



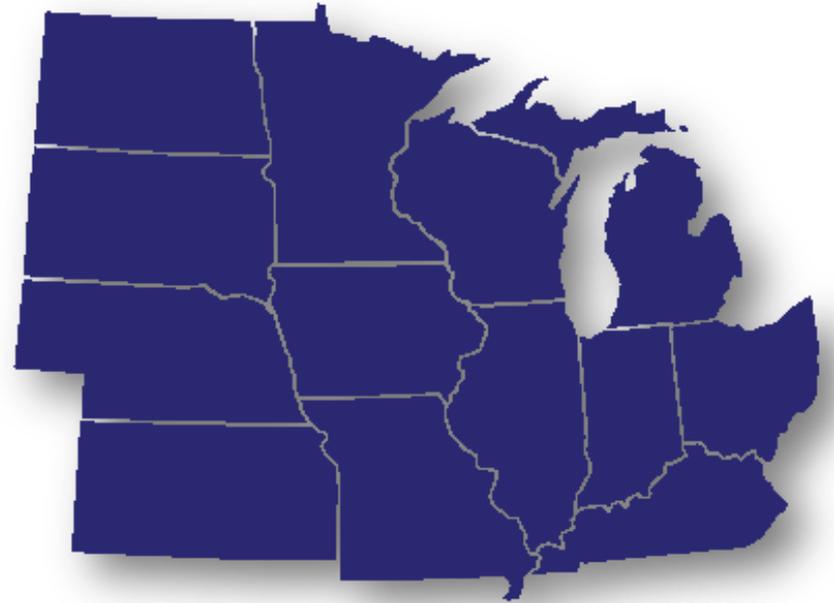
**MEEA**  
Midwest Energy Efficiency Alliance

# Case Studies: Sustained Energy Savings Achieved Through Successful Industrial Customer Interaction with Ratepayer Programs

**MEEA Webinar**  
**December 10, 2015**

# Midwest Energy Efficiency Alliance

- MEEA is a collaborative network focused on advancing energy efficiency in the Midwest for sustainable economic development and environmental stewardship
- Founded in 2000 to bring strategic partners together to improve market conditions for energy efficiency



# MEEA's Role in the Midwest

- Nonprofit serving 13 Midwest states: IL, IN, IA, KS, KY, MI, MN, MO, NE, ND, OH, SD, WI
- Actions:
  - Advancing energy efficiency policy
  - Facilitating energy efficiency programs
  - Coordinating utility program efforts
  - Delivering training & workshops
  - Evaluating & promoting emerging technologies
  - Promoting best practices

# Webinar Agenda

*Case Studies: Sustained Energy Savings Achieved Through Successful Industrial Customer Interaction with Ratepayer Programs*

## Sandy Glatt

U.S. Department of Energy  
Advanced Manufacturing Office



## Rick Pettibone

Senior Energy Advisor  
Franklin Energy





**SEE Action**

STATE ENERGY EFFICIENCY ACTION NETWORK

**Industrial Energy Efficiency  
and CHP Working Group**

**Sustained Energy Savings Achieved  
through Successful Industrial Customer  
Interaction with Ratepayer Programs:  
Case Studies**

Sandy Glatt  
MEEA Webinar  
12/10/2015

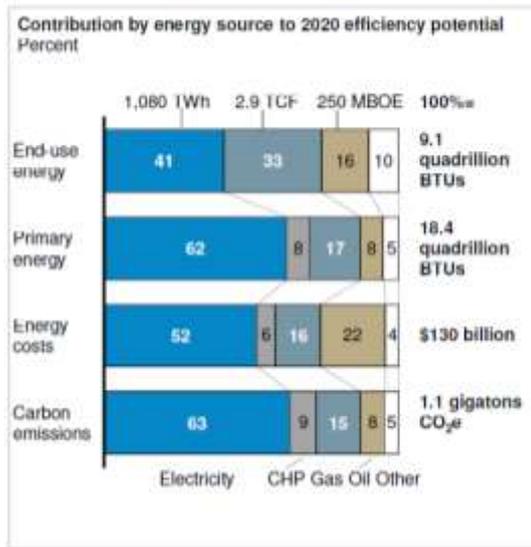
# Presentation Outline

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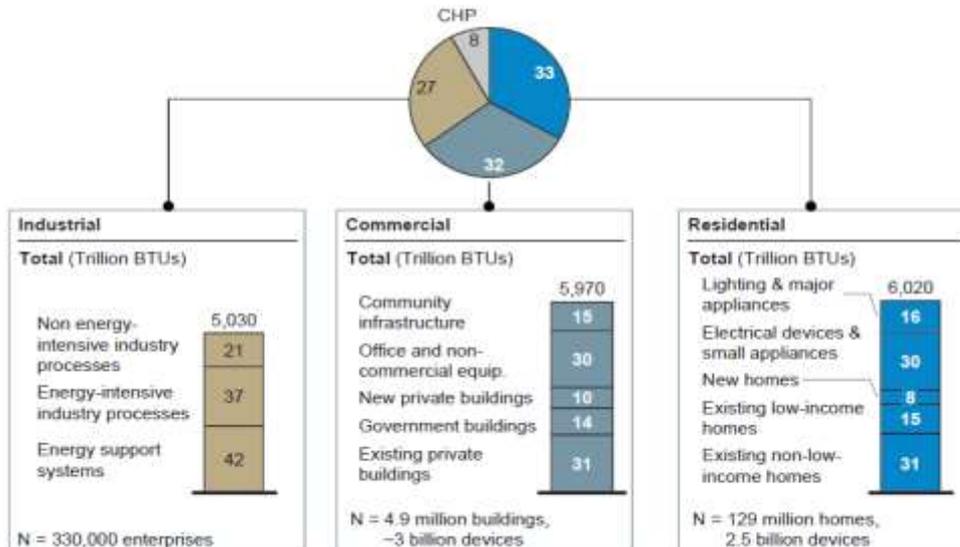
- Cost-effective EE potential
- Achieving the potential: boosting industrial participation
- Deep dive into four case studies
- Demonstrating success
- IEE program value to industrial customers
  - Technical assistance
  - Incentives
- Individual case study highlights
- Conclusions
- Recommendations
  - For industrial companies
  - For ratepayer program administrators



# Cost-Effective Energy Efficiency Potential



Percent, 100% = 18,410 trillion BTUs of primary energy



**\$50 B invested per year**



**20% savings in energy**

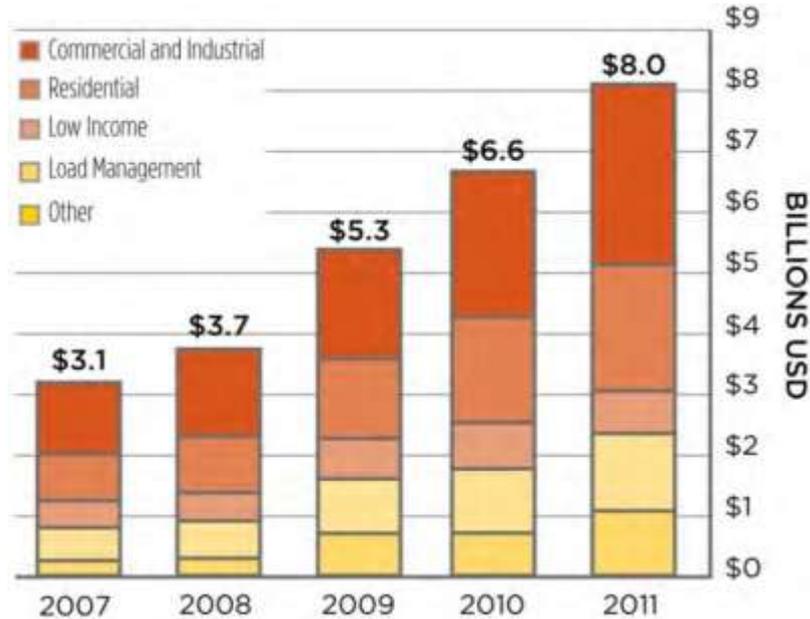


**Over twice the savings per \$ spent**



**Economic Development  
Market Transformation  
Emissions Reductions**

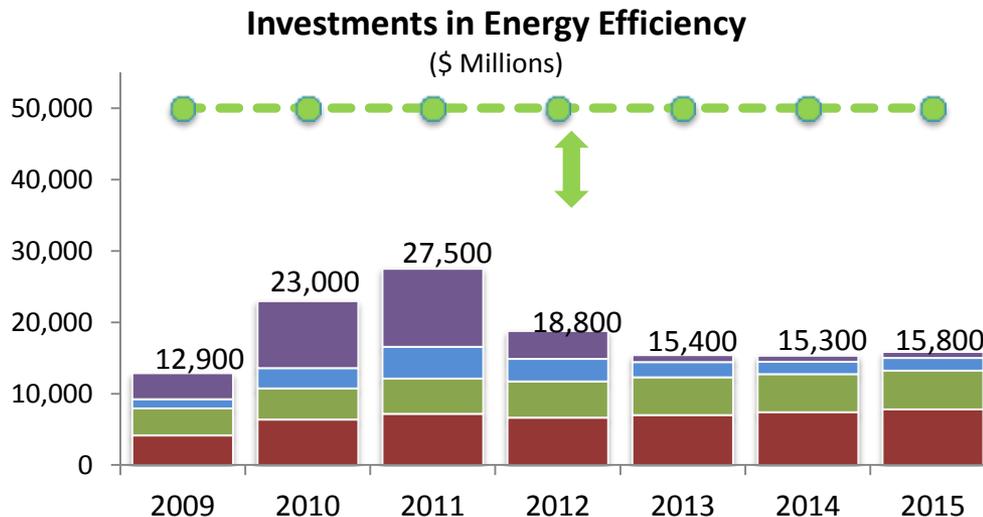
# Current Investment in Cost-Effective EE



## Ratepayer funded investment

- Grown to **\$8 B/year** in 2011, more than 2.5x investment 4 years ago

Source: CEE Annual Industry Report  
March 2012



## Ratepayer + private + consumer + federal investment

- Well below **\$50B/year**

Federal including ARRA

Consumer Programmatic Share

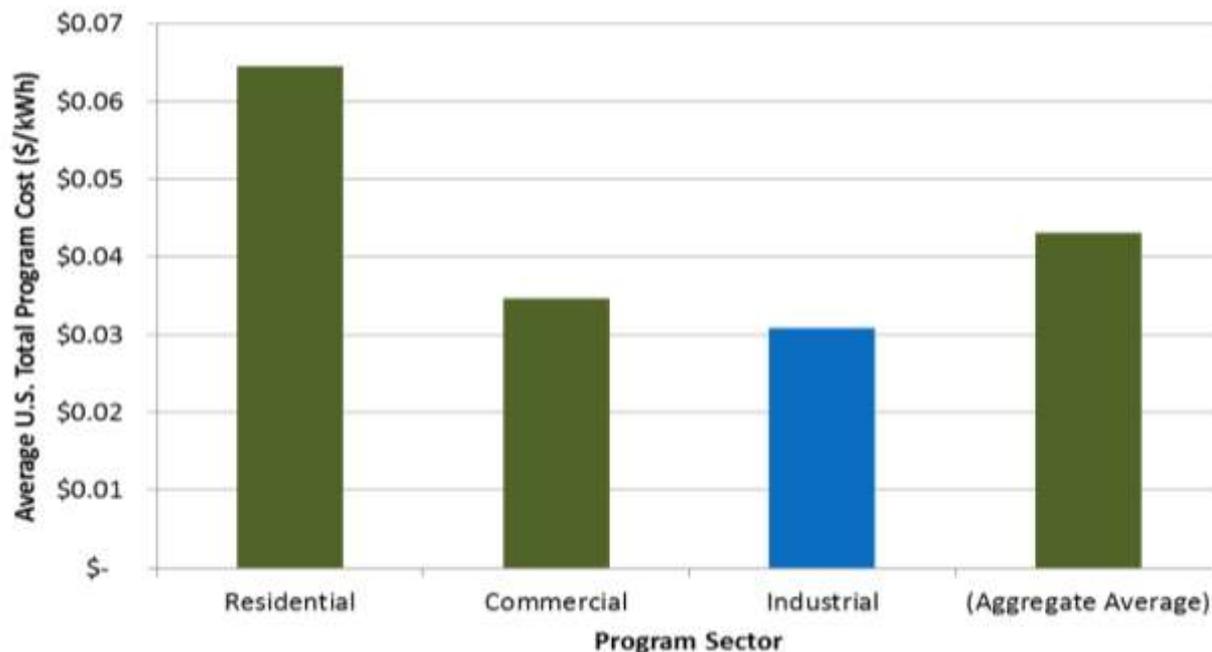
Utility Ratepayer Programs

Private (ESCO & other)

Source: McKinsey Global Energy and Materials (2009),  
*Unlocking Energy Efficiency in the U.S. Economy*

# Industrial EE is the Most Cost-effective EE Option at a National Level

## Cost of industrial EE resources vs. other customer classes



Source: Aden (2013) based on EIA 2012 DSM, energy efficiency and load management programs data for more than 1,000 utilities  
[www.eia.gov/electricity/data/eia861](http://www.eia.gov/electricity/data/eia861)

- EE remains one of the most cost effective ways<sup>1</sup> to address challenges
- Under-investment in energy efficiency given cost-effectiveness of resource
- Industry has the lowest cost of saved energy on a national level, although it is important to note that cost structures vary by program and sector at the state level

<sup>1</sup>Average cost of efficiency savings ~ 4.6 cents per kWh including participant costs. ACEEE, *Saving Energy Cost-Effectively: A National Review of the Cost of Energy Saved Through Utility-Sector Energy Efficiency Programs*



# Achieving the Potential: Boosting Industrial Participation

- IEE ratepayer programs suffer low uptake by industry across many states today, despite the fact the energy efficiency program spending across all customer classes continues to increase.
- Significant energy efficiency funds remain on the table for industrial customers.
- Successful custom industrial programs targeted to the largest customers can effectively reach the majority of the targeted market <sup>1</sup>
- Where effective programs are offered, participating industrial customers can receive significant value and financial benefits, with new energy savings that provide far more financial value in most cases than what they pay in energy efficiency charges.

<sup>1</sup>York, Neubauer, Nowak, Molina (2014). *Expanding the Energy Efficiency Pie: Serving More Customers, Saving More Energy Through High Program Participation*. ACEEE



# Deep Dive Case Studies

- Exploring the value customers have derived from participation in ratepayer-funded programs
- Provide insights for:
  - industrial companies considering participating in ratepayer programs
  - utilities and third parties looking to maximize IEE potential in their states, and encourage greater program participation



# Case Study Snapshots

|  | Terumo        | Roquette                        | Husky                | Logan                      |
|--|---------------|---------------------------------|----------------------|----------------------------|
| Facility location                              | Colorado      | Illinois                        | Vermont              | Kentucky                   |
| Manufacturing category                         | Biotechnology | Organic chemicals               | Machinery components | Aluminum                   |
| Rate-payer program                             | Xcel          | North Shore Gas/Franklin Energy | Efficiency Vermont   | Tennessee Valley Authority |
| Annual energy costs over \$1 million?          | Yes           | Yes                             | Yes                  | Yes                        |
| Share of energy costs in total operating costs | low           | low-medium                      | low                  | medium-high                |



# Program Summaries

*All programs offer prescriptive & custom incentives*

## Xcel Energy (CO)

- Process Efficiency (PE) program integrates technical assistance, energy management support, and incentive programs.
- 3<sup>rd</sup> party implementer for PE, as well as in-house energy engineers for incentive calculations & complex projects

## Northshore Gas (IL)

- Staffing grants
- Continuous project management support
- Gas Optimization Study Program
- Relies on 3<sup>rd</sup> party implementer

## Efficiency Vermont

- Technical assistance for energy audits, project development, employee awareness
- Strategic energy management (SEM) assistance through its Continuous Energy Improvement program
- Energy Leadership Challenge (2011-2013)

## Tennessee Valley Authority (KY)

- EnergyRight Solutions for Industry program provides financial incentives, technical assistance and information.
- Tailored solutions for large, complex projects, cutting edge technologies, or incentives for projects > \$500,000 cost.
- Relies on 3<sup>rd</sup> party implementer

# Demonstrating Success

- Considerable savings achieved through a range of EE projects over a number of years
- Would not have been identified or implemented without technical support, personnel capacity, and planning support provided by the program
- Program staff served as an extension of companies' energy teams

| Customer                        | Program                    | Annual energy cost savings (estimates)        | Total annual energy savings through program engagement | Number of projects implemented to date | Engagement period (yrs) |
|---------------------------------|----------------------------|---|--|--|-------------------------|
| Terumo BCT                      | Xcel Energy                | \$52,000<br>+ \$177,000 from planned projects | 789,000 kWh<br>+ 2,112,057 kWh from planned projects   | 13                                     | 4                       |
| Roquette                        | North Shore Gas            | \$430,000                                     | 664,000 therms   | 7                                      | 3                       |
| Husky Injection Molding Systems | Efficiency Vermont         | \$600,000                                     | 5,900,000 kWh  | 46                                     | 12                      |
| Logan Aluminum                  | Tennessee Valley Authority | \$300,000                                     | 4,206,000 kWh  | 7                                      | 4                       |



# IEE Program Value to Industrial Customers: Financial Incentives

## Financial incentives:

- Provided an initial entry point to interest energy/facility staff
- Served as a tool for facility managers to obtain internal management support or approval for capital EE projects
- Substantially reduced payback periods to below internal corporate hurdle rates

| Customer                        | Number of projects | Total incentive value since engagement (\$) | Payback period without incentive (average) | Payback period with incentive (average) |
|---------------------------------|--------------------|---|--|---|
| Terumo BCT*                     | 18                 | \$206,917                                   | 6.2  | 4.5                                     |
| Roquette                        | 7                  | \$868,000                                   | 3.6  | 1.4                                     |
| Husky Injection Molding Systems | 46                 | \$350,000                                   | 2  | 1.4                                     |
| Logan Aluminum                  | 7                  | \$395,000                                   | 2.3  | 1                                       |



# IEE Program Value to Industrial Customers: Technical Assistance

- Few industrial facilities have internal staff with sufficient time to pursue the details of energy efficiency projects given many competing duties.
- Provision of reliable and trusted technical assistance was highly valued – e.g. for Husky “even more valuable” than the financial incentives
- Technical assistance provided to the four customers took various forms:
  - Identification and packaging of project opportunities
  - Both broad and very specific engineering and optimization studies
  - Third-party technical review and advice on already identified projects
  - Performance verification of EE projects
  - Assistance in introducing and establishing SEM systems in the facilities
  - Review of manufacturing processes for efficiency gains through further optimization.



# Xcel Energy Highlights

- Program staff proactively identify customer-hosted venues/meetings for targeted outreach on program opportunities
- Free engineering and feasibility studies to determine payback and cost-effectiveness of EE projects
- Xcel engineering group serves as a resource to meet and discuss more complex projects with customers
- Process Efficiency program contractor performs energy data and regression analysis to identify all variables that affect energy use, and develops multi-year energy plan in partnership with customer
- Continuous Energy Improvement



# Terumo BCT

- Through range of Xcel offerings, Terumo was able to undertake some projects immediately, incorporate others into its three-year scheduling and budgeting processes, and embark on a longer-term, ongoing continuous improvement engagement
- Terumo is overlaying its enterprise software and power monitoring network into an integrated dashboard that also tracks energy management information in real time:
  - visualize peak demand use
  - set benchmarks
  - make system/process adjustments
  - track savings against the original levels
  - claim energy cost savings

*As a manager, I have limited resources. For some of the opportunities I would like to chase, I just don't have the resources to be able to tackle them. When I start a project or ask for money for that project, I may not have as much background as I would like to have. Having added resources provided by Xcel Energy, with the data tagged to it, has helped me present and explain a project. When you are chasing money, you have to tell the story. Having those added resources helped me tell the story. This is why we're going to do it, and this is how we are going to do it. The program gave us a focus and additional resources that we didn't have on site. That was a huge benefit to our business. We thought we were doing the right things, now we know we are doing the right things.*

– Chris Sirbin, Building Operations Manager, Terumo BCT



# Efficiency Vermont Highlights

- Non-incentive/non-project value-add
- Multi-year continuity of assigned EV account manager
- Bi-weekly onsite energy team meetings
- Identification of production-related issues & Improvements in productivity
- Offer assistance on metering
- Package projects
- Capital budget planning for the future
- Continuous energy improvement (CEI)



# Husky Injection Molding Systems

- After a mature EE project portfolio, Husky & Efficient Vermont turned focus on manufacturing process itself
- Reviewed EE options in core metal-cutting process
  - devised metering and measurement plans
  - Success led to permanent meters on all its machines. Installation low-cost (\$31,000 cost, 2 GWh savings/yr, 2 month payback)
- Engaged in Efficiency Vermont's new Continuous Energy Improvement Program.
  - Husky is using a new energy management information system (EMIS) to help identify further system optimizations
  - Applied Efficiency Vermont's new Industrial Peak Initiative Tool

*The work we have accomplished with Efficiency Vermont is the result of a relationship that has been built over 10 years of collaboration. The consultation services they provide allow us to methodically evaluate potential projects and focus our efforts on the ones that are the most impactful. They have a clear understanding of our business from both an operational and financial standpoint and this allows them to adapt their focus to help us meet our goals.*

– DeWayne Howell, Husky Injection Molding Systems



# North Shore Gas Highlights

- Customer Relationship
  - Customers do business with people they know, like and trust.
  - Concept must be integrated into any program design
- Industrial Process Knowledge Critical
  - Probe for causes of pain as it relates to process/energy use. If you could change one thing about your process/energy bill what would it be?
  - Develop empathy for customer situation and explore solutions
- Match Up Program Offerings to Customer Needs. Don't data dump!



# Roquette America

- With corporate top management buy-in for strategic energy saving efforts, yet severe in-house staffing constraints at the facility (10% time of maintenance & project coordinator), NSG contracted team helped Roquette to serve as an extension of their energy team.
- Major process project had previously been denied by Roquette's management because 3+ year payback. NSG rebate lowered the payback to an acceptable level from five to two years.

*The value for us was two-fold: first, getting to work with knowledgeable program representatives who helped us understand the benefits available to us, someone to walk us through the process. Second, obtaining the incremental funding which made the projects feasible. Probably would never have been done without the rebates.*

- Steve Calewarts, the Plant Manager, Roquette America's Gurnee facility



# TVA Highlights

- Continuous engagement built a relationship of trust
- Providing third-party services and experts to identify and quantify the savings and opportunities
- Collaborating more closely to work through planning cycles
- Measurement and verification services
  - Providing greater confidence to Logan's management team in support of electrical saving projects



# Logan Aluminum

- Already had an established energy saving program and project portfolio (mostly gas)
- Logan uses TVA savings analyses, performance monitoring and verification services as trusted information for requesting capital dollars to more confidently support energy-themed capital spending proposals.
- TVA incentives were a catalyst for aligning investment interests and helped to reduce Logan's investment risk to tolerable levels.

*Logan's participation in TVA's EnergyRight Solutions for Industry program has been a very good partnership. The program has provided assistance in evaluating project savings that reduce the risk associated with completing these projects. The dollar incentive associated with those projects favorably reduces SPB [standard payback], which makes the difference in whether or not several of the projects obtain funding.*  
- Russ Hendrick, Logan Aluminum



# Conclusions

- Program staff and contractors provided facility with needed additional expertise to identify, package and implement energy efficiency projects, serving as an extension of facilities' energy teams.
- Programs provided incentives to buy down upfront costs to levels where payback periods met levels acceptable to the enterprises.
- As relationships grew stronger and benefits accrued over time, customers became more comfortable with EE projects, and with the program participation process overall.
- This resulted in more complex projects, process efficiency projects, low-cost process optimization, O&M improvements, and leveraging smart manufacturing practices.
- Facility staff became increasingly willing to put in additional internal time and resources towards continued EE projects.



# Recommendations for Industrial Customers

- Request an on-site presentation by program staff of incentives and programs offered by the local ratepayer-funded program
- Request assignment of a stable program person of contact, and exploration of incentives and assessment/technical assistance programs
- Implement several projects in cooperation with the ratepayer-funded program and using available incentives. Selection of relatively simple or small projects may be a good place to start. Assistance in completing program procedures may be requested.
- Consider integration of energy efficiency projects with program support into the plant's capital budgeting cycle – with utility incentives adding value.
- Consider participation in SEM or continuous energy improvement programs, if offered, as a continuing mechanism to identify and implement more low-cost projects.



# Recommendations for Program Administrators/Utilities

- Develop multiple-year relationships between the utility/PA and industrial company personnel, involving a steadily evolving program of support and efforts to identify multiple projects over time (rather than a single project).
- Develop programs that can target energy efficiency gains in manufacturing processes, in addition to energy used in support systems.
- Develop programs involving Strategic Energy Management (SEM) that support internal company platforms for continual identification and implementation of energy savings measures, high-impact and low-cost behavioral changes, and operational and maintenance improvements.
- Promote smart manufacturing and enhanced metering practices, such as installing sensors and embedding devices in software that communicate with one another and with other systems through networks.



# SEE Action IEE & CHP Publications

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## White Papers:

- *Examples of Successful Industrial Customer Interaction with Ratepayer Programs (October 2015)*
- *Does Reduced Demand Equal Lower Energy Prices for All? (Forthcoming November 2015)*
- *Energy Efficiency in Industrial Companies with Facilities in Multiple States (working title, forthcoming)*

## Reports:

- *Designing Effective State Programs for the Industrial Sector (2014)*
- *Guide to the Successful Implementation of State CHP Policies (2013)*



**SEE Action**  
STATE ENERGY EFFICIENCY ACTION NETWORK

**Thank you!**

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**SEE Action**

STATE ENERGY EFFICIENCY ACTION NETWORK

## Background Slides

# About SEE Action

- Network of 200+ leaders and professionals, led by state and local policymakers, bringing energy efficiency to scale
- Support on energy efficiency policy and program decision making for:
  - Utility regulators, utilities and consumer advocates
  - Legislators, governors, mayors, county officials
  - Air and energy office directors, and others
- Facilitated by DOE and EPA; successor to the National Action Plan for Energy Efficiency



*The SEE Action Network is active in the largest areas of challenge and opportunity to advance energy efficiency*



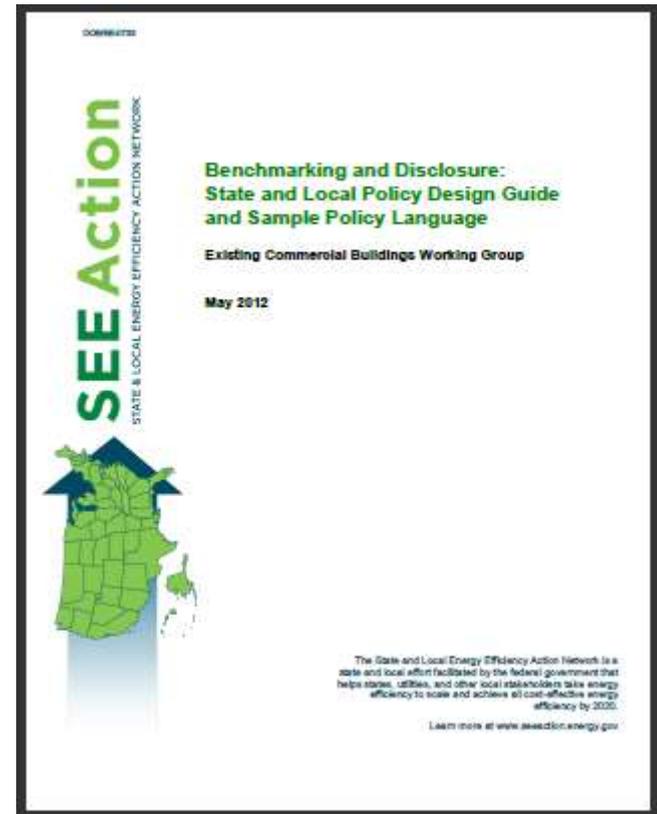
# What SEE Action Does

Provides ***solution pathways through market and policy barriers*** to achieve greater investment in cost-effective energy efficiency at the state and local government levels.

Offers ***decision-grade information*** for state and local policymakers.

- Guidance Documents
- Trainings
- Peer-to-peer dialogues
- Technical Assistance

**Goal:** All cost-effective energy efficiency by 2020



# The Peoples Gas and North Shore Gas Natural Gas Savings Programs

MEEA / SEE Action Webinar

**Rick Pettibone, Senior Energy Advisor**

December 10, 2015



# Why We Do What We Do – Results!

| Project Name                         | Year of installation | Annual therm savings | Annual cost savings* | Project cost | Gas rebate (\$) | Payback before rebate (yrs) | Payback after rebate (yrs) |
|--------------------------------------|----------------------|----------------------|----------------------|--------------|-----------------|-----------------------------|----------------------------|
| <i>Steam Trap Replacement</i>        | 2012                 | 852                  | \$554                | \$2,130      | \$360           | 3.85                        | 3.2                        |
| <i>Steam Trap Replacement</i>        | 2013                 | 13,498               | \$8,774              | \$3,080      | \$2,800         | 0.35                        | 0.03                       |
| <i>Pipe &amp; Fitting Insulation</i> | 2013                 | 39,051               | \$25,383             | \$66,410     | \$66,410        | 2.62                        | 0                          |
| <i>Desiccant Wheel Upgrade</i>       | 2013                 | 125,414              | \$81,519             | \$423,787    | \$216,910       | 7.96                        | 3.89                       |
| <i>Air Handler Energy Upgrade</i>    | 2014                 | 395,959              | \$257,373            | \$803,100    | \$500,000       | 3.12                        | 1.18                       |
| <i>Pipe &amp; Fitting Insulation</i> | 2014                 | 70,102               | \$45,566             | \$135,208    | \$79,620        | 2.97                        | 1.22                       |
| <i>Steam Trap Replacement</i>        | 2014                 | 19,087               | \$12,407             | \$2,606      | \$2,606         | 0.21                        | 0                          |
| <i>Project totals</i>                | 2012-2014            | 663,963              | \$431,576            | \$1,436,321  | \$868,706       | 3.56                        | <b>1.41</b>                |



# Program Elements – Key To Customer Success

- **Customer Relationship**

- Customers do business with people they know, like and trust.
- Concept must be integrated into any program design
- The relationship was key to success at Roquette



# Program Elements - Continued

- **Industrial Process Knowledge Is Critical**
  - **Understand, or gain understanding of customer process**
  - **Probe for causes of pain as it relates to process/energy use**
    - > If you could change one thing about your process/energy bill what would it be?
  - **Develop empathy for customer situation and explore solutions**

# Develop a Plan

- **Match Up Program Offerings to Customer Needs.**
  - **Don't data dump!**
  - **Target to customer needs**
  - **Agree on plan between you and customer**
  - **Follow up quickly and DELIVER**
  - **Regular communication is critical**



# Implementation

- **Nothing wrong with optimizing low hanging fruit**
  - **Steam traps**
  - **Pipe insulation**
- **Look to solve targeted customer problems**
  - **Production bottlenecks**
  - **Maintenance issues**
  - **Identification of inefficiencies (stupid things)**

# Implementation

- **Project/Process Management**
  - **Managing the process is critical**
  - **It is our job!**
  - **It pays dividends**
  - **It will exceed customer expectations**
  - **It WILL positively affect attribution**



# Program Success To Date

- **Gas Optimization Study Program has become an integral part of the overall portfolio**
- **22 studies performed—8 in North Shore Gas and 14 in Peoples Gas**
- **Customers totaling over 31M therms annual usage**
- **38 projects generated from the studies (1.4M therms saved)**
- **\$1.44M in rebates**



# Contact Me

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...and the **2016 Midwestern Industrial Energy Efficiency Summit**

**February 24-26, 2016 in Chicago, IL**  
**[www.meeaconference.org](http://www.meeaconference.org)**

# Q & A

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