

CleanMed 2009

Case Studies in Energy Upgrades with Bottom Line Benefits: Lessons from the Field

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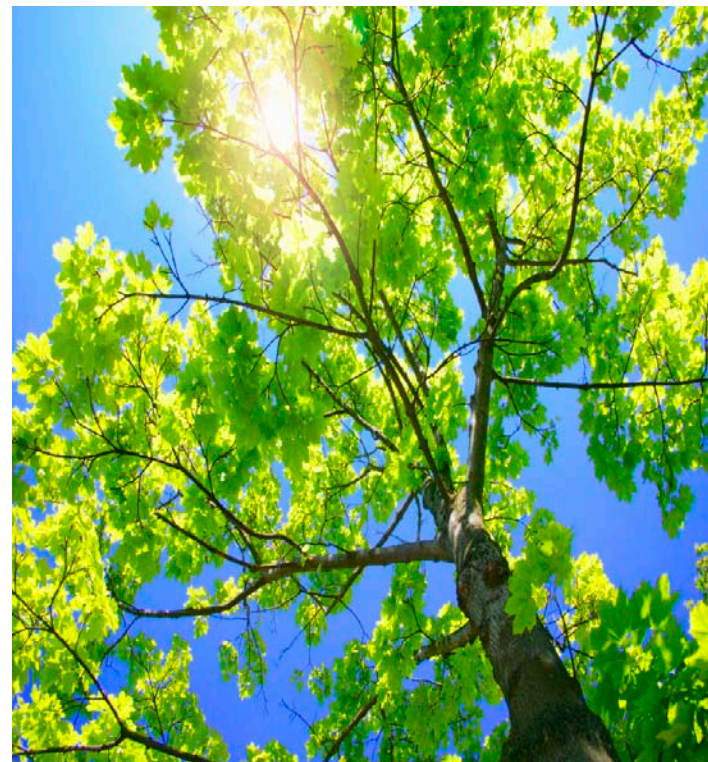
Rachel Adams

What is NYSERDA?

- Public benefit corporation
- Established by the New York State Legislature in 1975
- NYSERDA is tasked to address the State's energy & environmental challenges

Mission

Use innovation and technology to solve some of New York's most difficult energy and environmental problems in ways that improve the State's economy



NYSERDA & Healthcare

- NYSERDA has helped over 200 hospitals with >\$25 million in technical assistance and incentives
- US hospitals spend > \$8.3 billion*/year in energy costs
- Significant barriers (and opportunities) to making capital investments for energy efficiency exist – especially for NYS hospitals

Source: EIA; CBECS 2003; adjusted for inflation to 2009 dollars



Benefits



- Executive Staff
 - Increase in funds to allocate to patient care
 - Enhanced public image
 - Recognition by peers and local community
 - Demonstration of fiscal and environmental responsibility
- Operations Staff
 - Reduced operating costs
 - Fewer complaints
 - Recognition for achievements in operation excellence
 - Enhanced energy security
- Clinical Staff
 - Improved working environment
 - Increased productivity and staff
- **Every dollar a nonprofit health care organization saves on energy is equivalent to generating new revenues of \$20 for medical offices***

**US DOE EnergySmart Hospitals Program*

Commercial/Industrial: Sector Focus

- Commercial Real Estate
- Industrial Manufacturing
- Data Centers
- Municipal Water/Wastewater
- Hospitality
- Energy Smart Institutions
- Colleges/Universities
- Healthcare
- Local Government

Commercial & Industrial Programs

- FlexTech Technical Assistance
- Existing Facilities Program
- New Construction Program



FlexTech Technical Assistance

Objective: *Provide cost-shared, site-specific energy studies*

- Feasibility Studies
- Energy Master Plans
- Energy Procurement
- Retrocommissioning
- CHP/Renewables
- Load Curtailment
- Energy Advisor Consulting



Existing Facilities Program

Pre-qualified Incentives
Performance-based Incentives

Existing Facilities Program

Pre-Qualified Incentives

- Applicants can receive incentives (\$/unit) for pre-qualified electric-efficient measures.
- Projects can receive up to **\$30,000** through pre-qualified incentives.
- Pre-qualified Incentives are available for:
 - Lighting
 - HVAC
 - Chillers
 - Motors
 - Refrigeration
 - Interval Meters
 - Variable Frequency Drives (VFDs)
 - Commercial Kitchen Equipment and Washers

Existing Facilities Program

Performance-Based Incentives

Program Component	Incentive – Con Ed	Incentive – Upstate
Electric Efficiency	\$0.16/kWh	\$0.12/kWh
Industrial and Process Efficiency	\$0.16/kWh	0.12/kWh
Demand Response	\$200/kW	\$100/kW
Combined Heat and Power	\$0.10/kWh + \$750/kW	\$0.10/kWh + \$600/kW

\$ 2 million facility cap

New Construction Program

Objective

Transform the way buildings are designed and built

Services

- Technical assistance, Computer Modeling, commissioning
- Incentives for energy efficient equipment and systems
- Additional funding for LEED® rated buildings



****Apply (Customer)****
Design Intent is Ideal

St. Peter's Hospital

Albany, NY



Background

615,000 square feet

450-bed acute care facility

Incentives

50% cost share of study
(\$32,500)

\$81,000 towards
implementation

Study Recommendations

- Optimize and install VSDs in their AHUs and exhaust fans
- Install VSDs on heat pump roof-top units
- Change outdoor lighting to electronic ballasts, install occupancy sensors, perform lighting retrofits

St. Peter's Hospital

Albany, NY



Energy Savings

Annual energy cost savings

\$59,000

Annual kWh savings

630,000

Payback

3.7 years

“This project gave us the ability to invest and make upgrades in our physical plant while not having to compete against other hospital capital projects and/or equipment.”

Donald J. McLaughlin Jr., PE
 Director
 Facilities Management

NYU Langone Medical Center

New York, NY

Issue

3 million square feet facility

Peak Operating Load of
~9800 tons

Difficulty meeting cooling
needs despite 13,200 tons of
cooling

Chilled Water Study

Approach

- Detailed hydraulic model of the distribution system

Discovery

- Sufficient pumping capacity IS installed on system

Solution

- Remove excess pumps
- Improve the control of the system

NYU Langone Medical Center

New York, NY

Projected Results

Improved system performance

****Elimination of 1,290 hp of unnecessary pumps from service****

Energy Reduction

2,235,000 kWh/year

962 kW

Annual Energy Savings

\$460,000

Projected Incentives

50% cost share of study
(\$51,500)

\$95,000 towards
implementation

Jewish Home & Hospital

Bronx, NY

Background

Non-profit geriatric and rehabilitation institution

816-bed facility;
65 units of 202 HUD
housing
295 assisted living apts

Over 1 million square feet

Study Recommendations

- Installation of VSD's
- Replacement of 90-ton electric chiller
- Installation of energy efficient motors
- Installation of LED exit signs
- Upgrade lighting to T-8's with electronic ballasts

Jewish Home & Hospital

Bronx, NY

Energy Savings

Annual energy cost savings
\$310,000

Annual kWh savings
1.8 million

Payback Period
<4 years



Incentives

50% cost share of study
(\$50,000)

\$146,000 towards
implementation

Phelps Memorial Hospital

Sleepy Hollow, NY

Background

235-bed acute care facility
5 buildings



View of Hudson River from patient hotel rooms

Study Recommendations

- Installation of VSD's
- Install two (2) high efficiency chillers
- EMS upgrades
- Upgrade fresh air supply handler
- Improve air distribution system
- Upgrade lighting to T-8's with electronic ballasts

Phelps Memorial Hospital

Sleepy Hollow, NY

Energy Savings

Annual energy cost savings

\$310,000

Annual Energy Savings

1.6 million kWh

(enough to power 300 homes/year)

200 kW

Water Consumption Reduction

~ 40%

Incentives

\$470,000 towards
implementation

Focus on Healthcare - Pilot

Pilot Goals based on 10 Pilot Facilities:

- Identify low/no-cost ECMs that have minimal barriers to implementation
- Quantify facility energy use and provide performance benchmarking (EUI)
- Provide support as facilities implement recommended ECMs
- Develop educational materials and implement outreach program



Project Overview

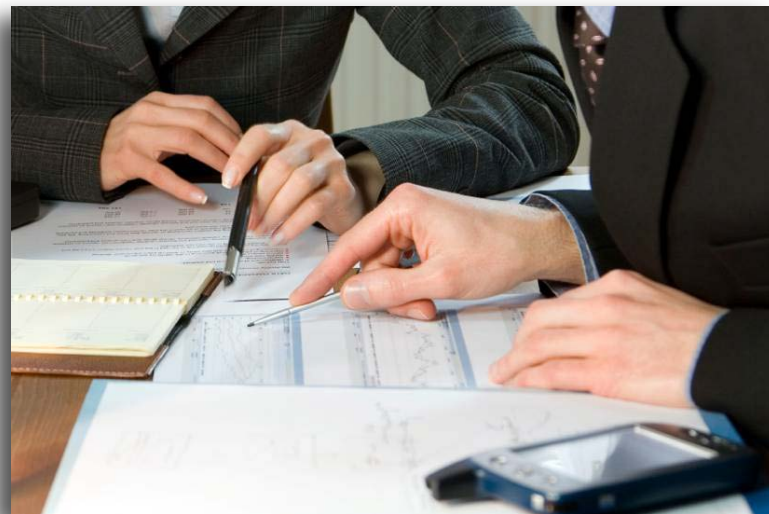
Energy Use Audit

Step 1: Develop energy-use equipment inventories

Step 2: Analyze EMC/BAS Output

Step 3: Develop building electrical use profiles

Step 4: Perform electrical consumption and demand analysis



Results: Electricity End-Use Profiles

HVAC is the largest contributor to energy consumption, followed by lighting

40% - 66%

13% - 23%



Other end-use equipment categories include office, medical, kitchen, computer/network, process, laundry, and miscellaneous equipment, 2%-11% each



Energy Efficiency Opportunities

- **Technical**
 - Motor upgrades
 - Lighting
 - Higher efficiency equipment purchases
- **Operational**
 - Retro-commissioning
 - Advanced interval metering
 - BAS optimization
- **Behavioral**
 - Energy awareness program



Conclusions

- HVAC and lighting are the primary areas for reducing electricity consumption and demand
- Low- and no-cost EEMs exist with short payback periods
- Energy efficiency results in energy and non-energy benefits
- Have a plan for your facility with both short and long-term goals for improving energy efficiency

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