

## ENERGY SYSTEMS LABORATORY

Texas Engineering Experiment Station  
Texas A&M University System

3581 TAMU  
College Station, Texas 77843-3581

August 31<sup>st</sup>, 2007

To: Code Officials, Energy Raters, Manufacturers, State Agency Officials, Stakeholders and Citizens of Texas

Subject: 15% Above-Code Energy Efficiency Measures for Commercial Buildings in Texas

In the 79<sup>th</sup> Legislature (2005) the Energy Systems Laboratory was required to develop three alternative methods for achieving 15% above-code energy savings in new residential, commercial and industrial construction. The Laboratory has worked closely with code officials, energy raters, manufacturers, state officials and other stakeholders to develop cost effective energy efficiency measures.

In the pages that follow, 15% above-code measures for new commercial buildings are presented for the 41 non-attainment and affected counties in Texas, separated by climate area. Each page contains a description of the individual measures and combined measures that achieve 15% above-code savings, which are based on ASHRAE Standard 90.1-1999. These measures include envelope, HVAC systems, and plant equipment. Annual energy and demand savings, estimated costs, simple payback, and NOx emissions reductions are provided for commercial buildings.

Sincerely,

Jeff S. Haberl, Ph.D., P.E.  
Associate Director

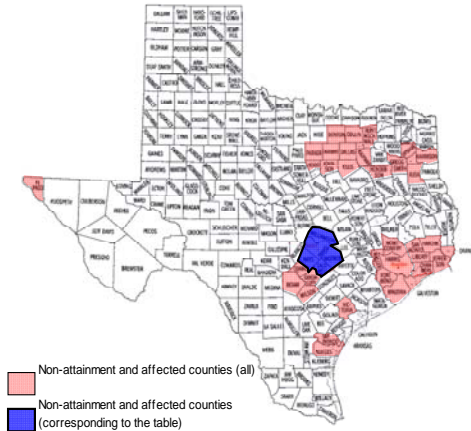
Charles C. Culp, Ph.D., P.E.  
Associate Director

Bahman L. Yazdani, P.E.  
Associate Director

# Natural Gas Heating (Bastrop, Caldwell, Hays, Travis and Williamson Counties)

Description of Individual Measures

Individual Measures	Annual Energy Savings (%)	Annual Energy Savings (\$/year)	Annual Demand Savings (%)	Annual Demand Savings (\$/year)	Combined Savings (Energy+Demand) (\$/year)	Estimated Cost (\$)	
						Marginal Cost <sup>1</sup>	New System Cost <sup>2</sup>
<b>A Envelope and Fenestration Measures</b>							
1 Glazing U Factor (1.22 to 0.45 Btu/hr-sf-F)	13.2%	\$9,512	3.1%	\$502	\$10,014	\$95,130 - \$174,150	
2 Lighting Load (1.3 to 1.0 w/sq-ft)	6.5%	\$16,417	10.6%	\$1,718	\$18,135	\$0 - \$0	
3 Occupancy Sensors Installation	11.5%	\$32,242	-3.6%	-\$576	\$31,667		\$26,500 - \$28,000
4 Shading (none to 2.5 ft overhangs)	1.6%	\$3,261	2.4%	\$395	\$3,656		\$67,900 - \$110,000
<b>B HVAC System Measures</b>							
5 Cold Deck Reset	5.7%	\$4,860	-0.8%	-\$124	\$4,736	\$0 - \$800	
6 Supply Fan Total Pressure (2.5 to 1.5 in-H2O)	1.4%	\$2,733	2.1%	\$337	\$3,070	\$0 - \$200	
<b>C Plant Equipment Measures</b>							
7 Chiller COP (4.9 to 6.1)	3.9%	\$7,815	6.0%	\$976	\$8,791	\$16,000 - \$18,000	
8 Boiler Efficiency (75% to 95%)	2.4%	\$1,121	0.0%	\$0	\$1,121	\$25,000 - \$35,000	
9 VSD on Chilled Water Pump (from Constant to VSD)	2.4%	\$4,755	0.8%	\$123	\$4,877	\$3,700 - \$4,700	
10 VSD on Hot Water Pump (from Constant to VSD)	2.3%	\$1,649	0.3%	\$47	\$1,696	\$4,000 - \$5,000	



Description of Combined Measures to Achieve 15% Above Code Savings

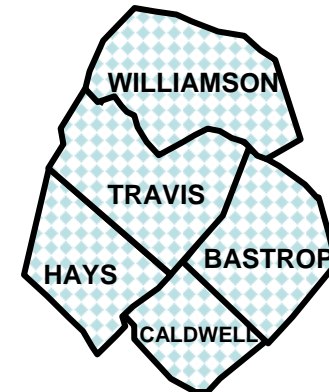
Combination of Measures <sup>3</sup>	Combined Energy Savings (%)	Combined Energy Savings (\$/year)	Combined Demand Savings (%)	Combined Demand Savings (\$/year)	Combined Savings (Energy+Demand) (\$/year)	Combined Estimated Cost (\$)		Combined Annual NOx Emissions Savings (lbs/year)	Combined Ozone Season Period NOx Emissions Savings (lbs/day)	Simple Estimated Payback (yrs)
						Marginal Cost <sup>1</sup>	New System Cost <sup>2</sup>			
<b>Combination 1</b>										
1 Glazing U Factor (1.22 to 0.45 Btu/hr-sf-F)	21.7%	\$27,563	13.7%	\$2,208	\$29,771	\$95,130 - \$174,150		345	1.01	3.5 - 6.3
2 Lighting Load (1.3 to 1.0 w/sq-ft)						\$0 - \$0				
<b>Combination 2</b>										
3 Occupancy Sensors Installation	19.6%	\$39,109	-4.2%	-\$678	\$38,431		\$26,500 - \$28,000	498	1.35	0.7 - 0.7
5 Cold Deck Reset						\$0 - \$800				
<b>Combination 3</b>										
1 Glazing U Factor (1.22 to 0.45 Btu/hr-sf-F)	17.1%	\$17,201	8.8%	\$1,425	\$18,626	\$95,130 - \$174,150		213	0.70	7.9 - 13.2
7 Chiller COP (4.9 to 6.1)						\$16,000 - \$18,000				
8 Boiler Efficiency (75% to 95%)						\$25,000 - \$35,000				

Note:

- Marginal cost = new system cost - original system cost
- New system cost = new system cost only
- See individual measures above for specific savings
  - \* Energy Cost: Electricity cost = \$0.119/kWh
  - Demand cost = \$5.00/kW
  - (Yearly demand cost = Sum of monthly demand cost for 12 months
  - Natural gas cost = \$0.80/therm

(Building Description)

- Building type: Office
- Gross area: 89,340 sq-ft
- Building dimension: 122ft x 122ft x 78ft (WxLxH)
- Number of floors: 6
- Floor-to-floor height: 13ft
- Window-to-wall ratio: 50%



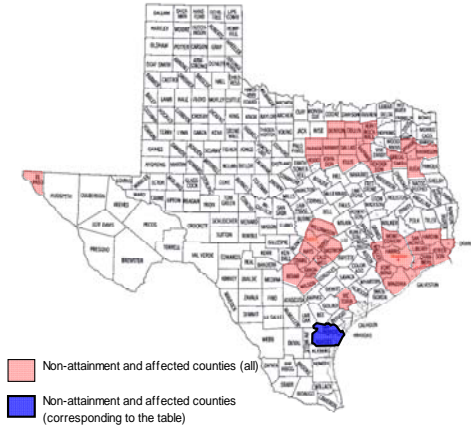
**Table 1a: 15% Above Code Savings (Commercial – Natural Gas Heating) for Bastrop, Caldwell, Hays, Travis and Williamson Counties**



# Natural Gas Heating (Nueces and San Patricio Counties)

Description of Individual Measures

Individual Measures	Annual Energy Savings (%)	Annual Energy Savings (\$/year)	Annual Demand Savings (%)	Annual Demand Savings (\$/year)	Combined Savings (Energy+Demand) (\$/year)	Estimated Cost (\$)	
						Marginal Cost <sup>1</sup>	New System Cost <sup>2</sup>
<b>A Envelope and Fenestration Measures</b>							
1 Glazing U Factor (1.22 to 0.45 Btu/hr-sf-F)	6.5%	\$5,867	3.3%	\$543	\$6,410	\$95,130 - \$174,150	
2 Lighting Load (1.3 to 1.0 w/sq-ft)	8.4%	\$17,849	10.7%	\$1,751	\$19,600	\$0 - \$0	
3 Occupancy Sensors Installation	15.5%	\$35,065	-3.0%	-\$497	\$34,568		\$26,500 - \$28,000
4 Shading (none to 2.5 ft overhangs)	1.8%	\$3,556	2.5%	\$413	\$3,969		\$67,900 - \$110,000
<b>B HVAC System Measures</b>							
5 Cold Deck Reset	2.6%	\$2,024	-1.0%	-\$159	\$1,865	\$0 - \$800	
6 Supply Fan Total Pressure (2.5 to 1.5 in-H2O)	1.4%	\$2,731	2.0%	\$324	\$3,055	\$0 - \$200	
<b>C Plant Equipment Measures</b>							
7 Chiller COP (4.9 to 6.1)	4.5%	\$8,485	6.2%	\$1,026	\$9,511	\$16,000 - \$18,000	
8 Boiler Efficiency (75% to 95%)	1.0%	\$423	0.0%	\$0	\$423	\$25,000 - \$35,000	
9 VSD on Chilled Water Pump (from Constant to VSD)	2.6%	\$4,844	0.8%	\$131	\$4,976	\$3,700 - \$4,700	
10 VSD on Hot Water Pump (from Constant to VSD)	1.8%	\$1,236	0.2%	\$35	\$1,270	\$4,000 - \$5,000	



Description of Combined Measures to Achieve 15% Above Code Savings

Combination of Measures <sup>3</sup>	Combined Energy Savings (%)	Combined Energy Savings (\$/year)	Combined Demand Savings (%)	Combined Demand Savings (\$/year)	Combined Savings (Energy+Demand) (\$/year)	Combined Estimated Cost (\$)		Combined Annual NOx Emissions Savings (lbs/year)	Combined Ozone Season Period NOx Emissions Savings (lbs/day)	Simple Estimated Payback (yrs)
						Marginal Cost <sup>1</sup>	New System Cost <sup>2</sup>			
<b>Combination 1</b>										
1 Glazing U Factor (1.22 to 0.45 Btu/hr-sf-F)	16.4%	\$24,991	13.8%	\$2,267	\$27,257	\$95,130 - \$174,150		239	0.78	3.8 - 7.0
2 Lighting Load (1.3 to 1.0 w/sq-ft)						\$0 - \$0				
<b>Combination 2</b>										
3 Occupancy Sensors Installation	20.7%	\$39,149	-3.8%	-\$618	\$38,531		\$26,500 - \$28,000	369	1.04	0.7 - 0.7
5 Cold Deck Reset						\$0 - \$800				
<b>Combination 3</b>										
2 Lighting Load (1.3 to 1.0 w/sq-ft)	18.4%	\$32,959	16.7%	\$2,746	\$35,704	\$0 - \$0		312	0.91	0.6 - 0.7
5 Cold Deck Reset						\$0 - \$800				
7 Chiller COP (4.9 to 6.1)						\$16,000 - \$18,000				
9 VSD on Chilled Water Pump (from Constant to VSD)						\$3,700 - \$4,700				

Note:

- Marginal cost = new system cost - original system cost
- New system cost = new system cost only
- See individual measures above for specific savings
  - \* Energy Cost: Electricity cost = \$0.119/kWh
  - Demand cost = \$5.00/kW
  - (Yearly demand cost = Sum of monthly demand cost for 12 months
  - Natural gas cost = \$0.80/therm

(Building Description)

- Building type: Office
- Gross area: 89,340 sq-ft
- Building dimension: 122ft x 122ft x 78ft (WxLxH)
- Number of floors: 6
- Floor-to-floor height: 13ft
- Window-to-wall ratio: 50%



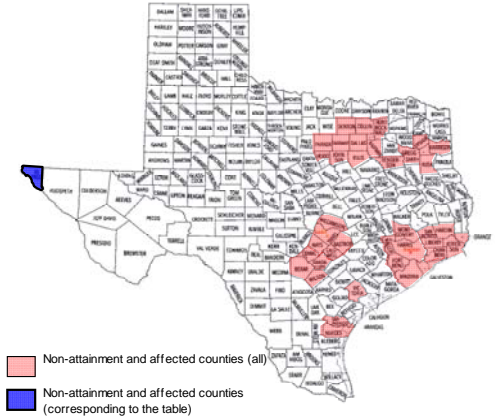
**Table 2a: 15% Above Code Savings (Commercial – Natural Gas Heating) for Nueces and San Patricio Counties**



# Natural Gas Heating (El Paso)

Description of Individual Measures

Individual Measures	Annual Energy Savings (%)	Annual Energy Savings (\$/year)	Annual Demand Savings (%)	Annual Demand Savings (\$/year)	Combined Savings (Energy+Demand) (\$/year)	Estimated Cost (\$)	
						Marginal Cost <sup>1</sup>	New System Cost <sup>2</sup>
<b>A Envelope and Fenestration Measures</b>							
1 Glazing U Factor (1.22 to 0.45 Btu/hr-sf-F)	0.0%	-\$6	-0.1%	-\$8	-\$14	\$95,130 - \$174,150	
2 Lighting Load (1.3 to 1.0 w/sq-ft)	10.3%	\$18,598	11.2%	\$1,700	\$20,297	\$0 - \$0	
3 Occupancy Sensors Installation	19.9%	\$37,024	-3.5%	-\$526	\$36,498		\$26,500 - \$28,000
4 Shading (none to 2.5 ft overhangs)	3.1%	\$5,469	3.5%	\$530	\$5,999		\$67,900 - \$110,000
<b>B HVAC System Measures</b>							
5 Cold Deck Reset	-1.3%	-\$2,494	-2.1%	-\$319	-\$2,813	\$0 - \$800	
6 Supply Fan Total Pressure (2.5 to 1.5 in-H2O)	1.5%	\$2,689	2.1%	\$318	\$3,008	\$0 - \$200	
<b>C Plant Equipment Measures</b>							
7 Chiller COP (4.9 to 6.1)	4.1%	\$7,162	5.4%	\$819	\$7,982	\$16,000 - \$18,000	
8 Boiler Efficiency (75% to 95%)	0.5%	\$203	0.0%	\$0	\$203	\$25,000 - \$35,000	
9 VSD on Chilled Water Pump (from Constant to VSD)	2.4%	\$4,214	0.8%	\$127	\$4,341	\$3,700 - \$4,700	
10 VSD on Hot Water Pump (from Constant to VSD)	0.5%	\$301	0.1%	\$11	\$312	\$4,000 - \$5,000	



Description of Combined Measures to Achieve 15% Above Code Savings

Combination of Measures <sup>3</sup>	Combined Energy Savings (%)	Combined Energy Savings (\$/year)	Combined Demand Savings (%)	Combined Demand Savings (\$/year)	Combined Savings (Energy+Demand) (\$/year)	Combined Estimated Cost (\$)		Combined Annual NOx Emissions Savings (lbs/year)	Combined Ozone Season Period NOx Emissions Savings (lbs/day)	Simple Estimated Payback (yrs)
						Marginal Cost <sup>1</sup>	New System Cost <sup>2</sup>			
<b>Combination 1</b>										
2 Lighting Load (1.3 to 1.0 w/sq-ft)	16.6%	\$29,884	19.4%	\$2,931	\$32,815	\$0 - \$0	\$67,900 - \$110,000	N/A	N/A	2.8 - 4.3
4 Shading (none to 2.5 ft overhangs)										
7 Chiller COP (4.9 to 6.1)						\$16,000 - \$18,000				
<b>Combination 2</b>										
3 Occupancy Sensors Installation	19.9%	\$37,024	-3.5%	-\$526	\$36,498		\$26,500 - \$28,000	N/A	N/A	0.72 - 0.76
<b>Combination 3</b>										
2 Lighting Load (1.3 to 1.0 w/sq-ft)	16.6%	\$29,850	17.2%	\$2,600	\$32,450	\$0 - \$0	\$67,900 - \$110,000	N/A	N/A	0.12 - 0.16
4 Shading (none to 2.5 ft overhangs)										
6 Supply Fan Total Pressure (2.5 to 1.5 in-H2O)						\$0 - \$200				
9 VSD on Chilled Water Pump (from Constant to VSD)						\$3,700 - \$4,700				

Note:

- Marginal cost = new system cost - original system cost
- New system cost = new system cost only
- See individual measures above for specific savings
  - \* Energy Cost: Electricity cost = \$0.119/kWh
  - Demand cost = \$5.00/kW
  - (Yearly demand cost = Sum of monthly demand cost for 12 months
  - Natural gas cost = \$0.80/therm

(Building Description)

- Building type: Office
- Gross area: 89,340 sq-ft
- Building dimension: 122ft x 122ft x 78ft (WxLxH)
- Number of floors: 6
- Floor-to-floor height: 13ft
- Window-to-wall ratio: 50%



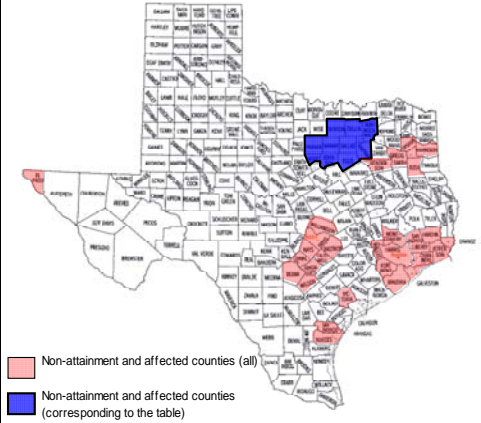
**Table 3a: 15% Above Code Savings (Commercial – Natural Gas Heating) for El Paso County**



# Natural Gas Heating (Collin, Dallas, Denton, Ellis, Hood, Hunt, Johnson, Kaufman, Parker, Rockwall and Tarrant Counties)

Description of Individual Measures

Individual Measures	Annual Energy Savings (%)	Annual Energy Savings (\$/year)	Annual Demand Savings (%)	Annual Demand Savings (\$/year)	Combined Savings (Energy+Demand) (\$/year)	Estimated Cost (\$)	
						Marginal Cost <sup>1</sup>	New System Cost <sup>2</sup>
<b>A Envelope and Fenestration Measures</b>							
1 Glazing U Factor (1.22 to 0.45 Btu/hr-sf-F)	17.8%	\$12,718	2.6%	\$406	\$13,125	\$95,130 - \$174,150	
2 Lighting Load (1.3 to 1.0 w/sq-ft)	5.7%	\$16,433	10.4%	\$1,628	\$18,061	\$0 - \$0	
3 Occupancy Sensors Installation	9.2%	\$31,103	-3.9%	-\$612	\$30,491		\$26,500 - \$28,000
4 Shading (none to 2.5 ft overhangs)	1.8%	\$3,802	2.5%	\$391	\$4,193		\$67,900 - \$110,000
<b>B HVAC System Measures</b>							
5 Cold Deck Reset	8.4%	\$7,732	-0.4%	-\$59	\$7,673	\$0 - \$800	
6 Supply Fan Total Pressure (2.5 to 1.5 in-H2O)	1.3%	\$2,667	1.9%	\$302	\$2,970	\$0 - \$200	
<b>C Plant Equipment Measures</b>							
7 Chiller COP (4.9 to 6.1)	3.5%	\$7,419	5.6%	\$883	\$8,302	\$16,000 - \$18,000	
8 Boiler Efficiency (75% to 95%)	3.5%	\$1,685	0.0%	\$0	\$1,685	\$25,000 - \$35,000	
9 VSD on Chilled Water Pump (from Constant to VSD)	2.4%	\$5,030	0.9%	\$143	\$5,173	\$3,700 - \$4,700	
10 VSD on Hot Water Pump (from Constant to VSD)	3.0%	\$2,293	0.4%	\$66	\$2,359	\$4,000 - \$5,000	



Description of Combined Measures to Achieve 15% Above Code Savings

Combination of Measures <sup>3</sup>	Combined Energy Savings (%)	Combined Energy Savings (\$/year)	Combined Demand Savings (%)	Combined Demand Savings (\$/year)	Combined Savings (Energy+Demand) (\$/year)	Combined Estimated Cost (\$)		Combined Annual NOx Emissions Savings (lbs/year)	Combined Ozone Season Period NOx Emissions Savings (lbs/day)	Simple Estimated Payback (yrs)
						Marginal Cost <sup>1</sup>	New System Cost <sup>2</sup>			
<b>Combination 1</b>										
1 Glazing U Factor (1.22 to 0.45 Btu/hr-sf-F)	26.0%	\$31,422	13.8%	\$2,160	\$33,582	\$95,130 - \$174,150		394	1.02	3.0 - 5.5
2 Lighting Load (1.3 to 1.0 w/sq-ft)						\$0 - \$0				
<b>Combination 2</b>										
3 Occupancy Sensors Installation	19.6%	\$40,553	-3.8%	-\$603	\$39,950		\$26,500 - \$28,000	521	1.36	0.7 - 0.7
5 Cold Deck Reset						\$0 - \$800				
<b>Combination 3</b>										
1 Glazing U Factor (1.22 to 0.45 Btu/hr-sf-F)	21.4%	\$20,037	8.1%	\$1,267	\$21,305	\$95,130 - \$174,150		247	0.66	6.8 - 11.3
7 Chiller COP (4.9 to 6.1)						\$16,000 - \$18,000				
8 Boiler Efficiency (75% to 95%)						\$25,000 - \$35,000				

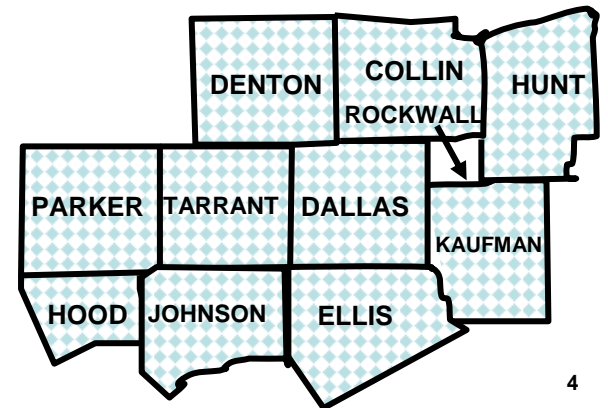
Note:

- Marginal cost = new system cost - original system cost
- New system cost = new system cost only
- See individual measures above for specific savings
  - \* Energy Cost: Electricity cost = \$0.119/kWh
  - Demand cost = \$5.00/kW
  - (Yearly demand cost = Sum of monthly demand cost for 12 months
  - Natural gas cost = \$0.80/therm

(Building Description)

- Building type: Office
- Gross area: 89,340 sq-ft
- Building dimension: 122ft x 122ft x 78ft (WxLxH)
- Number of floors: 6
- Floor-to-floor height: 13ft
- Window-to-wall ratio: 50%

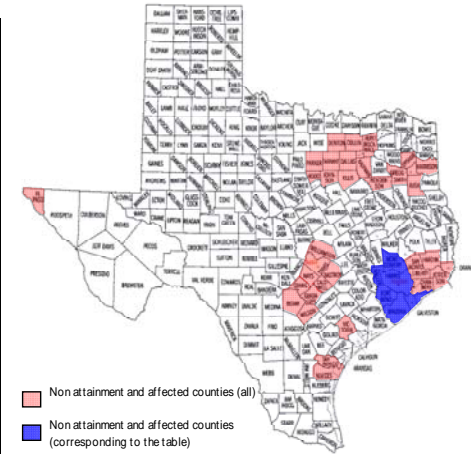
**Table 4a: 15% Above Code Savings (Commercial – Natural Gas Heating) for Collin, Dallas, Denton, Ellis, Hood, Hunt, Johnson, Kaufman, Parker, Rockwall and Tarrant Counties**



# Natural Gas Heating (Brazoria, Fort Bend, Galveston, Harris, Montgomery and Waller Counties)

## Description of Individual Measures

Individual Measures	Annual Energy Savings (%)	Annual Energy Savings (\$/year)	Annual Demand Savings (%)	Annual Demand Savings (\$/year)	Combined Savings (Energy+Demand) (\$/year)	Estimated Cost (\$)	
						Marginal Cost <sup>1</sup>	New System Cost <sup>2</sup>
<b>A Envelope and Fenestration Measures</b>							
1 Glazing U Factor (1.22 to 0.45 Btu/hr-sf-F)	10.7%	\$7,114	3.2%	\$517	\$7,631	\$95,130 - \$174,150	
2 Lighting Load (1.3 to 1.0 w/sq-ft)	6.9%	\$16,582	10.4%	\$1,695	\$18,277	\$0 - \$0	
3 Occupancy Sensors Installation	13.0%	\$33,409	-2.3%	-\$377	\$33,032		\$26,500 - \$28,000
4 Shading (none to 2.5 ft overhangs)	1.9%	\$3,785	2.7%	\$438	\$4,223		\$67,900 - \$110,000
<b>B HVAC System Measures</b>							
5 Cold Deck Reset	4.8%	\$3,978	-0.6%	-\$91	\$3,887	\$0 - \$800	
6 Supply Fan Total Pressure (2.5 to 1.5 in-H <sub>2</sub> O)	1.3%	\$2,629	2.0%	\$329	\$2,958	\$0 - \$200	
<b>C Plant Equipment Measures</b>							
7 Chiller COP (4.9 to 6.1)	3.9%	\$7,717	6.1%	\$1,000	\$8,718	\$16,000 - \$18,000	
8 Boiler Efficiency (75% to 95%)	2.2%	\$993	0.0%	\$0	\$993	\$25,000 - \$35,000	
9 VSD on Chilled Water Pump (from Constant to VSD)	2.4%	\$4,764	0.7%	\$121	\$4,885	\$3,700 - \$4,700	
10 VSD on Hot Water Pump (from Constant to VSD)	3.1%	\$2,243	0.4%	\$63	\$2,306	\$4,000 - \$5,000	



## Description of Combined Measures to Achieve 15% Above Code Savings

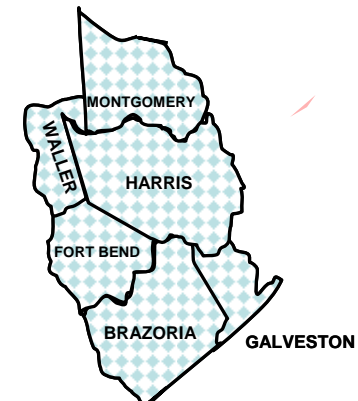
Combination of Measures <sup>3</sup>	Combined Energy Savings (%)	Combined Energy Savings (\$/year)	Combined Demand Savings (%)	Combined Demand Savings (\$/year)	Combined Savings (Energy+Demand) (\$/year)	Combined Estimated Cost (\$)		Combined Annual NOx Emissions Savings (lbs/year)	Combined Ozone Season Period NOx Emissions Savings (lbs/day)	Simple Estimated Payback (yrs)
						Marginal Cost <sup>1</sup>	New System Cost <sup>2</sup>			
<b>Combination 1</b>										
1 Glazing U Factor (1.22 to 0.45 Btu/hr-sf-F)	20.1%	\$26,160	13.6%	\$2,214	\$28,374	\$95,130 - \$174,150		258	0.95	3.6 - 6.7
2 Lighting Load (1.3 to 1.0 w/sq-ft)						\$0 - \$0				
<b>Combination 2</b>										
3 Occupancy Sensors Installation	19.6%	\$38,856	-3.4%	-\$558	\$38,299		\$26,500 - \$28,000	371	1.37	0.7 - 0.7
5 Cold Deck Reset						\$0 - \$800				
<b>Combination 3</b>										
1 Glazing U Factor (1.22 to 0.45 Btu/hr-sf-F)	16.8%	\$18,719	9.5%	\$1,554	\$20,273	\$95,130 - \$174,150		187	0.71	7.5 - 12.4
7 Chiller COP (4.9 to 6.1)						\$16,000 - \$18,000				
8 Boiler Efficiency (75% to 95%)						\$25,000 - \$35,000				
9 VSD on Chilled Water Pump (from Constant to VSD)						\$3,700 - \$4,700				

### Note:

- Marginal cost = new system cost - original system cost
- New system cost = new system cost only
- See individual measures above for specific savings
  - \* Energy Cost: Electricity cost = \$0.119/kWh
  - Demand cost = \$5.00/kWh
  - (Yearly demand cost = Sum of monthly demand cost for 12 months
  - Natural gas cost = \$0.80/therm

### (Building Description)

- Building type: Office
- Gross area: 89,340 sq-ft
- Building dimension: 122ft x 122ft x 78ft (WxLxH)
- Number of floors: 6
- Floor-to-floor height: 13ft
- Window-to-wall ratio: 50%



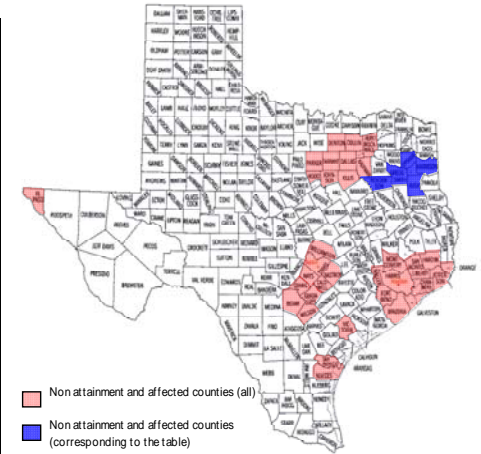
**Table 5a: 15% Above Code Savings (Commercial – Natural Gas Heating) for Brazoria, Fort Bend, Galveston, Harris, Montgomery and Waller Counties**



# Natural Gas Heating (Gregg, Harrison, Henderson, Rusk, Smith and Upshur Counties)

Description of Individual Measures

Individual Measures	Annual Energy Savings (%)	Annual Energy Savings (\$/year)	Annual Demand Savings (%)	Annual Demand Savings (\$/year)	Combined Savings (Energy+Demand) (\$/year)	Estimated Cost (\$)	
						Marginal Cost <sup>1</sup>	New System Cost <sup>2</sup>
<b>A Envelope and Fenestration Measures</b>							
1 Glazing U Factor (1.22 to 0.45 Btu/hr-sf-F)	14.5%	\$8,849	1.2%	\$184	\$9,033	\$95,130 - \$174,150	
2 Lighting Load (1.3 to 1.0 w/sq-ft)	5.4%	\$15,477	10.8%	\$1,640	\$17,117	\$0 - \$0	
3 Occupancy Sensors Installation	10.5%	\$31,798	-3.1%	-\$465	\$31,334		\$26,500 - \$28,000
4 Shading (none to 2.5 ft overhangs)	1.7%	\$3,491	2.6%	\$400	\$3,891		\$67,900 - \$110,000
<b>B HVAC System Measures</b>							
5 Cold Deck Reset	7.1%	\$6,066	-0.9%	-\$131	\$5,936	\$0 - \$800	
6 Supply Fan Total Pressure (2.5 to 1.5 in-H2O)	1.4%	\$2,870	2.3%	\$357	\$3,226	\$0 - \$200	
<b>C Plant Equipment Measures</b>							
7 Chiller COP (4.9 to 6.1)	3.3%	\$6,580	5.2%	\$785	\$7,365	\$16,000 - \$18,000	
8 Boiler Efficiency (75% to 95%)	2.8%	\$1,270	0.0%	\$0	\$1,270	\$25,000 - \$35,000	
9 VSD on Chilled Water Pump (from Constant to VSD)	2.3%	\$4,508	0.8%	\$128	\$4,636	\$3,700 - \$4,700	
10 VSD on Hot Water Pump (from Constant to VSD)	2.3%	\$1,663	0.3%	\$48	\$1,711	\$4,000 - \$5,000	



Description of Combined Measures to Achieve 15% Above Code Savings

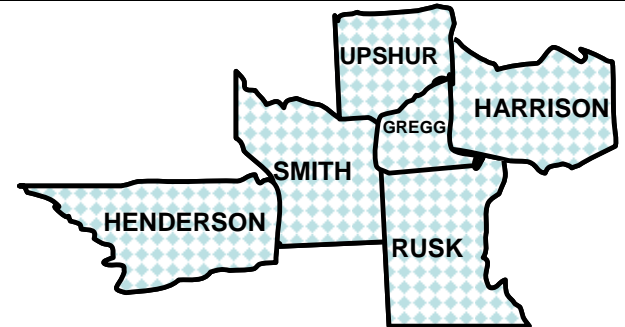
Combination of Measures <sup>3</sup>	Combined Energy Savings (%)	Combined Energy Savings (\$/year)	Combined Demand Savings (%)	Combined Demand Savings (\$/year)	Combined Savings (Energy+Demand) (\$/year)	Combined Estimated Cost (\$)		Combined Annual NOx Emissions Savings (lbs/year)	Combined Ozone Season Period NOx Emissions Savings (lbs/day)	Simple Estimated Payback (yrs)
						Marginal Cost <sup>1</sup>	New System Cost <sup>2</sup>			
<b>Combination 1</b>										
1 Glazing U Factor (1.22 to 0.45 Btu/hr-sf-F)	23.2%	\$26,614	12.6%	\$1,919	\$28,533	\$95,130 - \$174,150		334	0.85	3.6 - 6.5
2 Lighting Load (1.3 to 1.0 w/sq-ft)						\$0 - \$0				
<b>Combination 2</b>										
3 Occupancy Sensors Installation	20.2%	\$39,924	-3.2%	-\$491	\$39,433		\$26,500 - \$28,000	513	1.35	0.7 - 0.7
5 Cold Deck Reset						\$0 - \$800				
<b>Combination 3</b>										
1 Glazing U Factor (1.22 to 0.45 Btu/hr-sf-F)	18.0%	\$15,497	6.4%	\$967	\$16,465	\$95,130 - \$174,150		191	0.48	8.8 - 14.7
7 Chiller COP (4.9 to 6.1)						\$16,000 - \$18,000				
8 Boiler Efficiency (75% to 95%)						\$25,000 - \$35,000				

Note:

- Marginal cost = new system cost - original system cost
- New system cost = new system cost only
- See individual measures above for specific savings
  - \* Energy Cost: Electricity cost = \$0.119/kWh
  - Demand cost = \$5.00/kWh
  - (Yearly demand cost = Sum of monthly demand cost for 12 months
  - Natural gas cost = \$0.80/therm

(Building Description)

- Building type: Office
- Gross area: 89,340 sq-ft
- Building dimension: 122ft x 122ft x 78ft (WxLxH)
- Number of floors: 6
- Floor-to-floor height: 13ft
- Window-to-wall ratio: 50%



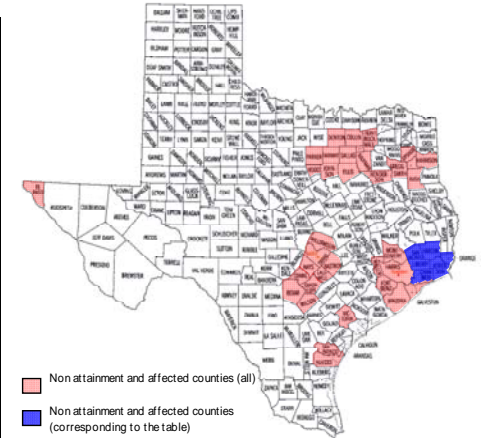
**Table 6a: 15% Above Code Savings (Commercial – Natural Gas Heating) for Gregg, Harrison, Henderson, Rusk, Smith and Upshur Counties**



# Natural Gas Heating (Chambers, Hardin, Jefferson, Liberty and Orange Counties)

Description of Individual Measures

Individual Measures	Annual Energy Savings (%)	Annual Energy Savings (\$/year)	Annual Demand Savings (%)	Annual Demand Savings (\$/year)	Combined Savings (Energy+Demand) (\$/year)	Estimated Cost (\$)	
						Marginal Cost <sup>1</sup>	New System Cost <sup>2</sup>
<b>A Envelope and Fenestration Measures</b>							
1 Glazing U Factor (1.22 to 0.45 Btu/hr-sf-F)	9.8%	\$6,661	2.0%	\$326	\$6,987	\$95,130 - \$174,150	
2 Lighting Load (1.3 to 1.0 w/sq-ft)	7.2%	\$17,289	10.6%	\$1,686	\$18,975	\$0 - \$0	
3 Occupancy Sensors Installation	12.4%	\$32,661	-3.6%	-\$575	\$32,086		\$26,500 - \$28,000
4 Shading (none to 2.5 ft overhangs)	2.2%	\$4,215	2.5%	\$392	\$4,608		\$67,900 - \$110,000
<b>B HVAC System Measures</b>							
5 Cold Deck Reset	5.1%	\$4,204	-0.9%	-\$142	\$4,063	\$0 - \$800	
6 Supply Fan Total Pressure (2.5 to 1.5 in-H2O)	1.3%	\$2,583	1.9%	\$301	\$2,884	\$0 - \$200	
<b>C Plant Equipment Measures</b>							
7 Chiller COP (4.9 to 6.1)	4.0%	\$7,773	6.0%	\$956	\$8,729	\$16,000 - \$18,000	
8 Boiler Efficiency (75% to 95%)	1.8%	\$804	0.0%	\$0	\$804	\$25,000 - \$35,000	
9 VSD on Chilled Water Pump (from Constant to VSD)	2.5%	\$4,849	0.8%	\$132	\$4,981	\$3,700 - \$4,700	
10 VSD on Hot Water Pump (from Constant to VSD)	2.0%	\$1,416	0.3%	\$40	\$1,457	\$4,000 - \$5,000	



Description of Combined Measures to Achieve 15% Above Code Savings

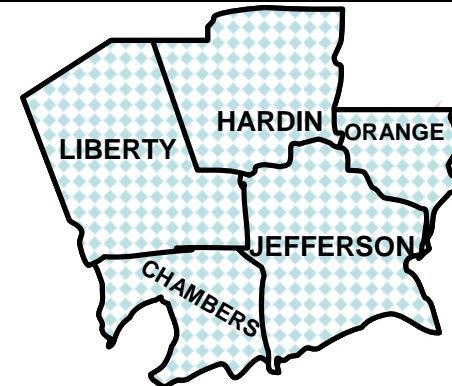
Combination of Measures <sup>3</sup>	Combined Energy Savings (%)	Combined Energy Savings (\$/year)	Combined Demand Savings (%)	Combined Demand Savings (\$/year)	Combined Savings (Energy+Demand) (\$/year)	Combined Estimated Cost (\$)		Combined Annual NOx Emissions Savings (lbs/year)	Combined Ozone Season Period NOx Emissions Savings (lbs/day)	Simple Estimated Payback (yrs)
						Marginal Cost <sup>1</sup>	New System Cost <sup>2</sup>			
<b>Combination 1</b>										
1 Glazing U Factor (1.22 to 0.45 Btu/hr-sf-F)	19.0%	\$ 24,913.29	13.0%	\$2,071	\$26,984	\$95,130 - \$174,150		N/A	N/A	3.8 - 7.0
2 Lighting Load (1.3 to 1.0 w/sq-ft)						\$0 - \$0				
<b>Combination 2</b>										
3 Occupancy Sensors Installation	20.7%	\$ 39,621.48	-3.9%	-\$620	\$39,002	\$26,500 - \$28,000		N/A	N/A	0.7 - 0.7
5 Cold Deck Reset						\$0 - \$800				
<b>Combination 3</b>										
1 Glazing U Factor (1.22 to 0.45 Btu/hr-sf-F)	15.9%	\$ 18,178.35	8.5%	\$1,357	\$19,535	\$95,130 - \$174,150		N/A	N/A	7.7 - 12.8
7 Chiller COP (4.9 to 6.1)						\$16,000 - \$18,000				
8 Boiler Efficiency (75% to 95%)						\$25,000 - \$35,000				
9 VSD on Chilled Water Pump (from Constant to VSD)						\$3,700 - \$4,700				

Note:

- Marginal cost = new system cost - original system cost
- New system cost = new system cost only
- See individual measures above for specific savings
  - \* Energy Cost: Electricity cost = \$0.119/kWh
  - Demand cost = \$5.00/kWh
  - (Yearly demand cost = Sum of monthly demand cost for 12 months
  - Natural gas cost = \$0.80/therm

(Building Description)

- Building type: Office
- Gross area: 89,340 sq-ft
- Building dimension: 122ft x 122ft x 78ft (WxLxH)
- Number of floors: 6
- Floor-to-floor height: 13ft
- Window-to-wall ratio: 50%



**Table 7a: 15% Above Code Savings (Commercial – Natural Gas Heating) for Chambers, Hardin, Jefferson, Liberty and Orange Counties**

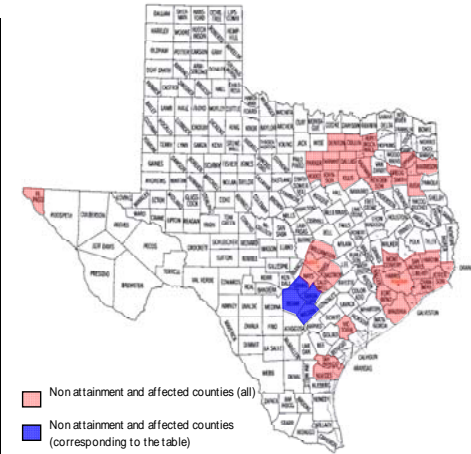




# Natural Gas Heating (Bexar, Comal, Guadalupe and Wilson Counties)

Description of Individual Measures

Individual Measures	Annual Energy Savings (%)	Annual Energy Savings (\$/year)	Annual Demand Savings (%)	Annual Demand Savings (\$/year)	Combined Savings (Energy+Demand) (\$/year)	Estimated Cost (\$)	
						Marginal Cost <sup>1</sup>	New System Cost <sup>2</sup>
<b>A Envelope and Fenestration Measures</b>							
1 Glazing U Factor (1.22 to 0.45 Btu/hr-sf-F)	11.6%	\$8,404	3.2%	\$522	\$8,926	\$95,130 - \$174,150	
2 Lighting Load (1.3 to 1.0 w/sq-ft)	6.7%	\$16,410	10.4%	\$1,683	\$18,093	\$0 - \$0	
3 Occupancy Sensors Installation	12.5%	\$32,979	-3.2%	-\$511	\$32,468		\$26,500 - \$28,000
4 Shading (none to 2.5 ft overhangs)	1.7%	\$3,451	2.7%	\$431	\$3,882		\$67,900 - \$110,000
<b>B HVAC System Measures</b>							
5 Cold Deck Reset	5.1%	\$4,158	-0.7%	-\$115	\$4,042	\$0 - \$800	
6 Supply Fan Total Pressure (2.5 to 1.5 in-H2O)	1.4%	\$2,739	2.1%	\$342	\$3,081	\$0 - \$200	
<b>C Plant Equipment Measures</b>							
7 Chiller COP (4.9 to 6.1)	4.0%	\$7,885	6.0%	\$978	\$8,863	\$16,000 - \$18,000	
8 Boiler Efficiency (75% to 95%)	2.1%	\$965	0.0%	\$0	\$965	\$25,000 - \$35,000	
9 VSD on Chilled Water Pump (from Constant to VSD)	2.5%	\$4,869	0.8%	\$131	\$5,001	\$3,700 - \$4,700	
10 VSD on Hot Water Pump (from Constant to VSD)	2.1%	\$1,516	0.3%	\$43	\$1,559	\$4,000 - \$5,000	



Description of Combined Measures to Achieve 15% Above Code Savings

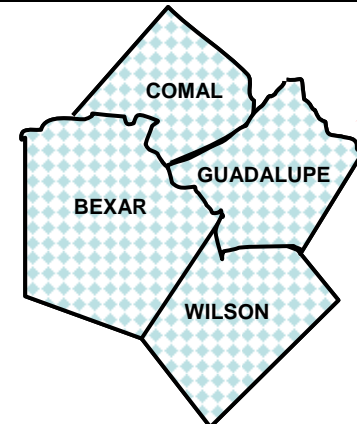
Combination of Measures <sup>3</sup>	Combined Energy Savings (%)	Combined Energy Savings (\$/year)	Combined Demand Savings (%)	Combined Demand Savings (\$/year)	Combined Savings (Energy+Demand) (\$/year)	Combined Estimated Cost (\$)		Combined Annual NOx Emissions Savings (lbs/year)	Combined Ozone Season Period NOx Emissions Savings (lbs/day)	Simple Estimated Payback (yrs)
						Marginal Cost <sup>1</sup>	New System Cost <sup>2</sup>			
<b>Combination 1</b>										
1 Glazing U Factor (1.22 to 0.45 Btu/hr-sf-F)	20.5%	\$26,514	13.8%	\$2,238	\$28,751	\$95,130 - \$174,150		338	0.96	3.6 - 6.6
2 Lighting Load (1.3 to 1.0 w/sq-ft)						\$0 - \$0				
<b>Combination 2</b>										
3 Occupancy Sensors Installation	20.0%	\$39,211	-3.6%	-\$591	\$38,619	\$0 - \$800		508	1.30	0.7 - 0.7
5 Cold Deck Reset										
<b>Combination 3</b>										
1 Glazing U Factor (1.22 to 0.45 Btu/hr-sf-F)	15.7%	\$16,193	8.9%	\$1,450	\$17,643	\$95,130 - \$174,150		203	0.66	8.4 - 14.0
7 Chiller COP (4.9 to 6.1)						\$16,000 - \$18,000				
8 Boiler Efficiency (75% to 95%)						\$25,000 - \$35,000				

Note:

- Marginal cost = new system cost - original system cost
- New system cost = new system cost only
- See individual measures above for specific savings
  - \* Energy Cost: Electricity cost = \$0.119/kWh
  - Demand cost = \$5.00/kW
  - (Yearly demand cost = Sum of monthly demand cost for 12 months
  - Natural gas cost = \$0.80/therm

(Building Description)

- Building type: Office
- Gross area: 89,340 sq-ft
- Building dimension: 122ft x 122ft x 78ft (WxLxH)
- Number of floors: 6
- Floor-to-floor height: 13ft
- Window-to-wall ratio: 50%



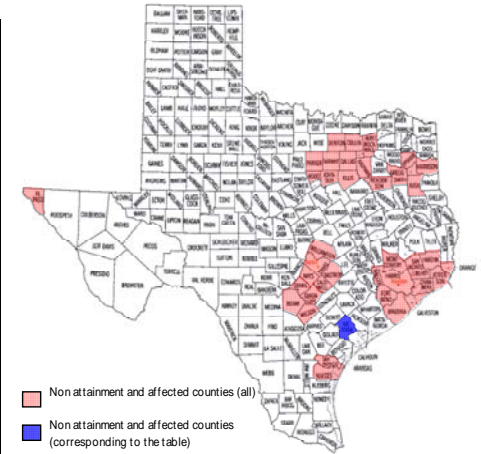
**Table 8a: 15% Above Code Savings (Commercial – Natural Gas Heating) for Bexar, Comal, Guadalupe and Wilson Counties**



# Natural Gas Heating (Victoria County)

Description of Individual Measures

Individual Measures	Annual Energy Savings (%)	Annual Energy Savings (\$/year)	Annual Demand Savings (%)	Annual Demand Savings (\$/year)	Combined Savings (Energy+Demand) (\$/year)	Estimated Cost (\$)	
						Marginal Cost <sup>1</sup>	New System Cost <sup>2</sup>
<b>A Envelope and Fenestration Measures</b>							
1 Glazing U Factor (1.22 to 0.45 Btu/hr-sf-F)	8.8%	\$7,107	2.7%	\$429	\$7,536	\$95,130 - \$174,150	
2 Lighting Load (1.3 to 1.0 w/sq-ft)	7.8%	\$17,638	10.5%	\$1,691	\$19,329	\$0 - \$0	
3 Occupancy Sensors Installation	14.3%	\$34,302	-3.4%	-\$544	\$33,758		\$26,500 - \$28,000
4 Shading (none to 2.5 ft overhangs)	2.1%	\$4,169	2.7%	\$427	\$4,595		\$67,900 - \$110,000
<b>B HVAC System Measures</b>							
5 Cold Deck Reset	3.6%	\$2,835	-0.9%	-\$150	\$2,685	\$0 - \$800	
6 Supply Fan Total Pressure (2.5 to 1.5 in-H2O)	1.4%	\$2,722	2.0%	\$320	\$3,043	\$0 - \$200	
<b>C Plant Equipment Measures</b>							
7 Chiller COP (4.9 to 6.1)	4.2%	\$8,021	6.0%	\$956	\$8,977	\$16,000 - \$18,000	
8 Boiler Efficiency (75% to 95%)	1.5%	\$654	0.0%	\$0	\$654	\$25,000 - \$35,000	
9 VSD on Chilled Water Pump (from Constant to VSD)	2.5%	\$4,804	0.8%	\$135	\$4,939	\$3,700 - \$4,700	
10 VSD on Hot Water Pump (from Constant to VSD)	2.5%	\$1,723	0.3%	\$48	\$1,771	\$4,000 - \$5,000	



Description of Combined Measures to Achieve 15% Above Code Savings

Combination of Measures <sup>3</sup>	Combined Energy Savings (%)	Combined Energy Savings (\$/year)	Combined Demand Savings (%)	Combined Demand Savings (\$/year)	Combined Savings (Energy+Demand) (\$/year)	Combined Estimated Cost (\$)		Combined Annual NOx Emissions Savings (lbs/year)	Combined Ozone Season Period NOx Emissions Savings (lbs/day)	Simple Estimated Payback (yrs)
						Marginal Cost <sup>1</sup>	New System Cost <sup>2</sup>			
<b>Combination 1</b>										
1 Glazing U Factor (1.22 to 0.45 Btu/hr-sf-F)	18.5%	\$26,186	13.5%	\$2,164	\$28,350	\$95,130 - \$174,150		253	0.80	3.6 - 6.7
2 Lighting Load (1.3 to 1.0 w/sq-ft)						\$0 - \$0				
<b>Combination 2</b>										
3 Occupancy Sensors Installation	20.7%	\$39,507	-3.6%	-\$582	\$38,924		\$26,500 - \$28,000	373	1.05	0.7 - 0.7
5 Cold Deck Reset						\$0 - \$800				
<b>Combination 3</b>										
2 Lighting Load (1.3 to 1.0 w/sq-ft)	18.5%	\$32,837	16.4%	\$2,627	\$35,464	\$0 - \$0		311	0.90	0.6 - 0.7
5 Cold Deck Reset						\$0 - \$800				
7 Chiller COP (4.9 to 6.1)						\$16,000 - \$18,000				
9 VSD on Chilled Water Pump (from Constant to VSD)						\$3,700 - \$4,700				

Note:

- Marginal cost = new system cost - original system cost
- New system cost = new system cost only
- See individual measures above for specific savings
  - \* Energy Cost: Electricity cost = \$0.119/kWh
  - Demand cost = \$5.00/kW
  - (Yearly demand cost = Sum of monthly demand cost for 12 months
  - Natural gas cost = \$0.80/therm

(Building Description)

- Building type: Office
- Gross area: 89,340 sq-ft
- Building dimension: 122ft x 122ft x 78ft (WxLxH)
- Number of floors: 6
- Floor-to-floor height: 13ft
- Window-to-wall ratio: 50%



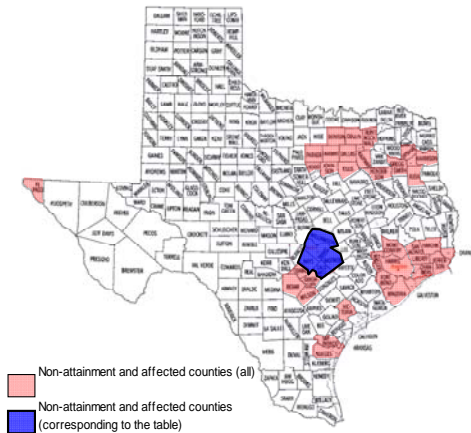
**Table 9a: 15% Above Code Savings (Commercial – Natural Gas Heating) for Victoria County**



# Electric Heating (Bastrop, Caldwell, Hays, Travis and Williamson Counties)

Description of Individual Measures

Individual Measures	Annual Energy Savings (%)	Annual Energy Savings (\$/year)	Annual Demand Savings (%)	Annual Demand Savings (\$/year)	Combined Savings (Energy+Demand) (\$/year)	Estimated Cost (\$)	
						Marginal Cost <sup>1</sup>	New System Cost <sup>2</sup>
<b>A Envelope and Fenestration Measures</b>							
1 Glazing U Factor (1.22 to 0.45 Btu/hr-sf-F)	10.9%	\$21,300	26.3%	\$5,663	\$26,963	\$95,130 - \$174,150	
2 Lighting Load (1.3 to 1.0 w/sq-ft)	7.3%	\$14,297	3.9%	\$832	\$15,128	\$0 - \$0	
3 Occupancy Sensors Installation	13.3%	\$25,987	-8.0%	-\$1,726	\$24,261		\$26,500 - \$28,000
4 Shading (none to 2.5 ft overhangs)	1.6%	\$3,188	2.4%	\$508	\$3,696		\$67,900 - \$110,000
<b>B HVAC System Measures</b>							
5 Cold Deck Reset	4.6%	\$8,928	7.9%	\$1,701	\$10,628	\$0 - \$800	
6 Supply Fan Total Pressure (2.5 to 1.5 in-H2O)	1.4%	\$2,720	1.5%	\$319	\$3,039	\$0 - \$200	
<b>C Plant Equipment Measures</b>							
7 Chiller COP (4.9 to 6.1)	4.0%	\$7,815	3.8%	\$810	\$8,625	\$16,000 - \$18,000	
8 Boiler Efficiency (Not Applicable)	n/a	n/a	n/a	n/a	n/a	n/a - n/a	
9 VSD on Chilled Water Pump (from Constant to VSD)	2.4%	\$4,755	1.0%	\$205	\$4,960	\$3,700 - \$4,700	
10 VSD on Hot Water Pump (from Constant to VSD)	1.4%	\$2,789	0.5%	\$111	\$2,901	\$4,000 - \$5,000	



Description of Combined Measures to Achieve 15% Above Code Savings

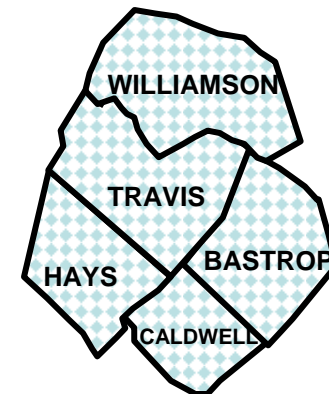
Combination of Measures <sup>3</sup>	Combined Energy Savings (%)	Combined Energy Savings (\$/year)	Combined Demand Savings (%)	Combined Demand Savings (\$/year)	Combined Savings (Energy+Demand) (\$/year)	Combined Estimated Cost (\$)		Combined Annual NOx Emissions Savings (lbs/year)	Combined Ozone Season Period NOx Emissions Savings (lbs/day)	Simple Estimated Payback (yrs)
						Marginal Cost <sup>1</sup>	New System Cost <sup>2</sup>			
<b>Combination 1</b>										
1 Glazing U Factor (1.22 to 0.45 Btu/hr-sf-F)	19.8%	\$38,610	32.8%	\$7,065	\$45,675	\$95,130 - \$174,150		492	1.12	2.5 - 4.5
2 Lighting Load (1.3 to 1.0 w/sq-ft)						\$0 - \$0				
<b>Combination 2</b>										
3 Occupancy Sensors Installation	19.9%	\$38,849	2.2%	\$478	\$39,327	\$26,500 - \$28,000		495	1.32	0.7 - 0.7
5 Cold Deck Reset						\$0 - \$800				
<b>Combination 3</b>										
1 Glazing U Factor (1.22 to 0.45 Btu/hr-sf-F)	16.6%	\$32,496	30.8%	\$6,642	\$39,138	\$95,130 - \$174,150		414	0.92	3.5 - 6.1
7 Chiller COP (4.9 to 6.1)						\$16,000 - \$18,000				
9 VSD on Chilled Water Pump (from Constant to VSD)						\$3,700 - \$4,700				

Note:

- Marginal cost = new system cost - original system cost
- New system cost = new system cost only
- See individual measures above for specific savings
  - \* Energy Cost: Electricity cost = \$0.119/kWh
  - Demand cost = \$5.00/kW
  - (Yearly demand cost = Sum of monthly demand cost for 12 months
  - Natural gas cost = \$0.80/therm

(Building Description)

- Building type: Office
- Gross area: 89,340 sq-ft
- Building dimension: 122ft x 122ft x 78ft (WxLxH)
- Number of floors: 6
- Floor-to-floor height: 13ft
- Window-to-wall ratio: 50%



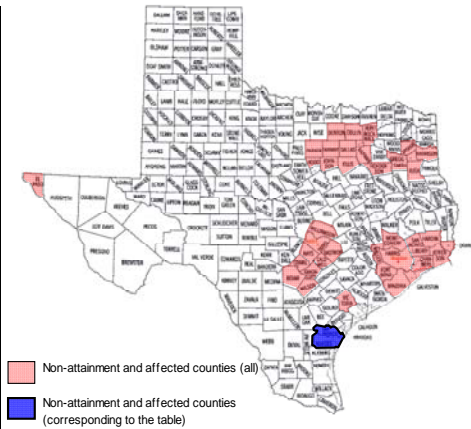
**Table 1b: 15% Above Code Savings (Commercial - Electric Heating) for Bastrop, Caldwell, Hays, Travis and Williamson Counties**



# Electric Heating (Nueces and San Patricio Counties)

Description of Individual Measures

Individual Measures	Annual Energy Savings (%)	Annual Energy Savings (\$/year)	Annual Demand Savings (%)	Annual Demand Savings (\$/year)	Combined Savings (Energy+Demand) (\$/year)	Estimated Cost (\$)	
						Marginal Cost <sup>1</sup>	New System Cost <sup>2</sup>
<b>A Envelope and Fenestration Measures</b>							
1 Glazing U Factor (1.22 to 0.45 Btu/hr-sf-F)	6.0%	\$11,294	13.8%	\$2,570	\$13,864	\$95,130 - \$174,150	
2 Lighting Load (1.3 to 1.0 w/sq-ft)	8.9%	\$16,677	5.9%	\$1,105	\$17,782	\$0 - \$0	
3 Occupancy Sensors Installation	16.6%	\$31,192	-7.6%	-\$1,419	\$29,773		\$26,500 - \$28,000
4 Shading (none to 2.5 ft overhangs)	1.9%	\$3,491	2.1%	\$385	\$3,875		\$67,900 - \$110,000
<b>B HVAC System Measures</b>							
5 Cold Deck Reset	2.1%	\$3,950	4.1%	\$765	\$4,715	\$0 - \$800	
6 Supply Fan Total Pressure (2.5 to 1.5 in-H2O)	1.4%	\$2,723	1.7%	\$315	\$3,038	\$0 - \$200	
<b>C Plant Equipment Measures</b>							
7 Chiller COP (4.9 to 6.1)	4.5%	\$8,485	5.0%	\$930	\$9,415	\$16,000 - \$18,000	
8 Boiler Efficiency (Not Applicable)	n/a	n/a	n/a	n/a	n/a	n/a - n/a	
9 VSD on Chilled Water Pump (from Constant to VSD)	2.6%	\$4,844	1.0%	\$180	\$5,024	\$3,700 - \$4,700	
10 VSD on Hot Water Pump (from Constant to VSD)	1.1%	\$2,075	0.5%	\$95	\$2,170	\$4,000 - \$5,000	



Description of Combined Measures to Achieve 15% Above Code Savings

Combination of Measures <sup>3</sup>	Combined Energy Savings (%)	Combined Energy Savings (\$/year)	Combined Demand Savings (%)	Combined Demand Savings (\$/year)	Combined Savings (Energy+Demand) (\$/year)	Combined Estimated Cost (\$)		Combined Annual NOx Emissions Savings (lbs/year)	Combined Ozone Season Period NOx Emissions Savings (lbs/day)	Simple Estimated Payback (yrs)
						Marginal Cost <sup>1</sup>	New System Cost <sup>2</sup>			
<b>Combination 1</b>										
1 Glazing U Factor (1.22 to 0.45 Btu/hr-sf-F)	15.9%	\$30,004	22.6%	\$4,222	\$34,226	\$95,130 - \$174,150		283	0.84	3.2 - 5.8
2 Lighting Load (1.3 to 1.0 w/sq-ft)						\$0 - \$0				
<b>Combination 2</b>										
3 Occupancy Sensors Installation	20.7%	\$38,924	-1.1%	-\$204	\$38,720		\$26,500 - \$28,000	367	1.03	0.7 - 0.7
5 Cold Deck Reset						\$0 - \$800				
<b>Combination 3</b>										
2 Lighting Load (1.3 to 1.0 w/sq-ft)	18.1%	\$34,069	16.4%	\$3,060	\$37,128	\$0 - \$0		321	0.91	0.6 - 0.7
5 Cold Deck Reset						\$0 - \$800				
7 Chiller COP (4.9 to 6.1)						\$16,000 - \$18,000				
9 VSD on Chilled Water Pump (from Constant to VSD)						\$3,700 - \$4,700				

Note:

- Marginal cost = new system cost - original system cost
- New system cost = new system cost only
- See individual measures above for specific savings
  - \* Energy Cost: Electricity cost = \$0.119/kWh
  - Demand cost = \$5.00/kW
  - (Yearly demand cost = Sum of monthly demand cost for 12 months
  - Natural gas cost = \$0.80/therm

(Building Description)

- Building type: Office
- Gross area: 89,340 sq-ft
- Building dimension: 122ft x 122ft x 78ft (WxLxH)
- Number of floors: 6
- Floor-to-floor height: 13ft
- Window-to-wall ratio: 50%



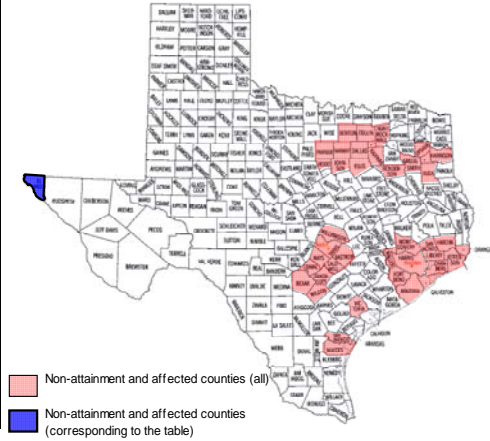
**Table 2b: 15% Above Code Savings (Commercial - Electric Heating) for Nueces and San Patricio Counties**



# Electric Heating (El Paso)

Description of Individual Measures

Individual Measures	Annual Energy Savings (%)	Annual Energy Savings (\$/year)	Annual Demand Savings (%)	Annual Demand Savings (\$/year)	Combined Savings (Energy+Demand) (\$/year)	Estimated Cost (\$)	
						Marginal Cost <sup>1</sup>	New System Cost <sup>2</sup>
<b>A Envelope and Fenestration Measures</b>							
1 Glazing U Factor (1.22 to 0.45 Btu/hr-sf-F)	0.0%	\$19	0.1%	\$12	\$31	\$95,130 - \$174,150	
2 Lighting Load (1.3 to 1.0 w/sq-ft)	10.4%	\$18,043	9.1%	\$1,512	\$19,555	\$0 - \$0	
3 Occupancy Sensors Installation	20.3%	\$35,271	-4.7%	-\$783	\$34,488		\$26,500 - \$28,000
4 Shading (none to 2.5 ft overhangs)	3.2%	\$5,487	3.1%	\$518	\$6,005		\$67,900 - \$110,000
<b>B HVAC System Measures</b>							
5 Cold Deck Reset	-1.4%	-\$2,421	-1.5%	-\$256	-\$2,677	\$0 - \$800	
6 Supply Fan Total Pressure (2.5 to 1.5 in-H2O)	1.5%	\$2,689	1.7%	\$288	\$2,977	\$0 - \$200	
<b>C Plant Equipment Measures</b>							
7 Chiller COP (4.9 to 6.1)	4.1%	\$7,162	4.5%	\$747	\$7,909	\$16,000 - \$18,000	
8 Boiler Efficiency (Not Applicable)	n/a	n/a	n/a	n/a	n/a	n/a - n/a	
9 VSD on Chilled Water Pump (from Constant to VSD)	2.4%	\$4,214	0.9%	\$155	\$4,369	\$3,700 - \$4,700	
10 VSD on Hot Water Pump (from Constant to VSD)	0.3%	\$506	0.1%	\$16	\$523	\$4,000 - \$5,000	



Description of Combined Measures to Achieve 15% Above Code Savings

Combination of Measures <sup>3</sup>	Combined Energy Savings (%)	Combined Energy Savings (\$/year)	Combined Demand Savings (%)	Combined Demand Savings (\$/year)	Combined Savings (Energy+Demand) (\$/year)	Combined Estimated Cost (\$)		Combined Annual NOx Emissions Savings (lbs/year)	Combined Ozone Season Period NOx Emissions Savings (lbs/day)	Simple Estimated Payback (yrs)
						Marginal Cost <sup>1</sup>	New System Cost <sup>2</sup>			
<b>Combination 1</b>										
2 Lighting Load (1.3 to 1.0 w/sq-ft)	16.8%	\$29,194	16.0%	\$2,665	\$31,859	\$0 - \$0	\$67,900 - \$110,000	N/A	N/A	2.9 - 4.4
4 Shading (none to 2.5 ft overhangs)										
7 Chiller COP (4.9 to 6.1)						\$16,000 - \$18,000				
<b>Combination 2</b>										
3 Occupancy Sensors Installation	20.3%	\$35,271	-4.7%	-\$783	\$34,488		\$26,500 - \$28,000	N/A	N/A	0.75 - 0.79
<b>Combination 3</b>										
2 Lighting Load (1.3 to 1.0 w/sq-ft)	16.8%	\$29,142	14.4%	\$2,399	\$31,541	\$0 - \$0	\$67,900 - \$110,000	N/A	N/A	0.13 - 0.17
4 Shading (none to 2.5 ft overhangs)										
6 Supply Fan Total Pressure (2.5 to 1.5 in-H2O)						\$0 - \$200				
9 VSD on Chilled Water Pump (from Constant to VSD)						\$3,700 - \$4,700				

Note:

- Marginal cost = new system cost - original system cost
- New system cost = new system cost only
- See individual measures above for specific savings
  - \* Energy Cost: Electricity cost = \$0.119/kWh
  - Demand cost = \$5.00/kW
  - (Yearly demand cost = Sum of monthly demand cost for 12 months
  - Natural gas cost = \$0.80/therm

(Building Description)

- Building type: Office
- Gross area: 89,340 sq-ft
- Building dimension: 122ft x 122ft x 78ft (WxLxH)
- Number of floors: 6
- Floor-to-floor height: 13ft
- Window-to-wall ratio: 50%



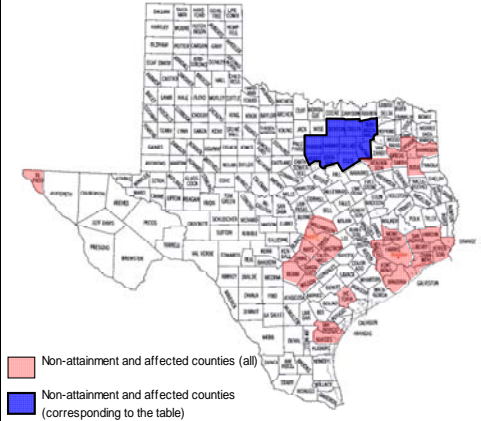
**Table 3b: 15% Above Code Savings (Commercial – Electric Heating) for El Paso County**



# Electric Heating (Collin, Dallas, Denton, Ellis, Hood, Hunt, Johnson, Kaufman, Parker, Rockwall and Tarrant Counties)

Description of Individual Measures

Individual Measures	Annual Energy Savings (%)	Annual Energy Savings (\$/year)	Annual Demand Savings (%)	Annual Demand Savings (\$/year)	Combined Savings (Energy+Demand) (\$/year)	Estimated Cost (\$)	
						Marginal Cost <sup>1</sup>	New System Cost <sup>2</sup>
<b>A Envelope and Fenestration Measures</b>							
1 Glazing U Factor (1.22 to 0.45 Btu/hr-sf-F)	14.3%	\$28,975	27.7%	\$6,042	\$35,017	\$95,130 - \$174,150	
2 Lighting Load (1.3 to 1.0 w/sq-ft)	6.8%	\$13,731	3.3%	\$729	\$14,460	\$0 - \$0	
3 Occupancy Sensors Installation	11.8%	\$23,907	-6.5%	-\$1,416	\$22,491		\$26,500 - \$28,000
4 Shading (none to 2.5 ft overhangs)	1.9%	\$3,792	2.3%	\$501	\$4,292		\$67,900 - \$110,000
<b>B HVAC System Measures</b>							
5 Cold Deck Reset	6.7%	\$13,580	6.4%	\$1,397	\$14,977	\$0 - \$800	
6 Supply Fan Total Pressure (2.5 to 1.5 in-H2O)	1.3%	\$2,643	1.4%	\$300	\$2,943	\$0 - \$200	
<b>C Plant Equipment Measures</b>							
7 Chiller COP (4.9 to 6.1)	3.7%	\$7,419	3.5%	\$765	\$8,184	\$16,000 - \$18,000	
8 Boiler Efficiency (Not Applicable)	n/a	n/a	n/a	n/a	n/a	n/a - n/a	
9 VSD on Chilled Water Pump (from Constant to VSD)	2.5%	\$5,030	1.0%	\$223	\$5,253	\$3,700 - \$4,700	
10 VSD on Hot Water Pump (from Constant to VSD)	1.9%	\$3,914	0.8%	\$172	\$4,086	\$4,000 - \$5,000	



Description of Combined Measures to Achieve 15% Above Code Savings

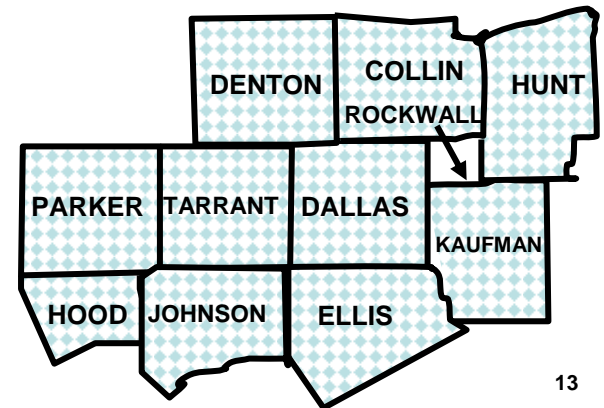
Combination of Measures <sup>3</sup>	Combined Energy Savings (%)	Combined Energy Savings (\$/year)	Combined Demand Savings (%)	Combined Demand Savings (\$/year)	Combined Savings (Energy+Demand) (\$/year)	Combined Estimated Cost (\$)		Combined Annual NOx Emissions Savings (lbs/year)	Combined Ozone Season Period NOx Emissions Savings (lbs/day)	Simple Estimated Payback (yrs)
						Marginal Cost <sup>1</sup>	New System Cost <sup>2</sup>			
<b>Combination 1</b>										
1 Glazing U Factor (1.22 to 0.45 Btu/hr-sf-F)	23.1%	\$46,774	33.0%	\$7,185	\$53,959	\$95,130 - \$174,150		601	1.16	2.0 - 3.7
2 Lighting Load (1.3 to 1.0 w/sq-ft)						\$0 - \$0				
<b>Combination 2</b>										
3 Occupancy Sensors Installation	20.1%	\$40,592	2.6%	\$569	\$41,162	\$26,500 - \$28,000		521	1.34	0.7 - 0.7
5 Cold Deck Reset						\$0 - \$800				
<b>Combination 3</b>										
1 Glazing U Factor (1.22 to 0.45 Btu/hr-sf-F)	17.9%	\$36,160	31.5%	\$6,855	\$43,015	\$95,130 - \$174,150		465	0.81	3.1 - 5.3
7 Chiller COP (4.9 to 6.1)						\$16,000 - \$18,000				

Note:

- Marginal cost = new system cost - original system cost
- New system cost = new system cost only
- See individual measures above for specific savings
  - \* Energy Cost: Electricity cost = \$0.119/kWh
  - Demand cost = \$5.00/kWh
  - (Yearly demand cost = Sum of monthly demand cost for 12 months
  - Natural gas cost = \$0.80/therm

(Building Description)

- Building type: Office
- Gross area: 89,340 sq-ft
- Building dimension: 122ft x 122ft x 78ft (WxLxH)
- Number of floors: 6
- Floor-to-floor height: 13ft
- Window-to-wall ratio: 50%



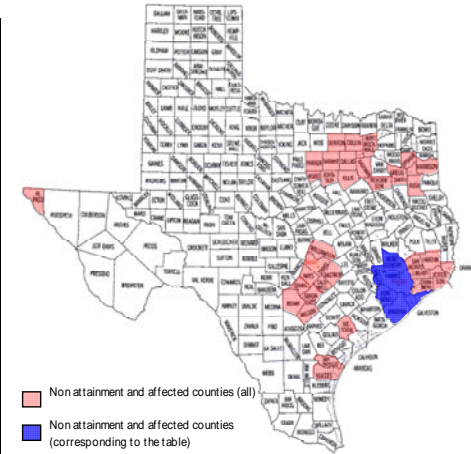
**Table 4b: 15% Above Code Savings (Commercial – Electric Heating) for Collin, Dallas, Denton, Ellis, Hood, Hunt, Johnson, Kaufman, Parker, Rockwall and Tarrant Counties**



# Electric Heating (Brazoria, Fort Bend, Galveston, Harris, Montgomery and Waller Counties)

Description of Individual Measures

Individual Measures	Annual Energy Savings (%)	Annual Energy Savings (\$/year)	Annual Demand Savings (%)	Annual Demand Savings (\$/year)	Combined Savings (Energy+Demand) (\$/year)	Estimated Cost (\$)	
						Marginal Cost <sup>1</sup>	New System Cost <sup>2</sup>
<b>A Envelope and Fenestration Measures</b>							
1 Glazing U Factor (1.22 to 0.45 Btu/hr-sf-F)	8.9%	\$17,184	22.6%	\$4,726	\$21,910	\$95,130 - \$174,150	
2 Lighting Load (1.3 to 1.0 w/sq-ft)	7.6%	\$14,774	2.6%	\$543	\$15,317	\$0 - \$0	
3 Occupancy Sensors Installation	14.7%	\$28,545	-7.0%	-\$1,468	\$27,078		\$26,500 - \$28,000
4 Shading (none to 2.5 ft overhangs)	2.0%	\$3,849	2.3%	\$471	\$4,321		\$67,900 - \$110,000
<b>B HVAC System Measures</b>							
5 Cold Deck Reset	3.8%	\$7,412	5.9%	\$1,244	\$8,656	\$0 - \$800	
6 Supply Fan Total Pressure (2.5 to 1.5 in-H2O)	1.4%	\$2,616	1.4%	\$299	\$2,916	\$0 - \$200	
<b>C Plant Equipment Measures</b>							
7 Chiller COP (4.9 to 6.1)	4.0%	\$7,717	3.7%	\$765	\$8,482	\$16,000 - \$18,000	
8 Boiler Efficiency (Not Applicable)	n/a	n/a	n/a	n/a	n/a	n/a - n/a	
9 VSD on Chilled Water Pump (from Constant to VSD)	2.5%	\$4,764	1.0%	\$208	\$4,972	\$3,700 - \$4,700	
10 VSD on Hot Water Pump (from Constant to VSD)	2.0%	\$3,787	0.8%	\$172	\$3,960	\$4,000 - \$5,000	



Description of Combined Measures to Achieve 15% Above Code Savings

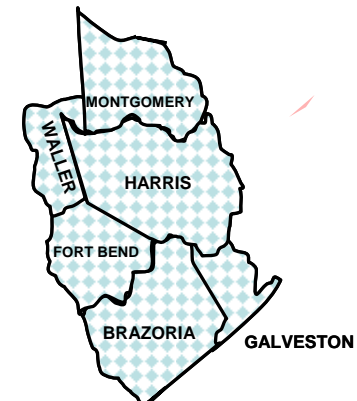
Combination of Measures <sup>3</sup>	Combined Energy Savings (%)	Combined Energy Savings (\$/year)	Combined Demand Savings (%)	Combined Demand Savings (\$/year)	Combined Savings (Energy+Demand) (\$/year)	Combined Estimated Cost (\$)		Combined Annual NOx Emissions Savings (lbs/year)	Combined Ozone Season Period NOx Emissions Savings (lbs/day)	Simple Estimated Payback (yrs)
						Marginal Cost <sup>1</sup>	New System Cost <sup>2</sup>			
<b>Combination 1</b>										
1 Glazing U Factor (1.22 to 0.45 Btu/hr-sf-F)	18.5%	\$35,763	29.8%	\$6,237	\$42,000	\$95,130 - \$174,150		341	1.08	2.7 - 4.9
2 Lighting Load (1.3 to 1.0 w/sq-ft)						\$0 - \$0				
<b>Combination 2</b>										
3 Occupancy Sensors Installation	19.8%	\$38,343	0.0%	\$5	\$38,348	\$26,500 - \$28,000		366	1.36	0.7 - 0.8
5 Cold Deck Reset						\$0 - \$800				
<b>Combination 3</b>										
1 Glazing U Factor (1.22 to 0.45 Btu/hr-sf-F)	15.5%	\$30,066	27.7%	\$5,793	\$35,859	\$95,130 - \$174,150		287	0.90	4.0 - 6.7
7 Chiller COP (4.9 to 6.1)						\$16,000 - \$18,000				
9 VSD on Chilled Water Pump (from Constant to VSD)						\$3,700 - \$4,700				
10 VSD on Hot Water Pump (from Constant to VSD)						\$4,000 - \$5,000				

Note:

- Marginal cost = new system cost - original system cost
- New system cost = new system cost only
- See individual measures above for specific savings
  - \* Energy Cost: Electricity cost = \$0.119/kWh
  - Demand cost = \$5.00/kWh
  - (Yearly demand cost = Sum of monthly demand cost for 12 months
  - Natural gas cost = \$0.80/therm

(Building Description)

- Building type: Office
- Gross area: 89,340 sq-ft
- Building dimension: 122ft x 122ft x 78ft (WxLxH)
- Number of floors: 6
- Floor-to-floor height: 13ft
- Window-to-wall ratio: 50%



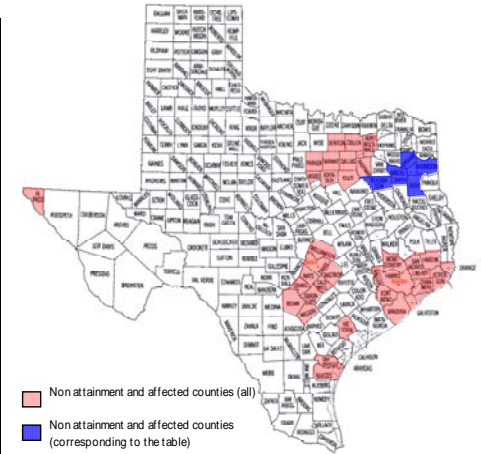
**Table 5b: 15% Above Code Savings (Commercial – Electric Heating) for Brazoria, Fort Bend, Galveston, Harris, Montgomery and Waller Counties**



# Electric Heating (Gregg, Harrison, Henderson, Rusk, Smith and Upshur Counties)

Description of Individual Measures

Individual Measures	Annual Energy Savings (%)	Annual Energy Savings (\$/year)	Annual Demand Savings (%)	Annual Demand Savings (\$/year)	Combined Savings (Energy+Demand) (\$/year)	Estimated Cost (\$)	
						Marginal Cost <sup>1</sup>	New System Cost <sup>2</sup>
<b>A Envelope and Fenestration Measures</b>							
1 Glazing U Factor (1.22 to 0.45 Btu/hr-sf-F)	11.7%	\$22,258	26.8%	\$5,596	\$27,854	\$95,130 - \$174,150	
2 Lighting Load (1.3 to 1.0 w/sq-ft)	6.6%	\$12,484	1.4%	\$285	\$12,769	\$0 - \$0	
3 Occupancy Sensors Installation	13.0%	\$24,749	-6.0%	-\$1,253	\$23,496		\$26,500 - \$28,000
4 Shading (none to 2.5 ft overhangs)	1.8%	\$3,431	1.6%	\$337	\$3,769		\$67,900 - \$110,000
<b>B HVAC System Measures</b>							
5 Cold Deck Reset	5.6%	\$10,563	6.5%	\$1,364	\$11,927	\$0 - \$800	
6 Supply Fan Total Pressure (2.5 to 1.5 in-H2O)	1.5%	\$2,853	1.5%	\$316	\$3,169	\$0 - \$200	
<b>C Plant Equipment Measures</b>							
7 Chiller COP (4.9 to 6.1)	3.5%	\$6,580	2.8%	\$581	\$7,161	\$16,000 - \$18,000	
8 Boiler Efficiency (Not Applicable)	n/a	n/a	n/a	n/a	n/a	n/a - n/a	
9 VSD on Chilled Water Pump (from Constant to VSD)	2.4%	\$4,508	1.1%	\$235	\$4,743	\$3,700 - \$4,700	
10 VSD on Hot Water Pump (from Constant to VSD)	1.5%	\$2,823	0.5%	\$112	\$2,935	\$4,000 - \$5,000	



Description of Combined Measures to Achieve 15% Above Code Savings

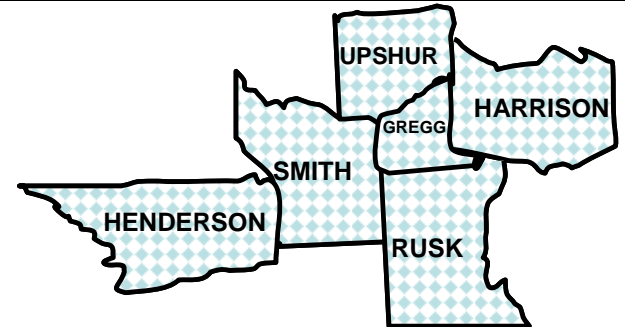
Combination of Measures <sup>3</sup>	Combined Energy Savings (%)	Combined Energy Savings (\$/year)	Combined Demand Savings (%)	Combined Demand Savings (\$/year)	Combined Savings (Energy+Demand) (\$/year)	Combined Estimated Cost (\$)		Combined Annual NOx Emissions Savings (lbs/year)	Combined Ozone Season Period NOx Emissions Savings (lbs/day)	Simple Estimated Payback (yrs)
						Marginal Cost <sup>1</sup>	New System Cost <sup>2</sup>			
<b>Combination 1</b>										
1 Glazing U Factor (1.22 to 0.45 Btu/hr-sf-F)	20.6%	\$39,107	34.1%	\$7,111	\$46,218	\$95,130 - \$174,150		502	0.96	2.4 - 4.5
2 Lighting Load (1.3 to 1.0 w/sq-ft)						\$0 - \$0				
<b>Combination 2</b>										
3 Occupancy Sensors Installation	20.7%	\$39,359	3.9%	\$805	\$40,164		\$26,500 - \$28,000	506	1.32	0.7 - 0.7
5 Cold Deck Reset						\$0 - \$800				
<b>Combination 3</b>										
1 Glazing U Factor (1.22 to 0.45 Btu/hr-sf-F)	15.2%	\$28,873	30.6%	\$6,378	\$35,251	\$95,130 - \$174,150		371	0.62	3.8 - 6.7
7 Chiller COP (4.9 to 6.1)						\$16,000 - \$18,000				

Note:

- Marginal cost = new system cost - original system cost
- New system cost = new system cost only
- See individual measures above for specific savings
  - \* Energy Cost: Electricity cost = \$0.119/kWh
  - Demand cost = \$5.00/kW
  - (Yearly demand cost = Sum of monthly demand cost for 12 months
  - Natural gas cost = \$0.80/therm

(Building Description)

- Building type: Office
- Gross area: 89,340 sq-ft
- Building dimension: 122ft x 122ft x 78ft (WxLxH)
- Number of floors: 6
- Floor-to-floor height: 13ft
- Window-to-wall ratio: 50%



**Table 6b: 15% Above Code Savings (Commercial – Electric Heating) for Gregg, Harrison, Henderson, Rusk, Smith and Upshur Counties**

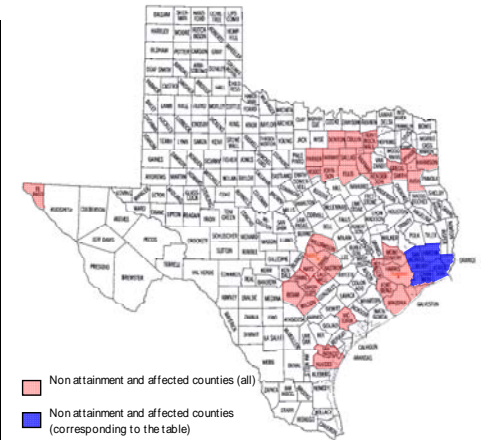




# Electric Heating (Chambers, Hardin, Jefferson, Liberty and Orange Counties)

Description of Individual Measures

Individual Measures	Annual Energy Savings (%)	Annual Energy Savings (\$/year)	Annual Demand Savings (%)	Annual Demand Savings (\$/year)	Combined Savings (Energy+Demand) (\$/year)	Estimated Cost (\$)	
						Marginal Cost <sup>1</sup>	New System Cost <sup>2</sup>
<b>A Envelope and Fenestration Measures</b>							
1 Glazing U Factor (1.22 to 0.45 Btu/hr-sf-F)	8.2%	\$15,613	20.6%	\$4,108	\$19,721	\$95,130 - \$174,150	
2 Lighting Load (1.3 to 1.0 w/sq-ft)	8.0%	\$15,168	2.9%	\$574	\$15,741	\$0 - \$0	
3 Occupancy Sensors Installation	14.2%	\$26,991	-5.9%	-\$1,171	\$25,820		\$26,500 - \$28,000
4 Shading (none to 2.5 ft overhangs)	2.3%	\$4,276	2.0%	\$398	\$4,675		\$67,900 - \$110,000
<b>B HVAC System Measures</b>							
5 Cold Deck Reset	3.9%	\$7,478	6.7%	\$1,333	\$8,811	\$0 - \$800	
6 Supply Fan Total Pressure (2.5 to 1.5 in-H2O)	1.4%	\$2,572	1.5%	\$293	\$2,866	\$0 - \$200	
<b>C Plant Equipment Measures</b>							
7 Chiller COP (4.9 to 6.1)	4.1%	\$7,773	3.8%	\$767	\$8,540	\$16,000 - \$18,000	
8 Boiler Efficiency (Not Applicable)	n/a	n/a	n/a	n/a	n/a	n/a - n/a	
9 VSD on Chilled Water Pump (from Constant to VSD)	2.6%	\$4,849	1.1%	\$214	\$5,063	\$3,700 - \$4,700	
10 VSD on Hot Water Pump (from Constant to VSD)	1.3%	\$2,389	0.5%	\$95	\$2,484	\$4,000 - \$5,000	



Description of Combined Measures to Achieve 15% Above Code Savings

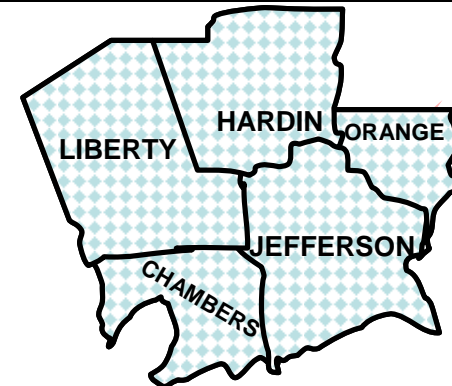
Combination of Measures <sup>3</sup>	Combined Energy Savings (%)	Combined Energy Savings (\$/year)	Combined Demand Savings (%)	Combined Demand Savings (\$/year)	Combined Savings (Energy+Demand) (\$/year)	Combined Estimated Cost (\$)		Combined Annual NOx Emissions Savings (lbs/year)	Combined Ozone Season Period NOx Emissions Savings (lbs/day)	Simple Estimated Payback (yrs)
						Marginal Cost <sup>1</sup>	New System Cost <sup>2</sup>			
<b>Combination 1</b>										
1 Glazing U Factor (1.22 to 0.45 Btu/hr-sf-F)	17.6%	\$33,270	28.6%	\$5,709	\$38,979	\$95,130 - \$174,150		N/A	N/A	2.9 - 5.2
2 Lighting Load (1.3 to 1.0 w/sq-ft)						\$0 - \$0				
<b>Combination 2</b>										
3 Occupancy Sensors Installation	20.9%	\$39,589	3.9%	\$785	\$40,375		\$26,500 - \$28,000	N/A	N/A	0.7 - 0.7
5 Cold Deck Reset						\$0 - \$800				
<b>Combination 3</b>										
1 Glazing U Factor (1.22 to 0.45 Btu/hr-sf-F)	16.2%	\$30,704	27.6%	\$5,506	\$36,210	\$95,130 - \$174,150		N/A	N/A	6.0 - 10.0
4 Shading (none to 2.5 ft overhangs)							\$67,900 - \$110,000			
7 Chiller COP (4.9 to 6.1)						\$16,000 - \$18,000				
9 VSD on Chilled Water Pump (from Constant to VSD)						\$3,700 - \$4,700				

Note:

- Marginal cost = new system cost - original system cost
- New system cost = new system cost only
- See individual measures above for specific savings
  - \* Energy Cost: Electricity cost = \$0.119/kWh
  - Demand cost = \$5.00/kW
  - (Yearly demand cost = Sum of monthly demand cost for 12 months
  - Natural gas cost = \$0.80/therm

(Building Description)

- Building type: Office
- Gross area: 89,340 sq-ft
- Building dimension: 122ft x 122ft x 78ft (WxLxH)
- Number of floors: 6
- Floor-to-floor height: 13ft
- Window-to-wall ratio: 50%



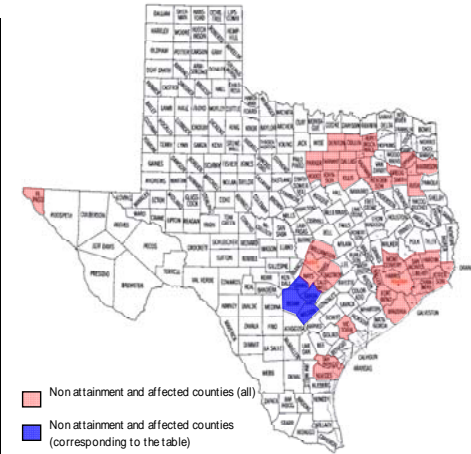
**Table 7b: 15% Above Code Savings (Commercial – Electric Heating) for Chambers, Hardin, Jefferson, Liberty and Orange Counties**



# Electric Heating (Bexar, Comal, Guadalupe and Wilson Counties)

Description of Individual Measures

Individual Measures	Annual Energy Savings (%)	Annual Energy Savings (\$/year)	Annual Demand Savings (%)	Annual Demand Savings (\$/year)	Combined Savings (Energy+Demand) (\$/year)	Estimated Cost (\$)	
						Marginal Cost <sup>1</sup>	New System Cost <sup>2</sup>
<b>A Envelope and Fenestration Measures</b>							
1 Glazing U Factor (1.22 to 0.45 Btu/hr-sf-F)	9.7%	\$18,753	22.8%	\$4,701	\$23,454	\$95,130 - \$174,150	
2 Lighting Load (1.3 to 1.0 w/sq-ft)	7.4%	\$14,331	3.6%	\$733	\$15,064	\$0 - \$0	
3 Occupancy Sensors Installation	14.3%	\$27,529	-5.6%	-\$1,146	\$26,383		\$26,500 - \$28,000
4 Shading (none to 2.5 ft overhangs)	1.8%	\$3,455	2.0%	\$422	\$3,877		\$67,900 - \$110,000
<b>B HVAC System Measures</b>							
5 Cold Deck Reset	4.0%	\$7,734	7.2%	\$1,486	\$9,220	\$0 - \$800	
6 Supply Fan Total Pressure (2.5 to 1.5 in-H2O)	1.4%	\$2,732	1.5%	\$315	\$3,047	\$0 - \$200	
<b>C Plant Equipment Measures</b>							
7 Chiller COP (4.9 to 6.1)	4.1%	\$7,885	3.7%	\$765	\$8,650	\$16,000 - \$18,000	
8 Boiler Efficiency (Not Applicable)	n/a	n/a	n/a	n/a	n/a	n/a - n/a	
9 VSD on Chilled Water Pump (from Constant to VSD)	2.5%	\$4,869	1.0%	\$215	\$5,084	\$3,700 - \$4,700	
10 VSD on Hot Water Pump (from Constant to VSD)	1.3%	\$2,561	0.5%	\$106	\$2,666	\$4,000 - \$5,000	



Description of Combined Measures to Achieve 15% Above Code Savings

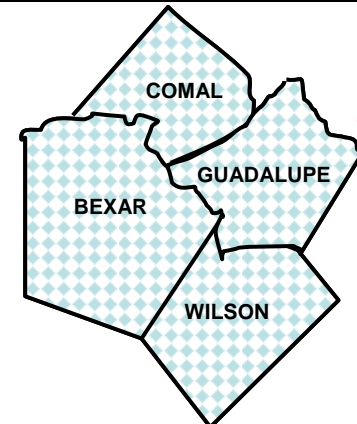
Combination of Measures <sup>3</sup>	Combined Energy Savings (%)	Combined Energy Savings (\$/year)	Combined Demand Savings (%)	Combined Demand Savings (\$/year)	Combined Savings (Energy+Demand) (\$/year)	Combined Estimated Cost (\$)		Combined Annual NOx Emissions Savings (lbs/year)	Combined Ozone Season Period NOx Emissions Savings (lbs/day)	Simple Estimated Payback (yrs)
						Marginal Cost <sup>1</sup>	New System Cost <sup>2</sup>			
<b>Combination 1</b>										
1 Glazing U Factor (1.22 to 0.45 Btu/hr-sf-F)	18.8%	\$36,294	29.8%	\$6,140	\$42,434	\$95,130 - \$174,150		470	1.06	2.6 - 4.8
2 Lighting Load (1.3 to 1.0 w/sq-ft)						\$0 - \$0				
<b>Combination 2</b>										
3 Occupancy Sensors Installation	20.3%	\$39,230	2.8%	\$584	\$39,814		\$26,500 - \$28,000	508	1.28	0.7 - 0.7
5 Cold Deck Reset						\$0 - \$800				
<b>Combination 3</b>										
1 Glazing U Factor (1.22 to 0.45 Btu/hr-sf-F)	15.6%	\$30,168	27.7%	\$5,720	\$35,888	\$95,130 - \$174,150		391	0.87	3.8 - 6.5
7 Chiller COP (4.9 to 6.1)						\$16,000 - \$18,000				
9 VSD on Chilled Water Pump (from Constant to VSD)						\$3,700 - \$4,700				

Note:

- Marginal cost = new system cost - original system cost
- New system cost = new system cost only
- See individual measures above for specific savings
  - \* Energy Cost: Electricity cost = \$0.119/kWh
  - Demand cost = \$5.00/kW
  - (Yearly demand cost = Sum of monthly demand cost for 12 months
  - Natural gas cost = \$0.80/therm

(Building Description)

- Building type: Office
- Gross area: 89,340 sq-ft
- Building dimension: 122ft x 122ft x 78ft (WxLxH)
- Number of floors: 6
- Floor-to-floor height: 13ft
- Window-to-wall ratio: 50%



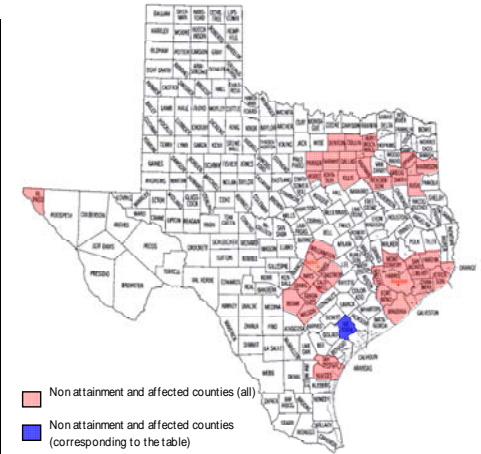
**Table 8b: 15% Above Code Savings (Commercial – Electric Heating) for Bexar, Comal, Guadalupe and Wilson Counties**



# Electric Heating (Victoria County)

Description of Individual Measures

Individual Measures	Annual Energy Savings (%)	Annual Energy Savings (\$/year)	Annual Demand Savings (%)	Annual Demand Savings (\$/year)	Combined Savings (Energy+Demand) (\$/year)	Estimated Cost (\$)	
						Marginal Cost <sup>1</sup>	New System Cost <sup>2</sup>
<b>A Envelope and Fenestration Measures</b>							
1 Glazing U Factor (1.22 to 0.45 Btu/hr-sf-F)	7.8%	\$14,873	22.0%	\$4,453	\$19,326	\$95,130 - \$174,150	
2 Lighting Load (1.3 to 1.0 w/sq-ft)	8.4%	\$15,980	3.9%	\$791	\$16,772	\$0 - \$0	
3 Occupancy Sensors Installation	15.7%	\$29,680	-5.7%	-\$1,154	\$28,526		\$26,500 - \$28,000
4 Shading (none to 2.5 ft overhangs)	2.2%	\$4,137	2.5%	\$499	\$4,635		\$67,900 - \$110,000
<b>B HVAC System Measures</b>							
5 Cold Deck Reset	2.8%	\$5,383	6.6%	\$1,346	\$6,729	\$0 - \$800	
6 Supply Fan Total Pressure (2.5 to 1.5 in-H2O)	1.4%	\$2,708	1.5%	\$301	\$3,009	\$0 - \$200	
<b>C Plant Equipment Measures</b>							
7 Chiller COP (4.9 to 6.1)	4.2%	\$8,021	3.9%	\$799	\$8,820	\$16,000 - \$18,000	
8 Boiler Efficiency (Not Applicable)	n/a	n/a	n/a	n/a	n/a	n/a - n/a	
9 VSD on Chilled Water Pump (from Constant to VSD)	2.5%	\$4,804	1.1%	\$218	\$5,022	\$3,700 - \$4,700	
10 VSD on Hot Water Pump (from Constant to VSD)	1.5%	\$2,899	0.6%	\$127	\$3,026	\$4,000 - \$5,000	



Description of Combined Measures to Achieve 15% Above Code Savings

Combination of Measures <sup>3</sup>	Combined Energy Savings (%)	Combined Energy Savings (\$/year)	Combined Demand Savings (%)	Combined Demand Savings (\$/year)	Combined Savings (Energy+Demand) (\$/year)	Combined Estimated Cost (\$)		Combined Annual NOx Emissions Savings (lbs/year)	Combined Ozone Season Period NOx Emissions Savings (lbs/day)	Simple Estimated Payback (yrs)
						Marginal Cost <sup>1</sup>	New System Cost <sup>2</sup>			
<b>Combination 1</b>										
1 Glazing U Factor (1.22 to 0.45 Btu/hr-sf-F)	17.6%	\$33,449	29.8%	\$6,047	\$39,497	\$95,130 - \$174,150		315	0.88	2.8 - 5.2
2 Lighting Load (1.3 to 1.0 w/sq-ft)						\$0 - \$0				
<b>Combination 2</b>										
3 Occupancy Sensors Installation	20.8%	\$39,431	3.6%	\$736	\$40,167		\$26,500 - \$28,000	372	1.04	0.7 - 0.7
5 Cold Deck Reset						\$0 - \$800				
<b>Combination 3</b>										
2 Lighting Load (1.3 to 1.0 w/sq-ft)	18.1%	\$34,324	16.1%	\$3,256	\$37,579	\$0 - \$0		324	0.91	0.57 - 0.68
5 Cold Deck Reset						\$0 - \$800				
7 Chiller COP (4.9 to 6.1)						\$16,000 - \$18,000				
9 VSD on Chilled Water Pump (from Constant to VSD)						\$3,700 - \$4,700				

Note:

- Marginal cost = new system cost - original system cost
- New system cost = new system cost only
- See individual measures above for specific savings
  - \* Energy Cost: Electricity cost = \$0.119/kWh
  - Demand cost = \$5.00/kW
  - (Yearly demand cost = Sum of monthly demand cost for 12 months
  - Natural gas cost = \$0.80/therm

(Building Description)

- Building type: Office
- Gross area: 89,340 sq-ft
- Building dimension: 122ft x 122ft x 78ft (WxLxH)
- Number of floors: 6
- Floor-to-floor height: 13ft
- Window-to-wall ratio: 50%



**Table 9b: 15% Above Code Savings (Commercial – Electric Heating) for Victoria County**

