



Savings Bonanza: Industrial Energy Efficiency Programs That Work

DOE Better Buildings Summit, May 27-29, 2015

Savings Bonanza: Industrial Energy Efficiency Programs That Work

Your Speakers:

- Gregory Walthers, Energy Advisor, Franklin Energy
- Greg Baker, Engineering Manager, Efficiency Vermont
- Brent Kent, Program Manager, TVA

Your Moderator:

- Sandy Glatt, DOE



SEE Action

STATE ENERGY EFFICIENCY ACTION NETWORK

State and Local Energy Efficiency Action Network

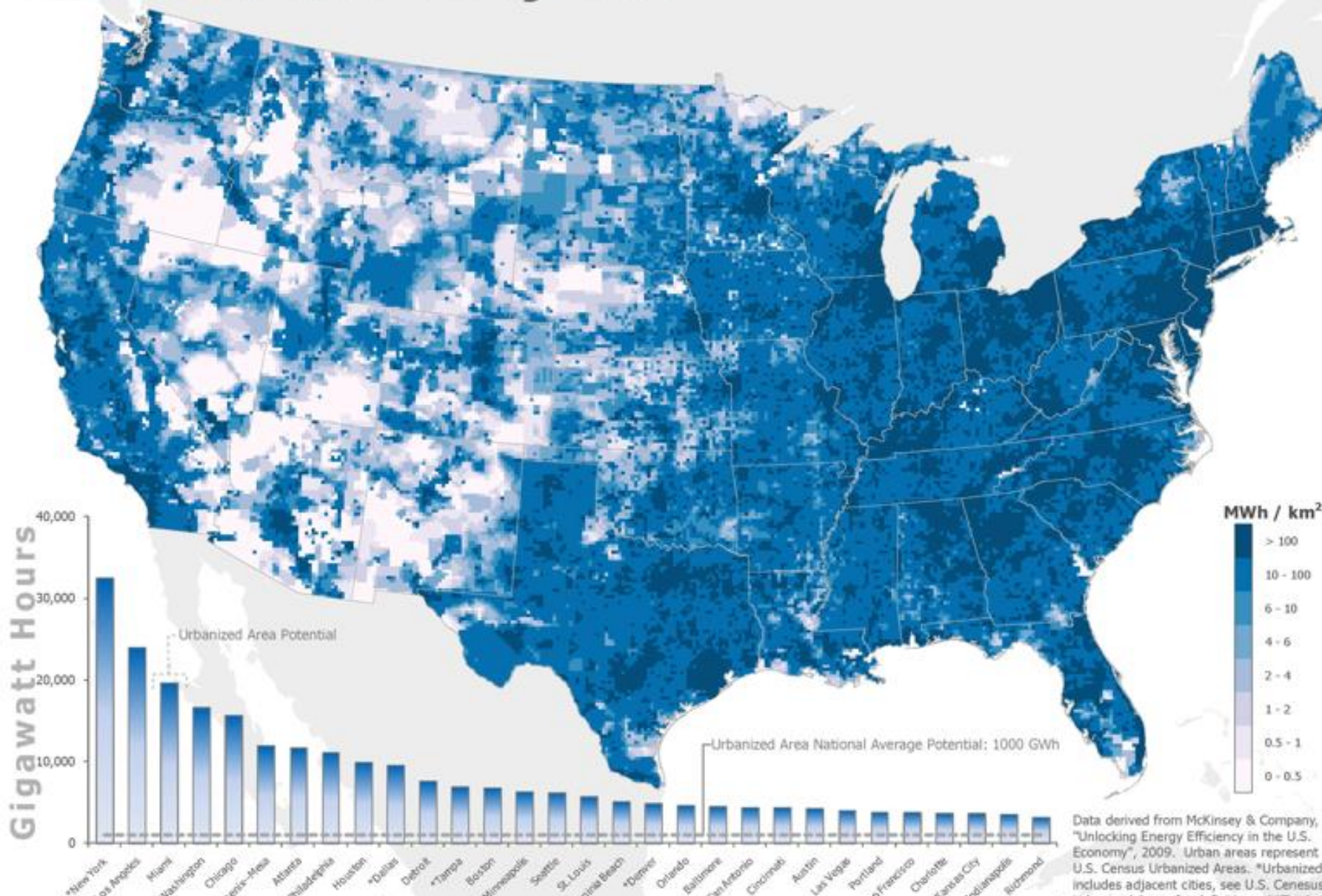
Industrial Energy Efficiency and CHP Working Group

Sandy Glatt
IEE-CHP WG Staff Lead
Better Buildings Summit 2015
May 28, 2015

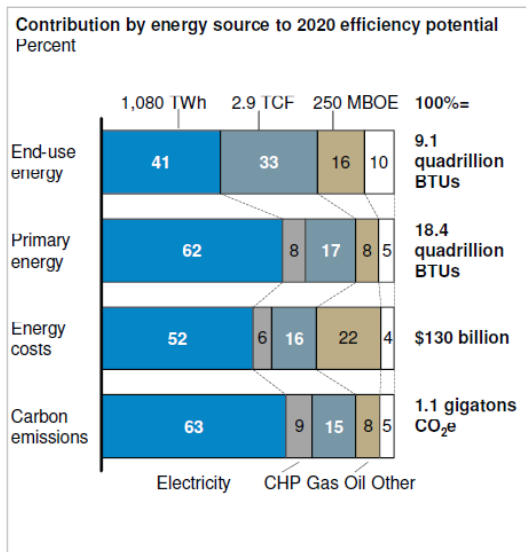
Electricity Energy Efficiency

Total Economic Potential Savings - 2020

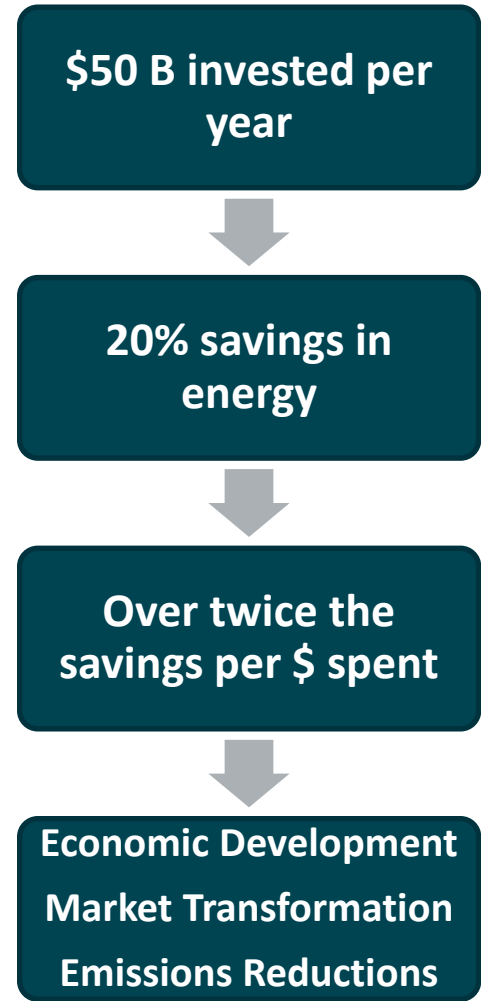
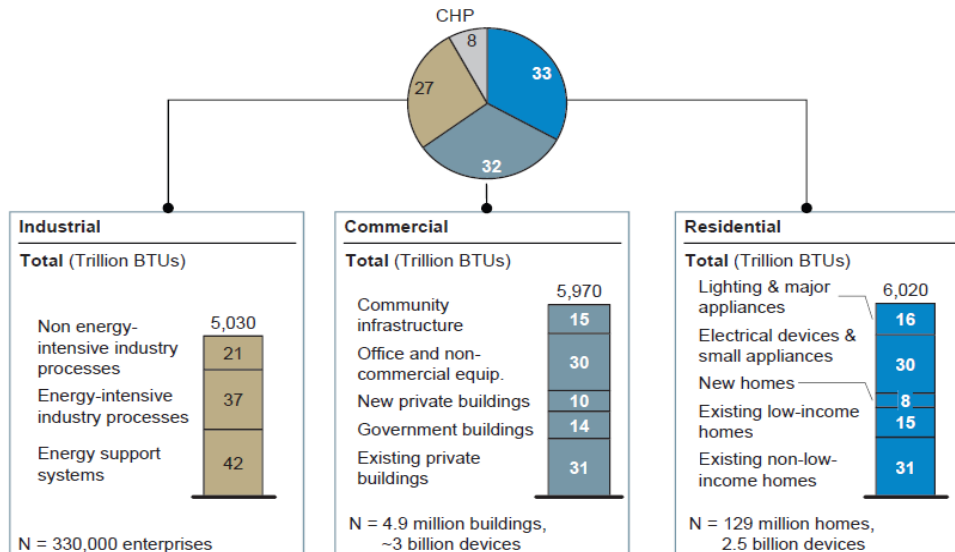
Date: 06-21-2010; Map Authors: Anthony Lopez & Seung-Jae Lee
 Map produced by NREL for the U.S. Department of Energy



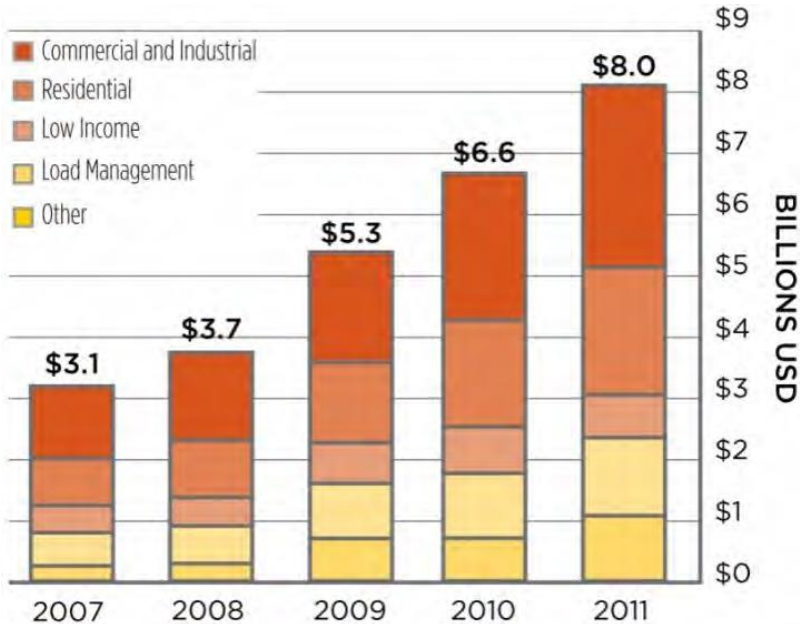
Cost-Effective Energy Efficiency Potential



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



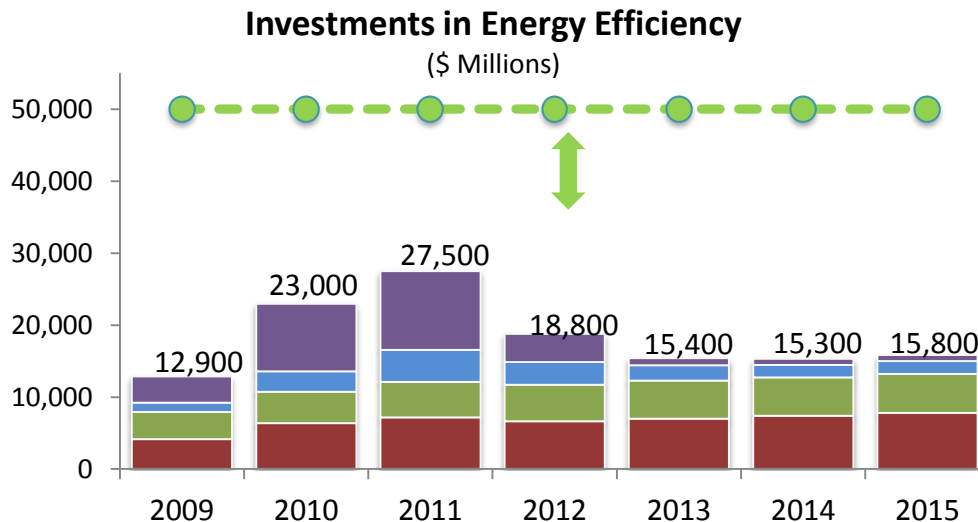
Current Investment in Cost-Effective EE



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

Achieving the Potential

- EE remains one of the most cost effective¹ ways to address challenges
 - High consumer energy prices
 - Fuel price volatility
 - Transmission and distribution infrastructure expansion costs
 - Localized system reliability
 - Environmental and public health costs of GHGs and air pollution
 - National energy security and independence
- Cost-effective EE can play a significant role in meeting energy requirements and save hundreds of millions of dollars²
 - \$50B/year² cost-effective investment potential
- ***Key Point: Under-investment in energy efficiency given cost-effectiveness of resource***

¹Average 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*

²McKinsey, *Unlocking EE in the US Economy*



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



SEE Action
STATE ENERGY EFFICIENCY ACTION NETWORK

www.seeaction.energy.gov

Designing Effective State Programs for the Industrial Sector

Scope and Purpose

- Provide guidance on successful design & implementation of state IEE programs
- Focus on utility ratepayer-funded EE programs

Objectives

- Demonstrate the significant benefits of IEE programs
- Explore how all states can promote IEE, even in diverse policy and local contexts
- Outline program features that respond to industry needs
 - Supported by numerous examples and case studies

Audience

- State regulators, utilities and other program administrators



Case Studies

Expand on our *Designing Effective Programs* paper by exploring detailed specific examples (case studies) of successful industrial customer / utility relationships. Create a value proposition for often reluctant industrial customers.

- Xcel Energy, CO
- North Shore Gas, IL
- Efficiency Vermont, VT
- Tennessee Valley Authority (TVA), TN

Final paper expected August 2015.

- Presented at the ACEEE Industrial Summer Study (Buffalo, NY August 4 – 6th, 2015)



Key Findings/Recommendations

For the Industrial Customer:

- Requesting an on-site presentation by program staff of incentives and programs offered by the local ratepayer-funded program that may be applicable to the plant.
- Requesting assignment of a stable program person of contact, and exploration with the contact of incentives and assessment/technical assistance programs of primary interest to the plant.
- Implementing 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.
- Considering integration of energy efficiency projects with program support into the plant's capital budgeting cycle – with utility incentives adding value.
- Considering participation in SEM or continuous energy improvement programs, if offered, as a continuing mechanism to identify and implement more low-cost projects.



Key Findings/Recommendations

For the Utility/Program Administrator

- Development of 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).
- Development of programs that can target energy efficiency gains in manufacturing processes, in addition to energy used in support systems.
- Development of 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.
- Promotion of 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.



Contact Information

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<https://www4.eere.energy.gov/seeaction/>

(sign up for the listserve at bottom of this page)

<https://www4.eere.energy.gov/seeaction/publication/industrial-energy-efficiency-designing-effective-state-programs-industrial-sector>

(Access the Designing Effective Programs paper)



The Peoples Gas and North Shore Gas Natural Gas Savings Programs

Better Buildings Summit

Greg Walthers, Energy Advisor

May 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)
Steam Trap Replacement	2012	852	\$554	\$2,130	\$360	3.85	3.2
Steam Trap Replacement	2013	13,498	\$8,774	\$3,080	\$2,800	0.35	0.03
Pipe & Fitting Insulation	2013	39,051	\$25,383	\$66,410	\$66,410	2.62	0
Desiccant Wheel Upgrade	2013	125,414	\$81,519	\$423,787	\$216,910	7.96	3.89
Air Handler Energy Upgrade	2014	395,959	\$257,373	\$803,100	\$500,000	3.12	1.18
Pipe & Fitting Insulation	2014	70,102	\$45,566	\$135,208	\$79,620	2.97	1.22
Steam Trap Replacement	2014	19,087	\$12,407	\$2,606	\$2,606	0.21	0
Project totals	2012-2014	663,963	\$431,576	\$1,436,321	\$868,706	3.56	1.41

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 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)**

*2015 rates used in example

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**

Questions?

Thank you!



Contact Us!

Greg Walthers | Energy Advisor

The Peoples Gas and North Shore Gas Natural Gas Savings Programs | Commercial and Industrial Program

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peoplesgasrebates.com | northshoregasrebates.com





EnergyRight[®] & Renewable Solutions

Utility and Customer Energy Efficiency Partnership

Brent Kent

Tennessee Valley Authority - TVA

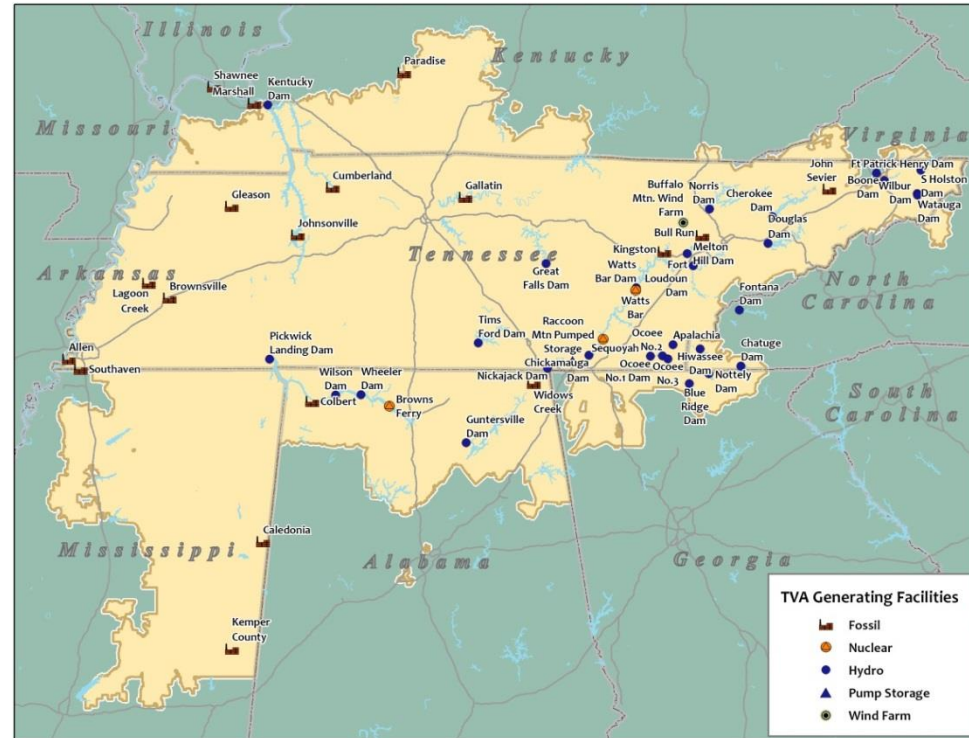
Program Manager

May 28, 2015



Tennessee Valley Authority - TVA

- Corporation owned by the U.S. government
- Provide electricity for 9 million people
- 80,000 square mile power-service area across seven states
- 41,000 square mile watershed
- 16,000 miles of transmission line
- Diverse power supply
 - 29 conventional hydroelectric plants
 - 1 pumped storage hydroelectric plant
 - 10 coal-fired plants
 - 3 nuclear plants
 - 5 combined cycle plants
 - 9 CT sites
- 155 local power companies
- 59 direct-serve customers





EnergyRight[®] Solutions Supports Public Power



Serving customers
and creating
partnerships



OPTIMIZE THE PUBLIC POWER ADVANTAGE

for the Tennessee Valley



Energy

Provide affordable electric power
throughout the Tennessee Valley Region



Environment

Act as a steward of the
Valley's natural resources



Economic Development

Serve as a catalyst for sustainable
economic development



EnergyRight[®] Solutions for INDUSTRY

EnergyRight[®] Solutions for **Industry** helps businesses and industries **save energy** and **money**. Our Solutions **support competitiveness, economic development** and **environmental stewardship**



Industry

- Standard Incentive
- Custom Solutions
- Tailored Solutions



Logan Aluminum

- Located in Russellville, Kentucky
- Joint venture of Novelis Corporation and the Tri-Arrows Aluminum Corporation



- One of TVA's 59 large directly-served customers
- Leading manufacturer of flat rolled aluminum alloy sheets, primarily for the beverage can market
- Began Production in 1984 and produces more than 40% of the aluminum for the beverage cans produced in North America



Keys for TVA and Logan Aluminum's Success

- Technical Assistance
 - Logan participated in DOE's "**Saving Energy Now**" program (Better Plants) that prioritized opportunities according to energy reduction potential with an emphasis on gas projects
 - TVA **established** the **relationship** by providing technical assistance and performance monitoring and verification services on an existing variable speed drive (VSD) project



Partnership Matters

- **Long-term Relationship**

- Logan Aluminum has **partnered** with TVA's EnergyRight Solutions for Industry for over four **years**
- Implemented **seven** energy efficiency **projects** together during that time
- TVA is **positioned** to better understand their planning cycles and **align** with our own program cycles

- **Technical Assistance**

- TVA **conducted** four **assessments** over the years for their pumping, cooling, and water treatment systems
- Three of the four assessments have been **converted** into energy efficiency **projects**

- **Incentives**

- 10 cents from the first-year annual kWh **savings** up to 70% project costs
- Helped **reduce** upfront investment **costs** and obtain corporate buy-in



Logan and TVA Project Results

Project	kWh/yr saving	TVA incentive	Annual cost savings @ \$0.07/kwh	Simple payback before incentive (yrs)	Simple payback after incentive (yrs)	Process impacts
Automated dryer controls - Compressor #1	48,478	\$4,848	\$3,393	9	7.5	Heat based on moisture
Highbay and parking lot lighting	107,740	\$10,774	\$7,542	3.2	1.8	Improved light levels
VFDs applied to cast water system	1,174,188	\$106,384	\$82,193	1.8	0.6	Flow to demand
Retrofit plant lighting from T12 to T8 fluorescents	344,797	\$32,481	\$24,136	3.1	1.7	Improved light levels
VFDs applied to fluid supply pumps	534,581	\$53,458	\$37,421	2.1	0.7	Flow to demand
Highbay lighting upgrade, J-M Bay, Est. in progress	368,385	\$34,892	\$24,424	4.2	2.8	Improved light levels
HM FM Coolant filter pump VFD, Est. in progress	1,628,000	\$150,500	\$113,960	1.9	0.5	Flow to demand
TOTALS:	4,206,169	\$393,337	\$293,069	2.3	1	

Custom Solutions



Unbiased, reliable technical assistance and information provided to help identify custom facility and process electric savings opportunities.



Keys for TVA and Logan Aluminum's Success

Continuous **engagement** built a relationship of **trust** by

- **Providing** third-party services and experts to identify and quantify the **savings** and **opportunities**
- **Collaborating** more **closely** to work through planning cycles
- **Providing** measurement and verification **services**
- **Providing** greater **confidence** to Logan's management team in support of electrical saving projects



Customized

Customized TVA technical assistance is available to meet specific needs.



Synergies Between TVA and Logan

- **Shared** tactics include
 - foster a **culture** that **promotes** energy and cost **reductions**
 - attain **continual improvement** in energy management/efficiency
 - continued **success** of operations
 - **utilize** alternate energy **resources** as appropriate





Takeaway

- Technical **assistance** can open doors between industrial **customers** and utilities
- Utilities should **leverage** third party **experts** and services if possible
- Independent assessments can help add **credibility** to potential **opportunities**
- **Incentives** allow customers to implement **projects** they otherwise would not have **implemented**





Efficiency Vermont's Trusted Partnership with Husky Injection Molding Systems



Greg Baker
Efficiency Vermont
Engineering Manager
May 26, 2015

Efficiency Vermont's Goal with Vermont Industry



- Deliver **cost-effective**, verifiable energy savings
- Be a **trusted energy advisor** to our client
- Provide **value** commensurate with the Vermont's energy efficiency charge to utility customers' bills

Our Approach to Industrial Customers



- Proactive outreach
- Meet customers where they are
- Understand their needs, constraints, objectives
- Account Management & technical teaming approach
- Non-incentive/non-project value-add
- Consultative engagement model

Keeping our customers in the lead

Husky Injection Molding Systems in Milton, Vermont

- Manufactures injection molding hot runners
- 250,000 ft² facility employing more than 350 people
- 11th largest industrial electricity user in Vermont
- 14-year relationship with Efficiency Vermont



Multi-faceted Savings Portfolio

- Lighting, motors, controls
- Compressed air system improvements
- HVAC upgrades and optimization
- Process and operational improvements



A Business Approach



- Relationships matter
 - Account manager and energy consultant
- Multi-year continuity
 - Technical and financial benefits consistent
 - Benefits accrue
- Trust has allowed deeper engagement
 - Process optimization
 - Energy management



Strengthening the Partnership

- Bi-weekly onsite energy team meetings
 - Efficiency Vermont Account Manager & Energy Consultant
- Review active opportunities
- Identify new efficiency opportunities
- Project scope development
- Package projects
- Capital budget planning for the future



Energy Experts

- Understand facility-specific energy needs
- Employ industrial best practices
- Identify opportunities
- Develop project scopes
- Offer assistance on metering
 - Facility energy map
 - Measure improvements, both pre- and post-project



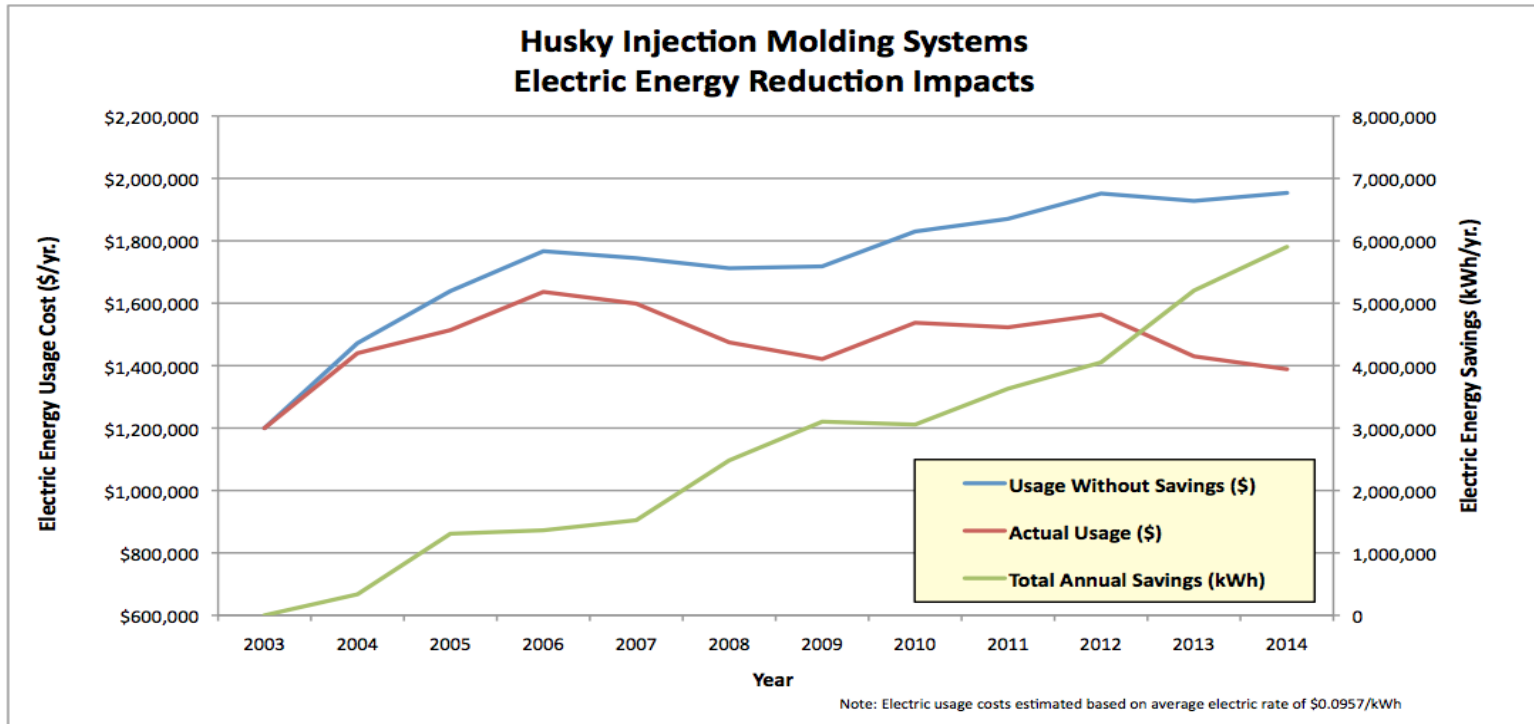
Process Optimization

- Metering baseline measurements
- Thorough investigation
 - ✓ Finding out why
 - ✓ Asking what if
 - ✓ Trust
 - ✓ Verify



Keeping our customers in the lead

Cumulative Energy Savings



Keeping our customers in the lead

Customer Feedback



“...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 Manufacturing Manager

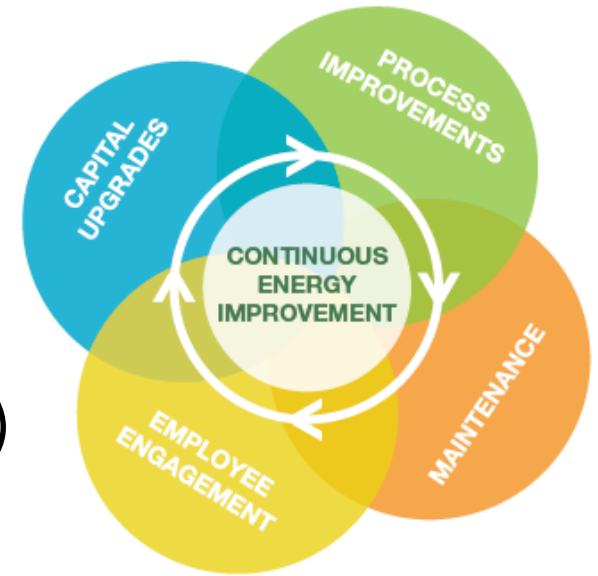
Efficiency Vermont's Value to Industry

- Ease of project implementation
- Reduced energy costs (per unit of production)
- Increased profitability
- Energy awareness / energy management
- Identification of production-related issues
- Improvements in productivity



Looking Forward

- Energy management
 - Continuous energy improvement (CEI)
 - Process optimization
 - Employee engagement
 - Company-wide focus and participation
 - EMIS
 - Dashboards
 - Behavioral savings



HUSKY

Keeping our customers in the lead

Efficiency Vermont

