America’s Refining and Petrochemical Industries: Meeting 21\textsuperscript{st} Century Challenges

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Steve Higley
Outreach Director
Who We Are

• AFPM represents more than 400 companies that encompass virtually all U.S. refining and petrochemical manufacturing capacity

• AFPM members are high-tech manufacturers who create essential products for your life every day
Our Mission & Goals

Mission

Ensure the existence of strong and viable US petrochemical and refining sectors and the societal benefits thereof

Goals

Ensure a level playing field for fossil-fuel based industries

Realize U.S. manufacturing renaissance
What Is the Downstream Sector?

Crude Imports
- Tanker Ship
- Offshore

Domestic Production
- Onshore

Product Imports
- Tanker Truck

Refinery

Terminals
- Barge
- Pipeline
- Railroad

Petrochemicals: Building Blocks for Manufacturing
- Toys
- Clothes
- Plastic bottles
- Food packaging
- Football helmet
- Computer
- Mobile devices
- Medical items

Products: Building Blocks for Energy
- Gasoline
- Asphalt
- Diesel
- Wax
- Heating Oil
Refined Products

- Refining separates crude oil into components that are used for a variety of purposes, from gasoline and jet fuel to waxes and asphalt.
- A 42 gallon barrel of crude oil yields about 45 gallons of petroleum products.

![Diagram showing the products made from a barrel of crude oil](EIA, Refining Crude Oil)
Petrochemical Products

• Vast majority (~99%) of petrochemicals are derived from oil or natural gas

• Used in thousands of everyday products and throughout the manufacturing supply chain:
  - Medical items
  - Food packaging
  - Cosmetics
  - Transportation
  - Textiles/clothing
  - Electronics
  - Military and fire/rescue equipment
  - Solar panels/wind turbines
### Economic Impact

- Our industries employ over 2 million people nationally and provide high-tech, well-paying jobs
- National **average** annual salary:
  - Refinery worker: $111,542
  - Chemical industry: $88,800

<table>
<thead>
<tr>
<th>SSEB State</th>
<th>Local Impacts</th>
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| TX         | - Largest refining capacity in the nation at 5,174,209 bpd; largest petrochemical industry presence in the U.S.  
- Refineries employ 21,377 people with an average salary of $131,589, contributing over $2.8 billion in total salaries and wages  
- Petrochemical facilities employ 15,423 people with an average salary of $111,632, contributing over $1.7 billion in total salaries and wages |
| LA         | - Second largest refining capacity at 3,274,520 bpd  
- 100,654 direct and indirect jobs created via the refining industry  
- The industry contributed $3.7 billion in income to workers in manufacturing sector – $6 billion in earnings to the overall Louisiana economy  
- Louisianans receive approximately $6 billion in total household income from the refining industry |
| OK         | - Refining capacity of 511,300 bpd (8th largest in U.S.)  
- AFPM member facilities employ more than 1,850 employees and contractors |

Opportunity: Domestic Energy Abundance

- Increased national security
- Rebirth of the American manufacturing sector
- Hundreds of thousands of jobs
Due to domestic shale production, the U.S. will surpass Saudi Arabia as the world’s largest oil producer in 2015 and overtook Russia as the largest natural gas producer in 2010.

In 2015, U.S. crude and natural gas production is expected to reach 9.3 million bpd and 74 bcf/d, respectively.
Economic Opportunities of the Manufacturing Renaissance

• Increased shale production will have major impacts on U.S. economy and manufacturing sector by 2020:
  
  – Support over 460,000 manufacturing jobs
    • By 2025, shale development will support one out of every eight manufacturing jobs
  
  – Increase real disposable income, adding over $2,700 to average household income
  
  – Contribute $468 billion to U.S. GDP
  
  – Contribute over $125 billion in federal, state and local taxes

Reference: IHS, “America’s New Energy Future: The Unconventional Oil and Gas Revolution and the US Economy”
Workforce Needs

• 188 new chemical industry projects announced

• New jobs:
  – 637,000 permanent new jobs by 2023
  – Additional 222,000 temporary jobs created during the capital investment phase which peaks in 2016

• Educational requirements range from high school diploma to Ph.D.

• Need STEM and craft professionals now

• 74% of companies said there is a shortage of craft workers*

• Deficits are in the range of one to two million by as early as 2017

• Approximately 800,000 of this deficit is from attrition due to retirement

References: Chemical Engineering, July 2014; Business Standard, February 2014; Associated General Contractors of America Survey (Sept. 2013)
Workforce Development

- **AFPM workforce development site**
  - “Point of entry” for individuals interested in working in the fuel and petrochemical industries
  - [workforce.afpm.org](http://workforce.afpm.org)

- **First Book**
  - Partnership offers *MathStart* collection focusing on early math skills, serving low-income children and school districts

- **ASMP**
  - Goal: Create policy framework to identify ways to revitalize domestic manufacturing, focusing on shale development and its impact on the supply chain
  - Workforce development is a recurring theme at discussion events held throughout U.S.
  - [Policy recommendations](http://example.com) released on January 28 on Capitol Hill
Air Quality in America Since 1970: Consistent, Significant Progress

Source: EPA
The Impacts of Regulation

Rules with Annual Compliance Costs Greater Than $1 Billion (2000-2013)

EPA vs. All Other Federal Agencies

- 13 Rules: $19.1 Billion
- 17 Rules: $90.3 Billion

EPA vs. All Other Agency Rules

AFPM
The Renewable Fuel Standard

Energy Policy Act of 2005
- Mandated a minimum of 7.5 billion gallons of renewable fuels to be used in the fuel supply by 2012.

- EISA superseded and expanded the biofuels blending mandate with the Renewable Fuel Standard 2 (RFS2).
- Biofuel volumes increase significantly in RFS2 – EISA requires 36 billion gallons of biofuels to be blended into the fuel supply by 2022, divided into 4 “nested” categories.

Total Renewable Mandate (36 B)
- Advanced Biofuels (21 B)
  - Cellulosic (16 B)
  - Biomass-Based Diesel (1B)
- Conventional Biofuels (15 B)
RFS Issues

- **Fuel & Engines**
  - Boats, motorcycles, lawnmowers, and 90% of vehicles are not designed/warranted to handle blends above E10
  - Consumer misfueling concerns
  - Lack of cellulosic

- **Food vs. Fuel**
  - ~40% of U.S. corn supply used for ethanol
  - CBO: If the ethanol mandates increase to 15 billion gallons, the price of corn would increase by 25¢ per bushel.
    - $1.35 billion increase in cost to food and livestock producers
    - U.S. food expenditures would rise to $3.5 billion by 2017

- **Environment**
  - Environmental Working Group: EPA’s 2014 proposal would reduce U.S. GHGs by 3 million tons CO2e
  - EPA’s RIA: the RFS will increase ozone and PM emissions, complicating NAAQS attainment efforts
What Is the Ozone NAAQS?

**National Ambient Air Quality Standard**

- Established through Clean Air Act; EPA sets standard, currently 75 parts per billion (ppb)
- CAA requires review every 5 years; last review/revision was 2008
  - Current proposal issued on 11/26/14 for 65-70 ppb standard (seeking comment on 60 ppb)
- Penalties for “nonattainment” are severe
  - Strict permitting requirements and costly emissions “offsets” for new facilities
  - Fines for failing to reduce emissions
  - EPA knows many cities cannot meet tighter requirements even if all known control technologies are applied
Nonattainment with Current Standard

Attainment and Nonattainment Areas in the U.S. 8-hour Ozone Standard

- Attainment (or Unclassifiable) Areas (2668 counties)
- Nonattainment Areas (432 entire counties)
- Nonattainment Areas (42 partial counties)
Nonattainment at 65 ppb Standard
CBSAs and Rural Counties that Violate an Ozone Standard of 65 ppb based on 2011-2013 Data

Overly stringent Ozone NAAQS standards threaten to halt domestic resource development and have broad effects on the economy.
National Economic Impacts

NERA study projects profound economic impacts from a 60 ppb ozone NAAQS:

- 2.9 million U.S. jobs lost through 2040
- $1,570 decrease in consumption for the average U.S. household per year
- $270 billion reduction in U.S. GDP per year
State Economic Impacts

By 2020, a 60 ppb standard will severely impact SSEB states:

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Questions?

Contact:
Steve Higley
Outreach Director
shigley@afpm.org
202.552.8455