Demand Response and EPA's Clean Power Plan: "Industrial Perspective"

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Industrial Energy Consumers of America (IECA)
The Energy Voice of Industrial Energy Consumers

Industrial Energy Consumers of America

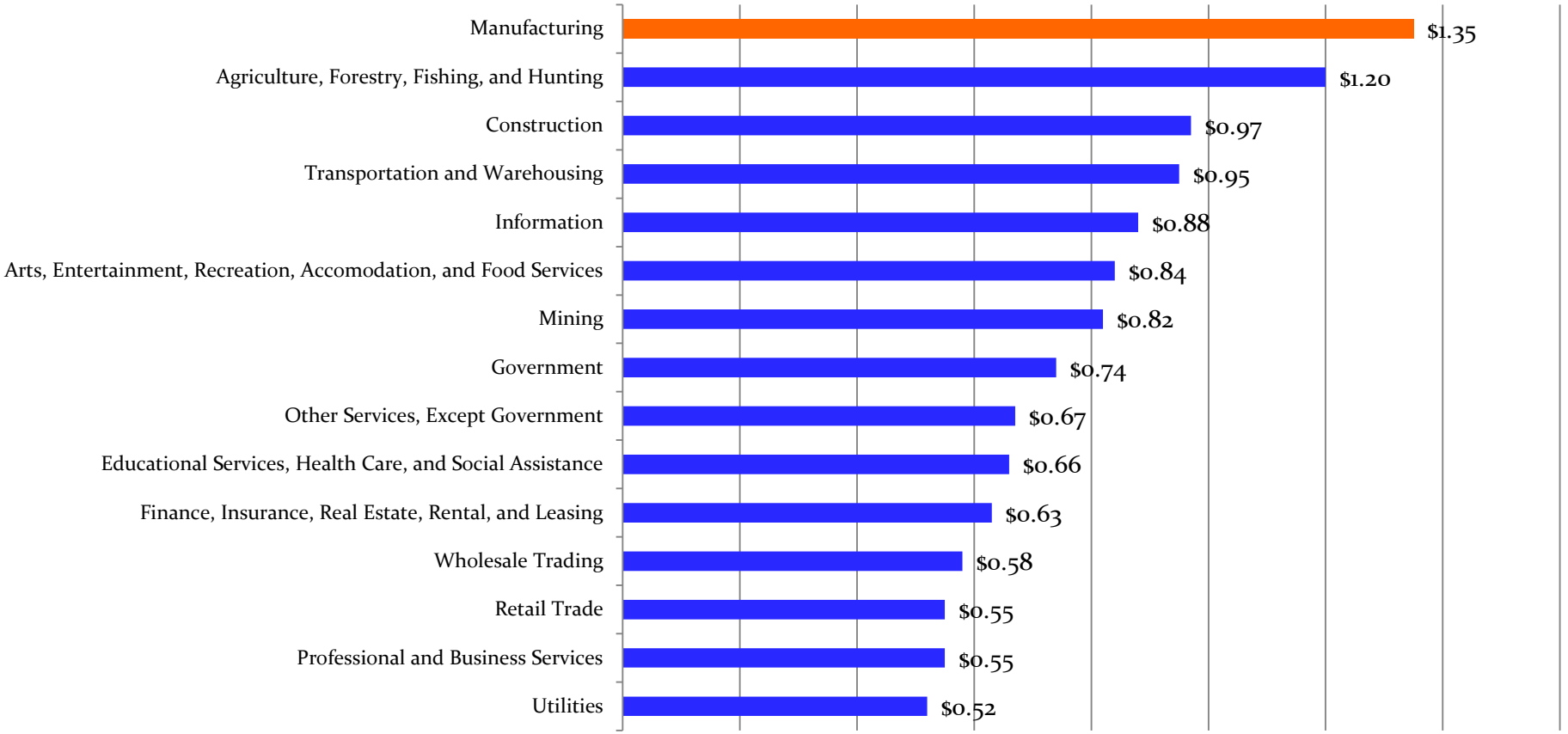
- The Industrial Energy Consumers of America is an association of leading non-partisan manufacturing companies with $1 trillion in annual sales. More than 1.2 million employees.
- Focused exclusively on availability, use and cost of energy and power.
- IECA membership represents a diverse set of mostly energy-intensive industries including: steel, iron ore, aluminum, commodity and specialty chemicals, fertilizer, paper, refining, food processing, glass, cement and plastics.

Manufacturing is Important to U.S. Economy

- Contributed $2.09 trillion to the economy.
- 12.0 percent of GDP.
- Supports 17.6 million jobs, one in six private sector jobs (12 million direct or 9 percent).

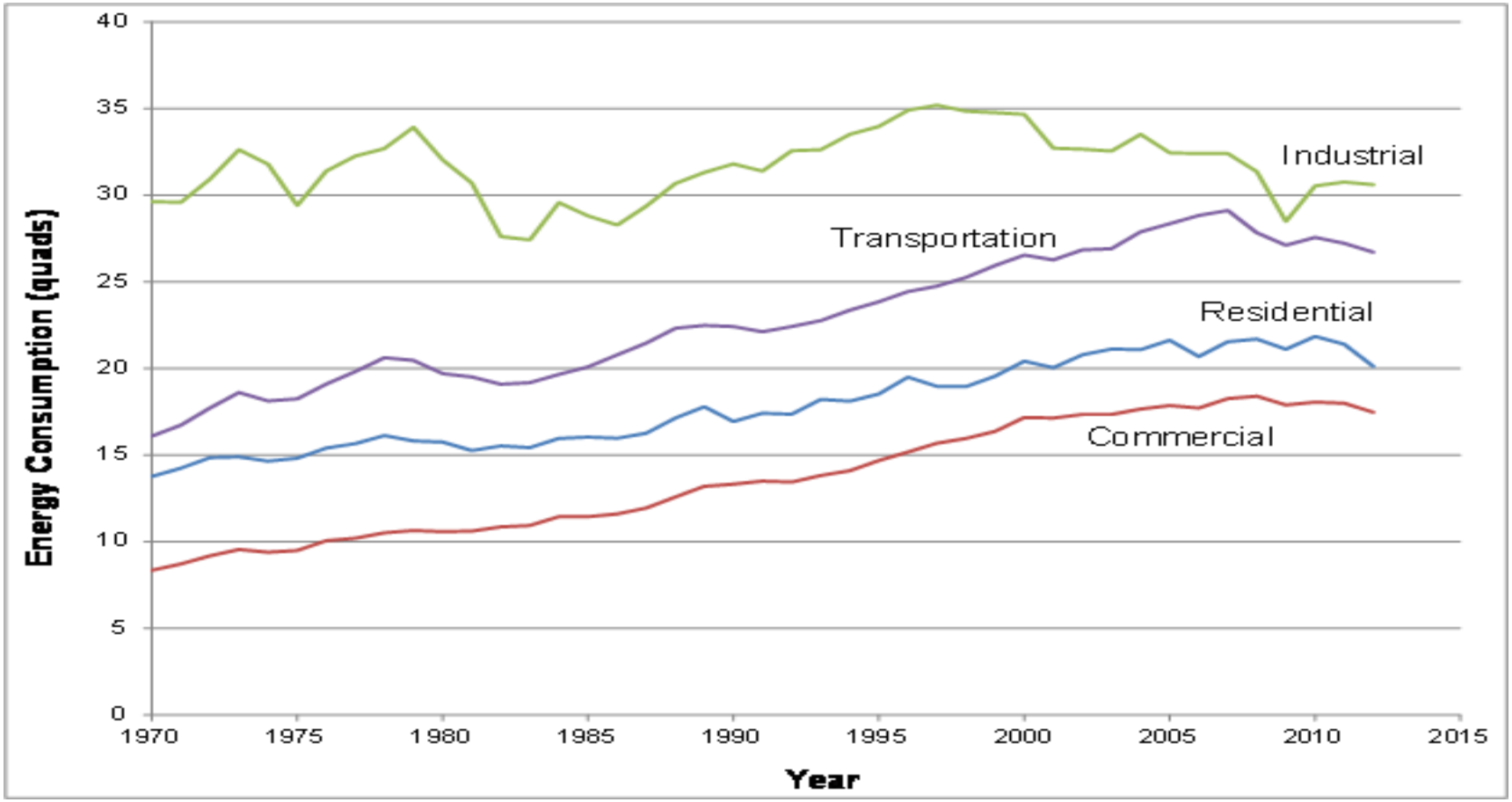
Manufacturing's Multiplier Effect

For every one dollar – returns $1.35 in indirect economic activity



Source: Bureau of Economic Analysis, 2010 Annual Input-Output Tables

A Success Story: Industrial Energy Consumption has Been Relatively Flat for 44 Years, While Output has Increased 761%



Source: Energy Information Administration, AEO 2014

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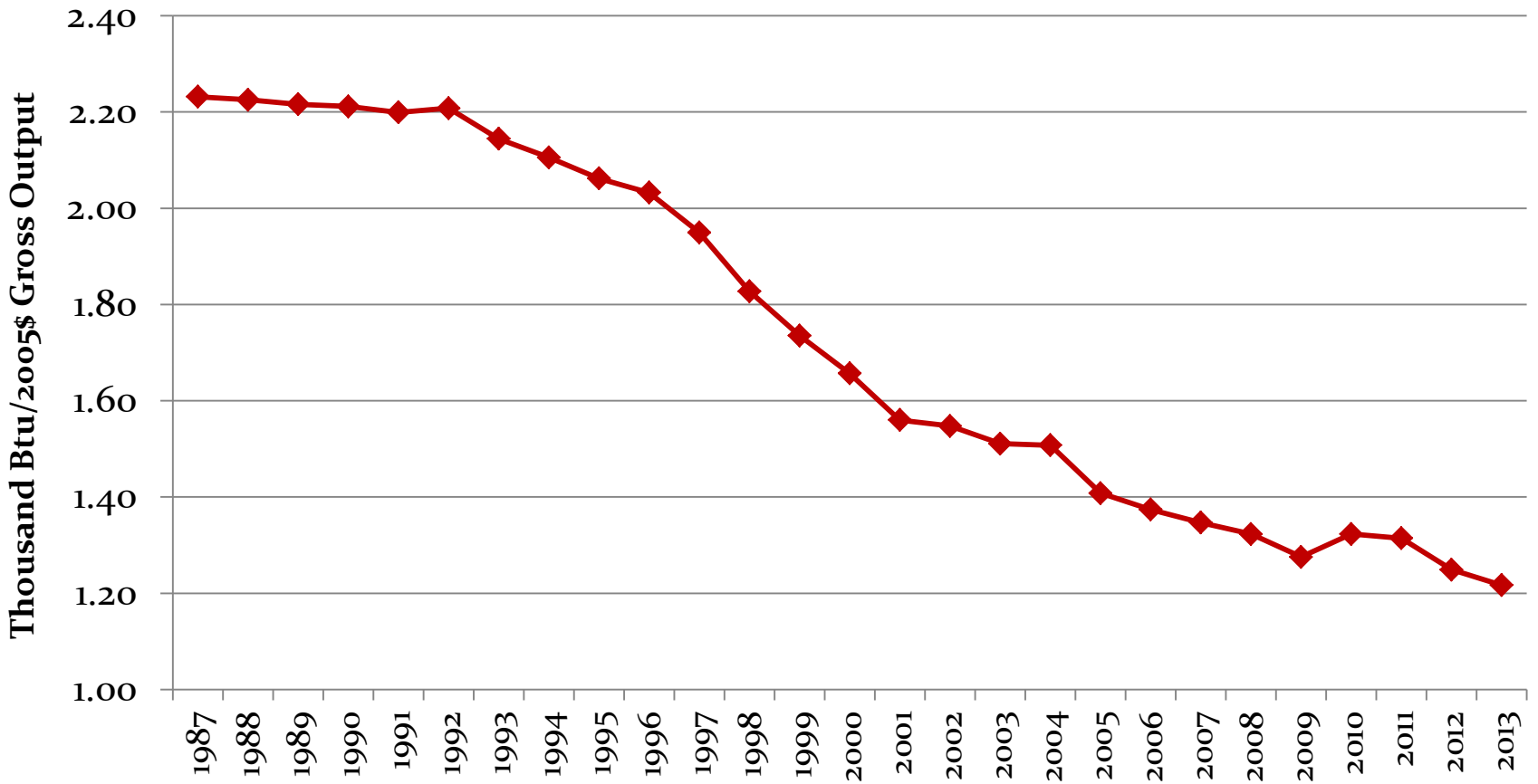
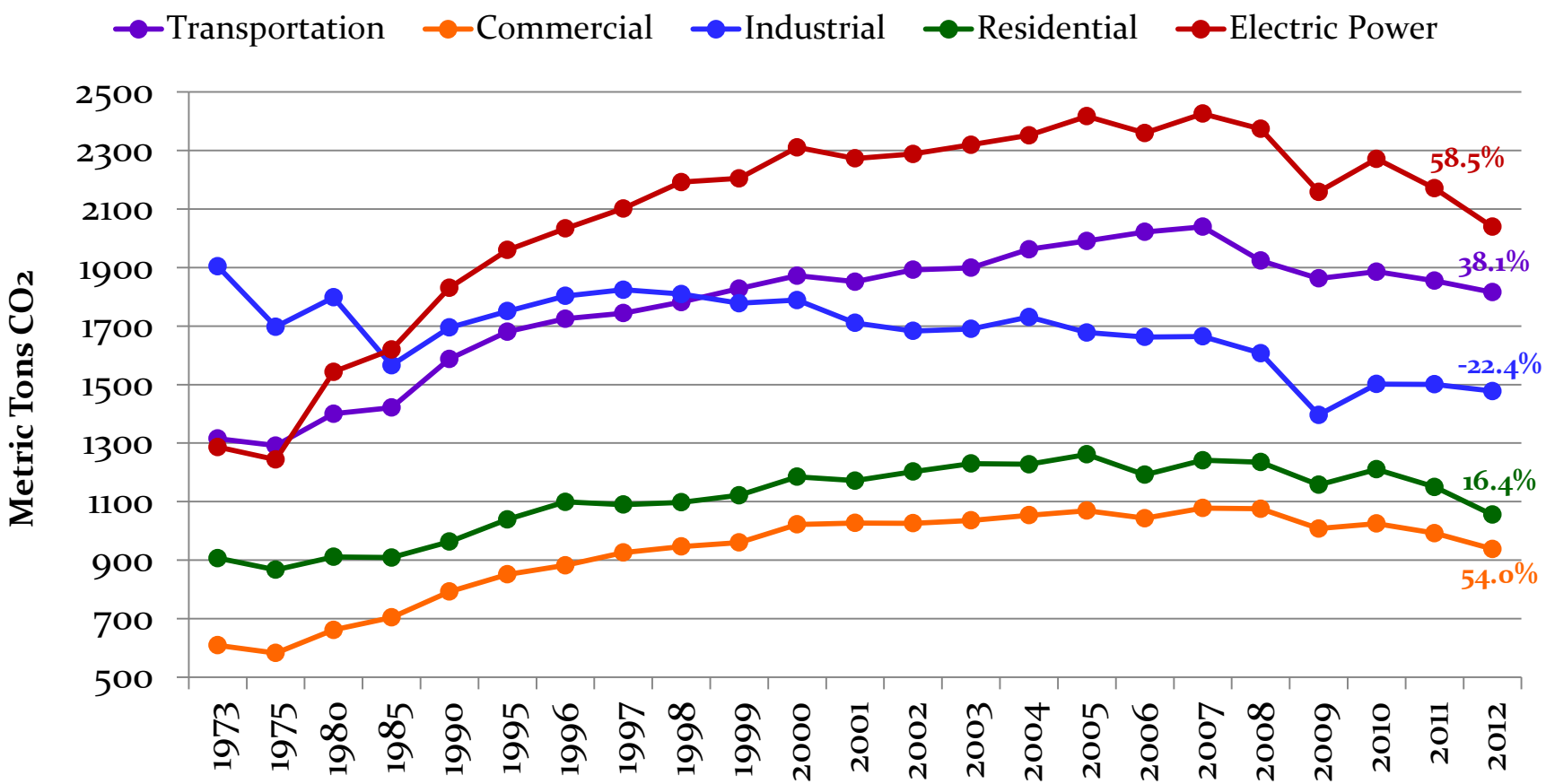
A Success Story: Industrial Energy Intensity Decreased by 46% Since 1987



Source: Energy Information Administration, Bureau of Economic Analysis

A Success Story: Industrial Sector – Only Sector with Lower CO2 Emissions than 1973 (22.4% below 1973)



Source: Energy Information Administration

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Manufacturing Use of Energy

- 26% of total U.S. electricity
- 29% of total U.S. natural gas
- 5% of total U.S. coal

- ***Energy-Intensive Trade-Exposed (EITE) industries consume 82% of the energy of the entire manufacturing sector!***

Source: Energy Information Administration

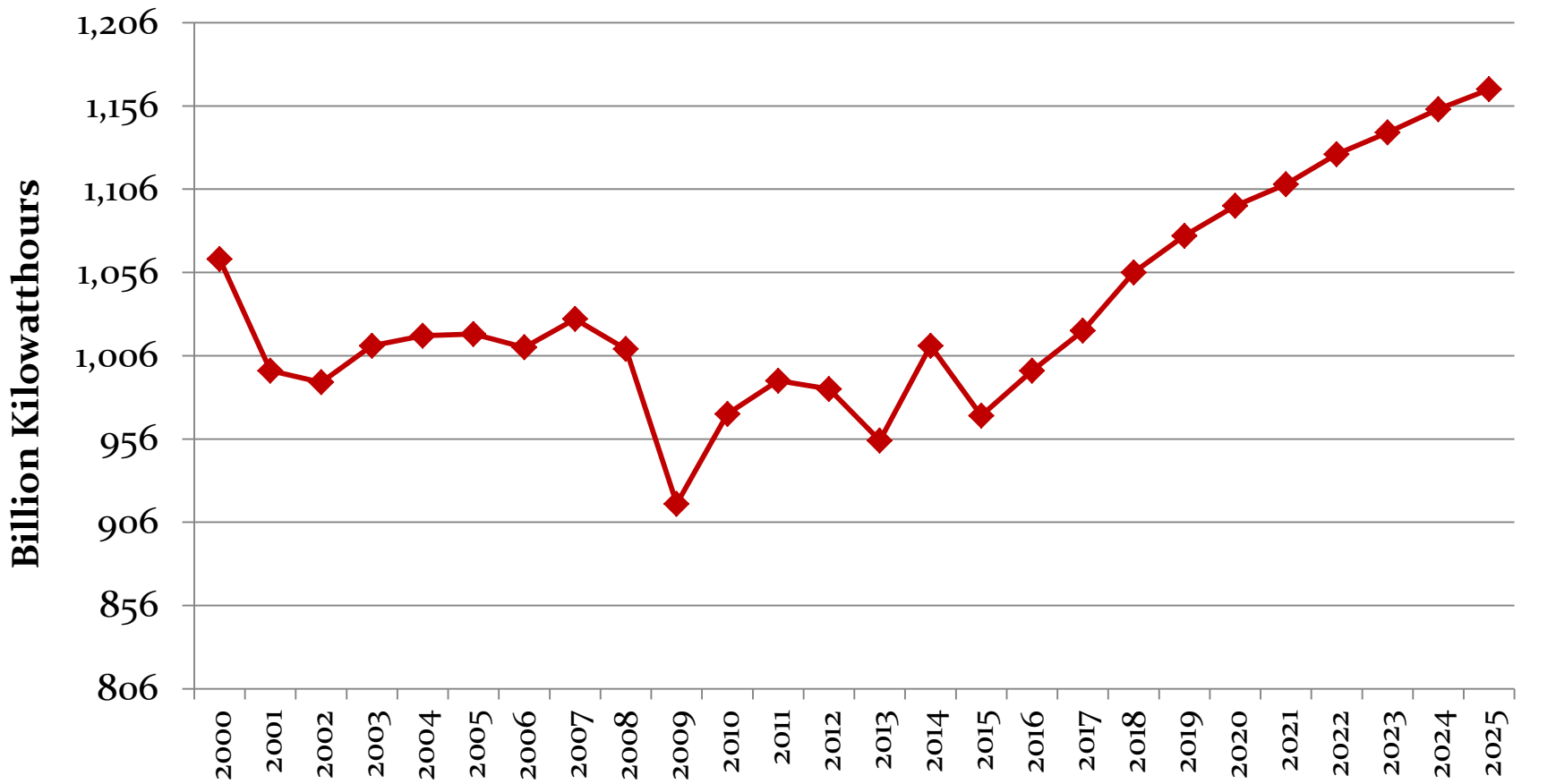
The Energy-Intensive Industrial Sector is Unique

- The only sector that requires globally competitive energy.
- Electricity and natural gas intensive.
- Compete globally and in an environment of unfair competition / Other countries subsidize energy and manufacturing.
- Unlike other sectors – shift production or relocate facilities to be competitive.

Energy Price Sensitive Products are Essential for Economic Growth

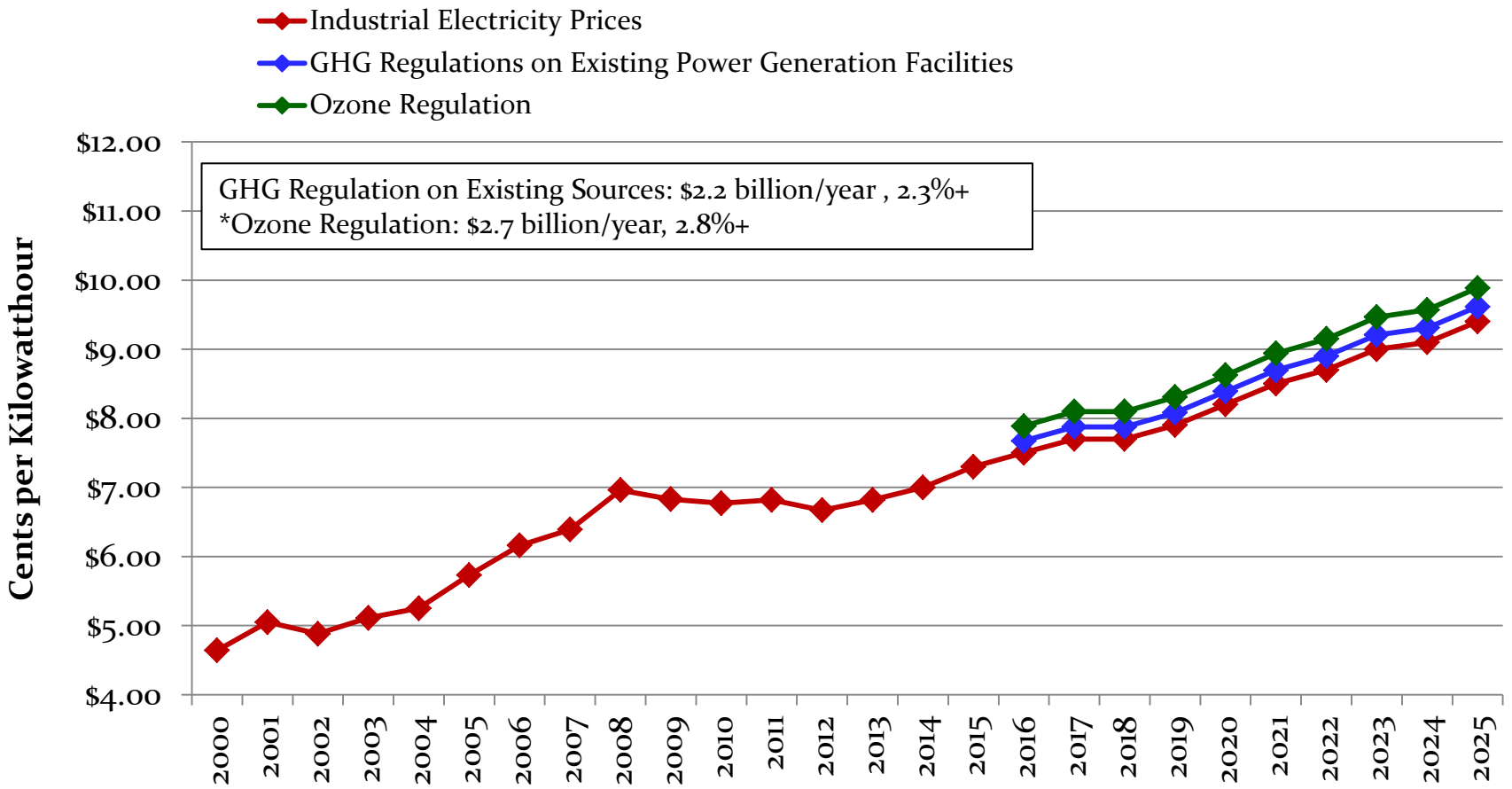
Building Block Industries	Convert to	Commercial & Consumer Products
Chemicals	→	Food Production
Plastics	→	Automobiles
Fertilizer	→	Consumer goods
Glass / ceramics	→	Construction
Steel	→	Medical Supplies
Aluminum	→	Energy Production
Pulp and Paper	→	Appliances
Cement	→	Household products
Food Processing	→	Defense industries
	→	Telecommunication

Industrial Electricity Demand
(Increases 15% from 2014-2025)



Source: Energy Information Administration, AEO 2015

Industrial Electricity Prices
(Increases 41% from 2014 to 2025)



Source: EIA, EIA AEO 2015, NERA, EPA, NAM

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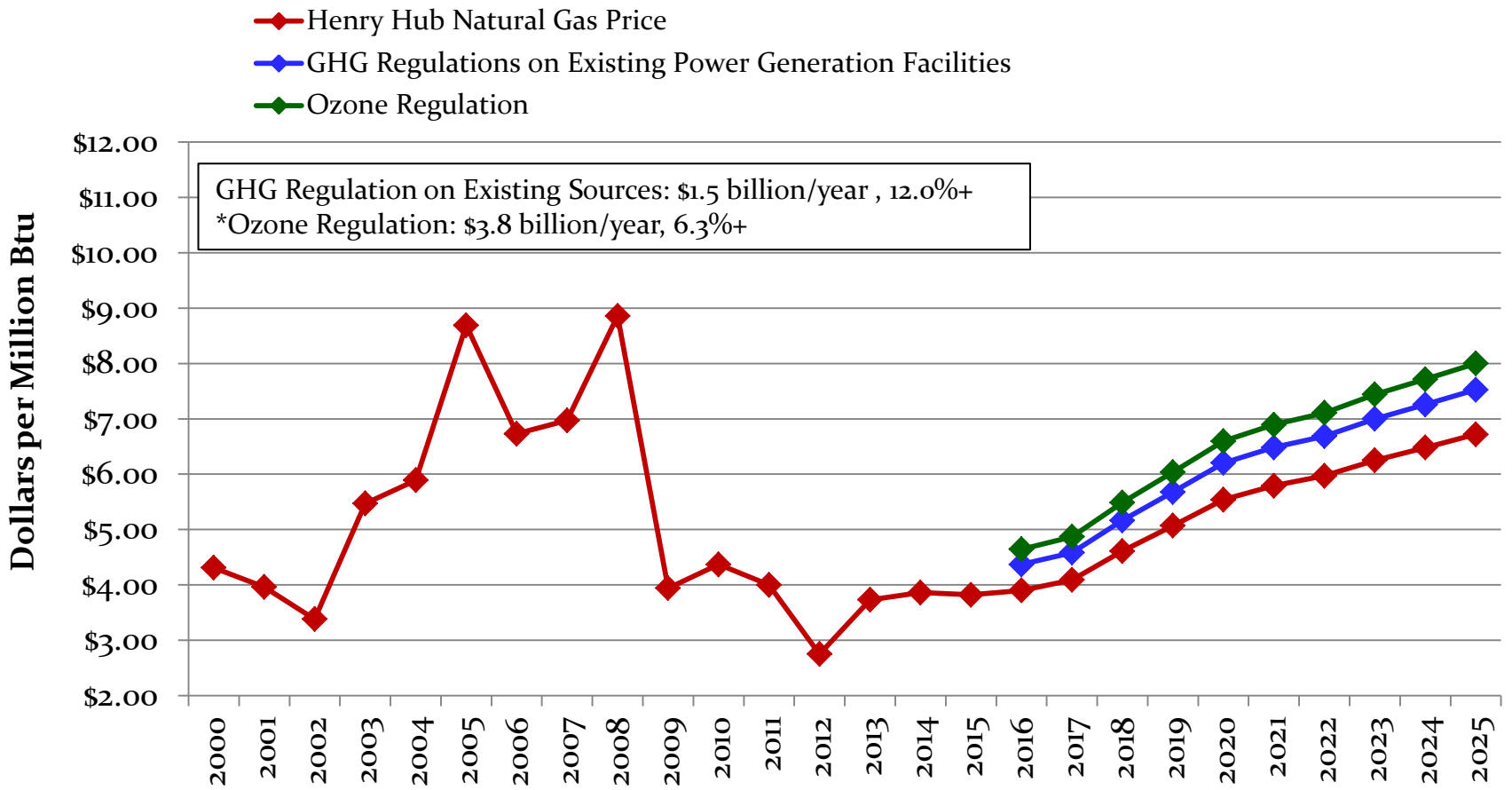
*Note: This analysis includes rules MATS, CAIR, most NSPS, and Tier 3 vehicle standards, amongst others.

Henry Hub Natural Gas Prices
(Increases 107% from 2014 to 2025)



Source: EIA, EIA AEO 2015, NERA, EPA, NAM

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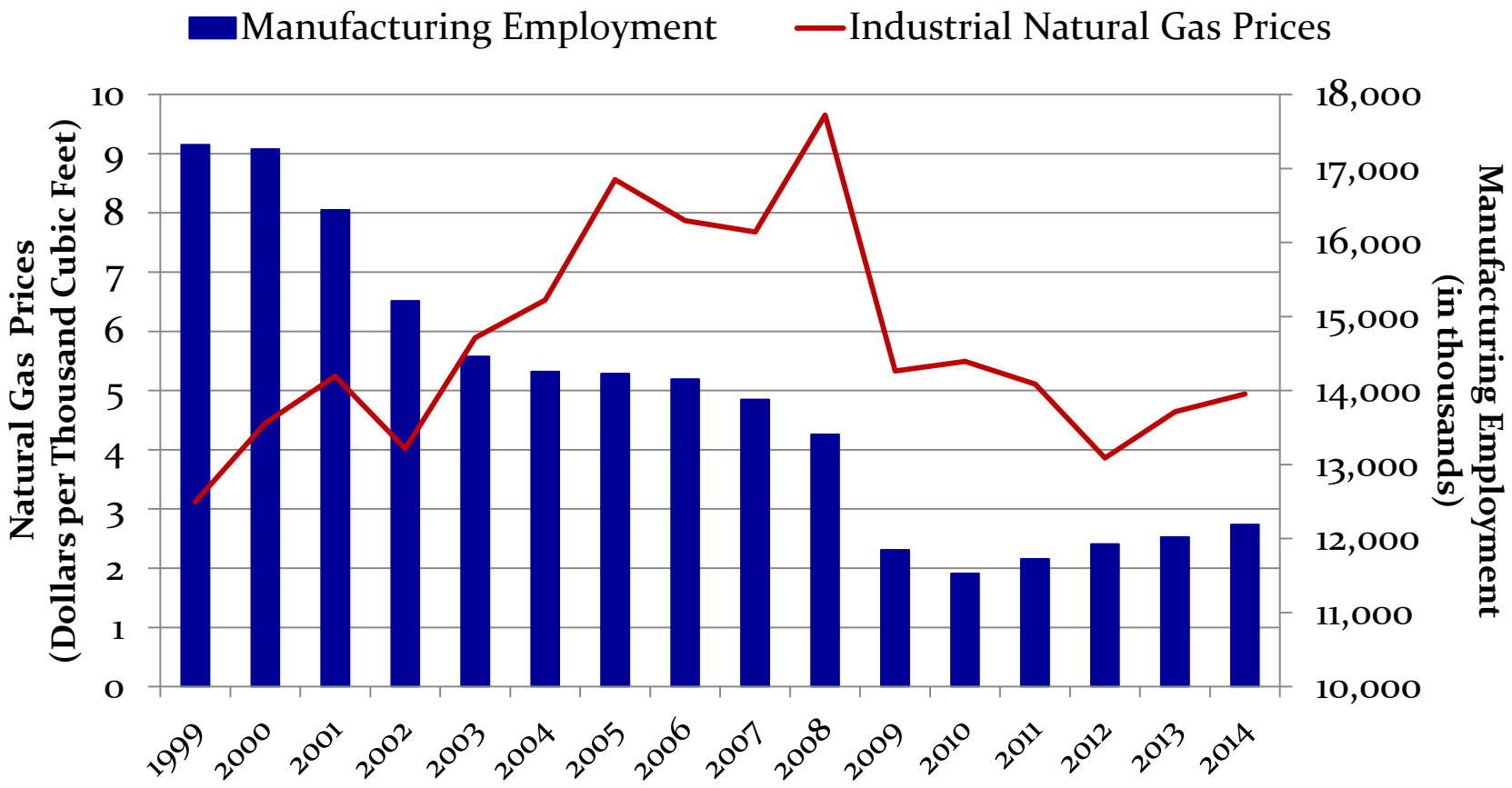
Example of Industrial Leakage: When Natural Gas Prices Increased, Manufacturing Jobs Decreased

(Natural Gas Prices Increased 209% from 1999 to 2008, or 23% a year)



Source: Energy Information Administration, Bureau of Labor Statistics

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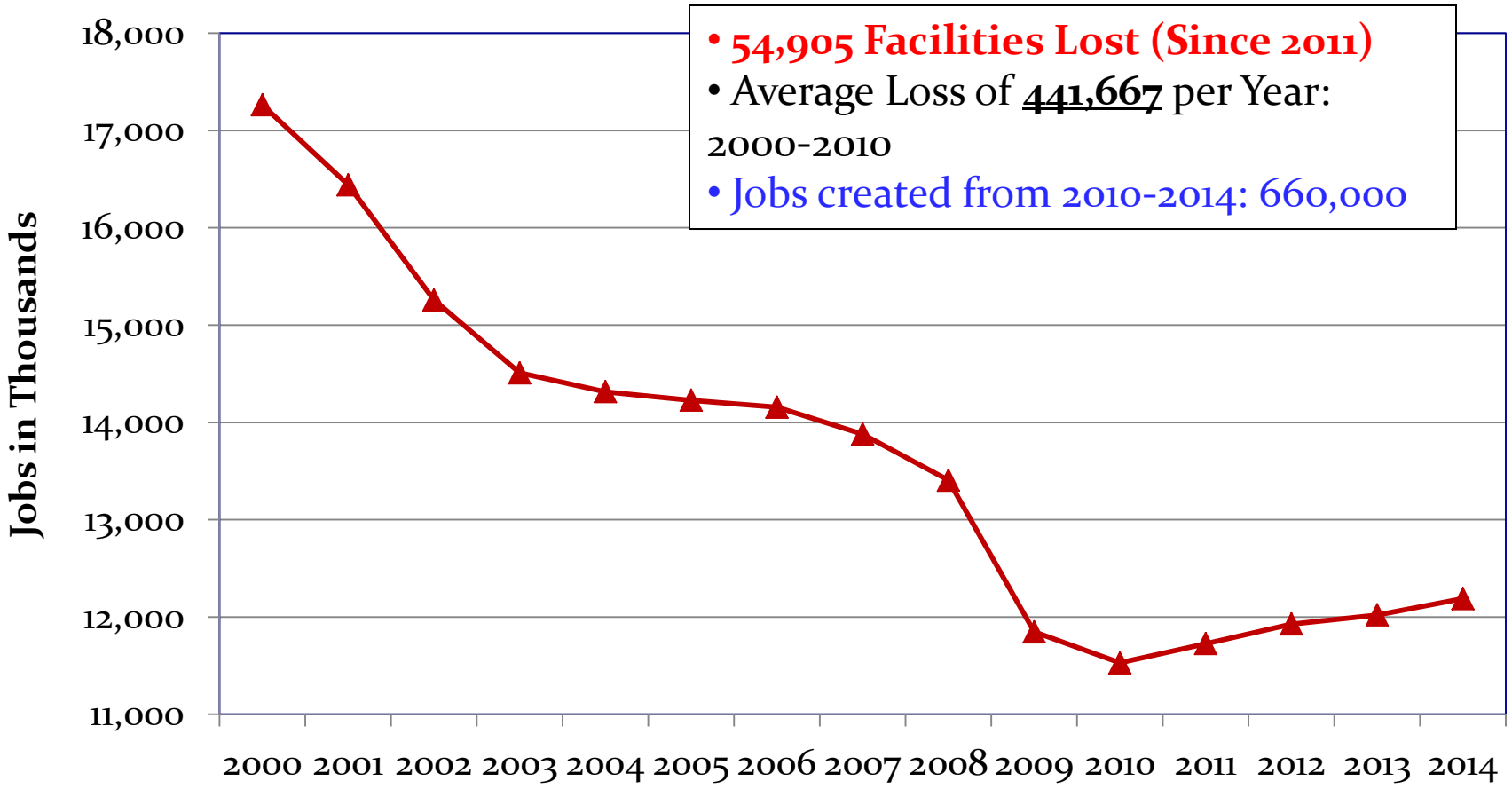
Energy Prices Significantly Contributed to the Loss of 5.1 Million Manufacturing Jobs (-29.4%)



Source: Bureau of Labor Statistics

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Industrial Perspectives on EPA's Clean Power Plan

Industrial Perspective

- A major stakeholder. Will pay up to a third of the costs of implementation.
- Urge states to partner with industrials.
- Focus is on **cost-effective** implementation and policy that will support job creation.
- *Allocation of costs is important. Allocation by volume negatively impacts high load factor industrial customers.*

If State Electricity Prices Rise…

- Industrial "GHG leakage" will occur.
- Industrials will shift production to locations in other states, reducing load, shifting GHG emissions to other states, and increasing electric rates for the remaining electric consumers.
- If industrials cannot be competitive operating in the U.S., their offshore competitors will prevail.
  - ***"A lose-lose for the economy and the environment."***

Industrial Perspectives on the CPP

- **State SIPs Filing Timing:**
  - Urge EPA to not require states to file SIPs until **after** judicial review.
    - Consumers will get stuck with all of the costs, including stranded costs.
  - Urge EPA to not require states to file SIPs until **after** there are federal model M&V rules for offset credits, energy efficiency, and renewable energy.

Industrial Perspectives on the CPP

- **CO_2 Reduction Targets:**
  - Set reduction **target** inside-the-fence line, but use outside-the-fence line reduction options if they are less expensive.
    - Outside-the-fence line reduction options should be voluntary, not mandatory.
  - Support 2005 baseline year.
- **Energy Efficiency:**
  - Opportunity is in res/comm buildings, not industrial EE.
  - Industrials must be able to opt-out and maintain ownership of EE-based reductions (RECs).
  - Use attainable EE assumptions (cost and availability).

Industrial Perspectives on the CPP

- **Support Industry & Jobs:**
  - *CPP must not set precedent for regulating industrial GHG emissions.*
  - Include a cost safety valve.
  - Include a reliability safety valve.
  - *Support ratable emission rates, allows for economic growth.*
  - Provide credit for actions already taken.
  - Consider CHP/WHP as a compliance option.
  - Exclude industrial CHP/WHP emissions from regulation under CPP.

Industrial Perspectives on the CPP

- **Support Jobs:**
  - Avoid Leakage
    - Before finalizing SIPs, complete industrial GHG leakage study to understand impact to the state economy, jobs, and GHG emissions.
    - *Seek to ensure that imported products share at least the same economic impact from CPP costs.*
  - Reduce Cost
    - Eliminate the 2020 interim target.
    - More time will reduce costs, especially stranded costs.

Energy Efficiency

Industrial Sector Has Best Record on Energy Intensity

- EIA data confirms that the industrial sector has perhaps the best record on energy intensity reduction – 46% reduction since 1987. Reasons for this include:
  - Energy-intensive industries are often trade exposed.
    - **Competition drives energy efficiency improvements**
    - ***Must continuously analyze how to cost-effectively reduce energy usage***
  - Most have professional energy, engineering, and finance staff.
  - All are experts on their processes and equipment.
  - And most have access to capital funds for energy reduction projects that meet company-specific timing, process, and ROI requirements.
- Most low-hanging fruit harvested long ago.

Industrial Energy Efficiency Policy

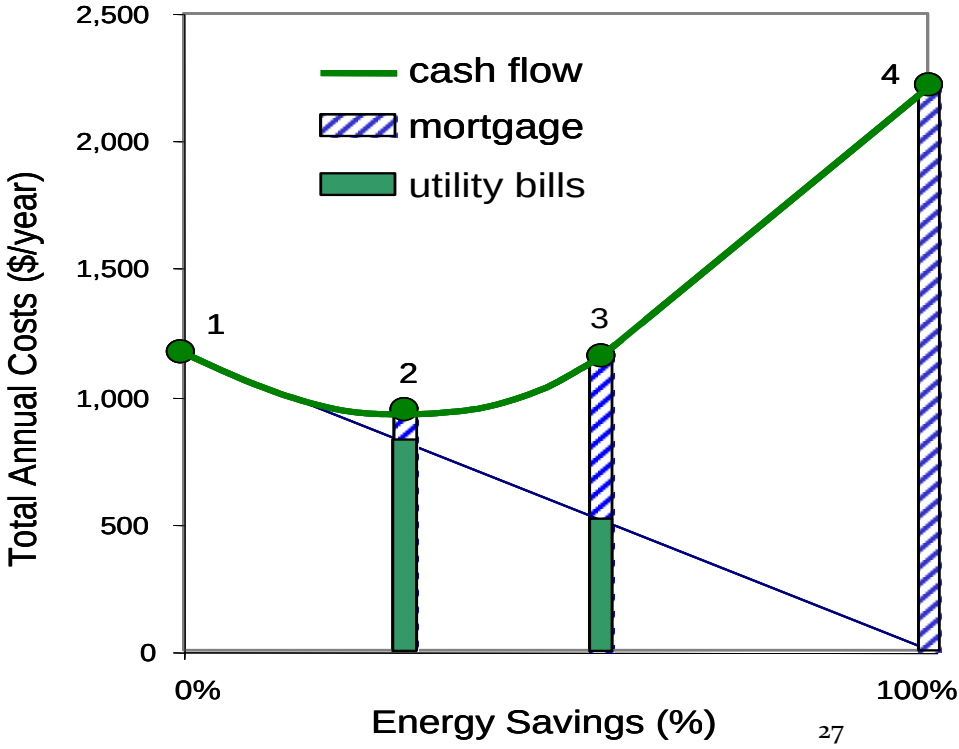
- *Must have ability to opt-out of utility rate programs including allocation of program costs*.
- Oppose mandates that would require facilities to certify as, for example, ISO 50001. (Costs $200,000 - $300,000 per facility or more.)
- Support voluntary programs like EPA Industrial Energy Star Program.

Buildings Provide Best Opportunity for Energy Efficiency

- Buildings consume 41% of our nation's energy (22% commercial; 19% residential). (EIA)
- U.S. buildings is largest consumer of electricity – 71%. (EIA)
- Accounts for over 40% of U.S. GHGs. (EIA)
- McKinsey study concluded that building insulation is single most cost-effective solution to reduce GHGs.

Residential Energy Efficiency Improvement Has Lagged

- Tens of millions of energy inefficient existing homes.
- New construction
  - Codes have advanced slowly and are not consistently adopted or enforced.
  - Split incentive: home builders have a tendency to reduce upfront purchase price by increasing home buyers' energy operating expenses.



Address Issues to Harvest Residential EE Opportunity

- Implement better education/outreach.
- Provide better funding.
  - Utility residential ratepayer dollars under new utility models
  - Air quality improvement programs
- Deploy new products and EE upgrade installation approaches that increase contractor productivity, reduce homeowner inertia.
- Clarify ownership of energy savings benefits, especially of utility emissions reductions.
- Ensure effective integration of non-utility energy efficiency contractors and projects into CPP compliance programs.

Demand Response

Demand Response Programs? What Do We Mean?

IECA companies participate in all forms of Demand Response programs across the country include energy, capacity and ancillary services:

1. Interruptible contracts or tariffs (stand by credit)
2. Peak shaving (reduce demand charges)
3. Peak Avoidance (reduce Capacity and/or Transmission obligation)
4. Economic Demand Response (curtailing during high prices)
5. Load Shifting (reduced costs by operating during off peak periods)
6. Dispatchable Load/Synchronized Reserve (market-based programs)
7. Regulation Service
8. Self-Generation

Demand Response is Not New!

- **Interruptible Contracts (Historically)**
  - Today its a Tariff, a Contract or a Market based solution.
- **Utilities use Interruptible Contracts for energy, capacity, emergency, transmission congestion, regulation and spinning reserve and now RAMP**
  - Avoid building expensive new generation that may only be required for a few hours each year.
  - Emergency, Reliability or Economics drive notice and compensation.
  - Utilities "call" the curtailment and provide energy payments or capacity credits to participants roughly equal to the utilities long-range replacement capacity costs.
- **Unbalanced stakeholder environments to replace or expand on the traditional interruptible contracts**

Market Solutions for DR are Relatively New with Enhanced Results

pjm

Summary of Benefits

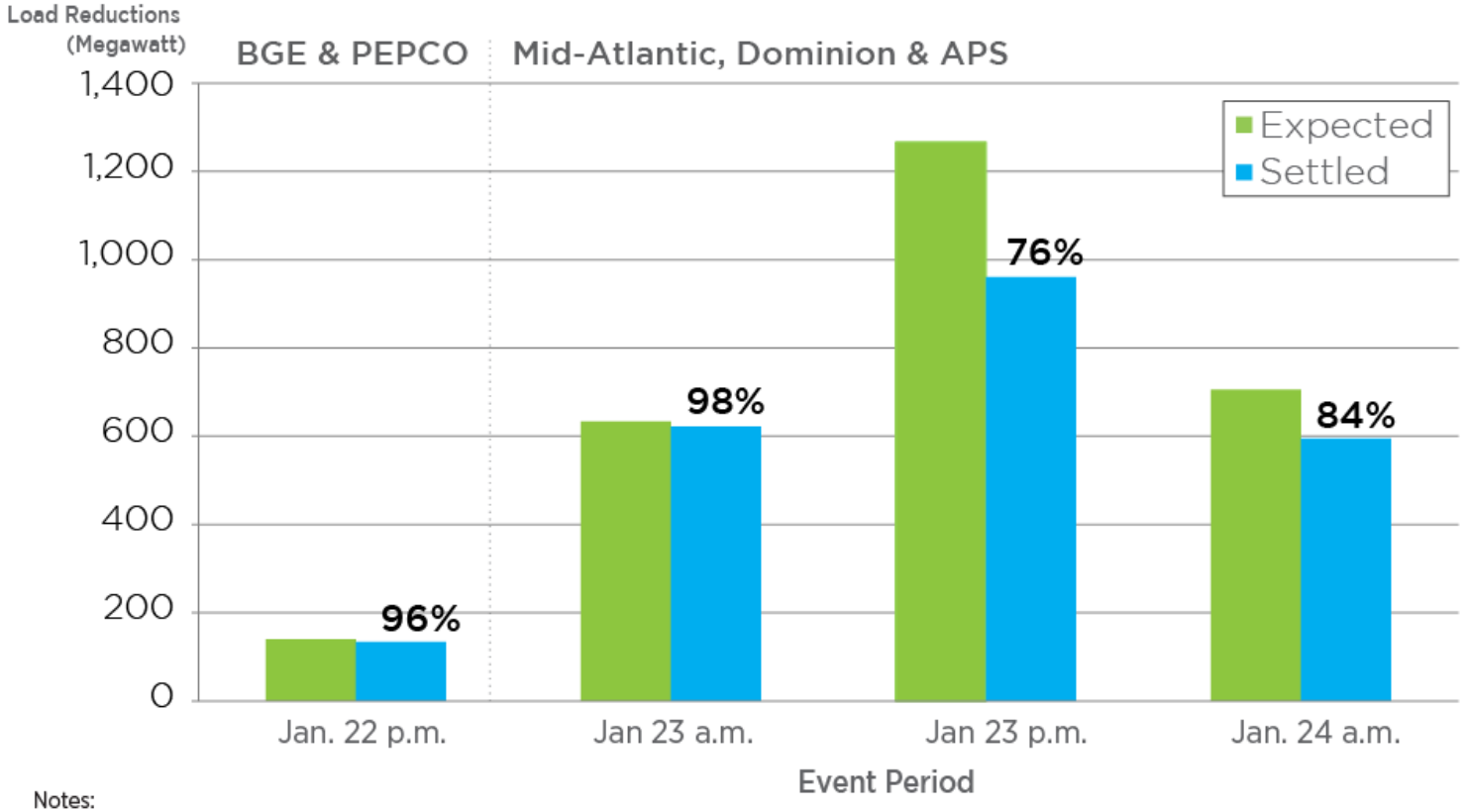
Potential benefits of demand response:

- Increased competition
- Operational savings
- Lower market prices
- Reduced price volatility
- Improved grid reliability
- Improved customer options
- Providing ancillary services
- Positive environmental benefits

- Q1 2014 demonstrated the value that DR brings
  - Curtailing consumption is more reliable than starting production

Source: Slide from PJM Training Manual on Load Response

Demand Response During Polar Vortex



Notes:
1. DR events dispatched during non-compliance period.
2. Expected Energy Load Reductions (MW) - CSP reported estimate based on current market rule.
3. MW value is average hourly load reduction for non-ramp in hours.

Demand Response (DR) Agenda

NARUC's questions:

1. Is it preferable to work with an aggregator or directly with a utility?
2. How does a company decide to participate? What would cause a company to stop participating?
3. When they are called upon to interrupt, how do they comply? (by shutting down early? Switching to a diesel generator?)
4. What do you think of Order 745 and the prospect of all DR being state jurisdictional?
5. IECA's recommendations.

Is it Preferable to Work with an Aggregator or Directly with a Utility?

- **Best to do it yourself.**
  - For large, sophisticated manufacturers, be your own Curtailment Service Provider.
- **Retain the value.**
  - Aggregators and utilities both extract a portion of the value stream anywhere from 5% to 40%.
- **Maintain independence.**
  - Avoid being served by those who own generation.
- **Aggregators.**
  - Can work with res/com to emulate a larger load.

How Does a Company Decide to Participate? What Would Cause a Company to Stop Participating?

- **Economic Value**
  - Must exceed the combination of direct costs, opportunity costs and risk.
- **Direct Cost**
  - Production loss - production made up in a lower cost hour or *not at all?*
  - Efficiency loss -Focus off of making widgets and involves the plant Senior Management Team.
- **Risk**
  - *Start-up risk* of complex operations.

When They are Called Upon to Interrupt, How Do They Comply?

- **Market Interface**
  - Event notification, offer submissions, bill reconciliation, performance evaluation.
- **Operator Interface and Control**
  - PLC controlled response, operator training, over-rides for safety and environment.
- **Plant procedures and Manuals**
  - Developed and training for curtailment is conducted.
- **Key Performance Indicators**
  - Developed and plant staff and operators are measured on how well they "manage" our participation in the market.

Cost/Complexity of Compliance

- **Bidding strategy**
  - Optimization of power market vs. widget market economics.
  - Strike Price - The plants determine strike prices for the industrial facility and curtail operations when certain conditions are met.
  - This is often an iterative process depending on the # of hours curtailed, inventory, plant conditions, etc.
- **Market Monitoring**
  - Software is utilized (internal/external) and public information on ISO websites is monitored for market prices, market demand, weather, generator outages, emergency messages

Price Response

- **Myth**
  - Customers who desire to only consume electricity below certain thresholds can price-watch and be successful – "it's easy".
- **Reality**
  - Real time prices fluctuate every 5 minutes, and the actual price isn't known until **after** the energy is consumed.
- **Efficiency Impact**
  - 5 minute dispatch might be most economically efficient for generation, but it has the opposite effect on load.
- **This is a prime example of why DR needs to be integrated into the market.**

DR Integration Example: PJM DAEDR

- **Schedule** - Determine Day Ahead if economic to operate
- **Efficient Dispatch** - ISO dispatch solves for the facilities response
- **End-user efficiency**
  - Enables staffing and maintenance decisions
  - Minimizes wear and tear on equipment
  - Ensures recovery of the costs of curtailing during high priced periods
- **Grid reliability** - Provides EGU planning certainty to the ISO
- **Maximizes DR** - Increases load reduction availability thereby providing additional system and cost reduction benefits to all customers
- **Reduces cost** - The costs are reduced for those that don't respond (homeowners) – totally in the public interest

What Do You Think of Order 745 and the Prospect of All DR Being State Jurisdictional?

"the Court argued, demand response is not actually a source of generation; it does not involve a direct sale of energy to the wholesale markets by consumers, who "'participate' only by declining to act." Rather, consumers engaging in demand response were being given preferential treatment by the FERC, being paid the LMP and saving on the avoided cost of electricity. This, the court ruled, overcompensates demand response."

- **This couldn't be further from reality. As we have discussed, industrial participation in DR is "active" participation.**

IECA Position on 745 Issue

- Large industrial customers support FERC Order 745.
- Order 745 finally achieved MW=NW (equal pay for equal work).
- Dr. Alfred E. Kahn recognized in his affidavits in that rulemaking, "full LMP" compensation for demand response was appropriate.
- Full LMP also reflects the marginal value to the system operator of the demand response that is being provided.
- IECA agrees with the PJM and MISO industrial groups, which have been actively participating in the D.C. Circuit and now U.S. Supreme Court appellate litigation.
- Moving demand response activity to the states raises several challenging issues:
  - Compensation - Where do states get the funding?
  - State Coordination – Inconsistent policy across RTOs
  - Legal barrier? - Circuit Court decisions on New Jersey LCAPP law?

IECA DR Recommendations

- Demand Response works and adds value and reliability
- Long term price signals promote the most DR
- DR programs improves competition, lower costs for all consumers, lower emissions and increases reliability.
- Cost allocation methodology sends important signals to incent the efficient use of the grid
  - (kW vs kWh) kWh charges mutes signal for demand response and allocates more to high load factor customers (new capacity, env upgrades, RPS).
  - Pass through signals to the end-user, don't stop at the class.
  - Demand Charge = Demand Credit
  - Coincident Peak allocation for Capacity and Transmission cost allocation.

Proposed Federal Legislation to Modernize PURPA

- PURPA standards for cogeneration should not be altered and exempt from proposed legislation that appears to be targeted at renewable energy projects.
- IECA welcomes the opportunity to address PURPA at future NARUC meeting.

Thank You!

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