Industrial Energy Efficiency Workshop

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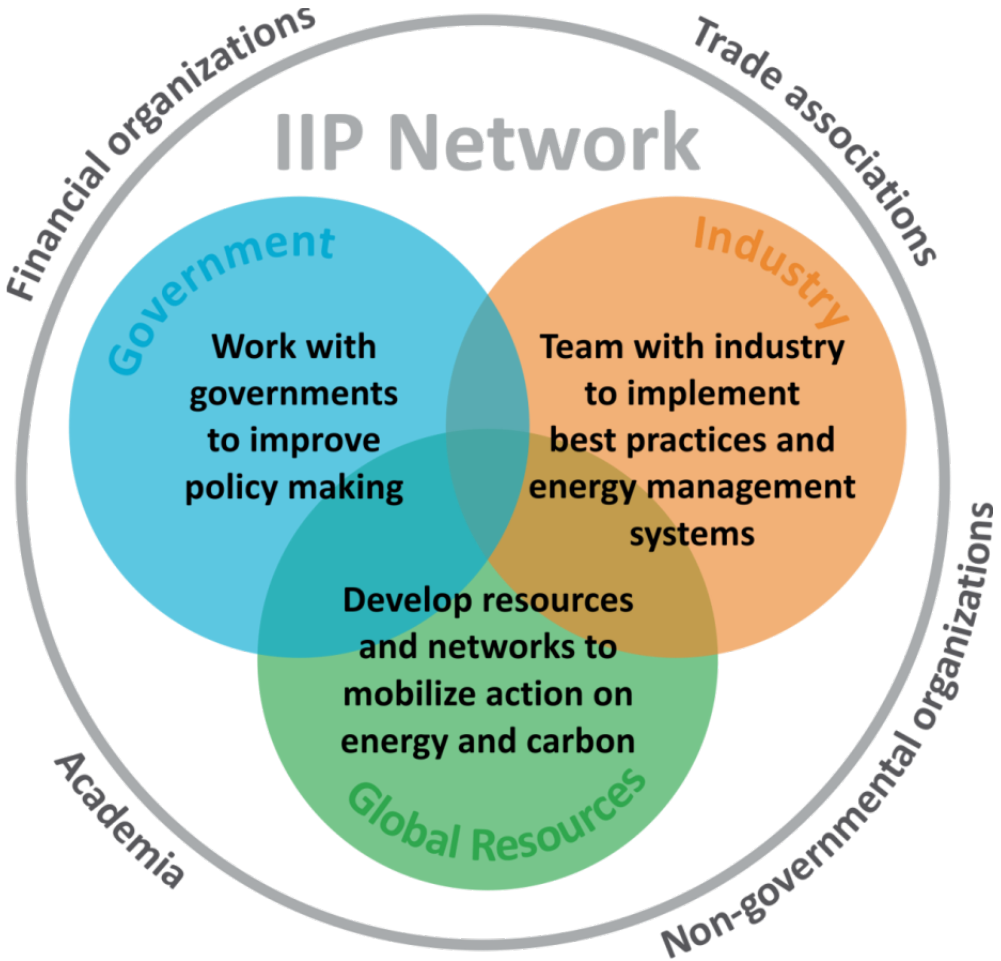
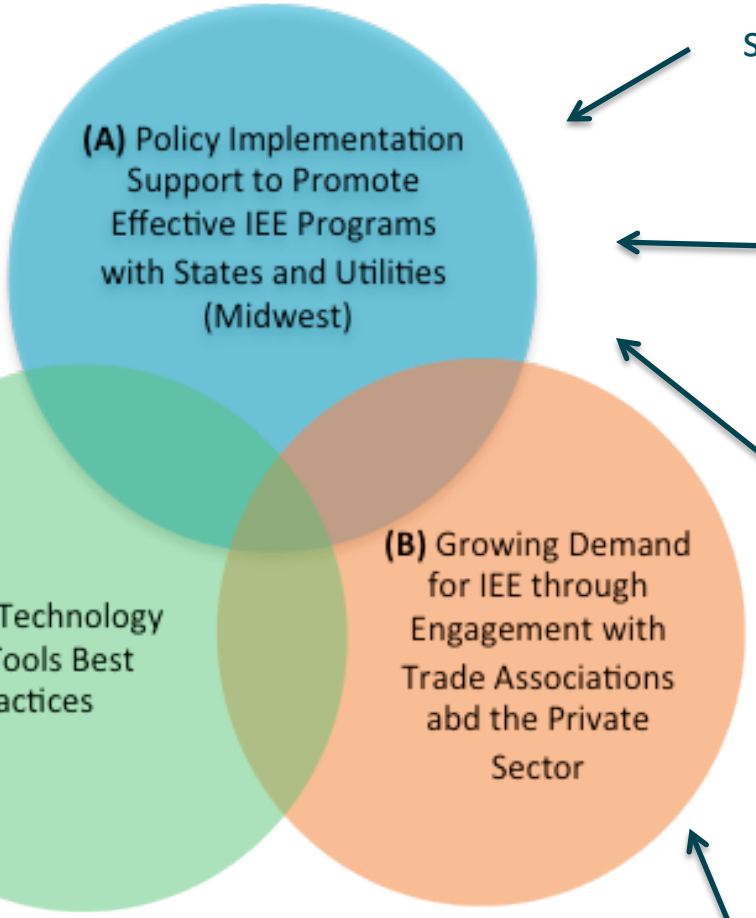


IIP's US work program



IIP collects examples of how and why IEE programs have been successful

IIP supports the SEE Action Network in IEE best practices and demonstrating the value of IEE to states, utilities and industries

IIP shares information on the opportunity for manufacturers in the Clean Power Plan

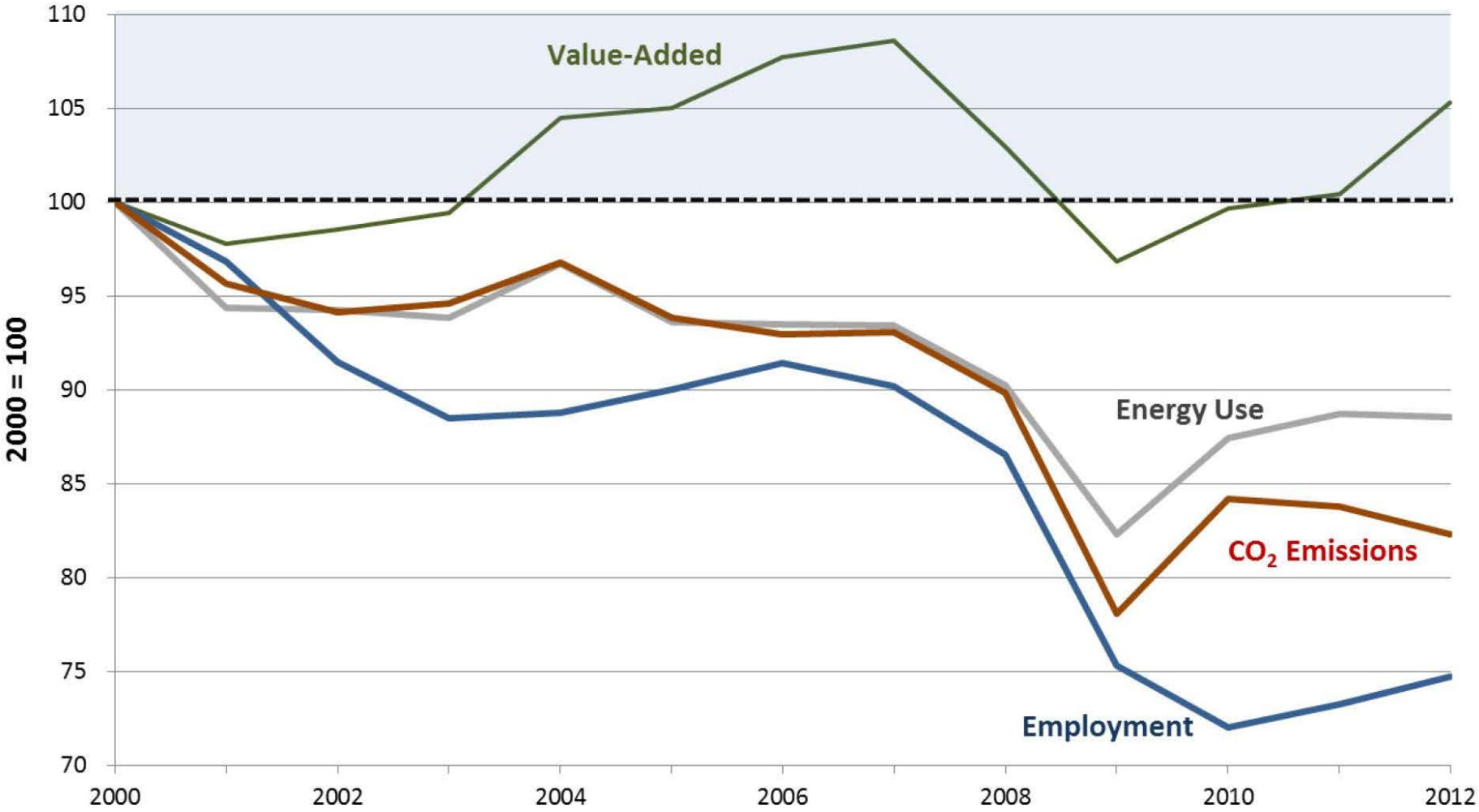
IIP engages manufacturers to improve EE and collect input into how programs could be best designed around industry needs

IIP Resource Library

IIP Technology Database

IIP collects examples of industrial companies that have benefited from IEE and IEE programs

U.S. Industry is Growing More Lean



Source: EIA, 2013; BEA, 2013; BLS, 2013.

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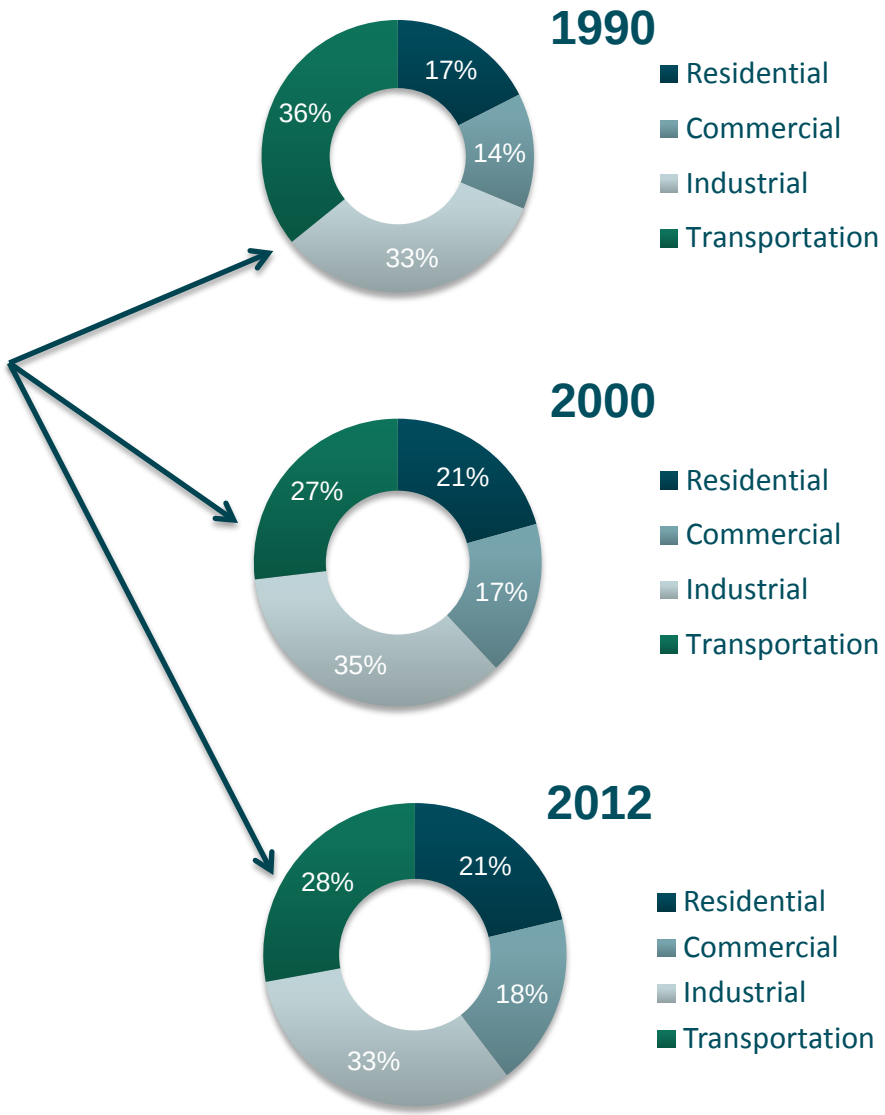
However, Industry is still the largest energy user

The industrial sector:

- Consumes more energy than any other sector and accounts for **~1/3 of all end-use energy**
- Remains the largest energy user even though industrial efficiency continues to improve
- Will consume **38% of all end-use energy in 2030**



Source: Energy Information Administration Annual Energy Outlook 2014

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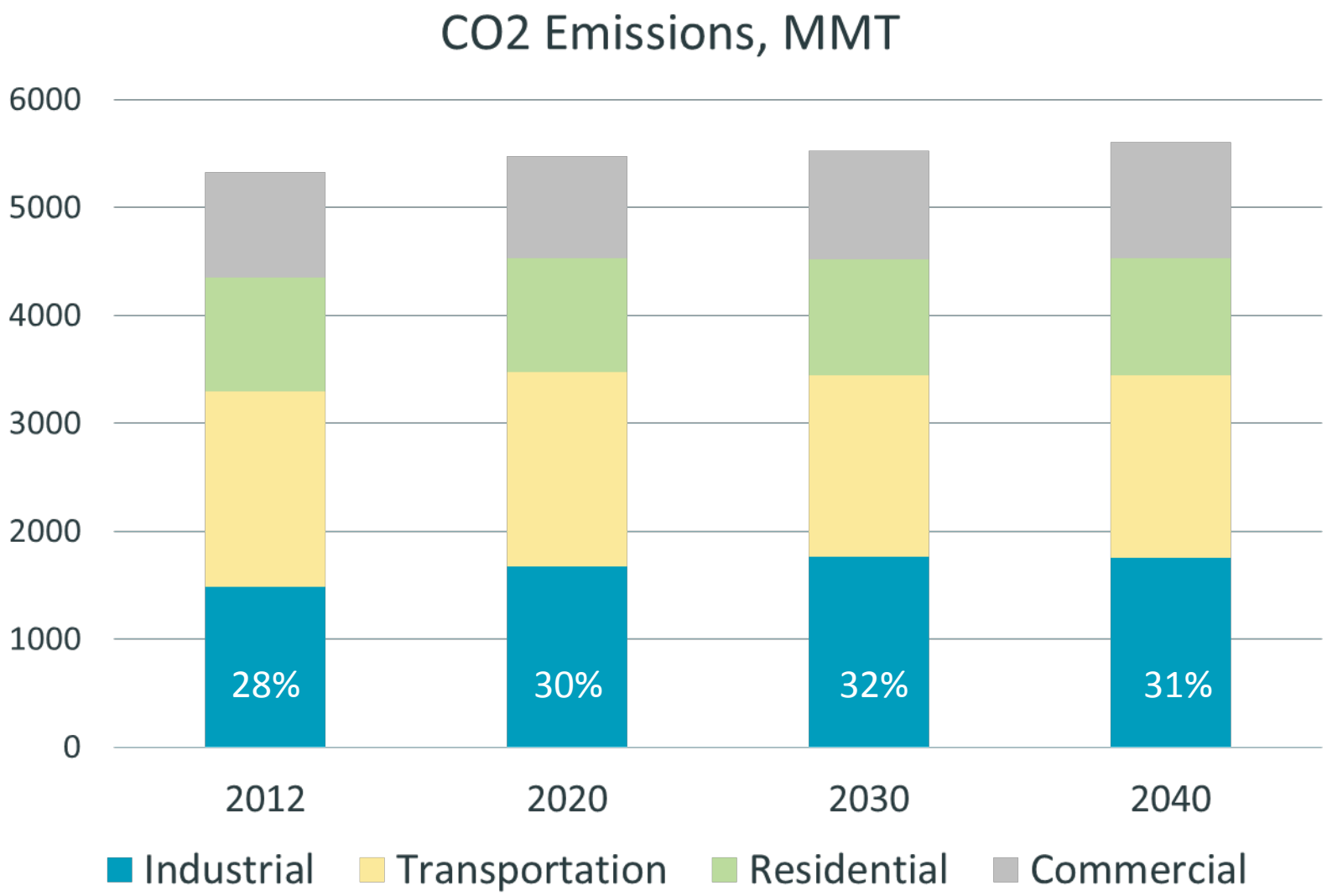
…and will be the Largest Source of CO_2 Emissions in 2040



Source: Energy Information Administration Annual Energy Outlook 2014

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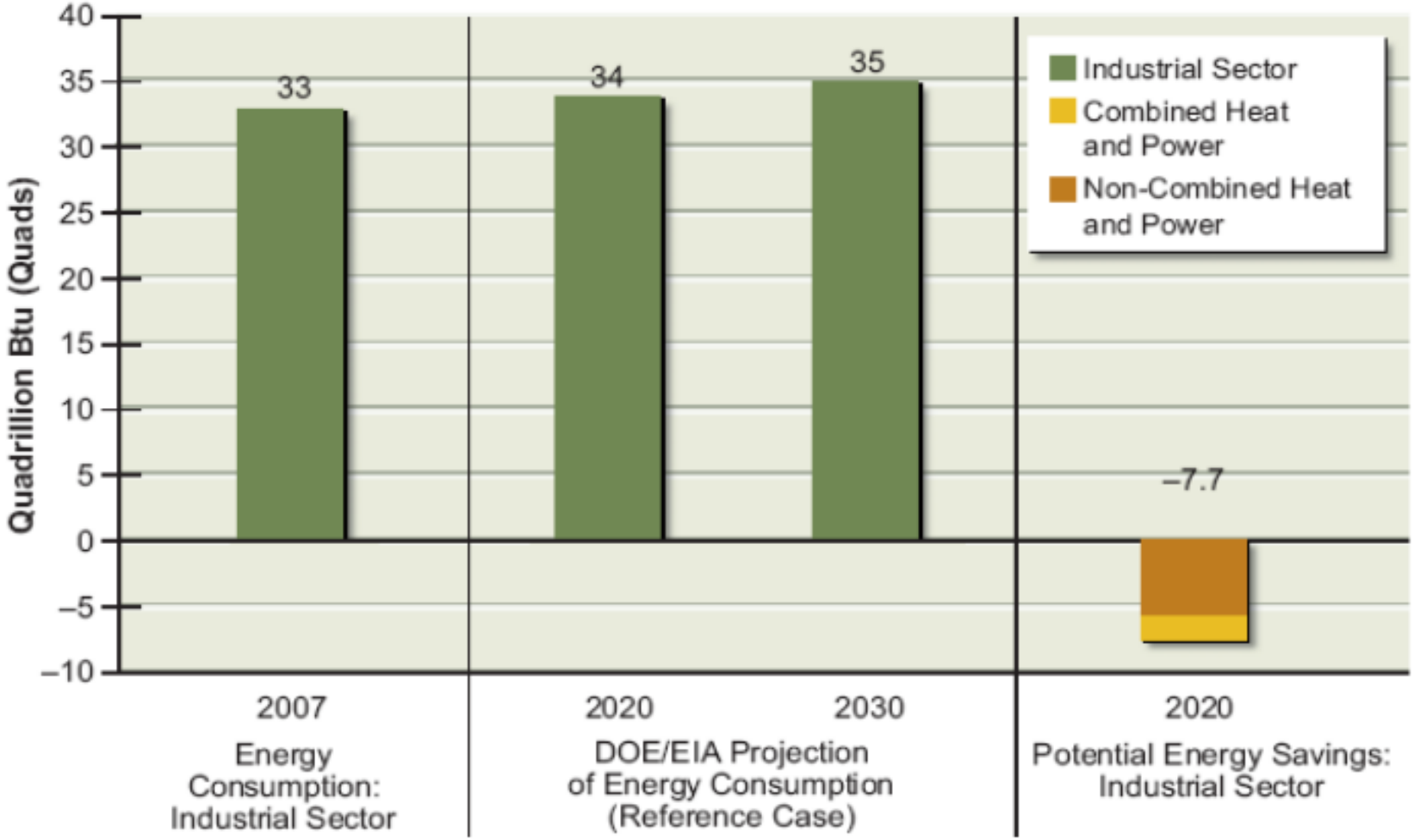
Industrial Energy Use can be Reduced by over 20% through Cost-effective Energy Efficiency Measures



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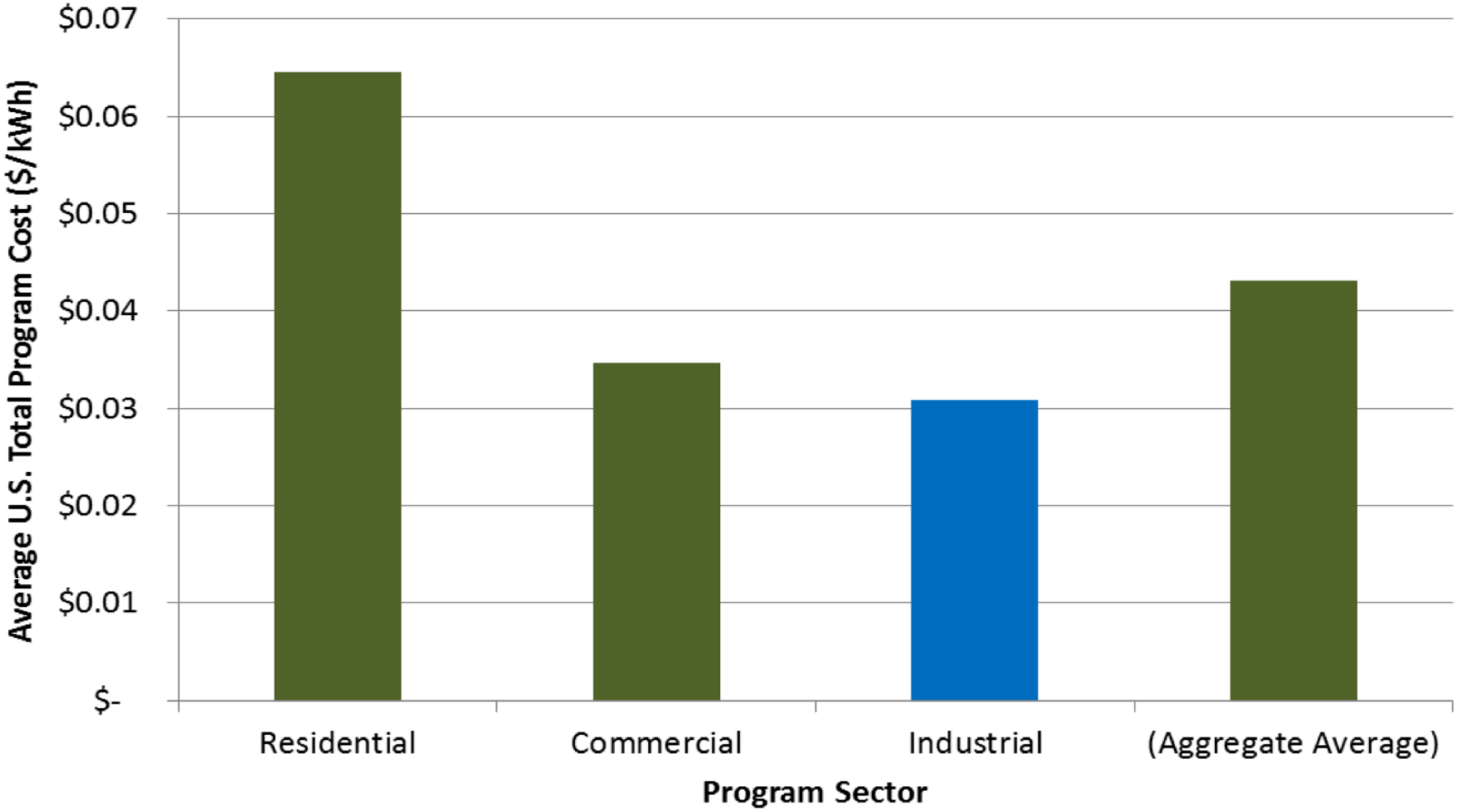
Source: National Research Council 2010.

Industrial Efficiency is the Most Cost-effective EE Option

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

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Energy Efficiency Improves Manufacturers' Bottom Lines

- A typical manufacturing company in North America can save between 10% and 30% of direct energy costs in 3 years with energy efficiency.

- Manufacturing facilities realize energy efficiency improvements of 10% or more with corresponding cost savings and financial paybacks of 2 years or less when they implement basic operational and maintenance improvements.

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Potential in Minnesota's Manufacturing

Energy savings and technology opportunities for Minnesota's manufacturing sub-sectors

Source: MnTAP 2010 Energy Conservation Market Analysis

Sector	Sub-Sector	Estimated Thermal Savings	Estimated Electrical Savings	Energy Efficient Technologies Identified for the Sub-Sector
Chemical Manufacturing	Ethanol Production	20%	11%	Boiler best practices, corn fractionation, motor and pump improvements, anaerobic digestion of thin stillage
	Pharmaceutical Manufacturing	18%	16%	Heat recovery opportunities, equipment and piping insulation, process controls, adding adjustable speed drives
Fabricated Metals	Machine Shops	15%	9%	Compressed air system improvements, boiler tuning and best practices, fan and paint ventilation optimization
	Sheetmetal Fabrication	24%	15%	Process heat system optimization, reduction in cure time and overheating, compressor control and intake modification
Food Processing	Poultry Processing	11%	15%	Steam, boiler, and equipment best practices; heat recovery; refrigeration improvements; motor opportunities
	Commercial Bakeries	10%	16%	Direct fired best practices, boiler blowdown heat recovery, thermal oxidizer improvements, cooling improvements
Primary Metals	Steel Products	20%	15%	Flue gas optimization, furnace optimization, process control improvements, waste heat recovery
	Aluminum Operations	14%	19%	Iso thermal melting technologies, reverberatory furnace improvements, insulation installation and improvements

Potential in Minnesota's Food Processing Sub-Sector

Sub-sector	# of Facilities	Gas			Electricity		
		Total Use (therms)	Remaining Potential Savings * (therms)	Est. Savings (%)	Total Use (kWh)	Remaining Potential Savings * (kWh)	Est. Savings (%)
Cheese and Butter Processing	22	11,348,282	1,017,200	9.0%	76,246,307	10,510,200	13.8%
Poultry Processing	24	10,903,658	903,200	8.3%	108,000,000	16,200,000	15.0%
Rendering	4	10,766,071	1,155,300	10.7%	24,948,375	1,532,800	6.1%
Dried Foods	10	9,506,837	110,000	1.2%	6,357,072	833,700	13.1%
Fruit and Vegetable Canning	14	7,126,977	372,500	5.2%	26,910,996	2,703,900	10.0%
Soybean Processing	2	3,304,160	450,000	13.6%	21,509,620	1,112,100	5.2%
Meat Processing (not poultry)	19	1,437,624	26,200	1.8%	83,622,144	8,942,000	10.7%
Margarine Manufacturing	1	422,316	65,700	15.6%	10,182,948	441,800	4.3%
Bakeries	31	341,488	64,400	18.9%	51,000,000	7,650,000	15.0%
Food Processors w/ Water Heating	44	330,416	42,200	12.8%	-	-	-
Seafood Processing	3	-	-	-	14,323,582	459,700	3.2%
Citric Acid Production	1	-	-	-	4,534,200	324,300	7.2%
Sunflower Seed & Rice Proc.	2	-	-	-	13,521,747	943,600	7.0%
Snack Chip Manufacturing	1	-	-	-	10,951,560	876,100	8.0%
Pet Food Manufacturing	1	-	-	-	10,654,189	625,700	5.9%
TOTAL	**179**	**55,487,829**	**4,206,700**	**7.6%**	**462,762,740**	**53,155,900**	**11.5%**

* *After facility specific rebates were subtracted where provided.*

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MnTAP Minnesota Technical Assistance Program
University of Minnesota

Purpose of this workshop

1. Provide recommendations to MN state agencies and utilities on the design and implementation of programs
2. Identify types of information resources that would be of value
3. Share information on available resources and programs
4. Networking, peer-to-peer exchange and shared learning

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AgriGrowth™ Growing MN Food & Agriculture™

MWFPA Midwest Food Processors Association, Inc.

Get in touch

Contact

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Visit our website for IEE information resources:

- SEE Action Network Guide: Industrial Energy Efficiency: *Designing Effective State Programs for the Industrial Sector* (March 2014)
- SEE Action Network White Paper (November 2015)*: Sustained Energy Savings Achieved through Successful Industrial Customer Interaction with Ratepayer Programs*
- www.iipnetwork.org

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