



Industrial Energy Efficiency: A Different Approach

NASEO 2013 Annual Meeting

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September 16, 2013

AGENDA

- Introduce EnerNOC
- Why Industrial EE is Key
- Standard Offer versus Turn-Key Approach
- Case Studies
- Conclusion

EnerNOC is the C&I Demand Response and Energy Efficiency Leader

Market Leadership





- Based in Boston, Massachusetts
- 700+ employees; approximately 400 in Boston
- Incorporated in 2003; Initial Public Offering in 2007
- Between 24,000-27,000 MW of Peak Load Under Management (~30-30% curtailable)
- Rapid growth: 1,308 C&I sites at IPO → ~13,700 at December 31, 2013)
- Responded to over 350 demand response dispatches in 2012 alone

Industrial Energy Efficiency

- Over **565,000,000 kWh** of first year Industrial EE savings
- Average program TRC of **2.83**
- Programs achieve on average **110% of the kWh goals** with only **~90% of the expected budget**

¹ As of June 1, 2012, we estimate our total contracted revenue to be approximately \$1.6 billion, 90% of which we expect to earn and recognize as revenue by May 2016.

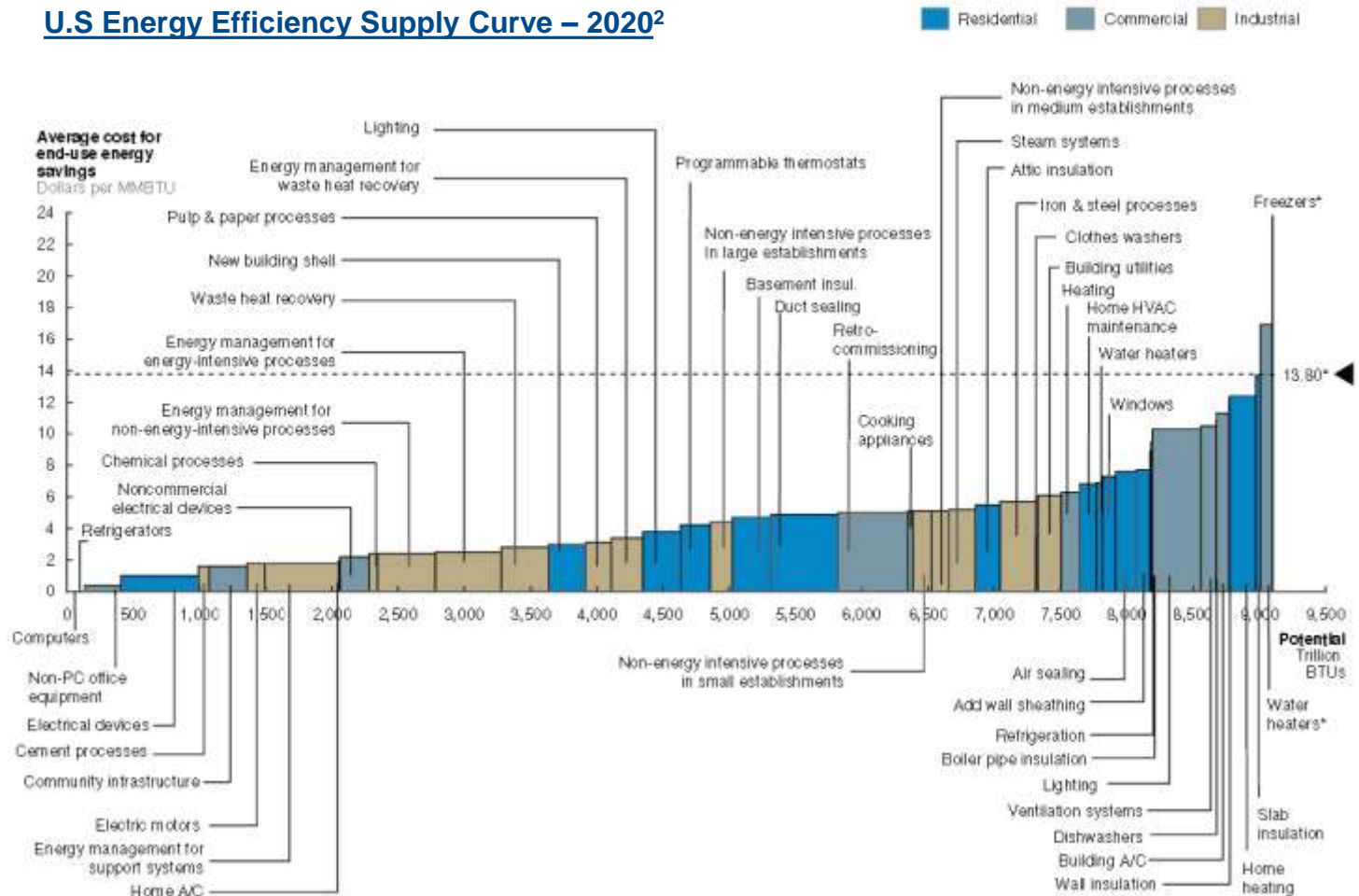
Extensive Experience in Industrial EE Program Implementation

Utility	Program Name
 <p>SOUTHERN CALIFORNIA EDISON An EDISON INTERNATIONAL Company</p>	<p>Ag Efficiency Plus</p> <p>Comprehensive Beverage Manufacturing Audit and Resource Efficiency Program</p> <p>Comprehensive Petroleum Refining Energy Efficiency Program</p> <p>Energy Efficiency Services for Oil Production</p> <p>Rapid Response Program</p> <p>Small Industrial Facility Upgrades Program</p>
	<p>California Agri-Food Energy Efficiency (CAFEE)</p> <p>Comprehensive Food Processing Audit and Resource Efficiency Program</p> <p>Energy Efficiency Services for Oil and Gas Production</p>
 <p>Duquesne Light Our Energy...Your Power®</p>	<p>Comprehensive Chemical Products Energy Efficiency Program</p> <p>Comprehensive Mixed Industrial Energy Efficiency Program</p>
 <p>Southern California Gas Company</p>	<p>Small Industrial Facilities Upgrades</p>

Why Industrial Energy Efficiency is Key

The industrial sector comprises 30% of U.S. Energy Usage¹, and a recent McKinsey study shows that industrial energy efficiency measures provide large savings at a low cost

U.S Energy Efficiency Supply Curve – 2020²



¹ U.S. Energy Information Administration, Annual Energy Review; 2009

² McKinsey & Company; "Unlocking Energy Efficiency in the U.S. Economy;" July 2009

Why is Industrial EE Different?

Commercial “Measures”

- **Lighting and Controls**
- **Energy Management Controls**
- **HVAC**
 - Controls
 - Variable Frequency Drives (VFD)
 - Variable Air Volume (VAV)
 - Energy Recovery Ventilation (ERV)
 - Boiler controls
 - Chiller optimization
 - Premium efficiency Motors

Selected Industrial “Measures”

Agriculture

- Premium efficiency pump with VFD
- Energy-efficient low-volume, high-speed exhaust or circulation fans
- High efficiency motors
- Air-cooled to evaporative-cooled condenser
- Micro-irrigation conversion
- Efficient lighting systems
- Floating head pressure controls
- Other energy efficient refrigeration measures

Oil and Gas Extraction

- Pump-off controllers
- Variable speed drives
- Premium efficient motors and pumps
- Artificial lift conversion
- Decreasing water/oil ratio
- Facility optimization
- Steam generator optimization
 - Heat recovery
 - VFDs
 - Combustion and electric controls

Food and Beverage

- Industrial refrigeration optimization
 - Floating head and suction pressure
 - Oversized condenser
 - VFDs for evaporator and condenser control
- Process optimization
- Heat recovery and optimization
- Water re-use/conservation
- Pumping optimization
- Compressed air system optimization
 - Compressor sequencing
 - Pressure drop reduction
- High efficiency motors
- Pneumatic electrification of systems
- High efficiency blow molding systems
- High efficiency fluid handling systems

Mixed Industrial

- Process optimization, including grinding, pumping, and pneumatic transportation
- Dryers and combustion optimization
 - Exhaust optimization
 - Process control
 - High efficiency motors/fans
- HVAC
- Industrial refrigeration
- Lighting and controls
- Thermal piping insulation
- Steam recovery, including steam traps and condensate recovery

The Standard Approach: Standard Offer Programs

Utility offers standard rebates for measure-level investments (e.g., lighting, motors), and equipment vendors and customers drive the execution of the program

Advantages:

- Open to all Utility Customers
- Standard approach and energy savings calculations
- Program savings can contribute heavily to Portfolio goals
- Back bone of Energy Efficiency program offerings

Barriers:

- Not comprehensive, single measure focus (typically lighting)
- Vendors may not understand utility incentives well
- Customers are busy and often don't have the time to research utility incentives
- Utility account managers may not have adequate incentives or time to engage with customers

Why a Turnkey Industrial EE Program?

	Standard Offer Industrial Energy Efficiency Program		Industrial Energy Efficiency with a Dedicated Program Implementer
Goal Alignment	Relying on vendors and industrial customers to identify savings means relying on companies with other, more important, goals – vendors sell equipment and industrials sell their products	→	Implementers are focused solely on delivering energy efficiency projects in the specific sector they serve, ensuring the utility reaches its goals
Understanding of Utility Incentives	Customers and Vendors may not understand utility incentives well	→	Implementers can help facilitate interactions between customers and utility incentives
Industrial Sector Process Expertise	Industrial systems and processes are complex – vendors may focus on only one measure	→	Implementers have expertise in energy efficiency in industrial processes and systems
Customer Service	Customers are busy and often don't have the time to research options	→	Implementers present business cases to customers and help facilitate interaction between customers and vendors
Support for Utility Account Managers	Utility account managers may have multiple objectives in addition to energy efficiency	→	Program implementers support utility account managers to focus specifically on energy efficiency opportunities and complete projects

Key Steps for a Successful Program

Engage in targeted & meaningful customer outreach

- Identify and focus outreach efforts
- Engage utility account managers
- Meet customers face-to-face
- Present customized business cases for energy efficiency investments

Start small & build trust

- Identify projects of interest to the customer
- Deliver on expectations and then seek to execute additional projects
- Emphasize vendor neutrality – customers want to work with those they know
- Win referrals – industrial verticals are tight-knit communities

Focus relentlessly on energy efficiency goals

- Execute projects with both deemed and calculated savings
- Maximize results for utility while simultaneously increasing customer satisfaction
- Move toward holistic facility assessments
- Explore SEM/Continuous Energy Improvement for long-lasting EE

Industrial Energy Efficiency Process Overview

Program Planning

- Kick-off meeting
- Staffing plan
- Fine tune work schedule
- Develop program policy manual
- Develop marketing plan, including customer outreach and vendor activities

Customer Enrollment

- Program launch
- Customer recruitment and marketing
- Technical and economic screening
- Secure project commitment
- Equipment installation with customer's vendors
- Post-installation inspection and verification
- Incentive application and payment

Program Management

- Tracking databases
- Processing rebates and forms
- Training sessions for customers, vendors, industry associations
- Comprehensive project support (EM&V support)
- Toll-free call center and website
- Invoicing and reporting
 - Monthly invoices
 - Monthly flat files
- Program ramp-down support

Case Study: SCE's Rapid Response Program



SCE's Rapid Response Program enabled SCE to successfully reach its end-of-year energy efficiency goals in 2007.

Program Scope

- Achieve as much EE as possible in 3 months

Successes

- Exceeded 10,000,000 kWh savings, exceeding utility goals by ~2,100,000 kWh
- Successfully recruited eight customers and executed 20 projects

Industry Segments

- Heavy manufacturing
- Chemicals
- Petroleum production
- Food processing
- Brewing

Program Features

- Customer outreach
- On-site targeted facility assessments to identify demand reduction and energy savings opportunities
- Full project support including energy savings calculations, project engineering support, program application, validation of energy savings

EE Measure Focus

- Compressed air systems, refrigeration systems, controls, process and facilities improvements

Customer Case Study: Ice Cream Manufacturer in SCE's Rapid Response Program



EnerNOC evaluated existing refrigeration system, and determined that the system would be improved by:

- 1) Implementing a Floating Head Pressure Control
- 2) Compressor Sequencing
- 3) Evaporator Fan Cycling
- 4) Glycol System Optimization



Customer's vendors implemented the suggested improvements



Annual energy consumption reduced by 2,445,000 kWh

Customer received \$300,000 incentive

Case Study: PG&E Oil & Gas Production Program



Global Energy Partners has helped oil and gas companies in PG&E's service territory achieve over 200,000,000 kWh of energy efficiency.

Program Scope

- Work with oil extractor customers to provide technical expertise and improve the energy efficiency consumption on their systems.

Energy Efficiency Measures

- Pump-off Controllers
- Artificial Lift Conversions
- Water Shut-off / Smart Well Conversions
- Pipeline Optimization
- Facility Optimization

Successes

- PG&E continued the program across multiple planning periods
- Planned TRC of 3.34, and completed programs used only 94% of the planned budget

Customer Case Study: Oil Extractor in PG&E's Program



EnerNOC evaluated existing oil pipeline design, and determined that the system would be improved by:

- 1) Replacing new pumping system
- 2) Modifying the piping layout to reduce head losses



Customer's vendors implemented the suggested improvements



Annual energy consumption reduced by 2,915,000 kWh

Customer received \$233,600 incentive

Oil flow rate increased 8%

Conclusions



Industrial sector represents a large and underserved EE savings opportunity



Tailoring programs for each industry sub-sector is the most effective way to optimize industrial EE



Key aspects of implementation include building trust and vendor objectivity



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