Energy Efficiency and Renewables Success Stories in Energy Reduction EMD Millipore

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World Wide Energy Manager

Agenda

- Sustainability Program
- Energy Management Program
- How to get started
- Success stories in Energy Reduction

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Our Sustainability Vision

Our operations will become environmentally sustainable in the long-term by dramatically reducing the consumption of non-renewable resources, reducing waste and adopting behavioral changes that support sustainability company wide.

EMD Millipore at a Glance

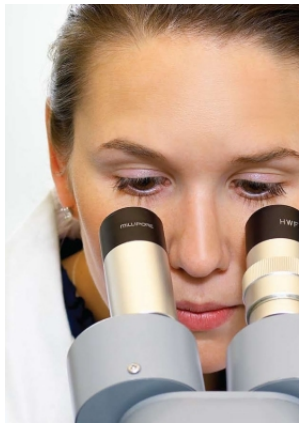
Approximately. $1.8B

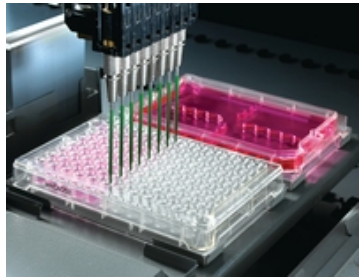
~6,000 employees worldwide

Offices in more than 31 countries.

R&D, Manufacturing, Distribution, Office

US Headquarters in Billerica, MA





Millipore's products and services help our customers in biotechnology, life science, and pharmaceutical industries discover, develop, scale up and manufacture novel therapeutic compounds.

Strategic Priorities and Goals

Environment

Climate & Energy
Waste
Water

- MM: Reduce GHGs 20% below 2006 baseline, by end of 2011
- Merck: Reduce GHGs 20% below 2006 baseline, by 2020

Products & Customers

Design for Sustainability
Product Recycling
Supply Chain
Packaging

- Apply Design for Sustainability to 100% of our products
- Develop product take back programs for consumables

Employees & Community

Health & Safety
Workplace
Employee Engagement
Corporate Giving

- Increase stakeholder engagement
- Drive risk reduction
- Target donations and motivate employee volunteering

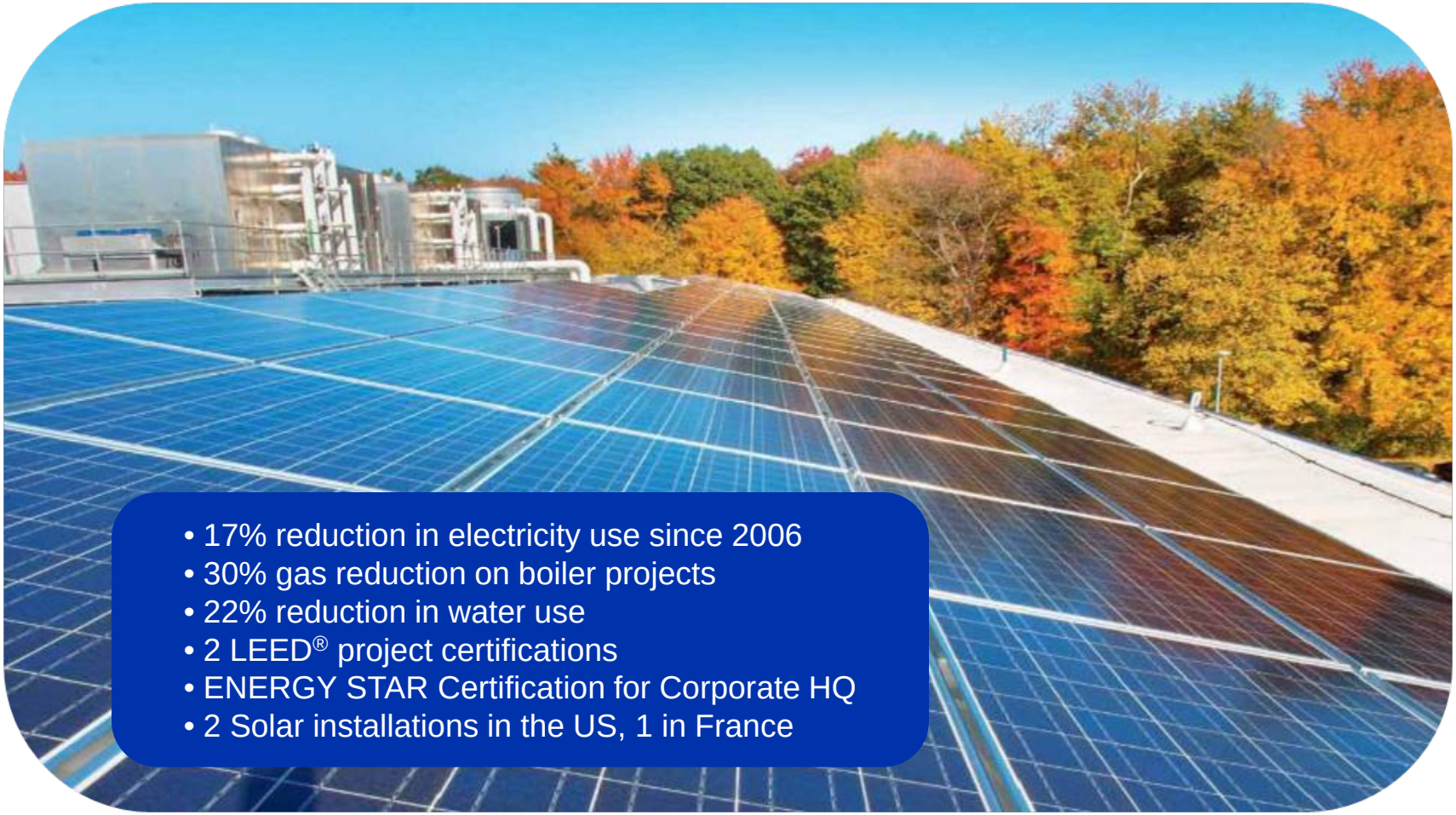
Driving Innovation, Developing Solutions

- Sustainability scorecard for products
- Conduct life cycle assessments
- Provide training to designers
- Develop top line growth
- Use of biodegradable plastics
- Partner with customers and suppliers

Invest in People: Magnet for Talent

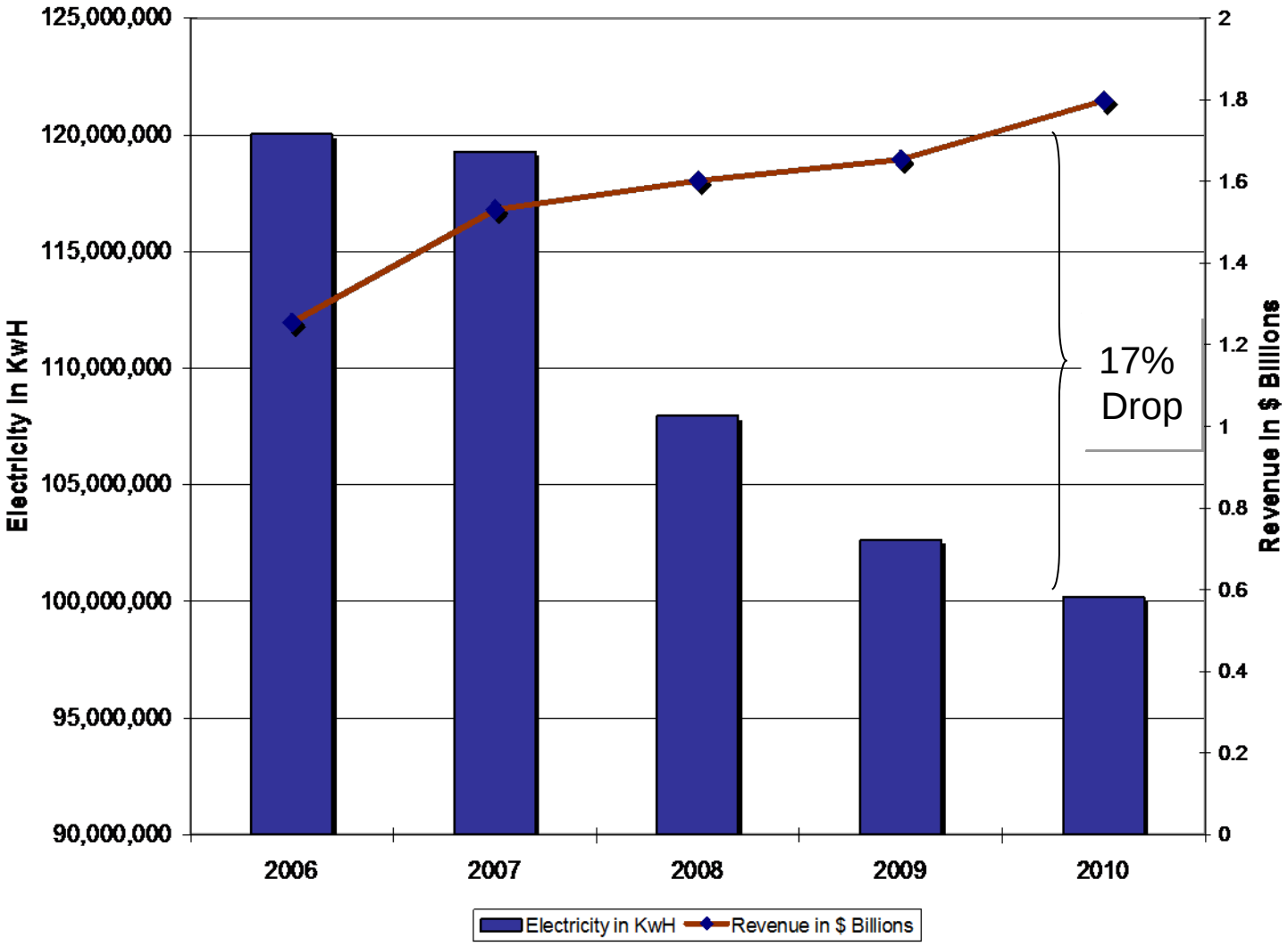
- Magnet for Talent
- 160 employees enrolled in flexible workplace program
- Interactive website with videos on home improvements
- Launched sustainable incentive programs
  - -Energy audits
  - -Solar installations
  - -Hybrid vehicles

Key Highlights:
Increasing Efficiency, Improving Performance



- 17% reduction in electricity use since 2006
- 30% gas reduction on boiler projects
- 22% reduction in water use
- 2 LEED® project certifications
- ENERGY STAR Certification for Corporate HQ
- 2 Solar installations in the US, 1 in France

MM Electricity vs. Revenue



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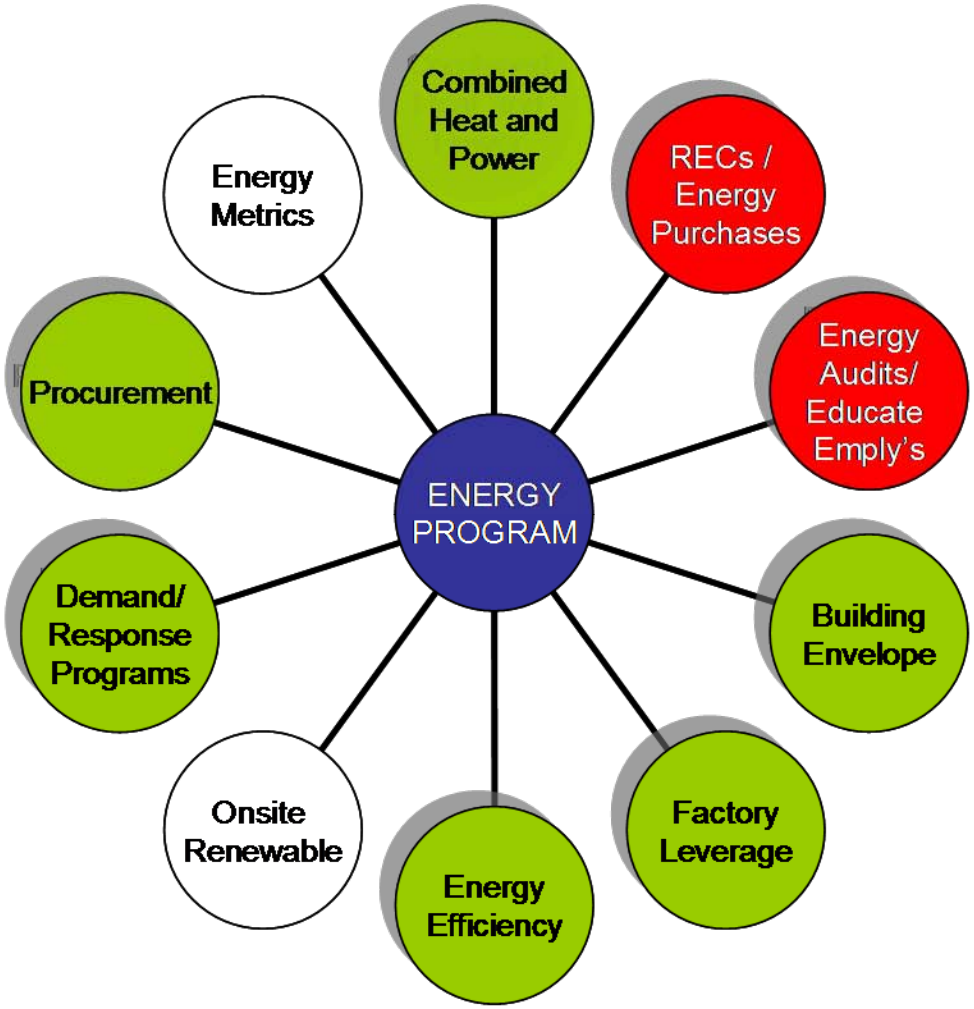
Implementing a Sustainable Energy Program

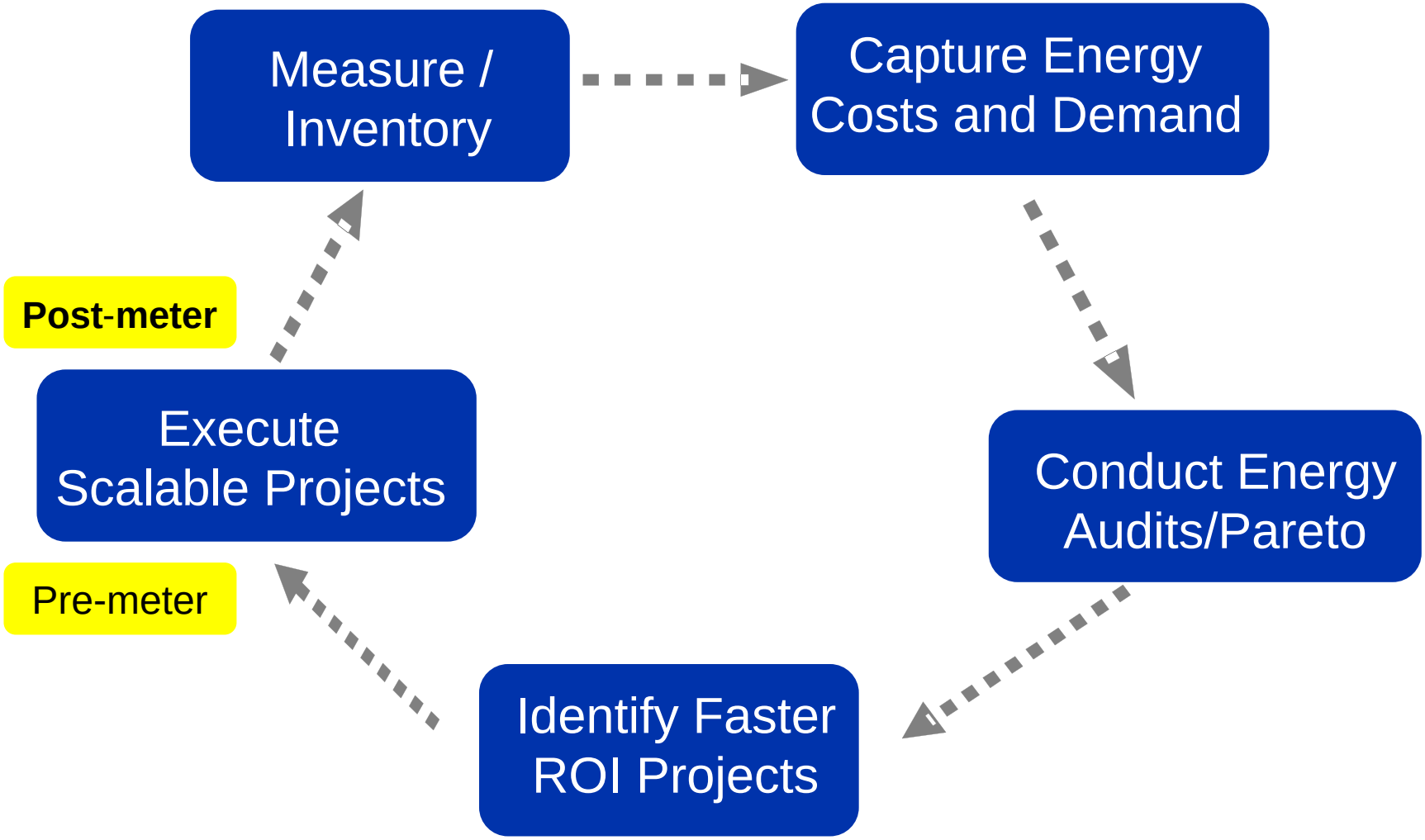
An Opportunity—and a Responsibility

Key Elements of Millipore's Energy Management Program

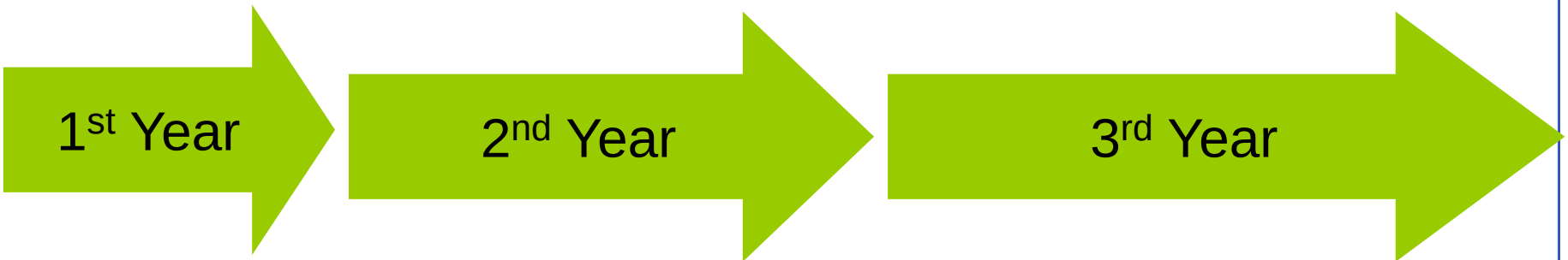


- Neutral
- Cost
- Savings

Energy Improvement Cycle



Areas of Focus – Start with the faster ROI and lower capital projects!



- Compressed Air
- Lighting
- LED Exit signage
- Energy Metrics

- Natural Gas
- Demand Response
- Renewable Energy Credits
- Training & Auditing

- On Site Renewable Energy
- Building Envelope
- Training and Auditing (Level 3)
- Products

1st Step - Energy Assessments

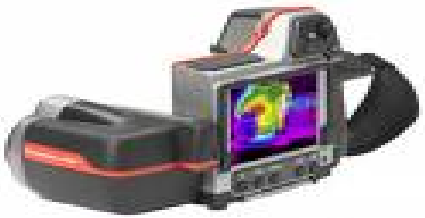
- Hired a dedicated resource for auditing in 2009
  - 9 audits to date.
  - Utility demand audits
- Continuous Commissioning

Internal Energy Audit Summary						
	Completion Date	kWh Goal	kWh Savings Identified	Installed Cost	Cost Savings	SPB
75 Wiggins, Bedford, MA	Jul-09	100,000	74,620	$24,500	$23,006	1.06
Danvers, MA	Sep-09	200,000	200,698	$85,616	$18,974	4.51
Jaffrey, NH	Jan-10	1,500,000	1,479,200	$443,000	$198,721	2.23
Cork, Ireland	May-10	3,000,000	4,864,896	€ 333,596	€ 259,269	1.29
St Charles, MO	Aug-10	300,000	384,841	$135,671	$26,169	5.18
Kankakee, IL	Aug-10	600,000	2,058,171	$171,355	$85,371	2.01
Temecula, CA	Aug-10	300,000	327,286	$65,488	$35,347	1.85
900 Middlesex Turnpike, Billerica, MA	Mar-11	350,000	680,016	$48,760	$38,940	1.25
Total		**6,350,000**	**10,069,728**	**$1,374,705.20**	**$737,650.54**	**1.86**

Auditing Tools

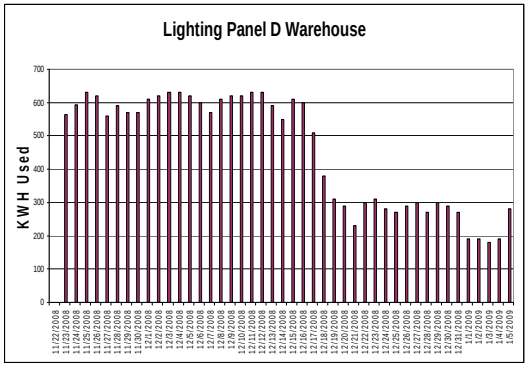
Infrared Camera

Purchased an Infrared camera for Bldg Envelope audits.
(3) Certified Level One Thermographer Sept 2009.



Electrical meters

Develop run charts & 1st 2nd 3rd level pareto diagrams to define next opportunities.

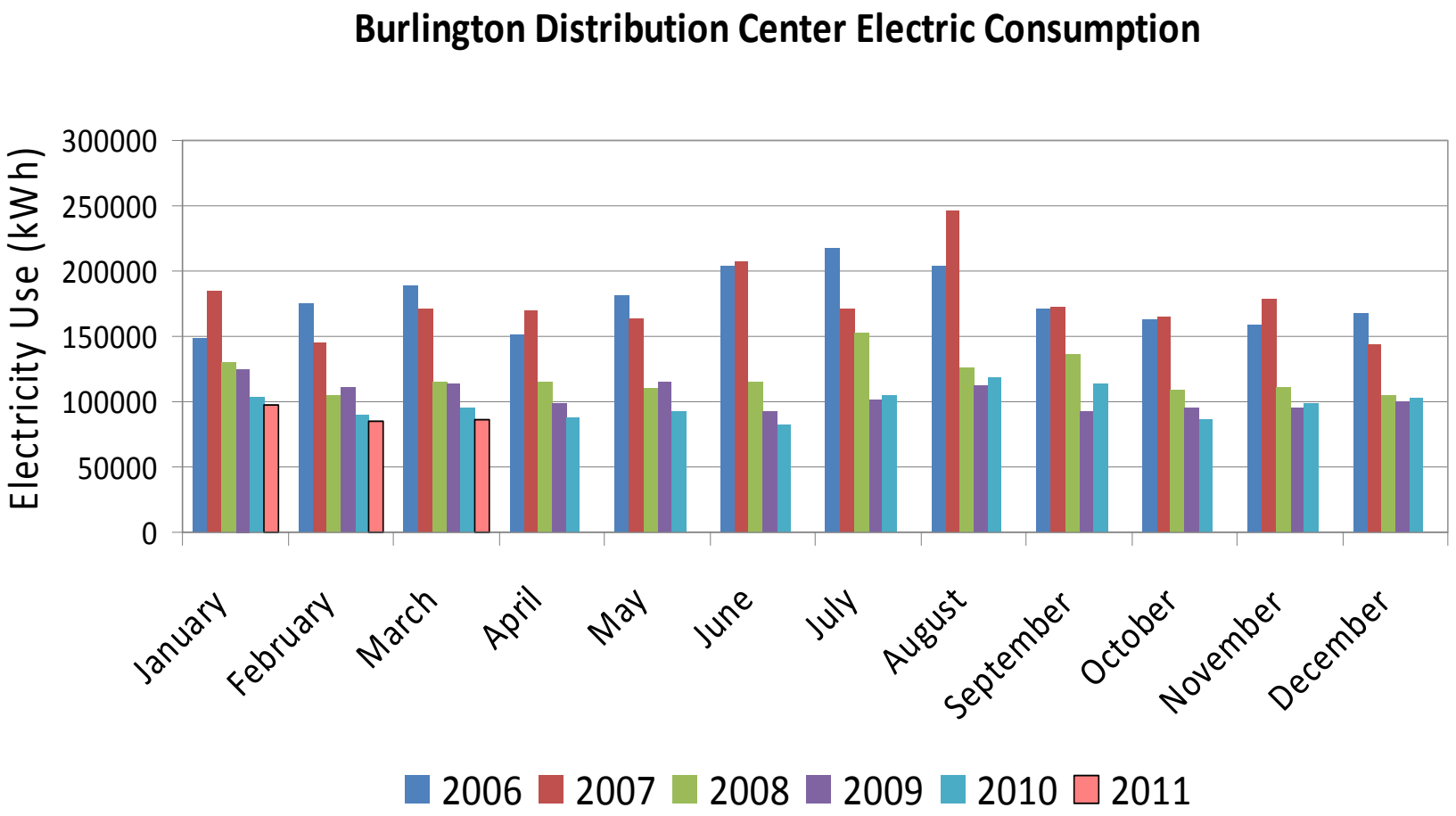


Dew point meters for compressed air

Discovered that Desiccant dryers are high energy consumers and not always needed.

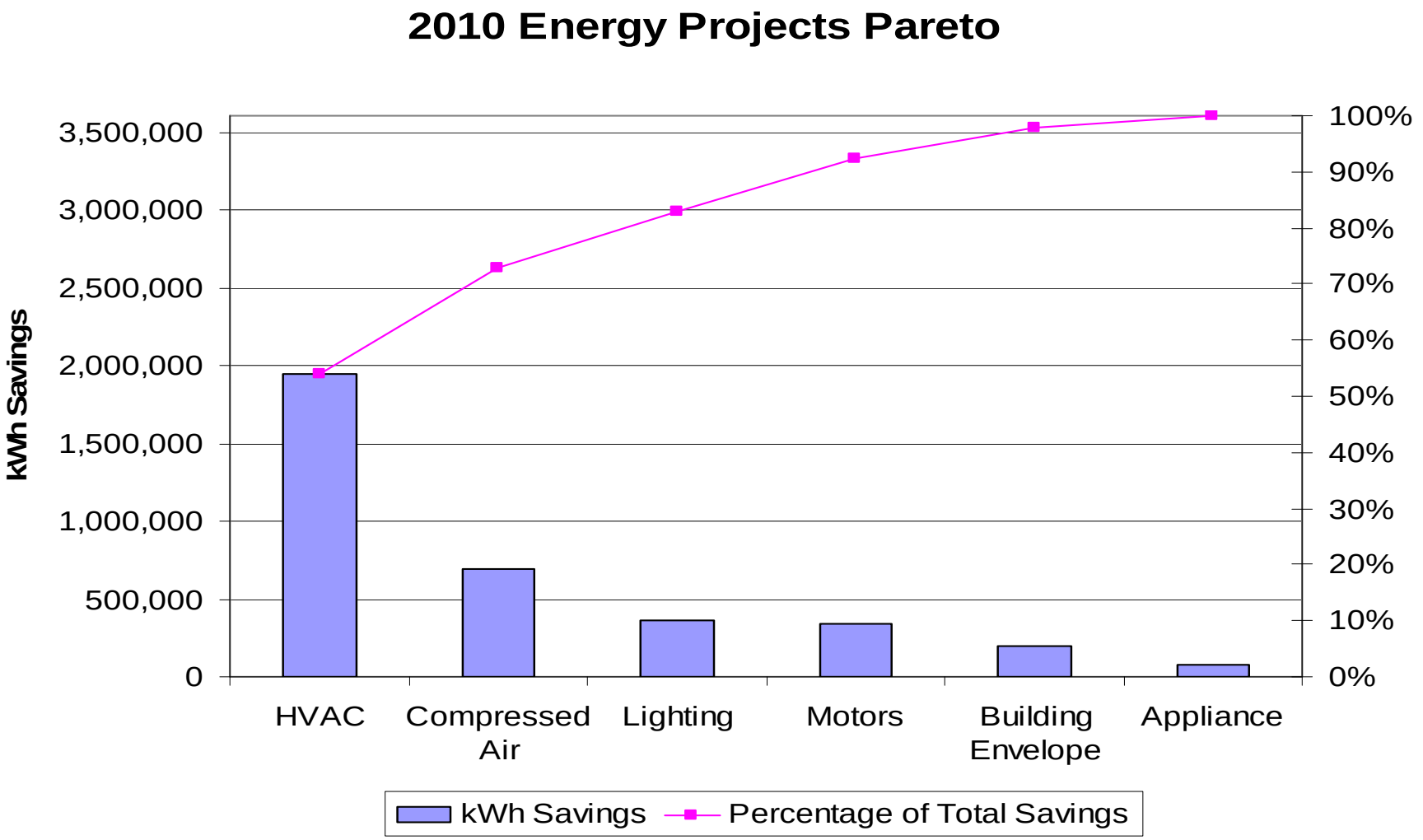
WW Energy Management Team meetings

Review Utility consumption regularly

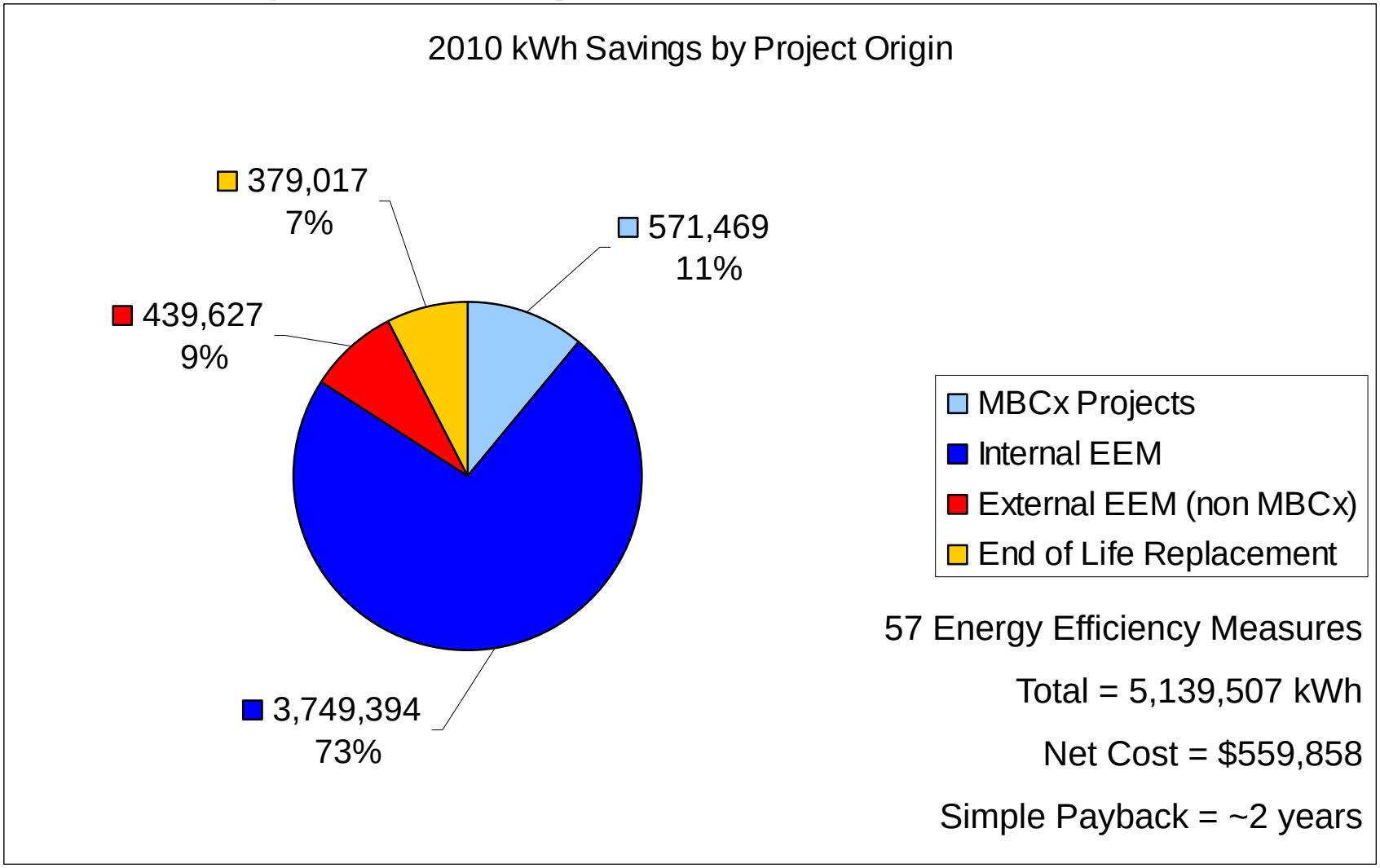


Enterprise Carbon Accounting- Energy Metrics

EEM Project Implemented – New England



EEM Projects completed 2010 –World Wide



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Success stories in Energy Reduction

Warehouse Lighting

To reduce electric load at warehouses, lighting retrofits were performed at 11 locations.

How it works

•High-bay metal halide fixtures have been replaced with High Efficient T-5 fluorescent fixtures.
•**"On"** 7 x 24
•Individual motion controls with a larger coverage area.

Metal Halide (400 Watts)
80-120 Foot candles

HE T-5 Fluorescent (234 Watts)
230 Foot candles

Results

•Warehouse lighting retrofits reduced electric consumption by 1,400,000 kWh /yr = ~ $210,000 per year.
•Result in higher quality warehouse lighting which has decreased the product miss-pick rate.

EEM-Energy Efficiency Measure	kWh Savings	Annual Cost Savings	Capital Cost	Utility Incentive	Net Cost with Incentive	Simple Payback
Warehouse Lighting (11 locations)	1,400,000	$210,000	$410,000	$106,000	$304,000	1.4 years

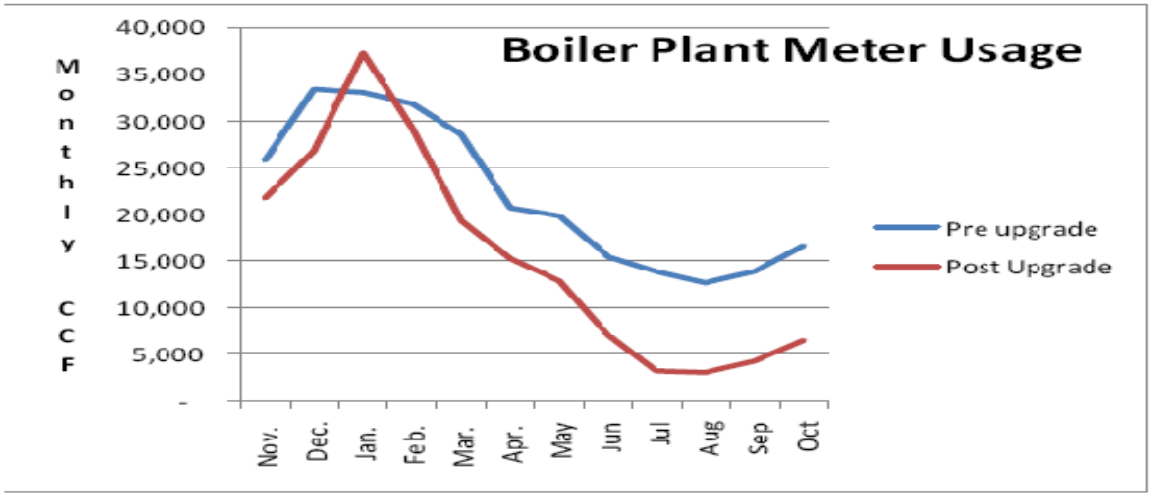
Boiler Combustion Improvement Project

Scope

- Replacement of burners/controls on (2)300 HP Cleaver Brooks Boilers.
- Autoflame controller provides independent micro modulation of air, fuel valves, and dampers. *(Like Electronic Fuel Injection on your car)*
- EGA- Exhaust Gas Analyzer provides continuous combustion monitoring to the Mark 6 controller. *(Like Cruise control on your car)*
- Limpsfield Low O_2 Burners replace Cleaver Brooks burner/linkage.

Before
Cleaver-Brooks Controls

Projected Results



- After 1 full year of Data = **29% gas reduction**
- Fuel Savings= 76,428 Therms = 2,239,349 KWh
- Cost Savings= $ 107,000 & GHG Reduction= 382 mTons of CO_2
- Project Cost= $190,000 with a Utility Incentive= $91,000
- Simple Payback= 0.9 yr Simple Payback
- Installed (4) additional systems in 09'-standardize all sites in future

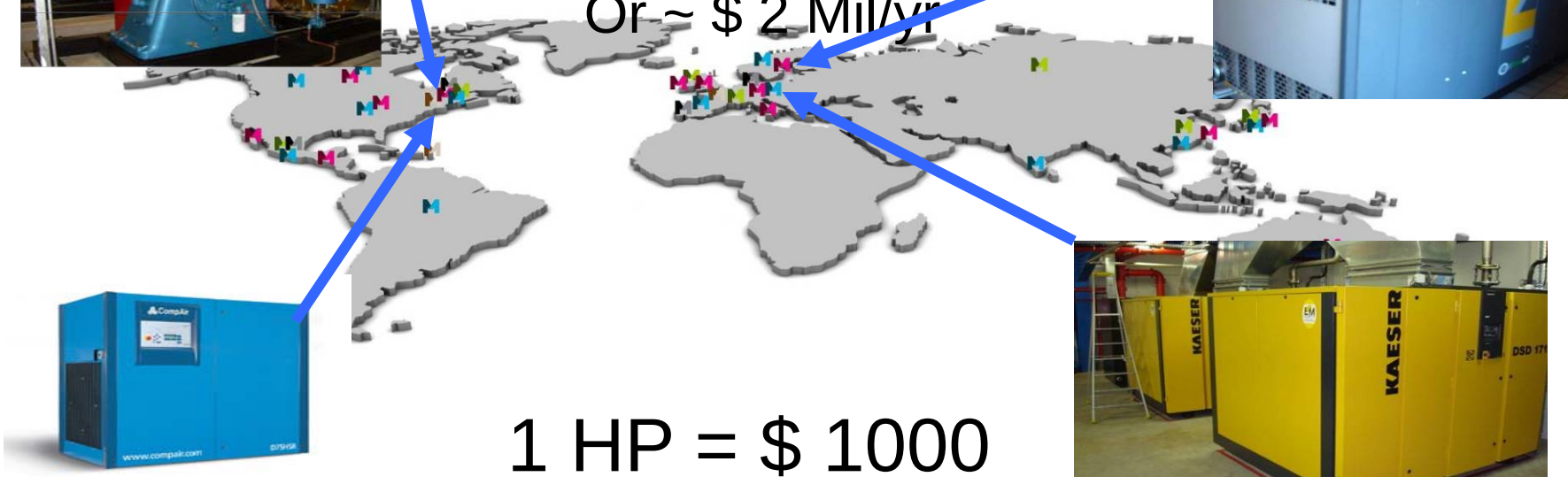
After
Mark-6 Controller and EGA

Compressed Air Systems
World Wide View

Jaffrey NH
4= 600 HP Reciprocating

Total ~ 2000 HP
Or
13,000,000 KWH/yr
Or ~ $ 2 Mil/yr

Cork Ireland
8= 550 HP Rotary Screw



1 HP = $ 1000

Bedford MA

3=350 HP Rotary Screw

Molsheim France

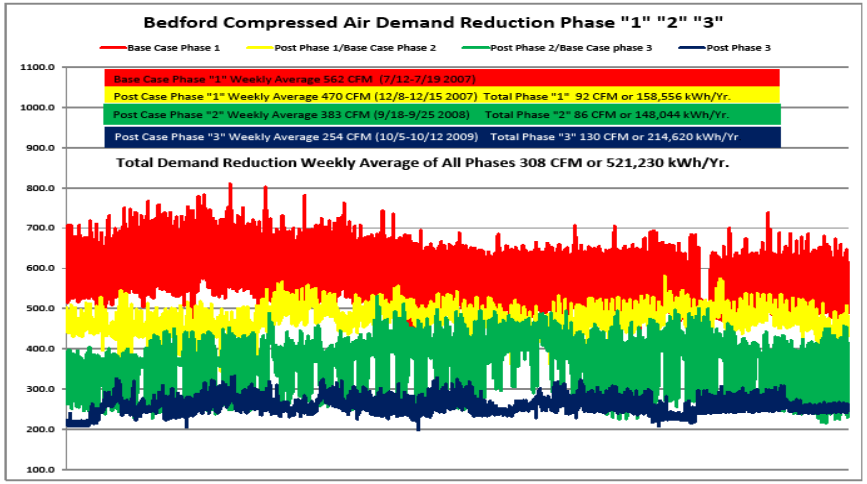
7= 400 HP Rotary Screw

Compressed Air Improvement Project

Scope

- Meter, Meter, Meter
  - Flow (CFM)
  - Power (KWh)
  - Pressure (PSI)
  - Dew Pt.
- Leak detection
- Study distribution system
- Stop inappropriate uses
- Study dryer consumption
- Install VFD compressors
- Monitor the process real time

Projected Results

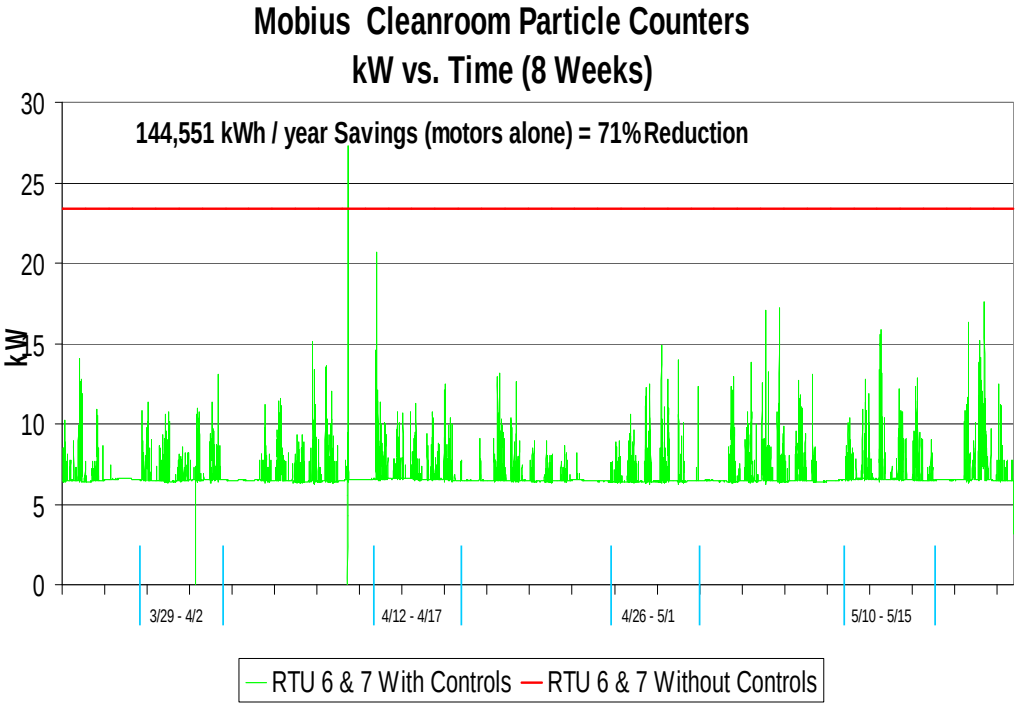


- Regular team mtgs to monitor & plan system improvements
- Reduced CFM=large KWH savings
- Reduced operating pressure 110 to ~90 psi
- Defined PM process for leak detection
- Stable and consistent delivery of clean dry air to the process

Mobius Clean Room - LEED Gold Certification

Innovative design features to save energy

- Particle Counters- Controls Air Handling system to save Energy
- Lighting Design- High efficiency T-5 HE lighting with Automatic controls
- VLM- Vertical Lift units- product handling saves HVAC energy
- Features ENERGY STAR® appliances



Building Envelope Project

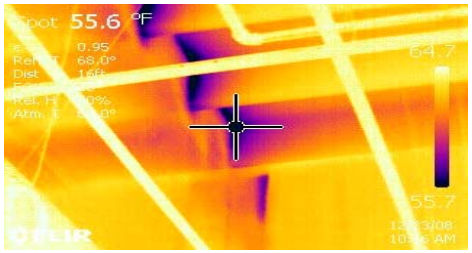
Scope

- As a result of a LEED ® Gold Project-Enhanced Commissioning Process detected a building envelope problem above our newly constructed Cleanroom.
- Infrared Scanning technology demonstrated lack of insulation R=1.
- Project was developed to upgrade the Building envelope to R=22

Benefits

- Natural gas savings. Reduce emissions.
- Eliminated a condensation issues above our Cleanroom.

Projected Results



This Image shows the conductive heat loss of the concrete roof T's on the interior side of the roof overhang. Planned future renovations of the exterior façade will eliminate a potential dew point concern on very cold winter days

Actual Results

854,235 KWh/yr Savings

$45,792 /yr Savings

Cost $ 243,833 Simple Payback of 5.1 yrs

Before R=1

After R=22

LED Parking Lot Lighting- Danvers MA

Scope

- Replace 48 yr old –(16)sodium light heads with 16 LED fixtures manufactured by BetaLED
- Replacement of light poles was required due to age.

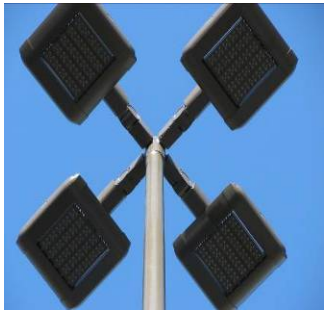
48 yr old Sodium Lighting

Benefits

- Reduced electrical consumption
- Significantly improved lighting; improved vision and operator safety
- Reduced maintenance costs- ~ 60,000 hrs expected life

Projected Results

- Project Cost: $ 20,500
- $2,175 annual savings
- 16,352 Kwh/yr savings
- Simple Payback: 9.4 yrs



New LED lighting

Isolé Plug Load Controls

Millipore wanted to do more than just “behind closed doors” energy conservation. One step in ***engaging employees*** in Millipore’s energy management plan was to install 1,100 plug load controllers into all cubicles.

How it works

•Plug Loads are controlled by a motion sensor.
•Automatically shuts down of non-critical equipment in each cubicle when vacant.
•Each power strip has 6 controlled outlets and 2 continuous power outlets.

Results

•Plug Control project reduces plug load demand by 110,000 kWh /yr = ~ $14,000 per year.
•Goal was to implement a unique technology in energy management that ***engages employees***.

EEM-Energy Efficiency Measure	kWh Savings	Annual Cost Savings	Capital Cost	Utility Incentive	Net Cost with Incentive	Simple Payback
Plug Load Controls - Qty 1100	110,000	$14,300	$80,000	$8,000	$72,000	5.0

Solar Installation

Both projects together represent one the Largest roof mounted Solar PV installations in Massachusetts

Project Launched April 24 - Projected Completed Sept 23, 2009

Bedford, MA

- System Size=153 KW
- 685 Sharp 225 Watt Panels
- (2) Solectria Inverters made in MA
- Production=176,095 KWh/yr
- Gross Cost=$ 1,021,612
- MRET & Federal Incentive=$757,470
- Net Cost= $264,142

Billerica, MA

- System Size=156 KW
- 698 Sharp 225 Watt Panels
- (2) Solectria Inverters made in MA
- Production=175,914 KWh/yr
- Gross Cost=$ 1,006,543
- MRET & Federal Incentive=$758,997
- Net Cost= $247,546

DC **Inverter** DC

AC to Building

Equal to **4%** Consumption

AC to Building

Equal to **7%** Consumption

World Class Energy Management Program

Training

- What is it all about?

Auditing

- Areas of opportunity
- How to conduct a detailed Energy Audit
- Diagnostic equipment and planning

Monitoring

- Utility consumption Analysis

Continuous Improvement -PDCA

- Plan
- Do
- Check
- Act

Execution

- Develop a team to “Sustain” Energy Management Process

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