Achieving Large-Scale Energy Savings with Industrial Energy Efficiency Programs

June 9, 2016
The Southeast Energy Efficiency Alliance (SEEA) promotes energy efficiency as a catalyst for economic growth, workforce development and energy security. We do this through collaborative public policy, thought leadership, outreach programs, and technical advisory activities.
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Today’s Presenters

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ACEEE

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TVA
Achieving Large Energy Savings with Industrial Energy Efficiency Programs

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Director, Industry Program

June 9, 2016
The American Council for an Energy-Efficient Economy (ACEEE)

- ACEEE is a 501(c)(3) nonprofit that acts as a catalyst to advance energy efficiency policies, programs, technologies, investments, & behaviors
- 50 staff; headquarters in Washington, D.C.
- Focus on end-use efficiency in industry, buildings, & transportation
- Other research in economic analysis; behavior; energy efficiency programs; & national, state, & local policy
- Funding:
  - Foundation Grants (52%)
  - Contract Work & Gov’t. Grants (20%)
  - Conferences & Publications (20%)
  - Contributions & Other (8%)

www.aceee.org/@ACEEEEdc
What we will cover

• Introduction to industrial energy efficiency
• The role of industrial programs in utility efficiency portfolios
• How industrial programs add value for large energy users
• Best practices in industrial program design
Industry is an important end-use sector

South represents largest share of industrial energy consumption

Energy consumption by census region and manufacturing industry subgroup for 2010 based on the MECS data set. 

Source: US DOE, Barriers to Industrial Energy Efficiency, June 2015
US industrial firms have a history of becoming more energy efficient

What are industrial energy efficiency programs?

- Financed by small charge on monthly energy bill
- Administered by local utility or third party
- Provide incentives, services, and technical assistance

Some of the many benefits of industrial energy efficiency

- Lowers operating costs
- Increases productivity
- Boosts competitiveness
- Improves safety

- Large energy savings
- Improved air quality
- Economic development
- Lowers price of energy

Common types of industrial efficiency programs

Knowledge sharing
   Technical assistance, workshops, peer exchange

Prescriptive incentives
   Rebates for technologies (ex: lighting, motors, drives, compressed air, process equipment, etc.)

Energy management
   Operations, organization, and behavioral changes through strategic energy management (ex: continuous improvement, data-driven benchmarking, ISO 50001, SEP, etc.)

Custom incentives
   Projects tailored to individual customers (ex: process improvements, combined heat and power, etc.)
Industrials represent a critical customers segment for utilities

Size and cost-effectiveness of C&I utility programs

<table>
<thead>
<tr>
<th>Utility</th>
<th>Energy Savings from C&amp;I (%)</th>
<th>Non-C&amp;I (%)</th>
<th>Levelized Cost of C&amp;I Savings ($/kWh)</th>
</tr>
</thead>
<tbody>
<tr>
<td>AEP Ohio</td>
<td>48%</td>
<td></td>
<td>1.2¢</td>
</tr>
<tr>
<td>Xcel Colorado</td>
<td>54%</td>
<td></td>
<td>1.9¢</td>
</tr>
<tr>
<td>Wisconsin Focus on Energy</td>
<td>57%</td>
<td></td>
<td>1.8¢</td>
</tr>
</tbody>
</table>
Combined investments enable greater savings potential

**INDUSTRY INVESTMENTS**

The low-risk, high return *private investments*. A small percentage of all possible energy efficiency projects.

Short-term return (1–2 years)

**UTILITY INVESTMENTS**

*Public infrastructure investments* with long-term benefits, like generation, transmission and distribution systems.

Long-term return (10–20 years)

**NEW POTENTIAL**

*Partnered investments* the customer would not make alone, but that represent deep energy savings and cost less than infrastructure.

Medium-term return (3–20 years)

Participation translates into financial value to customers

- Incentives reduce payback periods
- Help identifying projects
- Access to technical assistance and project implementation support
- Multiple benefits (safety, reduced waste, lower maintenance costs)
- Lower energy bills
Challenges exist, but good program design responds to customer needs
Best practices for building strong industrial EE programs

1. Clearly demonstrate the value proposition
2. Develop long-term relationships
3. Offer quality technical expertise
4. Provide both prescriptive and custom options
5. Accommodate customer schedules
6. Streamline application processes
7. Conduct targeted outreach
8. Leverage partnerships
9. Set energy savings goals
10. Undertake measurement and verification
The importance of large customer energy efficiency

- Large customers represent the largest fraction of electricity consumption
- Large customer energy efficiency programs produce saving at a fraction of residential and commercial programs
- Not including large customers increases the overall energy efficiency portfolio costs—increasing costs for all customers
- Energy efficiency improves the competitiveness and resilience of large customers, reducing their vulnerability to energy market volatility
- Important to design & operate good programs for large industrials that are responsive to their unique needs
“It’s time to implement good industrial energy efficiency programs in your state,” ACEEE Blog Post, February 10, 2016.

aceee.org/blog/2016/02/it-s-time-implement-good-industrial
SEE Action Guidance Documents

- **Industrial Energy Efficiency: Designing Effective State Programs for the Industrial Sector:**

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

- **State Approaches to Demand Reduction Induced Price Effects: Examining How Energy Efficiency Can Lower Prices for All:**
Thank you!

Questions? Comments?

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TVA Overview

- TVA is a corporation owned by the U.S. government
- Provides electricity for 9 million people across parts of 7 Southeastern states
- Area of 80,000 square miles
- Supplies up to 33,716 MW of electricity, delivered over 16,000 miles of high-voltage power lines from 53 power plants
- Funded by sales of electricity; TVA makes no profits and receives no taxpayer money
- TVA also provides flood control, navigation, land management and recreation for the Tennessee River system, and works with local utilities and state and local governments to promote economic development across the region

154 local municipal and cooperative distributors of TVA power
60 direct-served customers
TVA’s Target Power Supply Mix

ERS

- 1,300 MW avoided capacity

Renewables

- 1,500 MW wind
- 120 MW solar/biomass

Coal

- 12,400 MW
TVA’s Target Power Supply Mix

**Nuclear**
- 6,700 MW

**Hydro**
- 4,200 MW conventional
- 1,600 MW pumped storage

**Natural Gas**
- 5,500 MW CT and diesels
- 4,500 MW CC
ERS for Industry Outreach

**EPM**
- 5 TVA Staff
- Relationship Based
- Audits (SEM Type Model)

**PPN**
- High Volume
- 80% Sales
ERS for Industry Offer

**Standard Incentive**
- Dollar per Widget
- 500 dollar minimum

**Custom**
- Up to 0.10 per kWh
- Capped at 70% of Project Cost
Budget Sustainability

≤$100,000
• Process as current offer
• $100,000 per facility per payment year
• $500,000 max per campus per payment year

>$100,000
• Field staff offer locked in for 30 days
• Offer will not exceed 0.10 cents per kWh
• Customer signs offer and returns
• Payback requirement
• <70% of project cost
• 40% of available funds
How it Works

Application Submitted → Missing Information Review and Update → LPC Approval → Need Pre-Inspection → Follow Program Process

Need Pre-Inspection → Schedule Pre Inspection

Schedule Pre Inspection → Is Incentive >$100,000

Is Incentive >$100,000

Is Incentive >$100,000

Send Project Package to TVA → TVA Determines Offer

TVA Determines Offer → Applicant Reservation Release Sent to Field

 Applicant Reservation Release Sent to Field → Field Finalizes Offer with Customer → Customer Signs Offer and Returns
Airbus Helicopters Inc.

Airbus Helicopters Inc. manufactures, markets, sells and supports the broadest range of civil and parapublic helicopters in the United States. To meet its growing U.S. business volume, Airbus Helicopters Inc. operates a modern production center of excellence near Columbus, Mississippi. This facility opened in 2004 and spans 325,000 sq.ft. This facility produces the AS350 B2/B3 AStar commercial helicopter and the U.S. Army’s UH-72A Lakota Light Utility Helicopter. The scope of this lighting project involved the replacement of 372 metal halide fixtures with LED fixtures.

535,701 kWh
ENERGY SAVINGS
2013 Energy Saved

ERSI GWh Saved

The industrial sector alone accounts for about one-third of U.S. energy use. Customized TVA technical assistance is available to industrial users of power to devise plant-wide, holistic approaches to energy savings. TVA helps customers maximize efficiency, control expenses and boost their bottom lines.

253.41 GWh

ENERGY SAVED

Directly served customers reduced energy 50.95 GWh or 20.1% of the total 253.41 GWh saved

<table>
<thead>
<tr>
<th>TOP PERFORMERS</th>
<th>GWh</th>
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<tbody>
<tr>
<td>Directly Served Customers</td>
<td>50.95</td>
</tr>
<tr>
<td>Memphis Light, Gas &amp; Water</td>
<td>15.75</td>
</tr>
<tr>
<td>Warren Rural Electric Cooperative Corporation</td>
<td>12.40</td>
</tr>
<tr>
<td>Nashville Electric Service</td>
<td>11.72</td>
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<tr>
<td>Joe Wheeler Electric Membership Corporation</td>
<td>8.14</td>
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<tr>
<td>Alcorn County Electric Power Association</td>
<td>7.47</td>
</tr>
</tbody>
</table>

TOP MEASURES IMPLEMENTED

- Lighting - 75%
- Process Improvement - 11%
- Compressed Air - 8%
- All Others - 6%
2013 Incentives Paid

ERSI Incentives Paid

$24.98 million

INCENTIVES PAID TO INDUSTRIAL CUSTOMERS

$4.67 million went to directly served customers, the remaining went to LPC-served customers

ENERGY SAVINGS BY DISTRICT

- AL - 16%
- KY - 9%
- MS - 10%
- MID TN - 20%
- NE - 14%
- SE - 9%
- WEST TN - 16%

TOP INDUSTRIAL PROGRAM PARTICIPANTS

- Transportation Industrial Equipment 15%
- Primary Metal Industries 14%
- Rubber and Miscellaneous Plastic Products 9%
- Textile Mill Products 9%
- Fabricated Metal Products 7%

36
2014 Energy Saved

ERSI GWh Saved

The industrial sector alone accounts for about one-third of U.S. energy use. Customized TVA technical assistance is available to industrial users of power to devise plant-wide, holistic approaches to energy savings. TVA helps customers maximize efficiency, control expenses and boost their bottom lines.

268.94 GWh

ENERGY SAVED

Directly served customers reduced energy 104.43 GWh, or 38.8% of the total 268.94 GWh saved.

Top Performers

<table>
<thead>
<tr>
<th>Top Performer</th>
<th>Energy Saved (GWh)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Middle Tennessee Electric Membership Corporation</td>
<td>25.88</td>
</tr>
<tr>
<td>Memphis Light, Gas and Water Division</td>
<td>22.30</td>
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<tr>
<td>Electric Power Board of Chattanooga</td>
<td>6.68</td>
</tr>
<tr>
<td>Joe Wheeler Electric Membership Corporation</td>
<td>5.86</td>
</tr>
<tr>
<td>Greenville Light and Power System</td>
<td>5.34</td>
</tr>
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Top Savings, Percent of Sales

<table>
<thead>
<tr>
<th>Top Savings, Percent of Sales</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plateau Electric Cooperative</td>
<td>9.27%</td>
</tr>
<tr>
<td>Franklin Electric Cooperative</td>
<td>3.38%</td>
</tr>
<tr>
<td>Lexington Electric System</td>
<td>6.24%</td>
</tr>
<tr>
<td>Hartsville Utilities</td>
<td>5.96%</td>
</tr>
<tr>
<td>Columbia Power and Water Systems</td>
<td>5.58%</td>
</tr>
</tbody>
</table>
2014 Incentives Paid

ERSI INCENTIVES PAID

$24.09 million
INCENTIVES PAID TO INDUSTRIAL CUSTOMERS

$8.9 million went to directly served customers and the rest to LPC-served customers.

ENERGY SAVINGS BY DISTRICT

- AL – 10%
- KY – 10%
- NE – 9%
- SE – 9%
- MID TN – 15%
- WEST TN – 13%

TOP INDUSTRIAL PROGRAM PARTICIPANTS

- Transportation Equipment: 17%
- Primary Metal Industries: 12%
- Chemicals Products: 7%
- Paper Products: 6%
- Motor Freight Transportation and Warehouse: 4%
2015 Energy Saved

ERSI GWh Saved

The industrial sector alone accounts for about one-third of U.S. energy use. Customized TVA technical assistance is available to industrial users of power to devise plantwide, holistic approaches to energy savings. TVA helps customers maximize efficiency, control expenses and boost their bottom lines.

199.80 GWh

ENERGY SAVED

TOP MEASURES IMPLEMENTED
- Lighting – 41%
- Process Improvement – 29%
- Compressed Air – 19%
- All Others – 17%

TOP PERFORMERS
- Warren Rural Electric Cooperative: 8.75 GWh
- Alcorn County Electric Power Association: 8.40 GWh
- Nashville Electric Service: 7.20 GWh
- Electric Power Board of Chattanooga: 6.90 GWh
- Fort Payne Improvement Authority: 6.33 GWh

TOP SAVINGS, PERCENT OF SALES
- Fort Payne Improvement Authority: 8.12%
- Arab Electric Cooperative: 6.84%
- Weakley County Municipal Electric System: 4.77%
- Bossomor Electric Service: 4.14%
- Alcorn County Electric Power Association: 3.73%

Directly served customers reduced energy 88.62 GWh, or 44 percent of the total 199.80 GWh saved.
2015 Incentives Paid

ERSI Incentives Paid

$16.7 million
INCENTIVES PAID TO INDUSTRIAL CUSTOMERS

ENERGY SAVINGS BY DISTRICT
- AL - 6%
- KY - 20%
- NE - 0%
- SE - 0%
- MID.TN - 13%
- WEST TN - 6%

TOP INDUSTRIAL PROGRAM PARTICIPANTS
- Paper Mills: 16%
- Plastic Materials and Resins: 13%
- Primary Metals: 9%
- Motor Vehicles and Passenger Car Bodies: 5%
- Nonwoven Fabrics: 5%
- Other: 59%

$7.9 million went to directly served customers and the rest to LPC-served customers.
Questions?