

Commissioning and Retro Commissioning Programs for Energy Efficiency



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Amit Kulkarni, Senior Engineer, National Grid

Presentation Goals

- **Overview of National Grid's Commissioning Program**
- **Types of Commissioning Programs**
- **Customer Examples**

National Grid's Energy Efficiency Programs

Our commercial & industrial programs are designed to provide solutions for businesses and institutions to save money, improve energy performance, and reduce greenhouse gas emissions by:

- Providing financial incentives and technical assistance to replace inefficient equipment or systems to:
 - Reduce operating costs
 - Increase productivity
 - Reduce carbon foot-print
- Integrate gas and electric energy efficiency opportunities
- Provide technical assistance and financial incentives to raise building performance standards in existing buildings

“Minimizing our impact on the environment while delivering safe, secure and economic supplies of energy to customers is not an option, it is a must.”

– Steve Holliday,
National Grid CEO

National Grid's Large C&I Energy Efficiency Programs

- Energy Efficiency Programs are growing rapidly

FY 2011

- \$ 140 million dollars in incentives
- Commissioning Projects account for 2% of the total incentive dollars (\$ 1.8 million dollars)
- 15% of custom/comprehensive projects require commissioning
- New Program (Pay for Performance) rolled out in 2011
- Renewed emphasis on retro-commissioning program



Why is National Grid Involved in Commissioning Programs?

- Leader in energy efficiency utility industry
- Part of Market Transformation Efforts
- Promotion of Quality Energy Efficiency services to our customers
- Increase the likelihood that the building systems will operate as intended and achieve predicted savings
- Raise building performance standard in existing buildings
- Increase customer awareness towards sustainability



Commissioning Options...

COMMISSIONING

- Focused on installation of new equipment and/or systems
- Work with customer through design, construction and operation phases of the project

RETRO- C_x

- Focused on existing buildings, equipment and/or systems
- Buildings with high energy use
- Requires pre-qualification
- Customers with interest and commitment to improve their facility operations

MONITORING BASED C_x

- Similar to retro commissioning
- Focused on existing buildings, equipment or systems
- Requires pre-qualification
- Building with EMS systems
- Involves trending and monitoring of building systems

Commissioning- New Equipment/Systems

'Commissioning is a process that confirms and documents the energy efficiency project is properly installed, operating as intended and able to deliver the projected energy savings'..!

- Scope varies as compared to whole building commissioning services
- Commissioning focused on equipment/systems that have been provided incentives by National Grid
- All projects greater than \$100,000 incentive require commissioning
- Two steps: 1) Post Installation Verification
2) M & V, Trending to verify energy savings
- 20% of incentive is with held until the completion of commissioning process



Retro Commissioning

'Retro-Commissioning is the process of testing, troubleshooting, balancing and adjusting existing systems in buildings to raise performance standards'.

Why?

- Focused on increasing performance of existing buildings
- Energy Management Systems- Neglected or Outdated
- Equipment Operating at reduced efficiencies due to deferred or inadequate maintenance
- Facility modifications carried out without updating HVAC distribution system or controls
- Building operators are focused on occupant comfort and system reliability and not on how efficiently the building is operating



Retro Commissioning

What are we looking for?

- Customers with interest and commitment to improve building's performance
- Management willing to commit time and money to save energy
- Buildings with high energy use (MBtu/ft²/year)
- Presence of Energy Management System (preferred)
- Potential savings v/s study and implementation costs

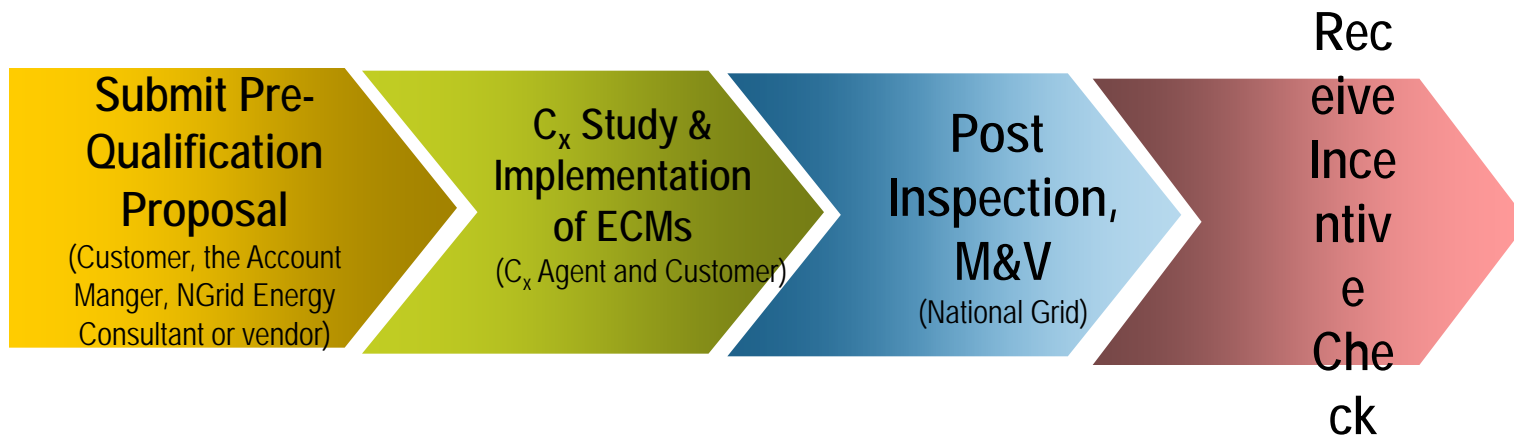
Potential Customers are required to be pre-qualified to get most value from Retro Commissioning effort

Three year commitment between customer and vendor to ensure persistence of savings

Incentive amount based on National Grid's custom program guidelines

Retro Commissioning Approaches

Retro Commissioning Study Approach



Retro Commissioning Project Approach



Retro Commissioning Project Example

**Trottier Middle School,
Marlboro, MA**

132,000 Sq Ft School

Annual Energy Use

950,000 kWh

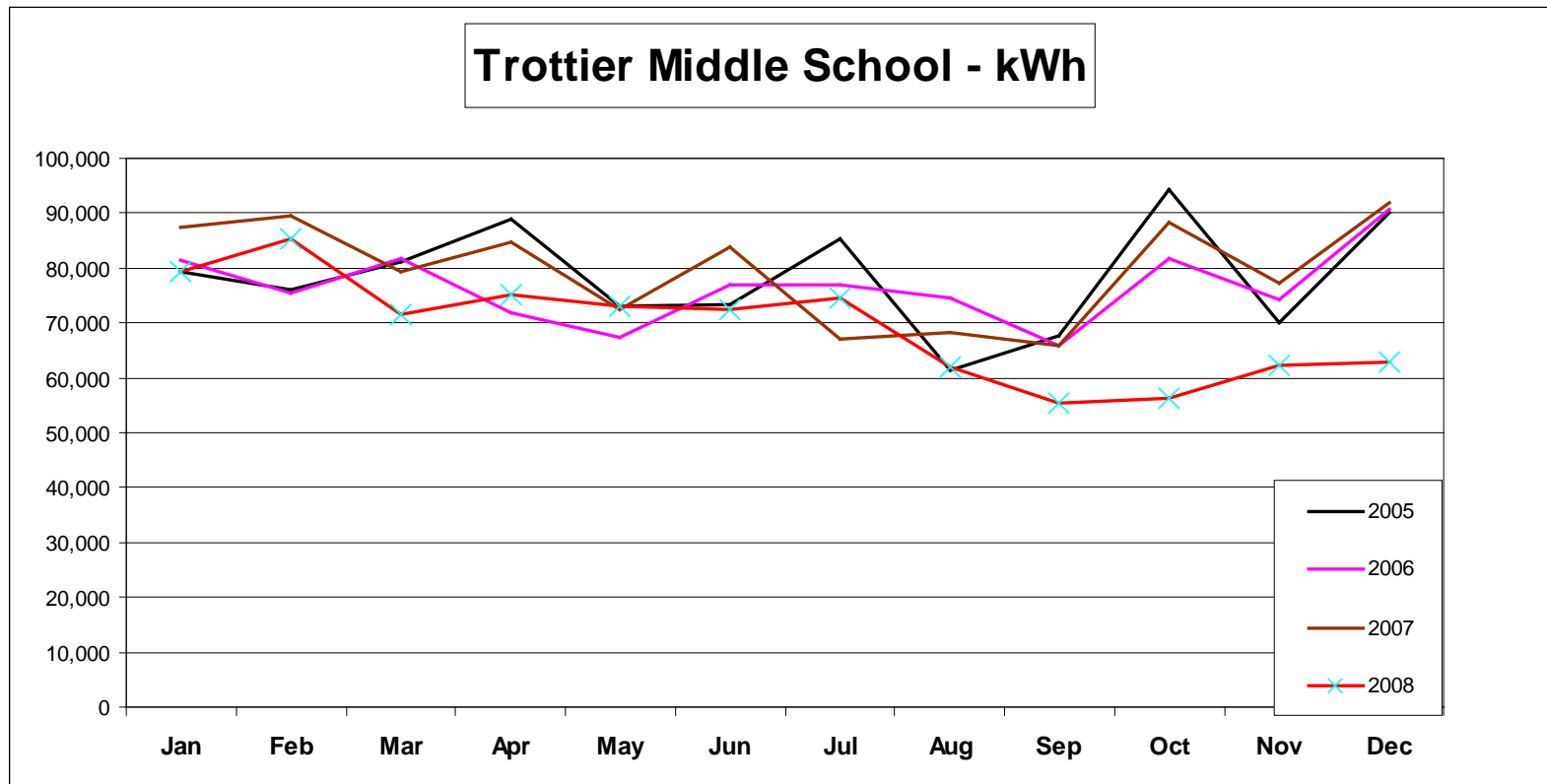
66,000 therms



- **After EMS/HVAC Improvements**
- **750,000 kWh – 20% Savings**
- **60,000 therms – 10% Savings**

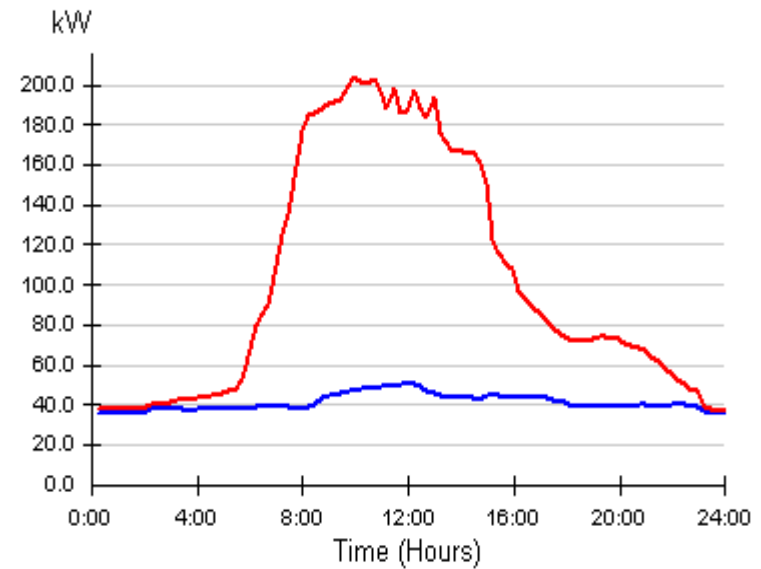
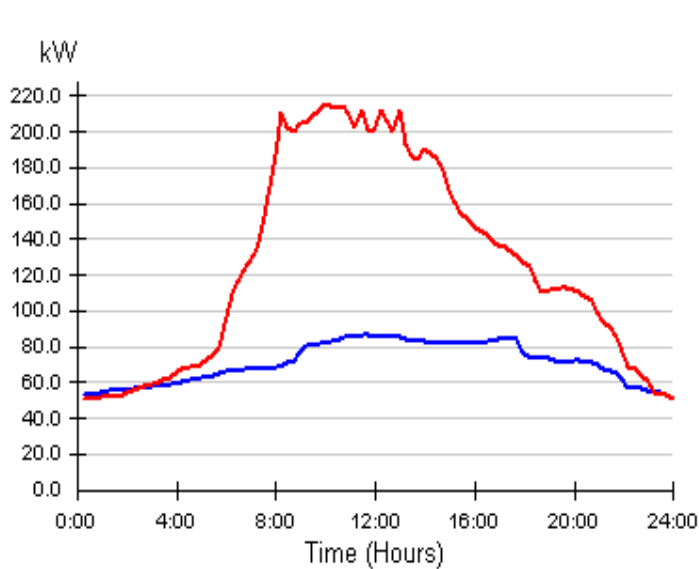
Trottier Middle School Monthly Energy Usage

Monthly Energy Usage Before and After Retro Commissioning Project



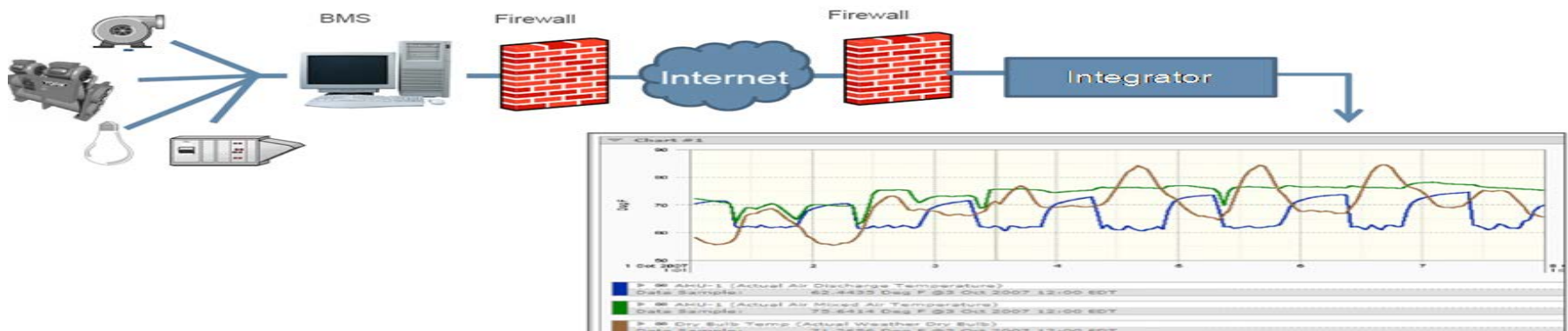
Trottier Middle School Demand

Daily Demand Before and After Retro Commissioning Project



Monitoring Based Commissioning (P4P)

'Monitoring Based Commissioning is the process of trending and monitoring existing systems in buildings to identify operational opportunities and to raise existing building performance standard'..!



- Program Rolled Out in 2011
- Prequalification requirements- similar to retro C_x
- TA funds may be available for ASHRAE Level I walk through study
- Vendor typically provides software interfaces with customer EMS to remotely monitor and analyze system operations
- Vendor provides monthly reports to customer identifying inefficiencies and suggested improvements
- Vendor provided trends and savings analysis as per IPMVP protocols (Option B or Option C)

Monitoring Based Commissioning Approach



- **3 year agreement between service provider and vendor**
- **Incentive based on \$0.075/kWh and \$0.75/therm of first years savings or first years implementation and monitoring cost (whichever is less)**
- **Final Incentive subject to change based on actual savings**

RETROFIT

2011 Pay-for-Performance Application

Choose Program Administrator for Application
 Cape Light Compact National Grid NSTAR
 Unitil Western Massachusetts Electric Company

Customer Information			
COMPANY NAME	APPLICATION DATE		
INSTALLATION SITE	PHONE NUMBER		
CONTACT PERSON	FAX NUMBER		
E-MAIL ADDRESS	SQ. FT. (covered by this application)		
STREET ADDRESS	CITY	STATE	ZIP
MAILING ADDRESS (if different)	CITY	STATE	ZIP
ELECTRIC COMPANY NAME	ELECTRIC ACCOUNT # (or copy of electric bill)		
GAS COMPANY NAME	GAS ACCOUNT # (or copy of gas bill)		
BUILDING TYPE: (select one)	TOTAL FACILITY SQ. FT.		
<input type="checkbox"/> Assembly	<input type="checkbox"/> Fast Food	<input type="checkbox"/> Hotel	<input type="checkbox"/> Multi Story Retail
<input type="checkbox"/> Automobile	<input type="checkbox"/> Full Service Restaurant	<input type="checkbox"/> Large Refrigerated Space	<input type="checkbox"/> Multifamily high-rise
<input type="checkbox"/> Big Box	<input type="checkbox"/> Grocery	<input type="checkbox"/> Large Office	<input type="checkbox"/> Multifamily low-rise
<input type="checkbox"/> Community College	<input type="checkbox"/> Heavy Industrial	<input type="checkbox"/> Light Industrial	<input type="checkbox"/> Other
			<input type="checkbox"/> Religious
			<input type="checkbox"/> K-12 Schools
			<input type="checkbox"/> Small Office
			<input type="checkbox"/> Small Retail
			<input type="checkbox"/> University
			<input type="checkbox"/> Warehouse

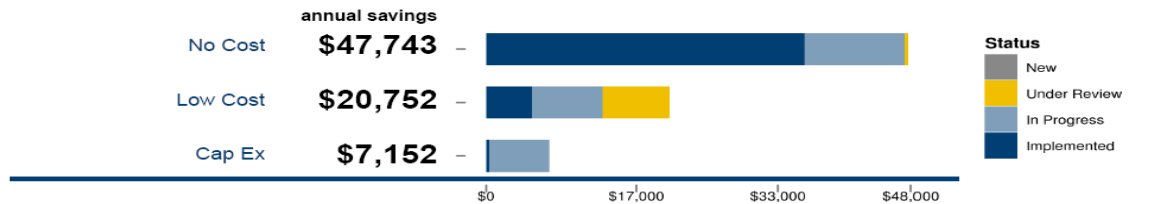
Monitoring Based Commissioning Project Example

- **Leading national insurance company**
- **Location: Worcester, MA**
- **Building Area: 475,000 square feet**
- **Annual Energy Usage: 16,490,400 kWh/year and 339,111 therms/year**
- **Projected Energy Savings: 363,293 kWh/year and 17,633 therms/year**
- **Energy Savings Low Cost/No Cost Measures (identified through 9 months): 168,000 kWh and 62,301 therms/year**
- **Proposed Incentive: \$27,000**
- **Numerous capital expenditure measures (payback > 2 years) identified and under review**



Monitoring based Commissioning Project Example Continued

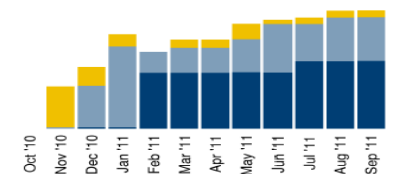
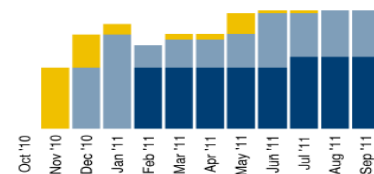
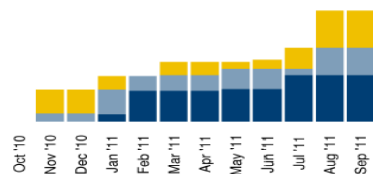
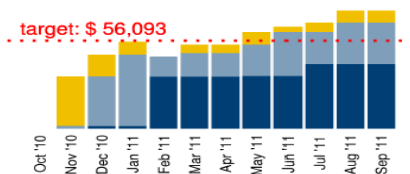
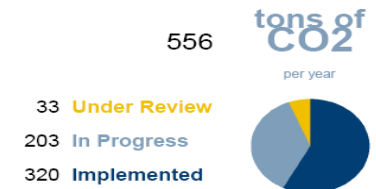
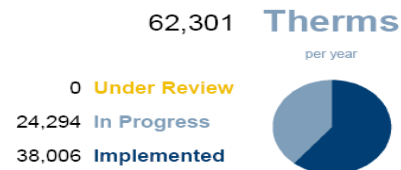
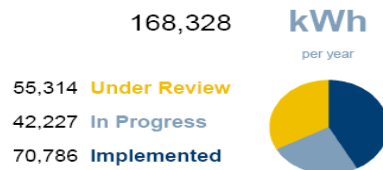
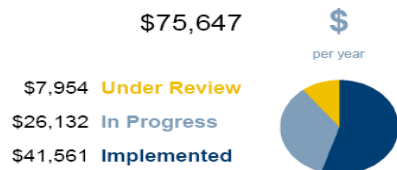
Energy Efficiency Measure Overview



Total Savings Identified **\$75,647** 134.86% of Total Savings Target
 Total Savings Accepted **\$67,693** 120.68% of Total Savings Target



Savings Progress



Other Commissioning Approaches

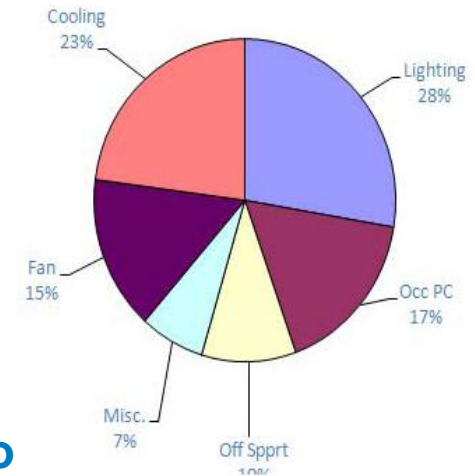
- **Value Retro Commissioning (Internal to National Grid)**

Streamlined High Level version of Retro C_x based on Interval meter data

- **Rapid Building Assessments (Pilot Initiative)**

Zero Touch whole building assessments based on interval meter data

Potential for high level scoping studies, identifying no cost/low cost ECMs and persistence commissioning



Thank you

Amit Kulkarni

Senior Engineer, Customer Energy
Solutions

40 Sylvan Road

Waltham, MA 02451

(781)907-1592

Amit.Kulkarni@us.ngrid.com