Industrial Technologies Program

U.S. DEPARTMENT OF ENERGY | Energy Efficiency & Renewable Energy

Utility Partnership Webinar Series

State Policies to Promote Utility Energy Efficiency Programs

December 7, 2010

U.S. DEPARTMENT OF ENERGY | Energy Efficiency & Renewable Energy

Speakers and Topics:

- **Franklin Energy Services, LLC, Vice President, Analytics & Engineering, Nels Andersen** will discuss the differences between C&I programs and why that is important, as well as the components of a successful industrial energy efficiency program, and the commonalities among some of the most successful industrial energy efficiency programs across the country.
- **Michigan Public Service Commission, Manager, Energy Efficiency Section, Robert Ozar** will provide an overview of Michigan's energy efficiency policies, how they've influenced the development of energy efficiency programs in Michigan, with particular emphasis on industrial programs, and some industrial energy efficiency success stories.
- **Washington State Energy Extension, Community Business Programs, Engineering and Fiscal Division Manager, Todd Currier** will discuss the approach Washington State has taken in establishing energy efficiency policies, as well as provide a discussion of what Washington's industrial energy efficiency policies are, and some of the most successful industrial programs as a result of these state policies.

Questions?

Email: jredick@bcs-hq.com
Presentations: http://www1.eere.energy.gov/industry/utilities/

Designing Industrial Sector Programs for Maximum Impact

State Policies to Promote Utility Energy Efficiency Programs

December 7, 2010

Nels Andersen
Franklin Energy Service
Vice President, Engineering

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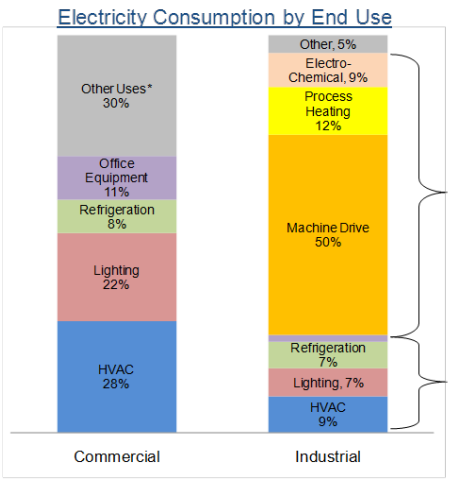
Goal for this presentation

Help you identify the elements to consider to achieve maximum impact relative to industrial program goals.

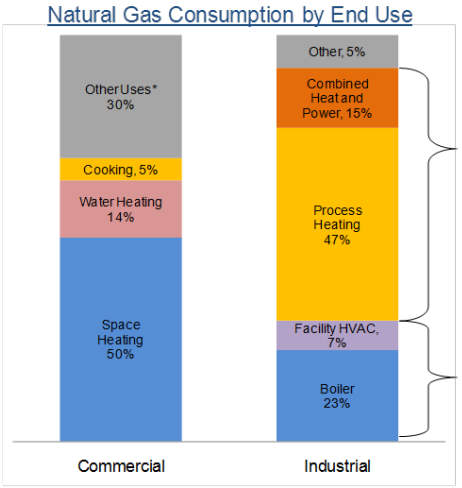
Energy Consumption Profile by Sector



Grouping "C&I" together for program design purposes can miss the biggest areas of opportunity:

Process-related end uses make up over 70% of industrial electricity use, largely comprised of machine drive systems (e.g., motors, pumps, fans, compressors, etc.)

Systems common to commercial and industrial buildings represent only one quarter of industrial electricity use



Process heating, CHP and cogeneration opportunities unique to industrial sub-sectors require customized approaches to providing incentives for investments in energy efficiency

Boiler and space heating measures are likely to have applications across both commercial and industrial facilities

Source: Energy Information Administration

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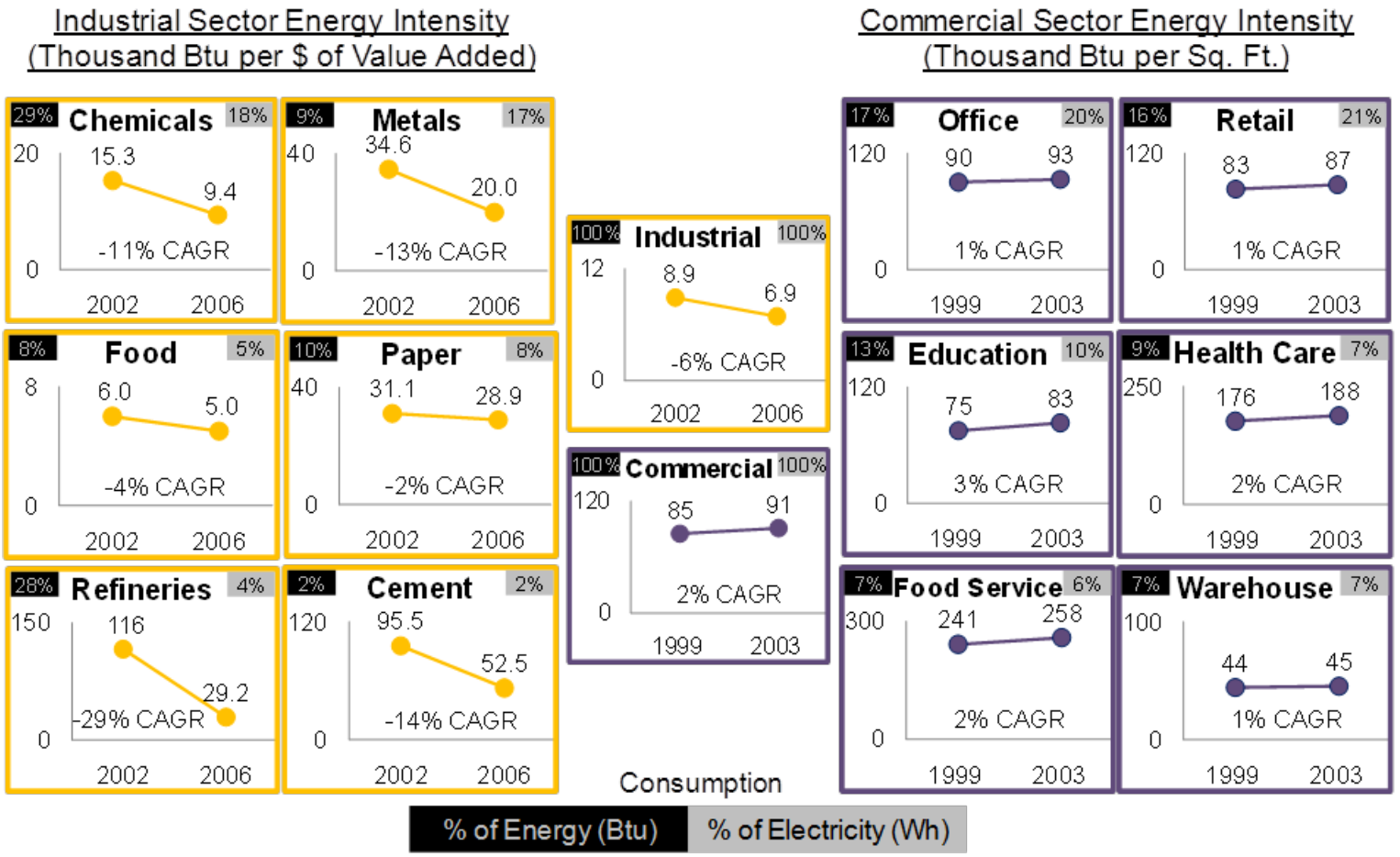
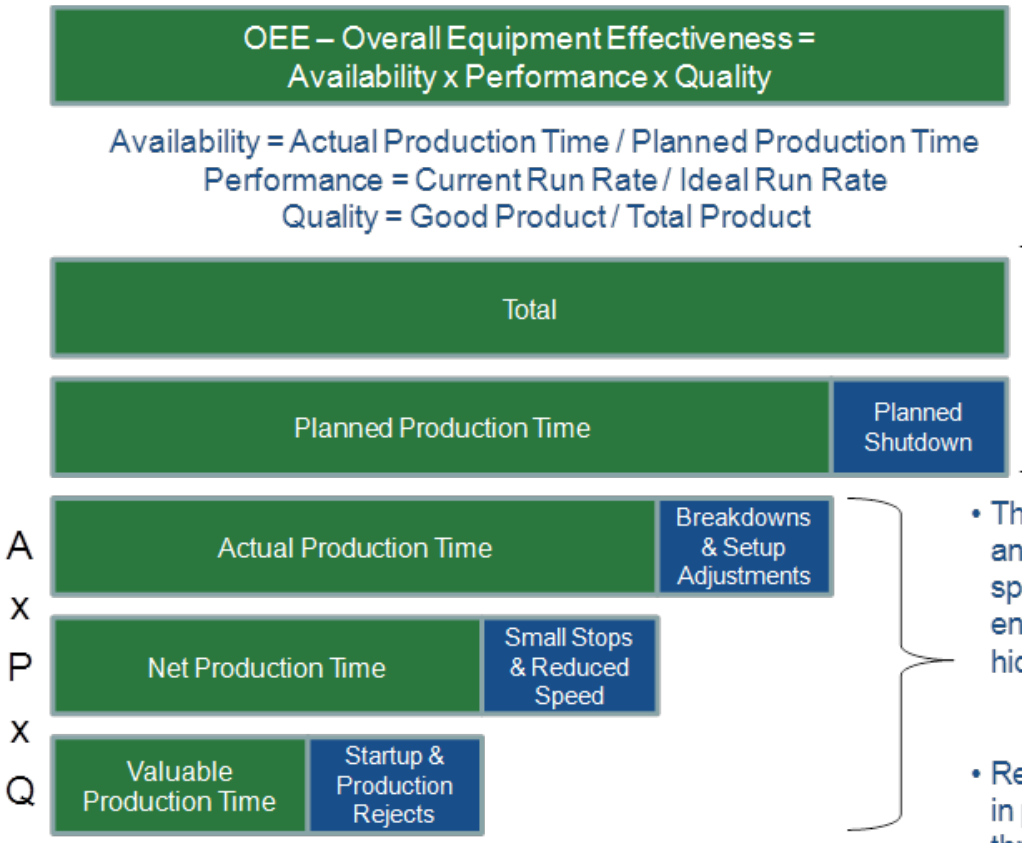
Sub-Sector Energy Intensity Trends in Recent EIA Surveys



Source: Energy Information Administration

Overall Equipment Effectiveness Model for Plant Performance Measurement



Impact of Energy Efficiency Retrofits

- Equipment replacement and facility retrofits can impact the **availability** of production facilities unless completed during planned shutdown times

- The need to verify process **performance** and ensure adherence to **quality** specifications following the installation of energy efficiency measures can create hidden project costs:
  - Equipment qualification
  - Process validation
- Requirements can be particularly sensitive in processes with tight tolerances, high throughput, or strict regulatory compliance requirements

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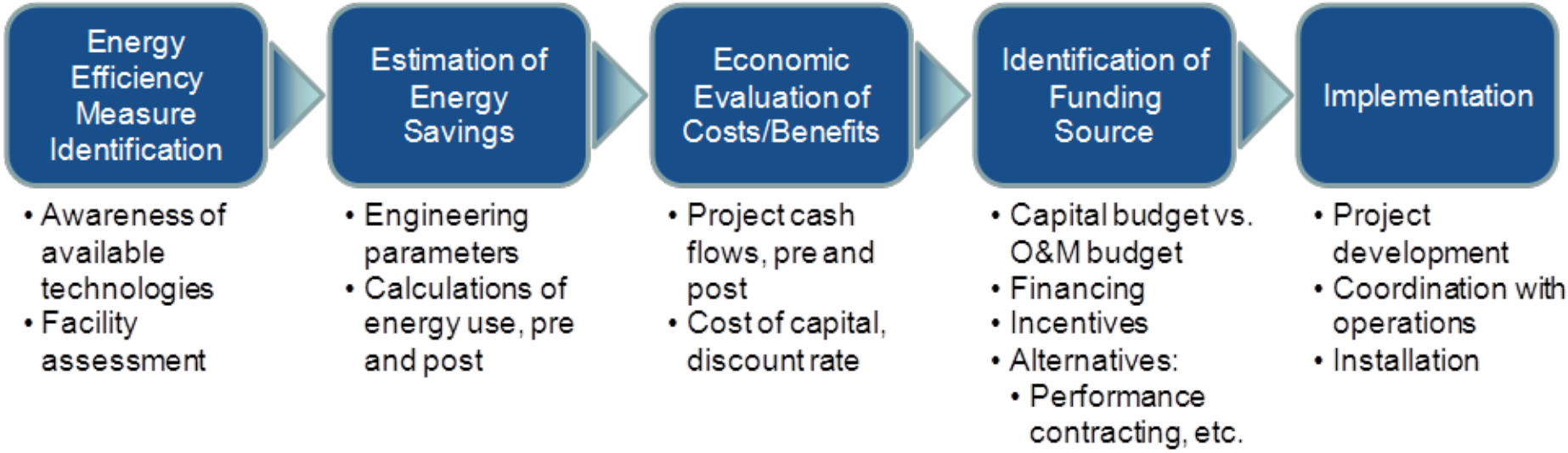
Energy Efficiency Project Process Flow



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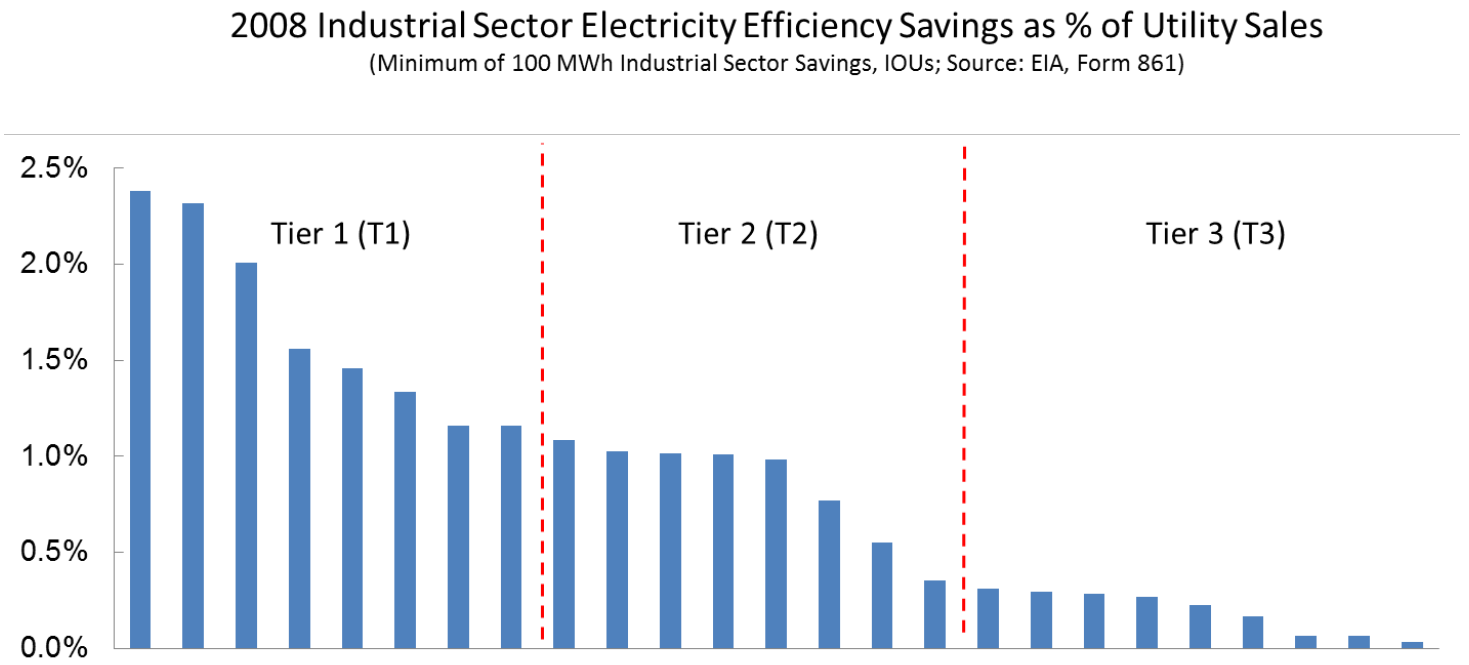
Business Size as a Factor in Pursuing Energy Efficiency Project Opportunities

	Enablers	Barriers
Smaller Businesses	• Single decision maker (likely) • Absence of formalized energy management practices presents opportunities for O&M efficiencies	• Less likely to have internal technical expertise, resources • Lack of access to capital, ability to self-finance measure costs
Larger Businesses	• Greater access to capital, financing options • Internal technical expertise, resources (facilities/energy management, engineering)	• Multiple layers of decision making • Separation of facilities management, finance functions • Focus on core business activities

Investor-Owned Utility Programs Achieving Greater Than 100 MWh in the Industrial Sector



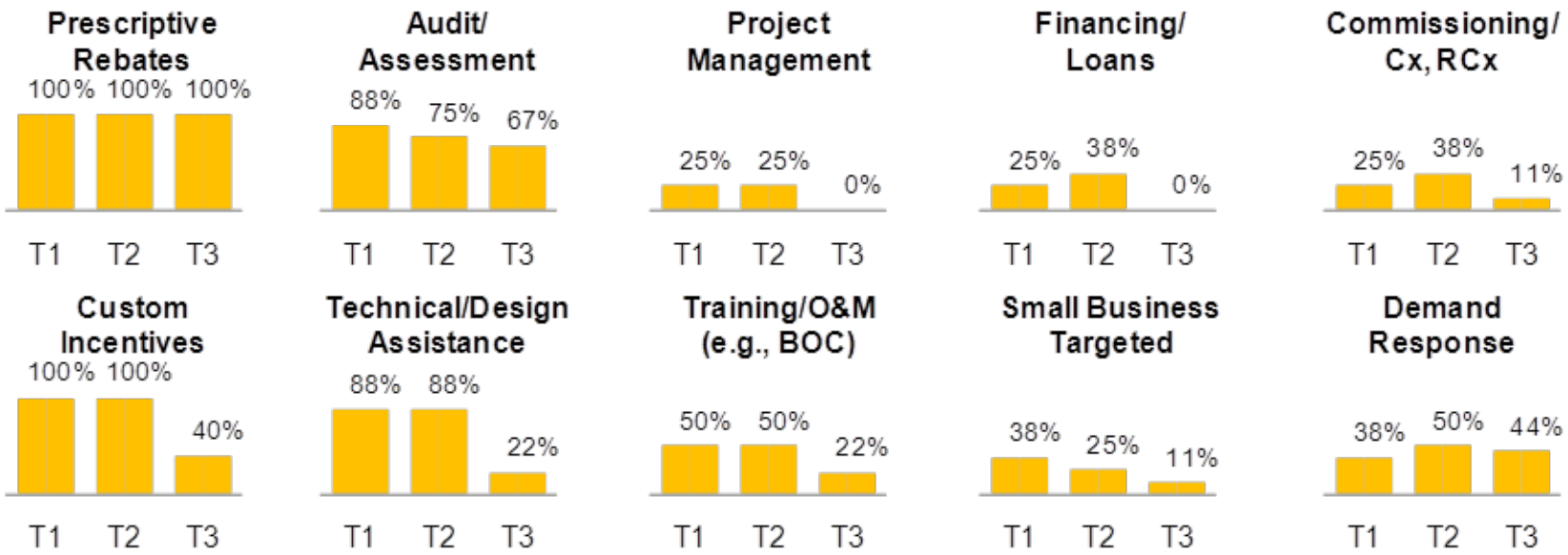
Source: Energy Information Administration

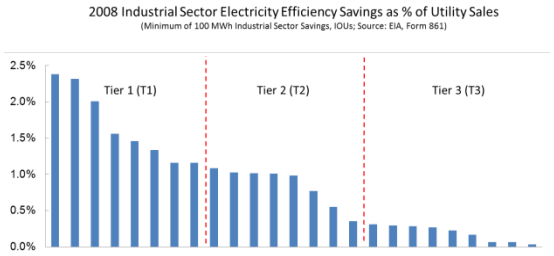
Program Services Offerings among IOUs with >100 MWh of Industrial Sector Savings

	Prescriptive	Custom	Financing (Loans)	Audits/ Assessment	Technical/Design Assistance	Project Management	Targeted Small Business	Commissioning, Retrocommissioning	Training / O&M (e.g., BOC)	Performance Contracting	Demand Response	Motors Program (In Addition to Measure Rebates)
Alliant Energy (IA)	●	●	●		●	●			●	●		
Alliant Energy (WI)	●	●	●	●	●	●			●	●		●
Avista (WA)	●	●		●							●	●
Connecticut L&P	●	●	●	●	●			●	●		●	●
Duke Energy (IN)	●								●		●	
Duke Energy (KY)	●											
Duke Energy (OH)	●											
Entergy (AR)	●	●		●	●		●				●	
Idaho Power	●	●		●	●							
MidAmerican (IA)	●	●	●	●	●	●		●			●	●
National Grid (MA)	●	●						●				●
National Grid (NH)	●	●		●	●			●				●
Otter Tail Power (MN)	●	●										●
PacifiCorp (UT)	●	●		●	●			●				
PG&E (CA)	●	●		●	●		●		●	●	●	
Progress Energy (FL)	●			●								●
SCE (CA)	●	●		●	●	●	●			●	●	
Tampa Electric (FL)	●			●							●	●
United Illuminating (CT)	●	●	●	●	●		●	●	●		●	●
Unitil (NH)	●	●		●	●							
We Energies (WI)	●	●		●	●				●		●	●
WMECO (MA)	●	●		●	●				●			●
Xcel Energy (CO)	●	●		●	●		●		●			
Xcel Energy (MN)	●	●		●	●		●				●	
Xcel Energy (NM)	●	●		●					●			

Source: Franklin Energy review of program offerings

Summary of Program Service Offerings by Savings Tier





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Additional Resources

- Andersen, Nels and Mark Brown. 2010. “Overcoming Barriers to Achieving Energy Savings in the Industrial Sector.” White Paper. Franklin Energy Services. May.
  - http://www.franklinenergy.com/casestudieswhitepapers.html
- Andersen, Nels and Mark Brown. 2010. “Barriers to Energy-Efficiency Adoption in the Industrial Sector.” Natural Gas & Electricity, Volume 27, Number 5. December. © 2010 Wiley Periodicals, Inc.
- Andersen, Nels and Mark Brown. 2011. “Successful Approaches for Conservation Programs for Industrial End-Users.” Natural Gas & Electricity, Volume 28, Number 1. January. © 2011 Wiley Periodicals, Inc.
- Chittum, Anna, R. Neal Elliot and Nate Kaufman. 2009. “Industrial Energy Efficiency Programs: Identifying Today’s Leaders and Tomorrow’s Needs.” Report No. IE091. American Consortium for an Energy-Efficient Economy. September.
  - http://www.aceee.org/research-report/ie091
- McKinsey & Company. 2009. “Unlocking Energy Efficiency in the U.S. Economy.” June.
  - http://www.mckinsey.com/clientservice/electricpowernaturalgas/downloads/US_energy_efficiency_full_report.pdf

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Public Service Commission
Energy, Labor & Economic Growth

Department of Energy's Utility Partnerships Webinar Series

Michigan Public Service Commission
Robert G. Ozar, PE
Manager, Energy Efficiency
Electric Reliability Division
December 7, 2010

Overview of PA 295

- Michigan's Public Act 295 was signed into law on October 8, 2008.
- PA 295 is part of a comprehensive energy package promoting private investment in renewable energy and energy efficiency.
- "*The overall goal of an energy optimization plan shall be to reduce the future costs of provider service to customers. In particular, an EO plan shall be designed to delay the need for constructing new electric generation facilities*…"
- The Act sets very specific administrative procedures and standards.

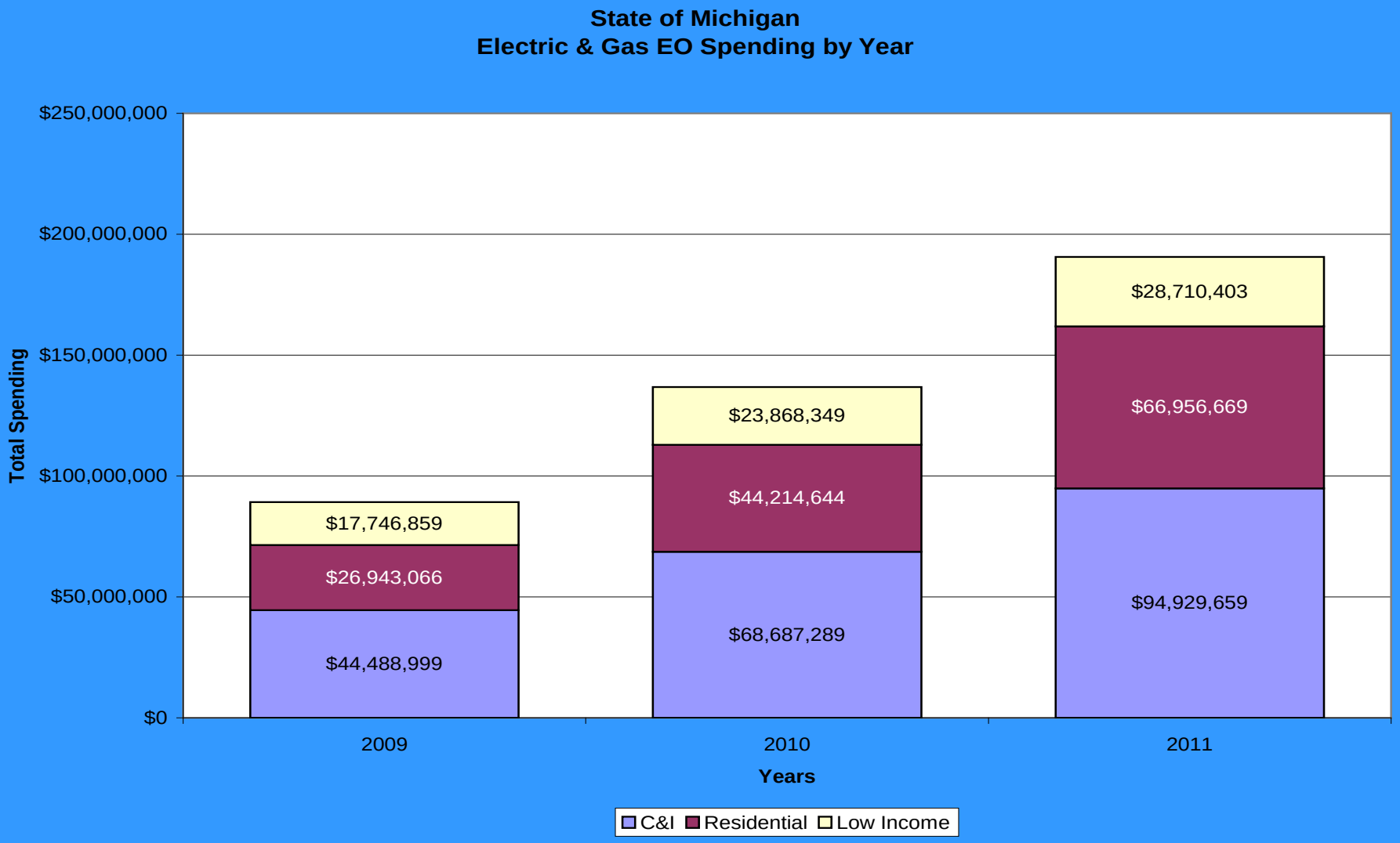
Overview of PA 295 (cont.)

- 66 utilities in Michigan are required to file energy efficiency plans. The Act calls such plans "Energy Optimization" (EO) plans.
- Targets are based on percentage reductions in retail sales. The Act does not set standards for electric peak reductions nor is power factor recognized as contributing to electric generation demand.
- Electric utility targets ramp to 1% of retail sales in 2012, gas utility targets ramp to 0.5%.

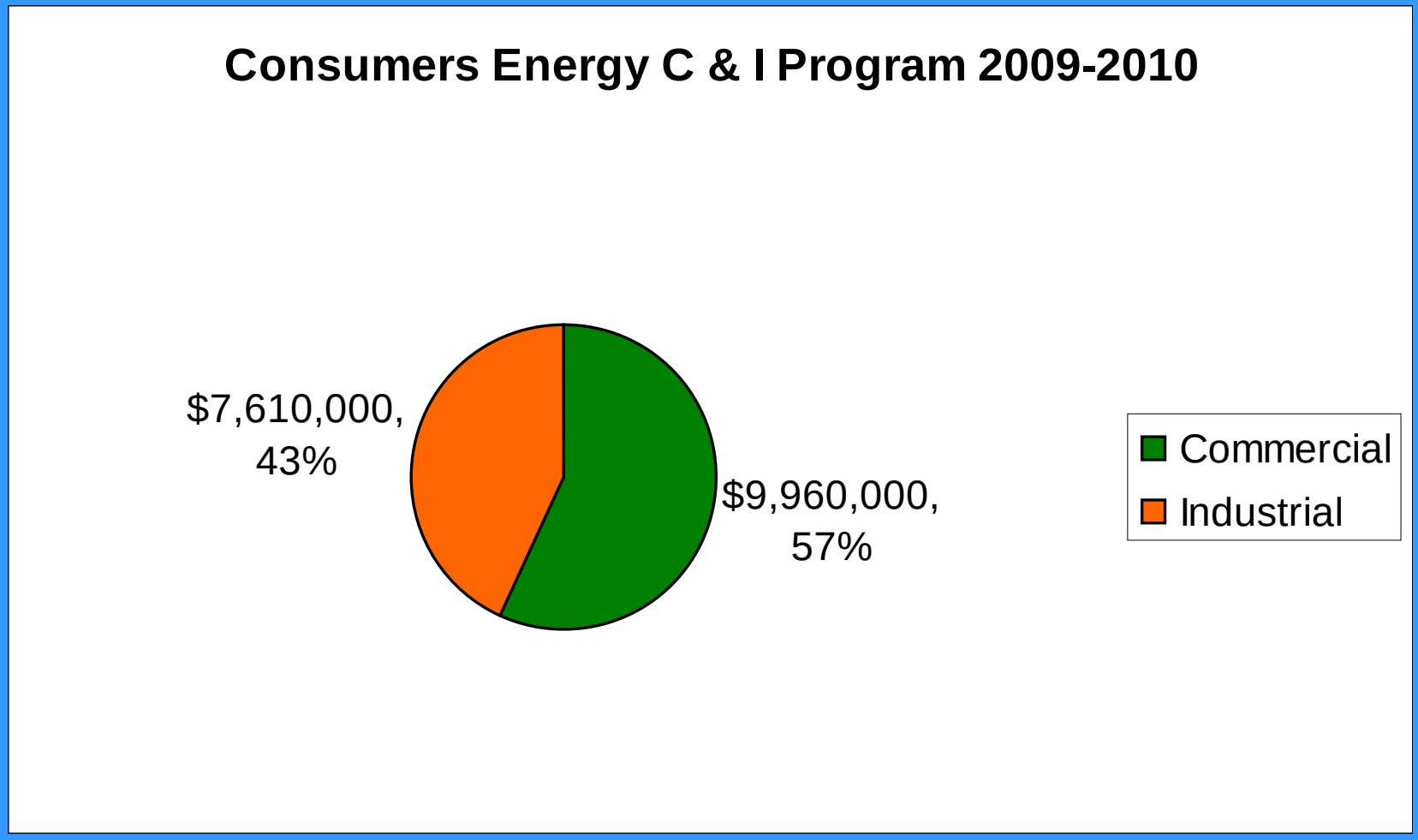
EO Plan Design

- Most plans divide customers into two customer groups: residential, and commercial/industrial (C&I). In addition, about 10% of the total budget is directed toward residential low-income programs.
- C&I programs generally consist of two foundational programs: (1) prescriptive rebates; and (2) custom incentives, $/kWh.
- PA 295 limits education spending to 3% of budget and pilot programs to 5% of budget.

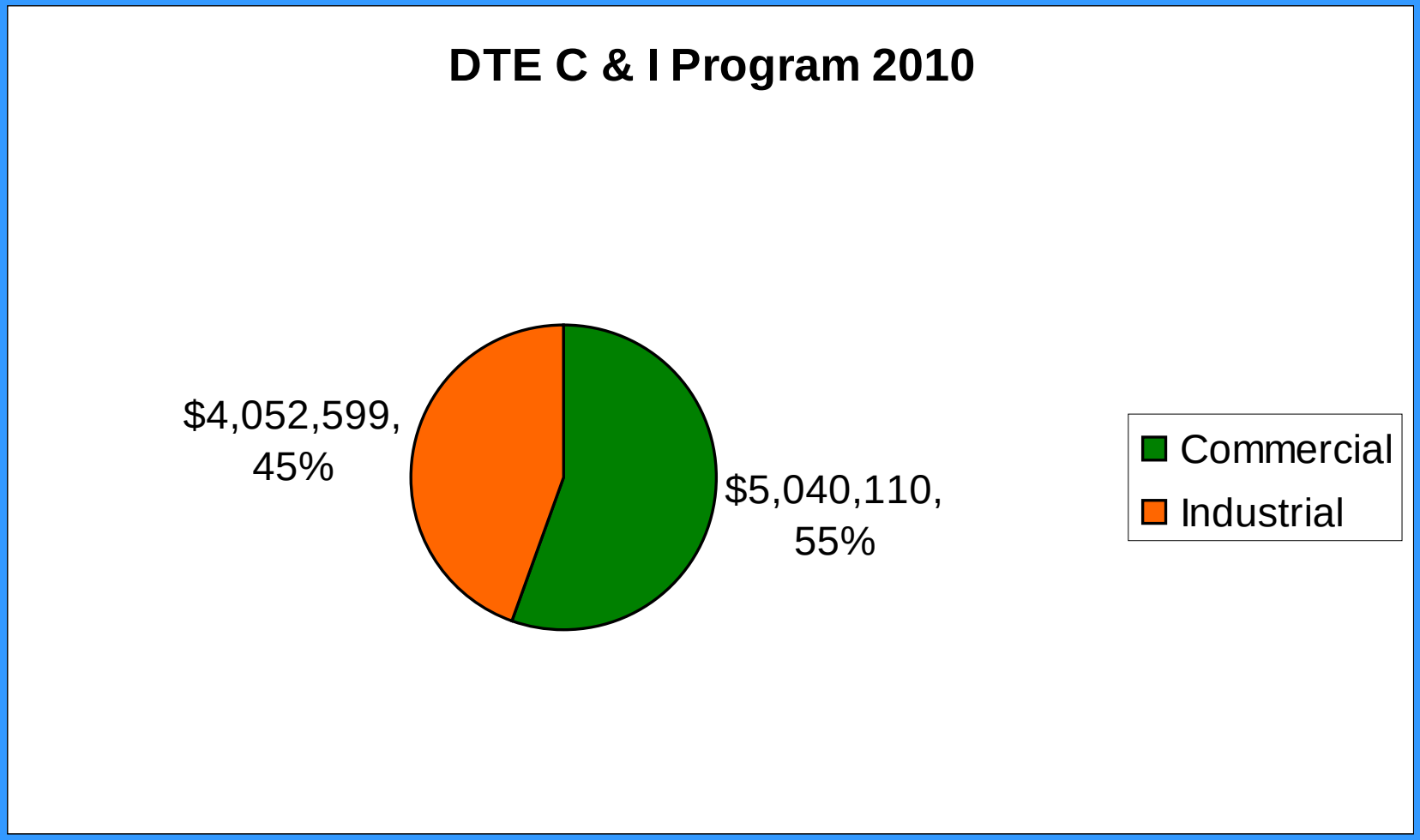
Spending: The statewide three-year cumulative funding level for Energy Optimization programs in Michigan is $418,088,780. The three-year cumulative funding level can be divided into three categories: $138,114,379 for residential (excluding low-income) programs, $208,105,947 for commercial and industrial programs, and $70,325,612 for low income programs.



C&I Split for Consumers Energy



C&I Split for Detroit Edison and MichCon



General Motors Corporation
Incentive from Consumers Energy

- Awarded $97,000 to Flint's GM Plant for Lighting Upgrades.

MICHIGAN TURKEY PRODUCERS CO-OP INC.

Incentive from Consumers Energy

- 4.5 Million birds processed per year
- $180,000 in rebates from Consumers
- Installed and replaced lighting in building.
- Improved efficiency and improved working conditions and made it easier for workers to spot defects while working.

General Motors
Incentive from Detroit Edison

Jerry S. Mendoza/Associated Press
General Motors' Orion Assembly plant in Lake Orion, Mich.

General Motors/Orion Assembly Incentive from Detroit Edison

The plant project involved replacing 2,610 high-intensity discharge 465 watt fixtures to a six lamp T8 fluorescent fixture using 235 watts. Following installation of the lighting upgrades, DTE Energy presented the plant with an incentive rebate of $150,000.

Michigan C&I Success Story: Consumers Energy

- $8.6 million in incentives so far this year to help nearly 1,700 Michigan businesses.
- Reducing energy costs by $9.1 million per year over projects lifecycles.

- Saving 81,629,805 kWh of electricity and 121,239 Mcf of natural gas annually.
- That’s enough electricity to serve about 9,070 residential customers, and enough natural gas to serve more than 1,080 residential customers.

Industrial Sector EE Shortcomings

- Persistent energy cost control is heavily dependant upon **whole system design**, not isolated components
  - EE programs tend to focus on isolated components e.g. lighting
- Issue analogous to residential “whole house” approach vs. ala carte
- Program implementation adverse to ESCO performance contracting model
- Deep energy savings lost: lighting pays for everything else
- Difficult to go back

Industry Sector Perspectives

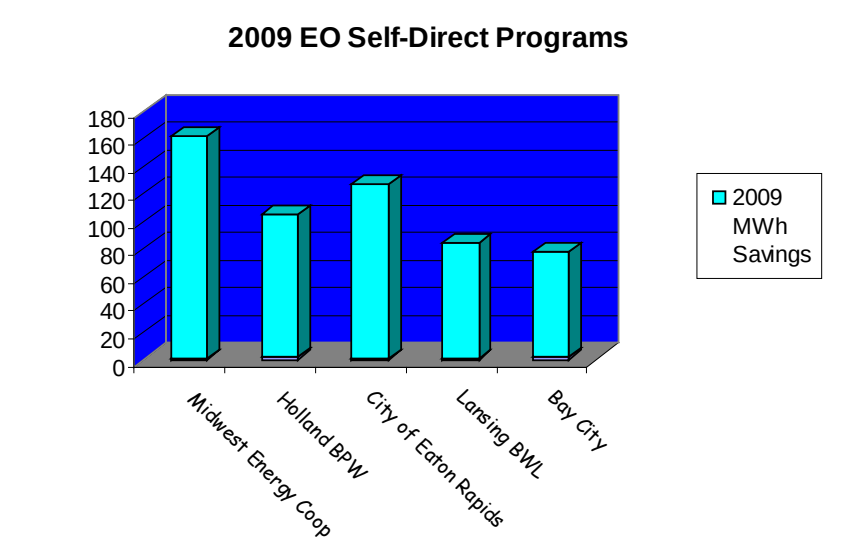
- Disconnect between industry lobbyists and plant managers.
  - Executive management insists that in order to be competitive they aggressively pursue all economic EE measures, and therefore do not need mandatory programs (public benefits fund).
  - Plant managers say they are not doing all economic EE measures - have projects in mind but can’t get funding
- Severe financial pressure on industrial sector
  - Unprecedented number of plant closings in Michigan
  - Declining asset value
  - Shrinking capital renewal allowances
  - Expensive financial models to evaluate high-performing technology
  - Short ROI desired

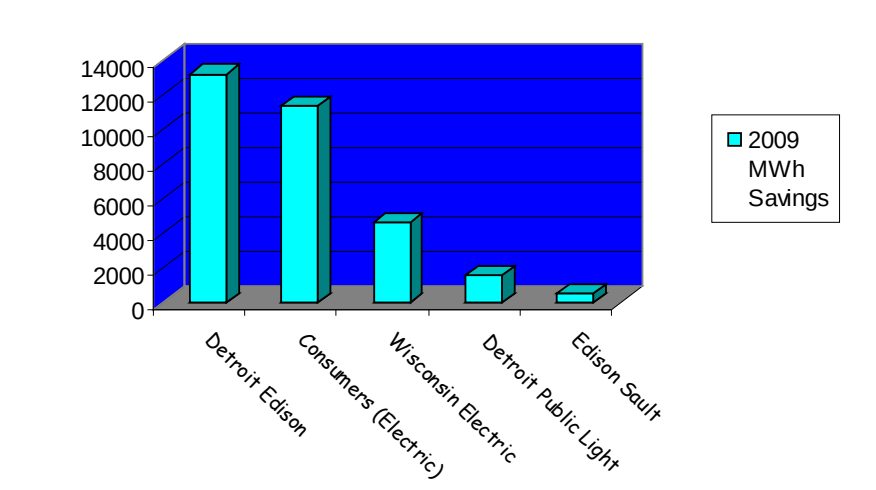
Regulatory Compromise

- PA 295 compromise: Formal self-directed energy efficiency program vis-à-vis pure opt out
  - Assumes that industry does in fact pursue energy efficiency on their own
  - Self-directed customers exempt from paying public benefits charge (except for low-income)
  - Must file brief application and biennial report
  - Limited enforcement, but PSC authority to order penalties for non-compliance.
  - Customer targets are identical to utility targets. For example, the 2012, 2013, 2014, and 2015 utility targets are 1% each year.

2009 EO Self-Directed Results

Utility	# Self-Direct Customers
Detroit Edison	26
Consumers (Electric)	31
Wisconsin Electric	5
Detroit Public Lighting	3
Edison Sault	4





Utility	# Self-Direct Customers
Midwest Energy Co-op	1
Holland BPW	2
City of Eaton Rapids	1
Lansing BWL	1
Bay City	2
Tri-County Electric Co-op	1

Note: 77 Self-Direct customers state-wide

C&I Self-Direct Energy Efficiency Analysis

- Targets are identical to utility targets which are based on statistical averaging.
- Utility programs sample a small portion of the customer population each year, thus utilities are able to achieve a consistent annual energy savings reduction over many years.
- Improvements are lumpy; one improvement can far exceed that year's target leaving subsequent years with no savings.
- Multi-year targets cannot be aggregated, e.g. 4% in 2012, and zero in 2013, 2014; and 2015 vs. 1% each year
- Carry-over limit: up to 1/3 of the current year's target may be met by excess savings from the previous year.
- This has caused companies to go after "low hanging fruit" which is easy and achieves the targets for the first few years but may cause them to lose resources in the long run.
- Thus, the long-term viability of the program is uncertain

Self-directed Options

- Michigan is exploring the possibility of having EO credits to buy, sell and trade
- Similar to renewable energy credit (REC) trading
- Voluntary involvement for customers
- Customer revenues could offset project costs

Fuel Switching

- Energy Efficient Fuel-Switching White Paper
  - Particular emphasis:
    - Ground sourced heat pumps (GSHP)
    - Air-to-air heat pumps
    - Solar Thermal
    - Commercial and industrial fuel-switching technologies

Gas Transport

- Limited in funding and the customers do not like it
- Not much money available for programming
- Industry argues they are wholesale customers not retail, and thus not subject to EO surcharges

DOE Industrial Utility Webinar

State Policies to Promote Utility Energy Efficiency Programs

Todd Currier

Community Business Programs,
Engineering and Fiscal Division Manager

December 7, 2010

WASHINGTON STATE UNIVERSITY
EXTENSION ENERGY PROGRAM

Washington State University Extension Energy Program

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Mission: To advance environmental and economic well-being by providing unmatched energy services, products, education and information based on world-class research

Presentation Outline

- Major Policy Initiatives – Washington State
- WSU Industrial Services
- National-Level Policy Activities

Washington Clean Energy Initiative - I937

- Requires major electric utilities get 15% power from new renewable resources by 2020 and capture all available cost-saving energy efficiency throughout utility service territories
- Large customer challenge

Washington State Energy Strategy – *Industrial Energy Efficiency*

- Federal-Coupled Recognition Program
- Streamlined Permitting of Combined Heat & Power (CHP) Projects

WSU Industrial Services

- Settlement Funds
- Resources: technical assistance, assessments, training, incentive funds to help “tip the scales”
- Leveraged Approach – Extensive Stakeholder Network, including public and private utilities

Successful Collaborations

- Puget Sound Energy, Cascade Natural Gas, Avista Utilities, PacifiCorp (IOUs)
- Public Utilities (most all in state w/ industrial load)
  - Tacoma Power
  - Clark Public Utilities
  - City of Port Angeles

State Energy Efficiency (SEE) Action Network

Goals

- 40 GW new CHP by 2020
- 2.5% annual reduction in industrial energy intensity

www.seeaction.energy.gov

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For More Information:

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For answers to additional questions, please email Jaime Redick at jredick@bcs-hq.com.

Utility Partnerships Webinar Presentations are posted on the ITP Utility Partnerships Resources and Tools webpage:

http://www1.eere.energy.gov/industry/utilities/

Follow the above link to register for upcoming webinars.

The next webinar is on
Financing Utility Energy Efficiency Programs,
January 4, 2010 from 12-2pm EDT.