
	2-Story	5,754	182	8,172	0	8,110	0	
	3-Story	5,771	174	8,056	0	8,000	0	
Total		17,361	561	24,905	0	24,682	0	

Precode Total Energy Use (For total houses in a County)

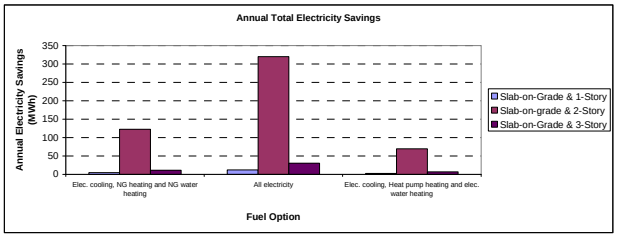
		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	81	3,195	399	0	84	0	563	3,195
	2-Story	2,705	99,181	12,807	0	2,701	0	18,213	99,181
	3-Story	253	8,939	1,177	0	248	0	1,678	8,939
Total		3,038	111,316	14,383	0	3,033	0	20,454	111,316

Code compliant Total Energy Use (For total houses in a County)

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	76	2,691	387	0	81	0	545	2,691
	2-Story	2,582	81,454	12,487	0	2,632	0	17,702	81,454
	3-Story	241	7,267	1,147	0	242	0	1,630	7,267
Total		2,900	91,413	14,021	0	2,955	0	19,876	91,413

Total Energy Savings Due to the Code Adoption

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	4	504	12	0	3	0	19	504
	2-Story	122	17,727	320	0	70	0	512	17,727
	3-Story	11	1,672	30	0	7	0	48	1,672
Total		138	19,903	362	0	79	0	578	19,903



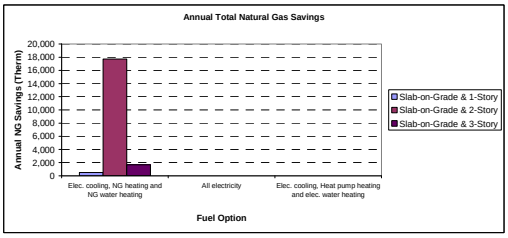


Table 200: Code and Pre-code Annual Simulation Results for Tarrant County (Multi-Family).

Precode Avg. OSD Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	26.49	0.50	31.17	0.00	31.17	0.00
	2-Story	24.75	0.47	28.85	0.00	28.85	0.00
	3-Story	24.48	0.45	28.37	0.00	28.37	0.00
Total		75.72	1.42	88.39	0.00	88.39	0.00

Code compliant Avg. OSD Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	24.81	0.38	29.49	0.00	29.49	0.00
	2-Story	23.48	0.35	27.57	0.00	27.57	0.00
	3-Story	23.25	0.33	27.15	0.00	27.15	0.00
Total		71.54	1.06	84.21	0.00	84.21	0.00

Precode Avg. OSD Total Energy Use (For total houses in a County)

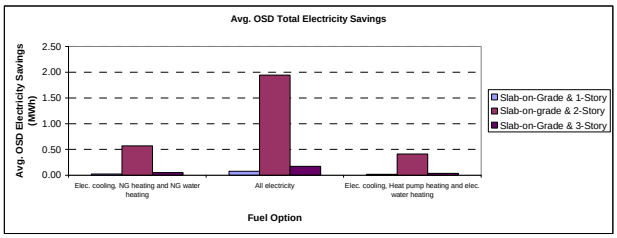
		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	0.35	6.51	1.39	0.00	0.36	0.00	2.03	6.51
	2-Story	11.11	208.82	44.08	0.00	9.36	0.00	64.55	208.82
	3-Story	1.02	19.00	4.04	0.00	0.86	0.00	5.92	19.00
Total		12.48	234.34	49.51	0.00	10.51	0.00	72.50	234.34

Code compliant Avg. OSD Total Energy Use (For total houses in a County)

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	0.32	4.94	1.31	0.00	0.28	0.00	1.92	4.94
	2-Story	10.54	154.96	42.14	0.00	8.95	0.00	61.62	154.96
	3-Story	0.97	13.95	3.86	0.00	0.82	0.00	5.66	13.95
Total		11.83	173.85	47.32	0.00	10.05	0.00	69.20	173.90

Total Energy Savings Due to the Code Adoption

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Savings (kWh)	NG Savings (Therm)	Elec. Savings (kWh)	NG Savings (Therm)	Elec. Savings (kWh)	NG Savings (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	0.02	1.57	0.07	0.00	0.02	0.00	0.11	1.57
	2-Story	0.57	53.85	1.94	0.00	0.41	0.00	2.93	53.85
	3-Story	0.05	5.02	0.17	0.00	0.04	0.00	0.26	5.02
Total		0.64	60.44	2.19	0.00	0.47	0.00	3.30	60.44



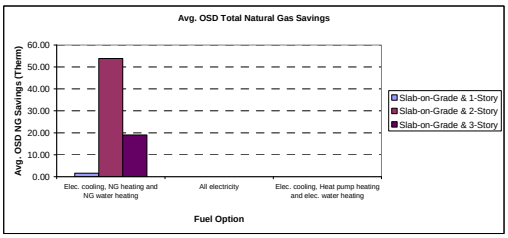


Table 201: Code and Pre-code Average OSD Simulation Results for Tarrant County (Multi-Family).

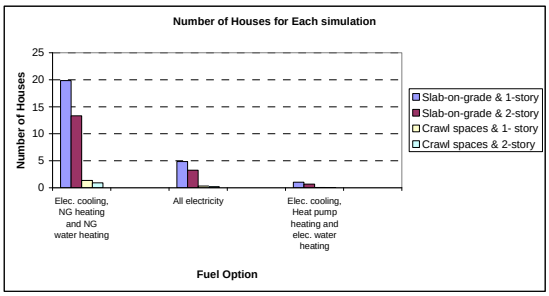
Table 202: Code and Pre-code Simulation Results for Individual Residence for Waller County (Single-Family and Multi-Family).

County	SF or MF	Precode or Code-compliant	Options			Simulation #	Annual Elec. (kWh/yr)	Annual NG (Therms/yr)	Avg. OSD Elec. (kWh/day) (Aug. 19)	Avg. OSD NG (Therm/day) (Aug. 19)	Total Annual (Elec. + NG) (MBtu)	Annual Elec.Savings (kWh/yr)	Annual NG Savings (Therms/yr)	Avg. OSD Elec. Savings (kWh/day) (Aug. 19)	Avg. OSD NG Savings (Therm/day) (Aug. 19)	Total Annual Savings (Elec. + NG) (MBtu)
Waller	SF	Precode	Slab-on-grade	Fuel Option 1	1-story	1	14288	363	60.1422	0.738051	85.08					
					2-story	2	13464	350	56.711	0.738051	80.98					
				Fuel Option 2	1-story	3	19003	0	68.7572	0	64.86					
					2-story	4	17945	0	65.3259	0	61.25					
				Fuel Option 3	1-story	5	18813	0	68.7572	0	64.21					
					2-story	6	17833	0	65.3259	0	60.86					
			Crawl Space	Fuel Option 1	1-story	7	14942	352	60.8627	0.738051	86.2					
					2-story	8	14339	341	57.5396	0.738051	83.07					
				Fuel Option 2	1-story	9	19473	0	69.4776	0	66.46					
					2-story	10	18666	0	66.1545	0	63.71					
				Fuel Option 3	1-story	11	19330	0	69.4776	0	65.97					
					2-story	12	18574	0	66.1545	0	63.39					
		Code - Compliant	Slab-on-grade	Fuel Option 1	1-story	13	12555	316	52.6998	0.618051	74.48	1,733	47	7.44	0.12	10.60
					2-story	14	11920	306	49.6583	0.618051	71.26	1,544	44	7.05	0.12	9.72
				Fuel Option 2	1-story	15	17197	0	61.3148	0	58.69	1,806	0	7.44	0.00	6.17
					2-story	16	16375	0	58.2731	0	55.89	1,570	0	7.05	0.00	5.36
				Fuel Option 3	1-story	17	17069	0	61.3148	0	58.26	1,744	0	7.44	0.00	5.95
					2-story	18	16289	0	58.2731	0	55.59	1,544	0	7.05	0.00	5.27
			Crawl Space	Fuel Option 1	1-story	19	13235	305	53.4929	0.618051	75.62	1,707	47	7.37	0.12	10.58
					2-story	20	12760	295	50.5649	0.618051	73.06	1,579	46	6.97	0.12	10.01
				Fuel Option 2	1-story	21	17682	0	62.1077	0	60.35	1,791	0	7.37	0.00	6.11
					2-story	22	17036	0	59.1797	0	58.14	1,630	0	6.97	0.00	5.57
				Fuel Option 3	1-story	23	17590	0	62.1077	0	60.04	1,740	0	7.37	0.00	5.93
					2-story	24	16978	0	59.1797	0	57.95	1,596	0	6.97	0.00	5.44
	MF	Precode	Slab-on-grade	Fuel Option 1	1-story	1	6343.5	209	24.94285	0.504	42.525					
					2-story	2	6229	192.75	23.298675	0.471	40.5275					
					3-story	3	6270.833333	187.5	23.04266667	0.460001667	40.15833333					
				Fuel Option 2	1-story	4	8492	0	29.7152	0	28.985					
					2-story	5	8095	0	27.4745	0	27.6275					
					3-story	6	8045.5	0	27.01966667	0	27.45833333					
				Fuel Option 3	1-story	7	8491	0	29.7152	0	28.98					
					2-story	8	8095.75	0	27.4745	0	27.63					
					3-story	9	8046.333333	0	27.01966667	0	27.46166667					
		Code - Compliant	Slab-on-grade	Fuel Option 1	1-story	10	5936	166.5	23.3975	0.384001	36.93	408	43	1.55	0.12	5.60
					2-story	11	5894	150.25	22.1195	0.351	35.14	335	43	1.18	0.12	5.39
					3-story	12	5940	145	21.9065	0.340001667	34.76833333	331	43	1.14	0.12	5.39
				Fuel Option 2	1-story	13	8113.5	0	28.16985	0	27.69	379	0	1.55	0.00	1.30
					2-story	14	7781.75	0	26.29525	0	26.56	313	0	1.18	0.00	1.07
					3-story	15	7734.333333	0	25.8835	0	26.39666667	311	0	1.14	0.00	1.06
				Fuel Option 3	1-story	16	8113	0	28.16985	0	27.69	378	0	1.55	0.00	1.29
					2-story	17	7782.5	0	26.29525	0	26.5625	313	0	1.18	0.00	1.07
					3-story	18	7733.666667	0	25.8835	0	26.395	313	0	1.14	0.00	1.07

Prototype of the simulation result for one county

County Name	Waller
Division (East or West Texas)	East Texas
Number of new building permits for SFD	46

		Fuel Option 1	Fuel Option 2	Fuel Option 3	Total
		Elec. cooling, NG heating and NG water heating	All electricity	Elec. cooling, Heat pump heating and elec. water heating	
		77.1%	18.9%	4.0%	
Slab-on-grade (93.6%)	1-Story (59.8%)	43.16%	10.58%	2.24%	55.97%
	2-Story (40.2%)	29.01%	7.11%	1.51%	37.63%
Crawl spaces (6.4%)	1-Story (59.8%)	2.95%	0.72%	0.15%	3.83%
	2-Story (39.2%)	1.98%	0.49%	0.10%	2.57%
Total		77.10%	18.90%	4.00%	100.00%



Number of Houses for each simulation

		Fuel Option 1	Fuel Option 2	Fuel Option 3	Total
		Elec. cooling, NG heating and NG water heating	All electricity	Elec. cooling, Heat pump heating and elec. water heating	
		77.1%	18.9%	4.0%	
Slab-on-grade (93.6%)	1-Story (59.8%)	20	5	1	26
	2-Story (40.2%)	13	3	1	17
Crawl spaces (6.4%)	1-Story (59.8%)	1	0	0	2
	2-Story (39.2%)	1	0	0	1
Total		35	9	2	46

Precode Energy Use for each option (per house)

		Fuel Option 1		Fuel Option 2		Fuel Option 3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	14,288	363	19,003	0	18,813	0
	2-Story	13,464	350	17,945	0	17,833	0
Crawl spaces	1-Story	14,942	352	19,473	0	19,330	0
	2-Story	14,339	341	18,668	0	18,574	0
Total		57,033	1,406	75,087	0	74,550	0

Code compliant Energy Use for each option (per house)

		Fuel Option 1		Fuel Option 2		Fuel Option 3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	12,555	316	17,197	0	17,069	0
	2-Story	11,920	306	16,375	0	16,289	0
Crawl spaces	1-Story	13,235	305	17,682	0	17,590	0
	2-Story	12,766	295	17,036	0	16,978	0
Total		50,476	1,222	68,290	0	67,926	0

Precode Total Energy Use (For total houses in a County)

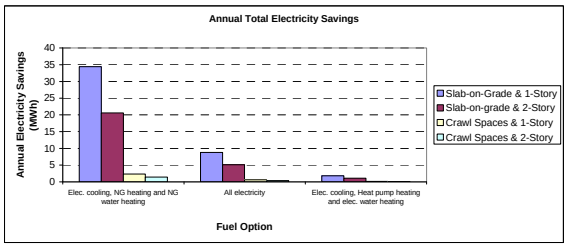
		Fuel Option 1		Fuel Option 2		Fuel Option 3		Total	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	284	7,206	92	0	19	0	395	7,206
	2-Story	180	4,671	59	0	12	0	251	4,671
Crawl spaces	1-Story	20	478	6	0	1	0	28	478
	2-Story	13	311	4	0	1	0	18	311
Total		497	12,666	162	0	34	0	692	12,666

Code compliant Total Energy Use (For total houses in a County)

		Fuel Option 1		Fuel Option 2		Fuel Option 3		Total	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	249	6,273	84	0	18	0	350	6,273
	2-Story	159	4,084	54	0	11	0	224	4,084
Crawl spaces	1-Story	18	414	6	0	1	0	25	414
	2-Story	12	269	4	0	1	0	16	269
Total		438	11,040	147	0	31	0	616	11,040

Total Energy Savings Due to the Code Adoption

		Fuel Option 1		Fuel Option 2		Fuel Option 3		Total	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)
Slab-on-grade	1-Story	34	933	9	0	2	0	45	933
	2-Story	21	587	5	0	1	0	27	587
Crawl spaces	1-Story	2	64	1	0	0	0	3	64
	2-Story	1	42	0	0	0	0	2	42
Total		59	1,626	15	0	3	0	77	1,626



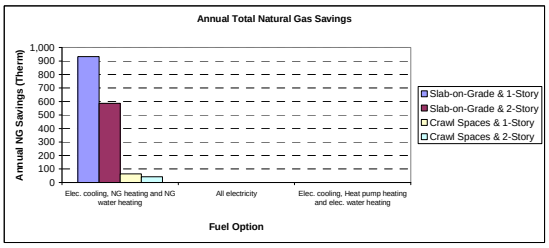


Table 203: Code and Pre-code Annual Simulation Results for Waller County (Single-Family).

Precode Avg. OSD Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	60.14	0.74	68.76	0.00	68.76	0.00
	2-Story	56.71	0.74	65.33	0.00	65.33	0.00
Crawl spaces	1-Story	60.88	0.74	69.48	0.00	69.48	0.00
	2-Story	57.54	0.74	66.15	0.00	66.15	0.00
Total		235.26	2.95	269.72	0.00	269.72	0.00

Code compliant Avg. OSD Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	52.70	0.62	61.31	0.00	61.31	0.00
	2-Story	49.66	0.62	58.27	0.00	58.27	0.00
Crawl spaces	1-Story	53.49	0.62	62.11	0.00	62.11	0.00
	2-Story	50.56	0.62	59.18	0.00	59.18	0.00
Total		206.42	2.47	240.88	0.00	240.88	0.00

Precode Avg. OSD Total Energy Use (For total houses in a County)

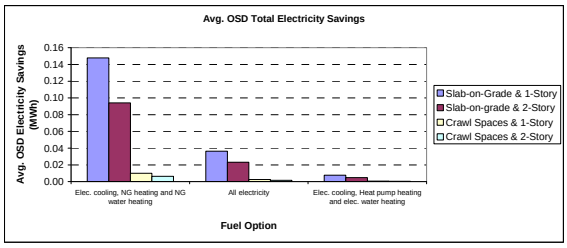
		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	1.19	14.65	0.33	0.00	0.07	0.00	1.60	14.65
	2-Story	0.76	9.85	0.21	0.00	0.05	0.00	1.02	9.85
Crawl spaces	1-Story	0.08	1.00	0.02	0.00	0.00	0.00	0.11	1.00
	2-Story	0.05	0.67	0.01	0.00	0.00	0.00	0.07	0.67
Total		2.08	26.18	0.59	0.00	0.12	0.00	2.80	26.18

Code compliant Avg. OSD Total Energy Use (For total houses in a County)

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	1.05	12.27	0.30	0.00	0.06	0.00	1.41	12.27
	2-Story	0.66	8.25	0.19	0.00	0.04	0.00	0.89	8.25
Crawl spaces	1-Story	0.07	0.84	0.02	0.00	0.00	0.00	0.10	0.84
	2-Story	0.05	0.56	0.01	0.00	0.00	0.00	0.06	0.56
Total		1.83	21.92	0.52	0.00	0.11	0.00	2.46	21.92

Avg. OSD Total Energy Savings Due to the Code Adoption

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)	Elec. Savings (MWh)	NG Savings (Therm)
Slab-on-grade	1-Story	0.15	2.38	0.04	0.00	0.01	0.00	0.19	2.38
	2-Story	0.09	1.60	0.02	0.00	0.00	0.00	0.12	1.60
Crawl spaces	1-Story	0.01	0.16	0.00	0.00	0.00	0.00	0.01	0.16
	2-Story	0.01	0.11	0.00	0.00	0.00	0.00	0.01	0.11
Total		0.26	4.26	0.06	0.00	0.01	0.00	0.33	4.26



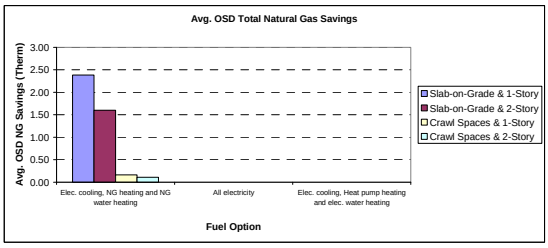
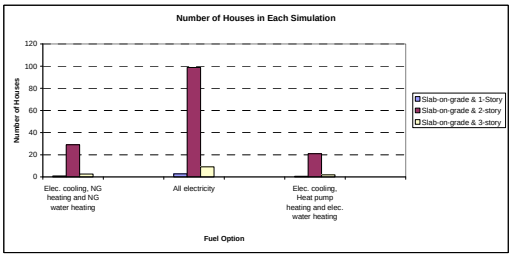


Table 204: Code and Pre-code Average OSD Simulation Results for Waller County (Single-Family).

The simulation result for one county

County Name	Waller
NAHB Division	West South Central
Number of new building permits for MF	167

		Fuel Option			Total
		1	2	3	
		Elec. cooling, NG heating and NG water heating	All electricity	Elec. cooling, Heat pump heating and elec. water heating	
		19.5%	66.4%	14.1%	
Slab-on-grade (100%)	1-Story (2.6%)	0.51%	1.73%	0.37%	2.60%
	2-Story (89.1%)	17.37%	59.16%	12.56%	89.10%
	3-Story (8.3%)	1.62%	5.51%	1.17%	8.30%
Total		19.50%	66.40%	14.10%	100.00%



Number of Houses for each simulation

		Fuel Option			Total
		1	2	3	
		Elec. cooling, NG heating and NG water heating	All electricity	Elec. cooling, Heat pump heating and elec. water heating	
		19.5%	66.4%	14.1%	
Slab-on-grade (100%)	1-Story (2.6%)	1	3	1	4
	2-Story (89.1%)	29	99	21	149
	3-Story (8.3%)	3	9	2	14
Total		33	111	24	167

Precode Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	8,344	209	8,492	0	8,491	0
	2-Story	6,225	193	8,095	0	8,096	0
	3-Story	6,271	188	8,046	0	8,046	0
Total		18,843	589	24,633	0	24,633	0

Code compliant Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	5,936	167	8,114	0	8,113	0
	2-Story	5,894	150	7,782	0	7,783	0
	3-Story	5,940	145	7,734	0	7,734	0
Total		17,770	462	23,630	0	23,629	0

Precode Total Energy Use (For total houses in a County)

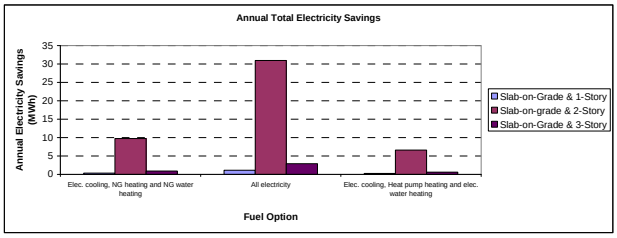
		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	5	177	24	0	5	0	35	177
	2-Story	181	5,593	800	0	170	0	1,150	5,593
	3-Story	17	507	74	0	16	0	107	507
Total		203	6,276	898	0	191	0	1,292	6,276

Code compliant Total Energy Use (For total houses in a County)

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	5	141	23	0	5	0	33	141
	2-Story	171	4,360	769	0	163	0	1,103	4,360
	3-Story	16	392	71	0	15	0	102	392
Total		192	4,892	863	0	183	0	1,239	4,892

Total Energy Savings Due to the Code Adoption

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	0	36	1	0	0	0	2	36
	2-Story	10	1,233	31	0	7	0	47	1,233
	3-Story	1	115	3	0	1	0	4	115
Total		11	1,384	35	0	7	0	53	1,384



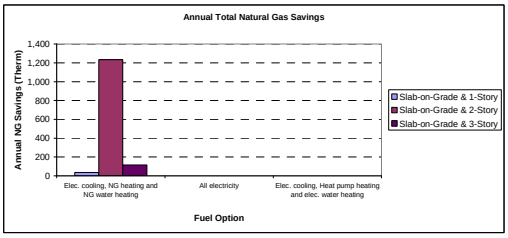


Table 205: Code and Pre-code Annual Simulation Results for Waller County (Multi-Family).

Precode Avg. OSD Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	24.94	0.50	29.72	0.00	29.72	0.00
	2-Story	23.30	0.47	27.47	0.00	27.47	0.00
	3-Story	23.04	0.46	27.02	0.00	27.02	0.00
Total		71.28	1.44	84.21	0.00	84.21	0.00

Code compliant Avg. OSD Energy Use for each option (per house)

		Fuel Option					
		1		2		3	
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating	
		Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	23.40	0.38	28.17	0.00	28.17	0.00
	2-Story	22.12	0.35	26.30	0.00	26.30	0.00
	3-Story	21.91	0.34	25.88	0.00	25.88	0.00
Total		67.42	1.06	80.35	0.00	80.35	0.00

Precode Avg. OSD Total Energy Use (For total houses in a County)

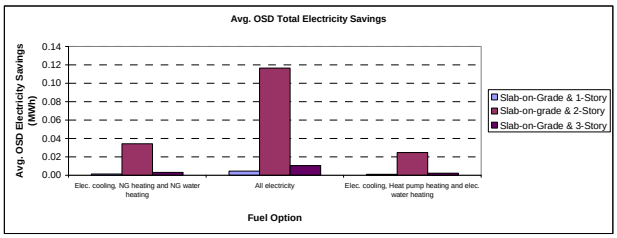
		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	0.02	0.43	0.09	0.00	0.02	0.00	0.12	0.43
	2-Story	0.68	13.67	2.71	0.00	0.58	0.00	3.97	13.67
	3-Story	0.06	1.24	0.25	0.00	0.05	0.00	0.36	1.24
Total		0.75	15.34	3.05	0.00	0.65	0.00	4.45	15.34

Code compliant Avg. OSD Total Energy Use (For total houses in a County)

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)	Elec. Use (MWh)	NG Use (Therm)
Slab-on-grade	1-Story	0.02	0.33	0.08	0.00	0.02	0.00	0.12	0.33
	2-Story	0.64	10.18	2.60	0.00	0.55	0.00	3.79	10.18
	3-Story	0.06	0.92	0.24	0.00	0.05	0.00	0.35	0.92
Total		0.72	11.43	2.92	0.00	0.62	0.00	4.26	11.43

Total Energy Savings Due to the Code Adoption

		Fuel Option						Total	
		1		2		3			
		Elec. cooling, NG heating and NG water heating		All electricity		Elec. cooling, Heat pump heating and elec. water heating			
		Elec. Savings (kWh)	NG Savings (Therm)	Elec. Savings (kWh)	NG Savings (Therm)	Elec. Savings (kWh)	NG Savings (Therm)	Elec. Use (kWh)	NG Use (Therm)
Slab-on-grade	1-Story	0.00	0.10	0.00	0.00	0.00	0.00	0.01	0.10
	2-Story	0.03	3.48	0.12	0.00	0.02	0.00	0.18	3.48
	3-Story	0.00	0.32	0.01	0.00	0.00	0.00	0.02	0.32
Total		0.04	3.91	0.13	0.00	0.03	0.00	0.20	3.91



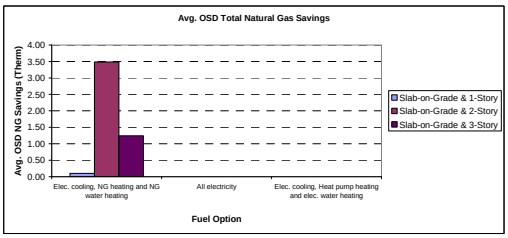


Table 206: Code and Pre-code Average OSD Simulation Results for Waller County (Multi-Family).