

Institute for Industrial Productivity – Addressing Energy Efficiency in the U.S.

*Technology Forum: Sustaining Industrial Energy Efficiency
in a Potentially Water-Short Future*

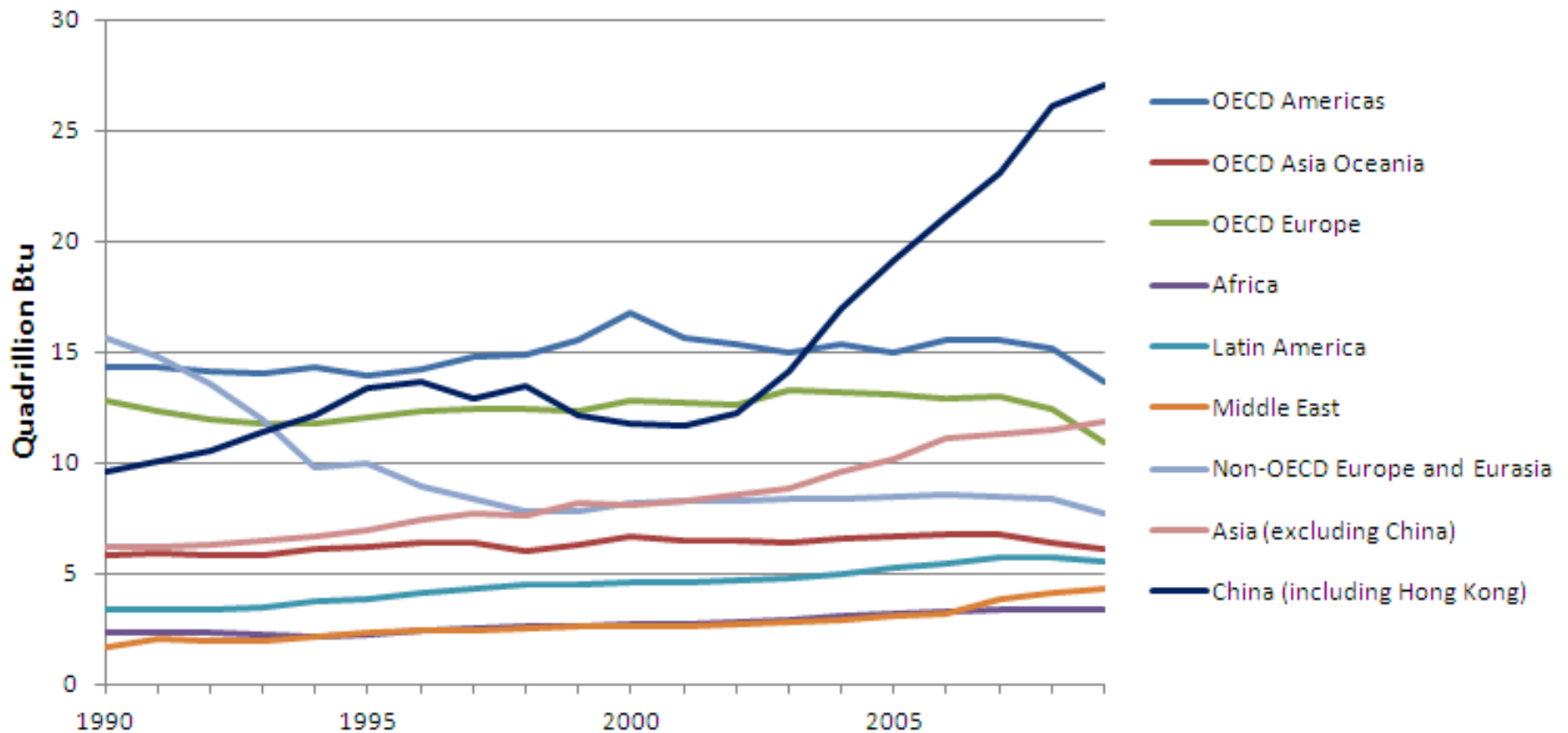
June 19, 2013 – Brady's Landing, Houston

Jim Quinn



World Energy Use

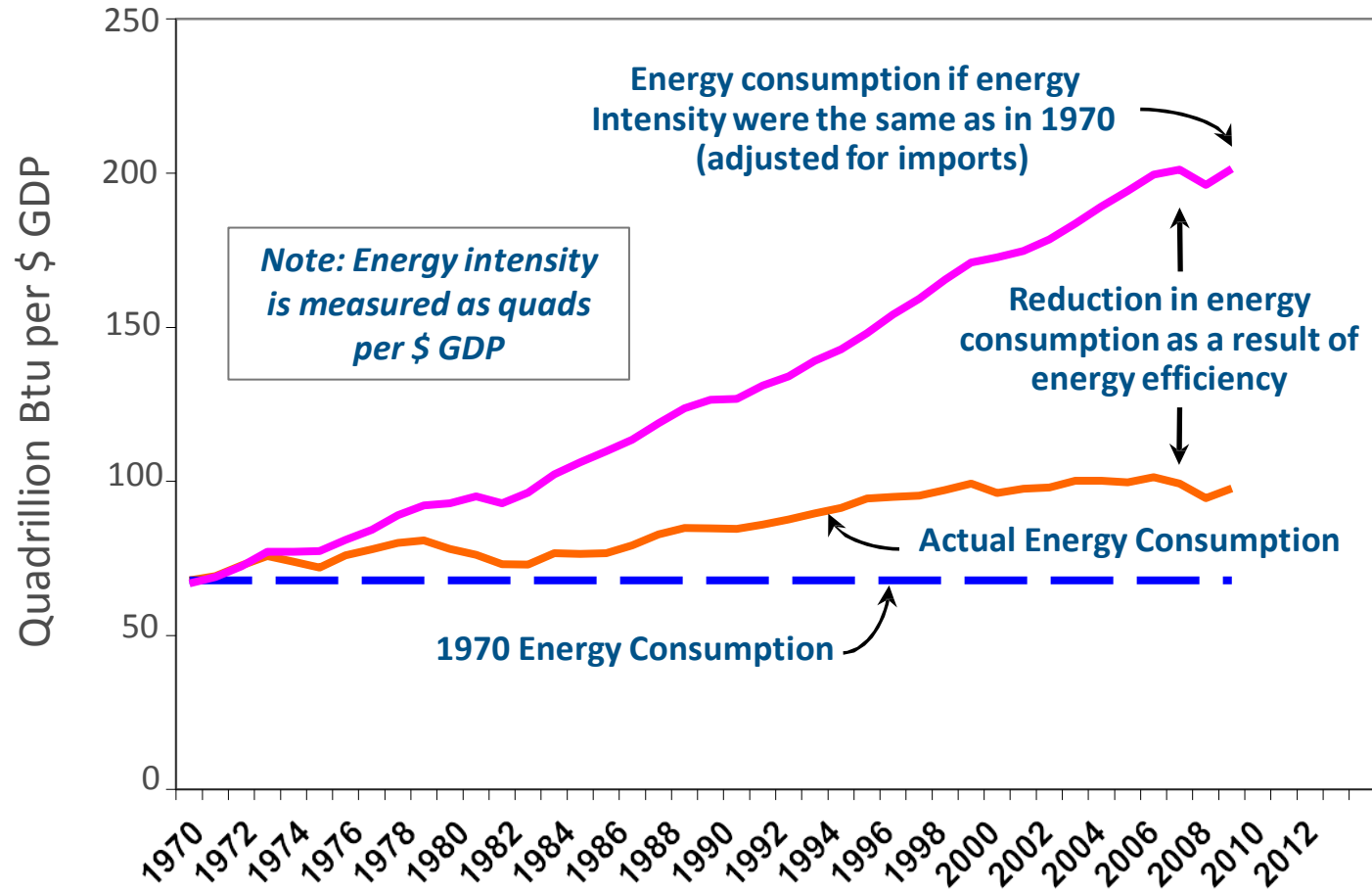
Global Industrial Energy Consumption



(Excludes energy conversion losses and petroleum feedstocks)

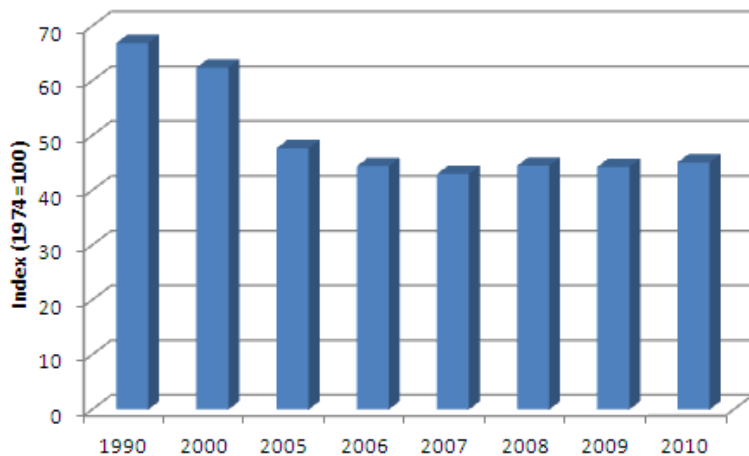
Source: International Energy Agency, Online Database (Energy Balances of OECD and Non-OECD Countries)

U.S. Energy Use per Unit of GDP, 1970–2010



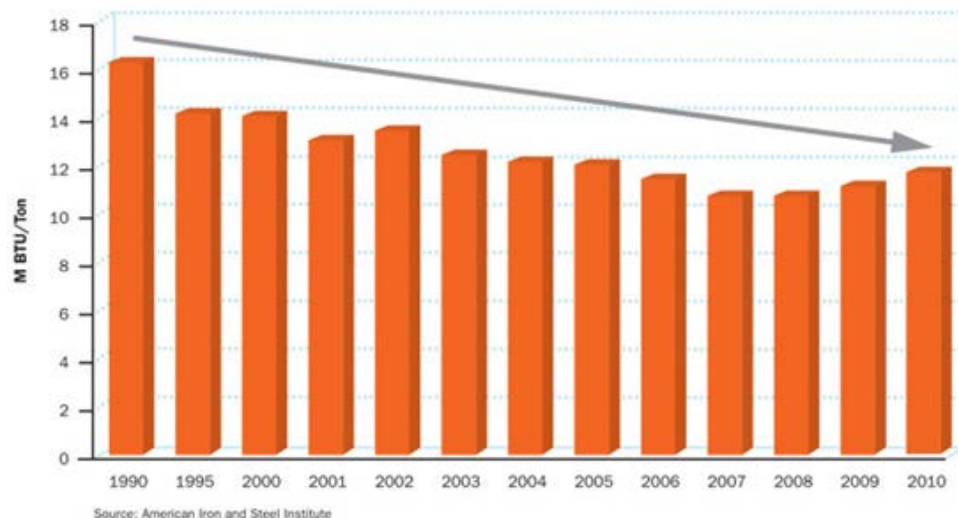
Trends in Industrial Energy Intensity

U.S. Chemicals Industry: Energy Intensity

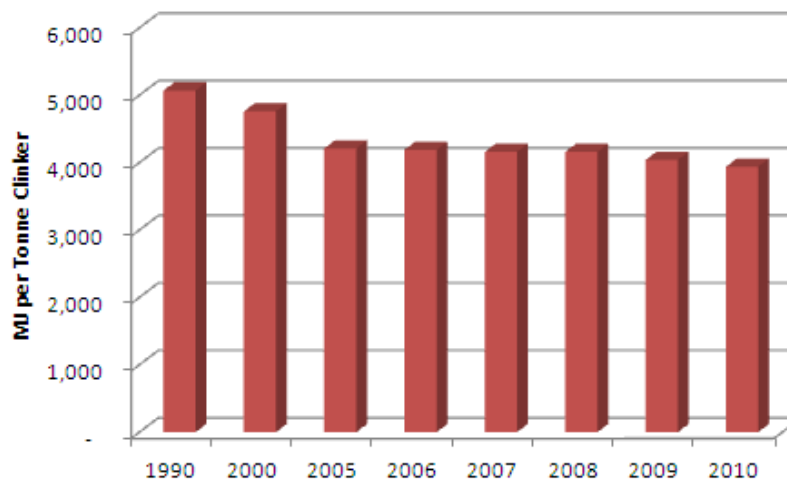


2012 Guide to the Business of Chemistry, Table 10.5: Fuel and Power Energy Consumed per Unit of Output (index where 1974=100).

U.S. Iron and Steel Industry: Energy Intensity

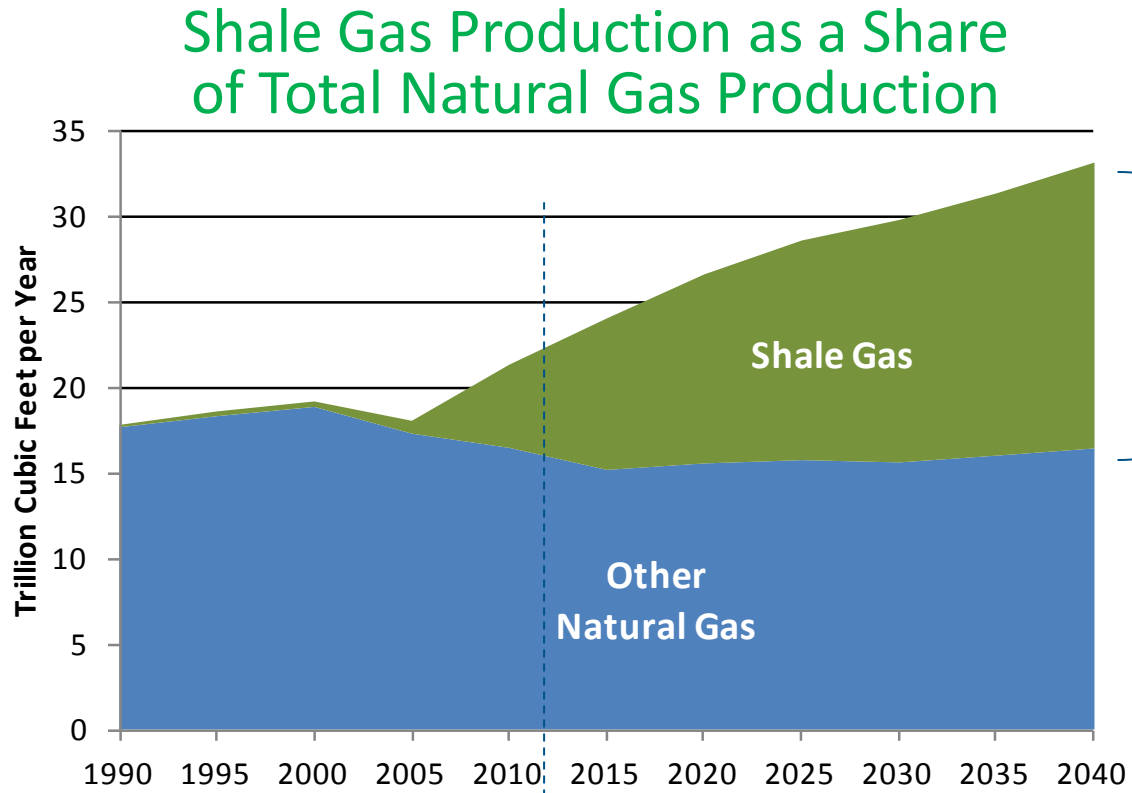


U.S. Cement Industry: Energy Intensity



Source: World Business Council for Sustainable Development (WBCSD). See http://wbcsdcement.org/GNR-2010/United%20States/GNR-Indicator_329-United%20States.html

Shale Gas Revolution



By 2040, shale gas is projected to account for over **50%** of all natural gas production.

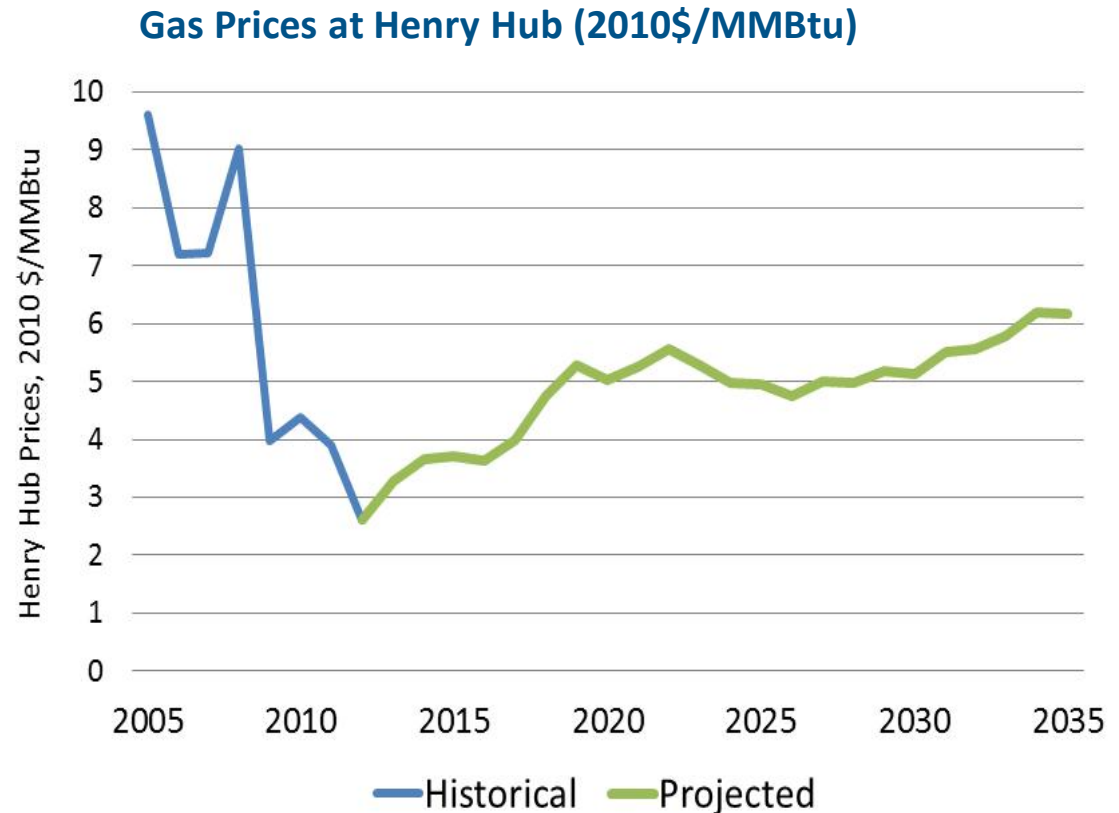
Shale gas production increased by **1400%** from 2005 to 2011.

Source: Energy Information Administration (EIA) Annual Energy Outlook 2013

Gas availability and prices likely to be key driver for industrial decisionmaking

Henry Hub natural gas prices are projected to average between \$4 and \$6 per MMBtu throughout much of the projection.

Investments in new industrial facilities as well as retrofits likely to focus on natural gas as major supply source



Source: ICF Estimates, 2013

Re-shoring of U.S. Manufacturing

Rising production of shale gas makes prospect of U.S. manufacturing increasingly attractive:

*The Economist*¹:

“...lower American energy prices could result in 1 [million] more manufacturing jobs...”

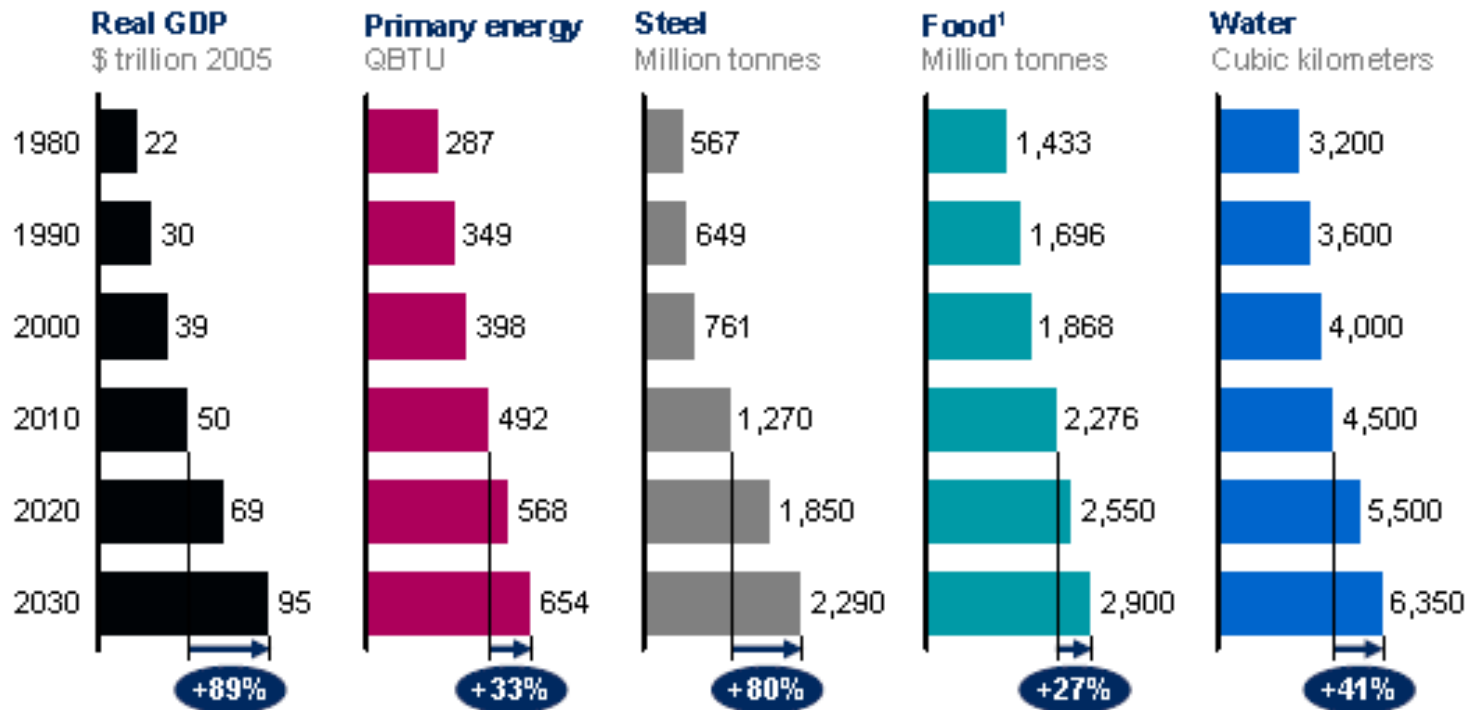
*“Companies such as Dow Chemical...and Vallourec [steel-tube producer]...have announced new investments in America to take advantage of **low gas prices** and to supply extraction equipment.”*

The U.S. Government is tracking over \$80 billion in planned manufacturing investments (fertilizer, chemicals, steel, assembly)



Resource Constraints

Demand for most resources has grown strongly since 2000, a trend likely to continue to 2030.



¹ Only cereals.

SOURCE: Global Insight; IEA; UN Environment Program (UNEP); FAO; World Steel Association; McKinsey analysis

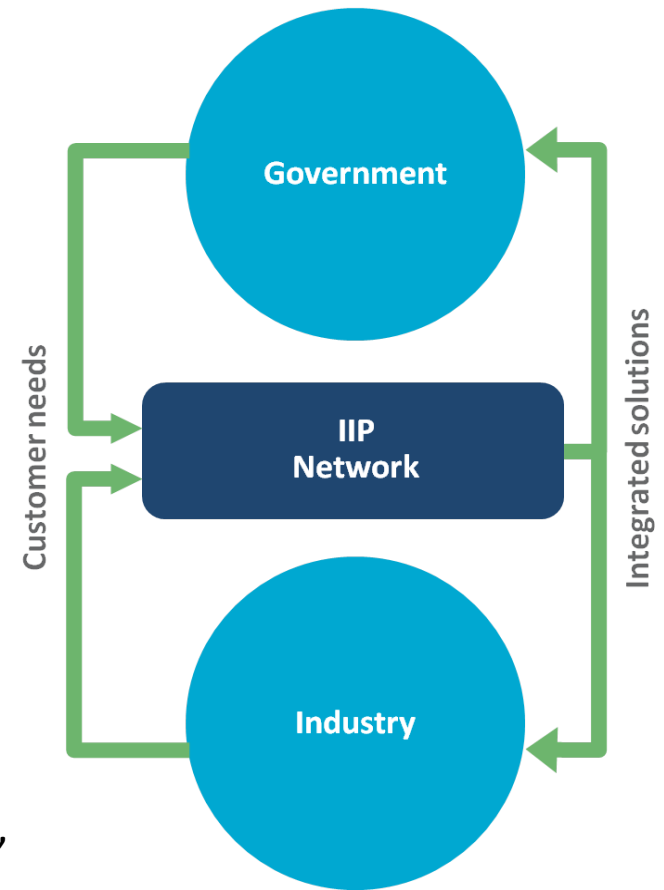
IIP at a glance....

Our Mission

To improve industrial energy efficiency and productivity by providing industry and government decision makers with best practices to implement effective policies, technologies, and financial approaches.

Who We Are

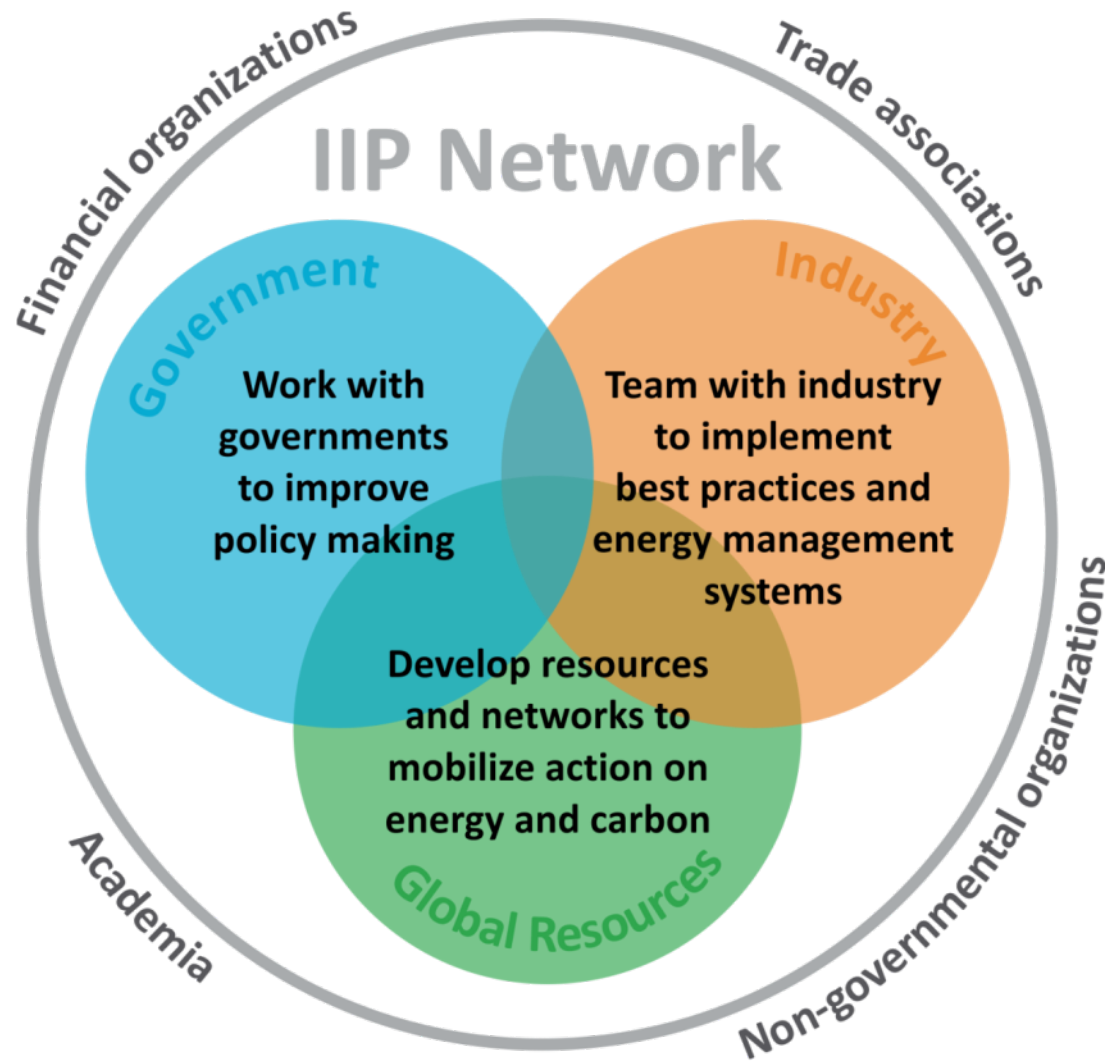
- A non-profit established by the ClimateWorks Foundation in 2010
- Strategically linked to a global network of groups addressing climate change
- Work in partnership with industries, governments, financial institutions, and other stakeholders
- Offices in Washington DC, Paris, New Delhi and Beijing



IIP's Strategic Focus



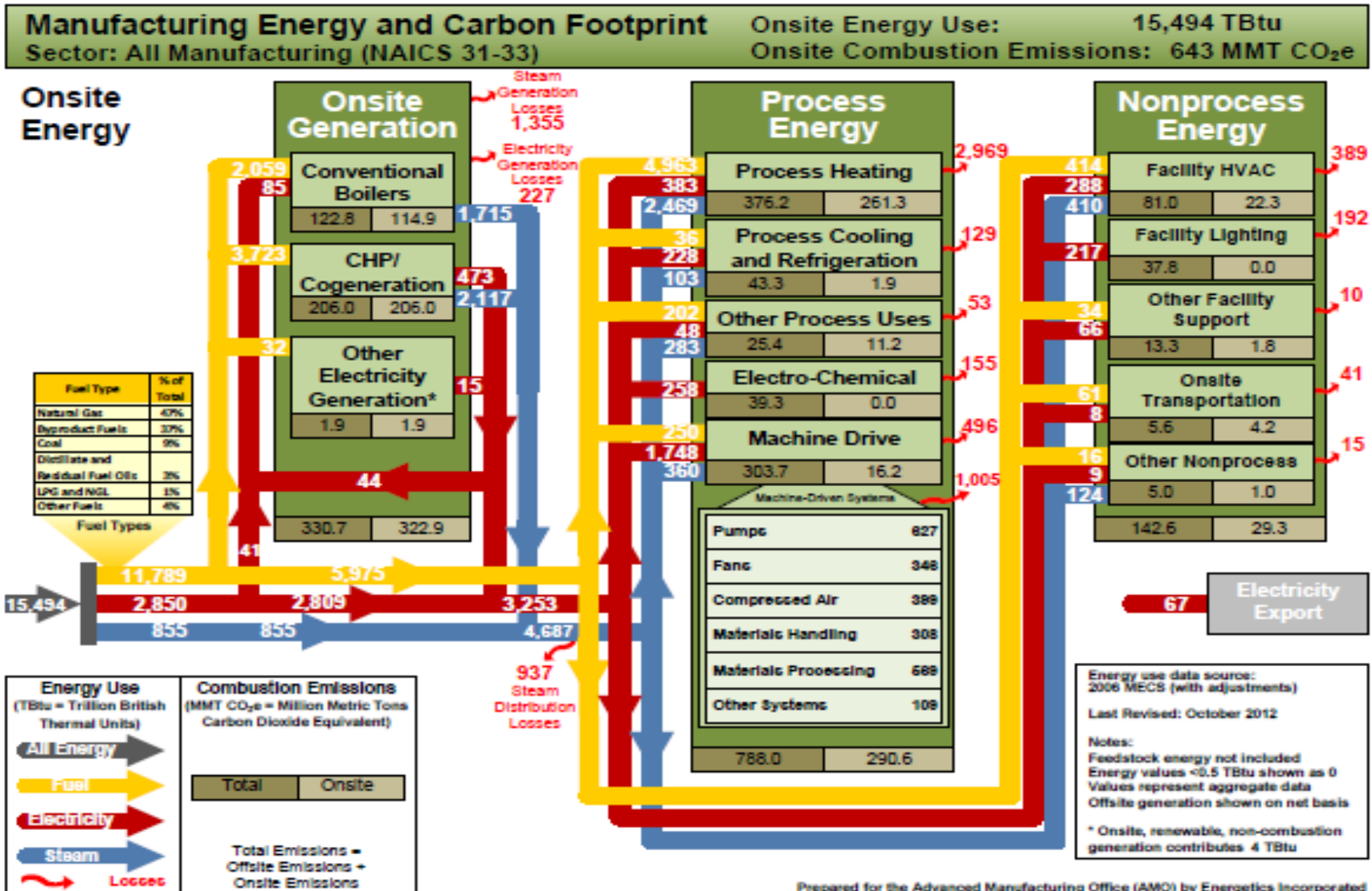
Integrated Strategies



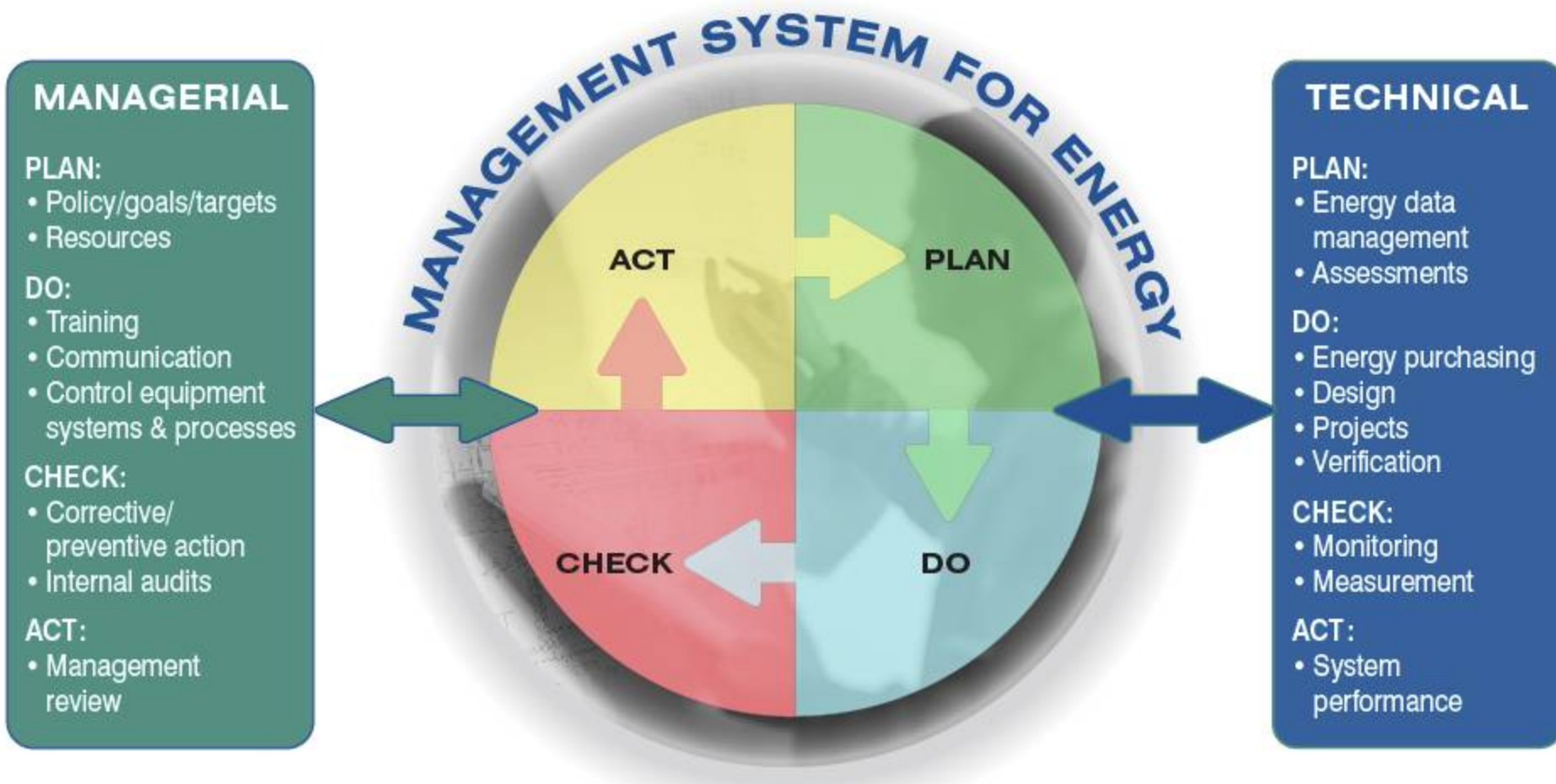
U.S. Program Focus

- Develop consortium for managing/updating industrial energy efficiency decision tools
- Partner with gas and electric utilities to promote recognition of Energy Management System programs as valid energy efficiency measures under utility requirements
- Promote combined heat and power and efficient natural gas technologies in existing and new industrial facilities

Software Decision Tools for Energy Systems

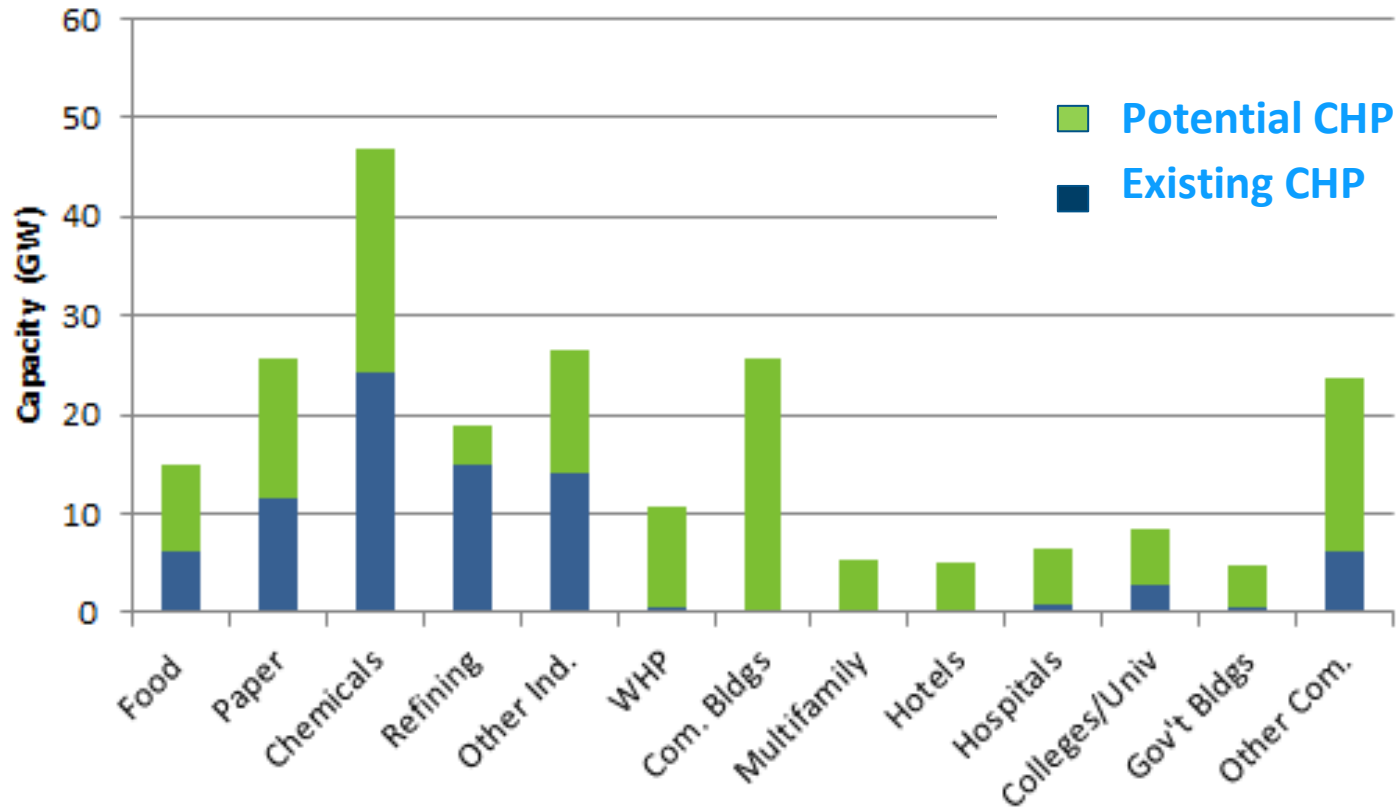


Energy Management Systems

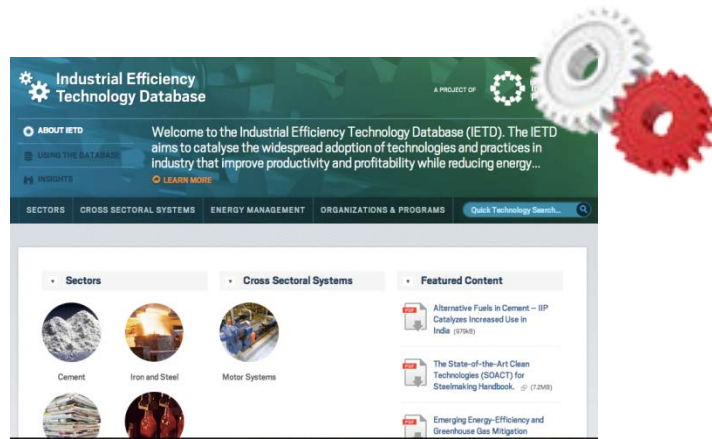


CHP - Technical Potential of 130,000 MW

Existing CHP vs Technical Potential

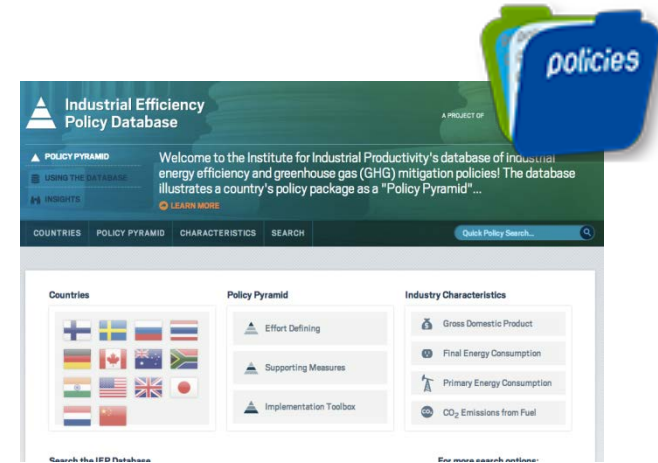


IIP's Best Practice Databases



Industrial Efficiency Technology Database

www.ietd.iipnetwork.org



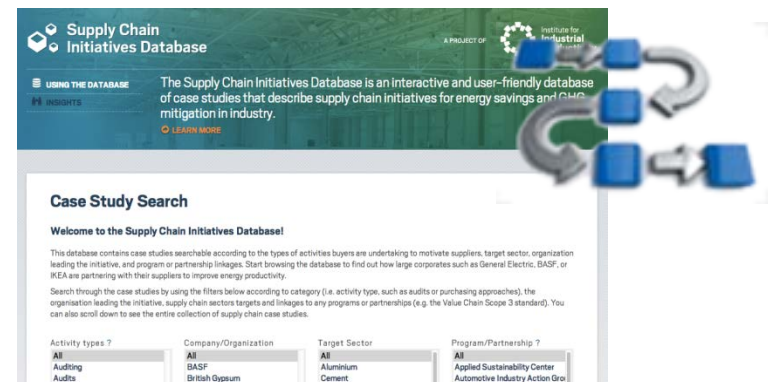
Industrial Efficiency Policy Database

www.iepd.iipnetwork.org



Industrial Efficiency Finance Database

www.iipnetwork.org/databases/finance



Supply Chain Initiatives Database

www.iipnetwork.org/databases/supply-chain

The Energy-Water Nexus in Chemical Manufacturing and Refining

Current Practice: 67 to 92% of water used is for process cooling or steam systems (TxIOF 2013)

Future: What happens if there is a decrease in water available for energy systems?

Resulting in increase in energy use

- Substitute chillers for cooling water
- Substitute other cooling systems for cooling towers

Impacts on production

- Decreased production due to less efficient product recovery (not operating at optimum temperature) or
- Change processes to avoid energy/production penalty

Thank You!



Institute for
**Industrial
Productivity**

| ipnetwork.org