CHEMISTRY & SHALE GAS: FUELING A U.S. MANUFACTURING RENAISSANCE
Potential cooling impact of 111 (d)
What is Natural Gas?

- Mixture of small hydrocarbon molecules that are all gasses at normal temperatures

- Methane is the most abundant constituent of natural gas, while ethane, propane, and helium are also present

- Dry gas is almost all methane and is usually used for energy

- Ethane, propane and other molecules are removed from wet gas to make it dry

- Ethane is the primarily molecule for chemical production
ETHYLENE CHAIN

Natural Gas

Ethane

Cracker

Intermediate Products

PVC
Vinyl Chloride
Ethylene Glycol
Styrene
Polystyrene

Pool Liners
Window Siding
Trash Bags
Sealants
Carpet Backing
Insulation
Detergent
Flooring Pipes

Food Packaging
Bottles
Cups
Housewares
Crate

Footwear
Clothes
Diapers
Stockings
Toys
Textiles

Tires
Sealants
Paint
Antifreeze

Adhesives
Coatings
Films
Paper Coatings
Models
Instrument Lenses
U.S. Chemical Industry Global Cost Advantage


*Based on estimates from best available data
U.S. Shale Gas

Manufacturing renaissance due to increased access to natural gas from shale

Downstream partners are more competitive than ever

Chemical Investment

166 projects and $107 billion in potential capital investment announced as of April 2014

...Up from 97 projects and $72 billion as of March 2013

62% is by firms based outside the U.S.
Global Chemical Production: Growing Competitive Advantage for the United States
(N. America and Western Europe Production of Basic Chemicals/Plastics; 1990 base)

Data provided with permission from IHS Global Insight
Chemical Industry is Energy Intensive

Use both natural gas and electricity as a feedstock
- Crack the natural gas molecule to make stuff
- Use electrical electrolysis processes

Use both natural gas and electricity as an energy source
- Many of our processes require heat to begin the reaction
- Motors and electronic controls require electricity

Proposed 111 (d) changes potentially will cause price pressure on natural gas due to utility fuel switching
- Cool economic expansion
- Reduce competitiveness
Winter Arctic Vortex

Natural gas spot prices (Henry Hub)

$/MMBtu

Source: Natural Gas Intelligence
Benefits of Proposed 111(d)

Energy Efficiency Focus

- Lowest cost to increase energy supply
- Products of chemistry create energy efficient homes and buildings
- Better more updated Model Energy Building Codes and combined heat and power systems key to energy conservation
  - IECC 2012 is 30 more efficient than IECC 2006
Energy Efficiency Reduces Demand

Change in U.S. electricity use and gross domestic product

Electricity use

GDP

Source: U.S. Energy Information Administration
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