

# **America's Refining and Petrochemical Industries: Meeting 21<sup>st</sup> Century Challenges**

## **Southern States Energy Board Associate Members Winter Meeting February 23, 2015**

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# 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

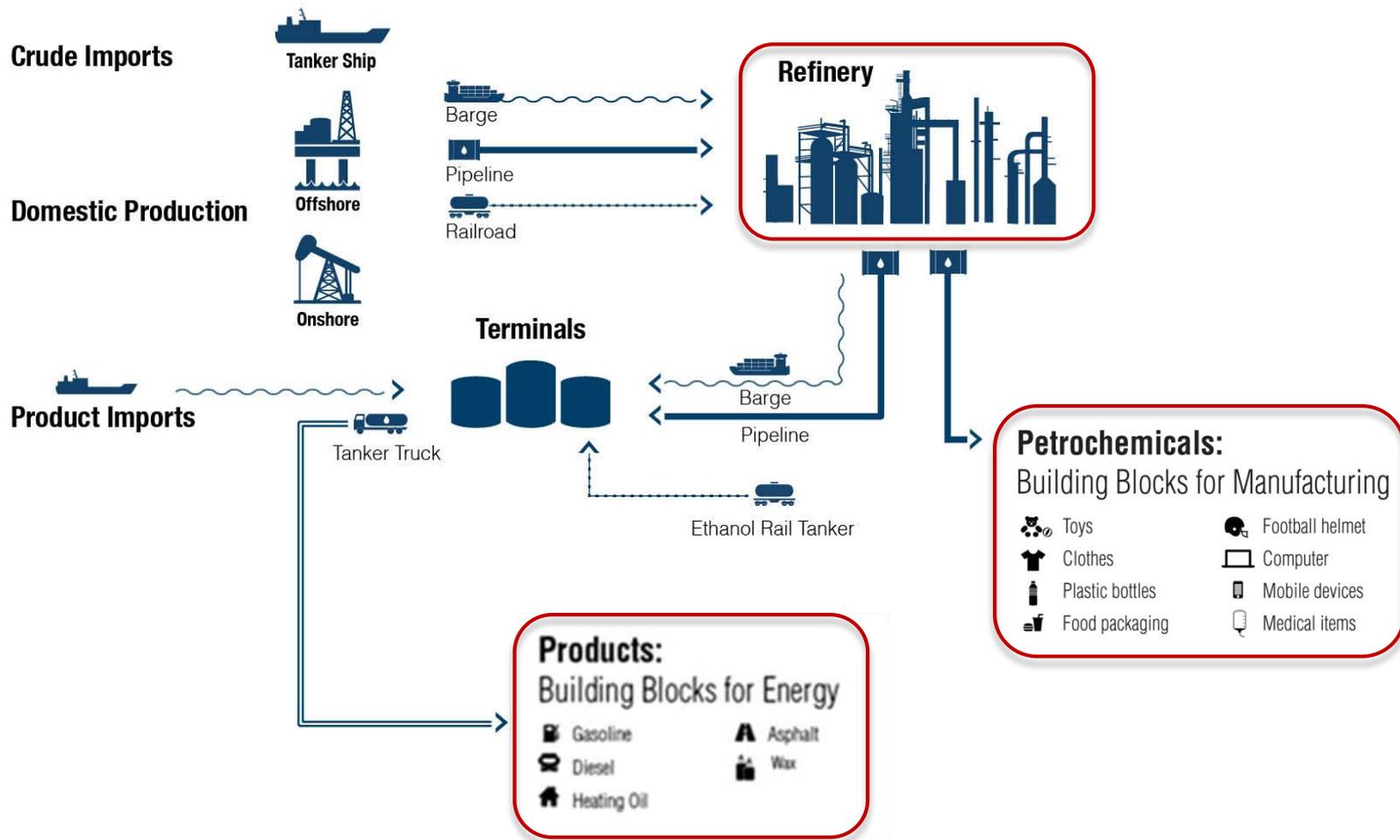
Ensure the existence of strong and viable US petrochemical and refining sectors and the societal benefits thereof

Goals

Ensure a level playing field for fossil-fuel based industries

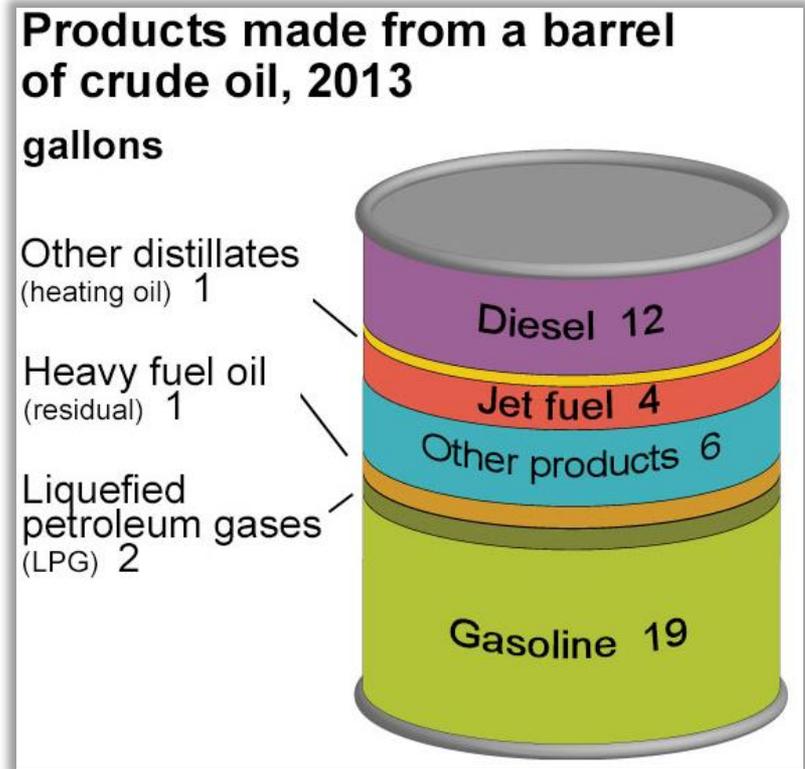
Realize U.S. manufacturing renaissance

# What Is the Downstream Sector?



# 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



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



**PRODUCTS  
FOR YOUR LIFE.  
EVERY DAY.**

# Economic Impact

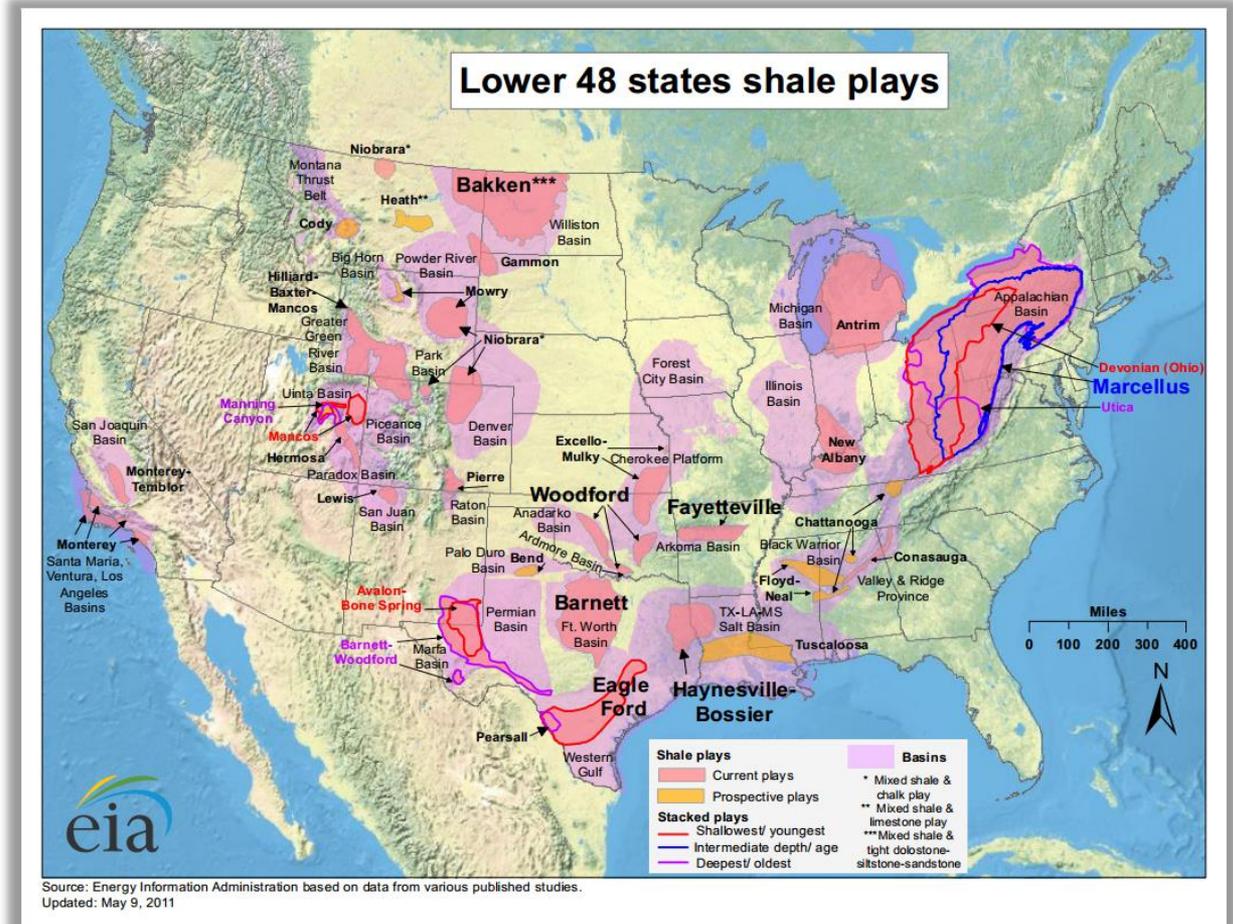
- Our industries employ over 2 million people nationally and provide high-tech, well-paying jobs
- National average annual salary:
  - Refinery worker: \$111,542
  - Chemical industry: \$88,800

SSEB State	Local Impacts
TX	<ul style="list-style-type: none"> <li>• Largest refining capacity in the nation at 5,174,209 bpd; largest petrochemical industry presence in the U.S.</li> <li>• Refineries employ 21,377 people with an average salary of \$131,589, contributing over \$2.8 billion in total salaries and wages</li> <li>• Petrochemical facilities employ 15,423 people with an average salary of \$111,632, contributing over \$1.7 billion in total salaries and wages</li> </ul>
LA	<ul style="list-style-type: none"> <li>• Second largest refining capacity at 3,274,520 bpd</li> <li>• 100,654 direct and indirect jobs created via the refining industry</li> <li>• The industry contributed \$3.7 billion in income to workers in manufacturing sector - \$6 billion in earnings to the overall Louisiana economy</li> <li>• Louisianans receive approximately \$6 billion in total household income from the refining industry</li> </ul>
OK	<ul style="list-style-type: none"> <li>• Refining capacity of 511,300 bpd (8<sup>th</sup> largest in U.S.)</li> <li>• AFPM member facilities employ more than 1,850 employees and contractors</li> </ul>

References: "2014 Guide to the Business of Chemistry," "[The State of American Energy](#)," "[Economic Impacts of the Oil and Natural Gas Industry on the U.S. Economy in 2011](#)," Energy Information Administration, "[Fueling the Texas Economy](#)," "[The Energy Sector: Still a Giant Economic Engine for the Louisiana Economy - an Update](#)"

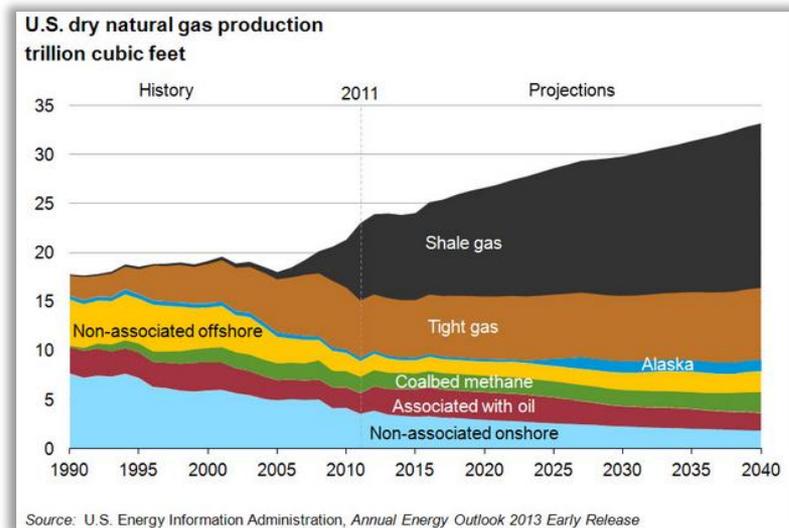
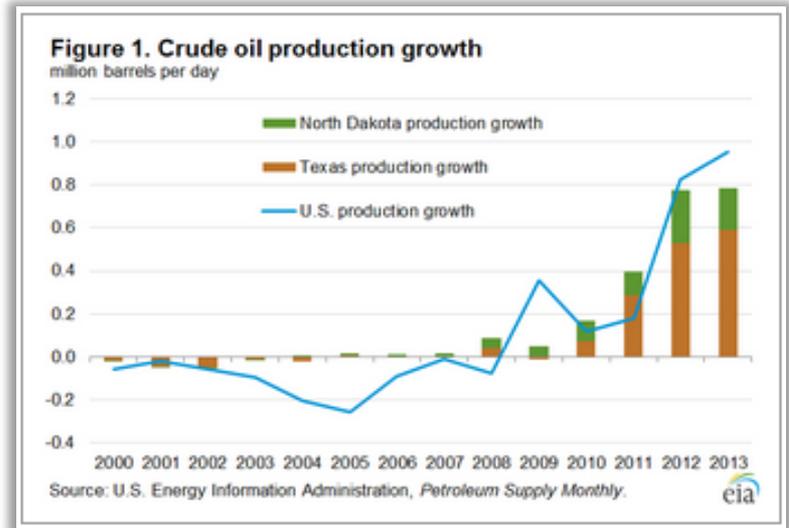
# Opportunity: Domestic Energy Abundance

- Increased national security
- Rebirth of the American manufacturing sector
- Hundreds of thousands of jobs



# Domestic Production

- 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**

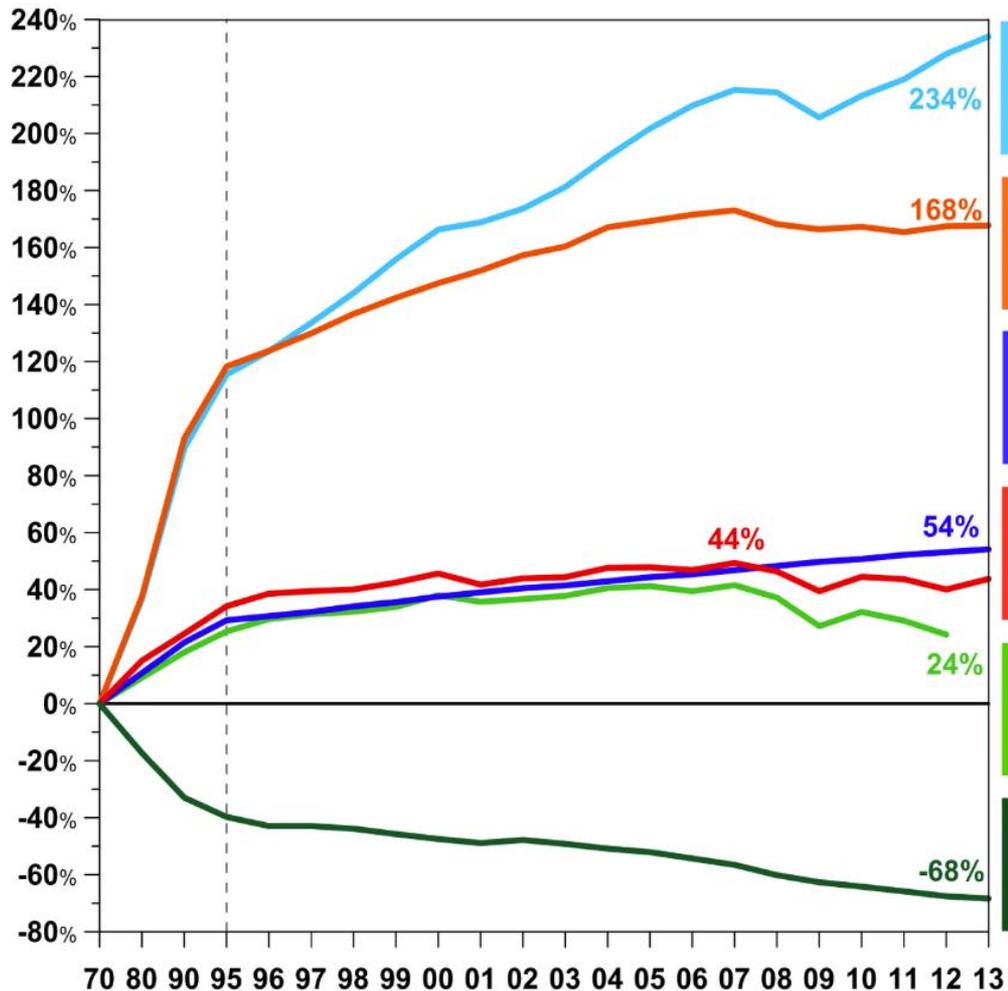
- Partnership offers *MathStart* collection focusing on early math skills, serving low-income children and school districts

- **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](#) released on January 28 on Capitol Hill



# Air Quality in America Since 1970: Consistent, Significant Progress



Gross Domestic Product



Vehicle Miles Traveled



Population



Energy Consumption



CO<sub>2</sub> Emissions

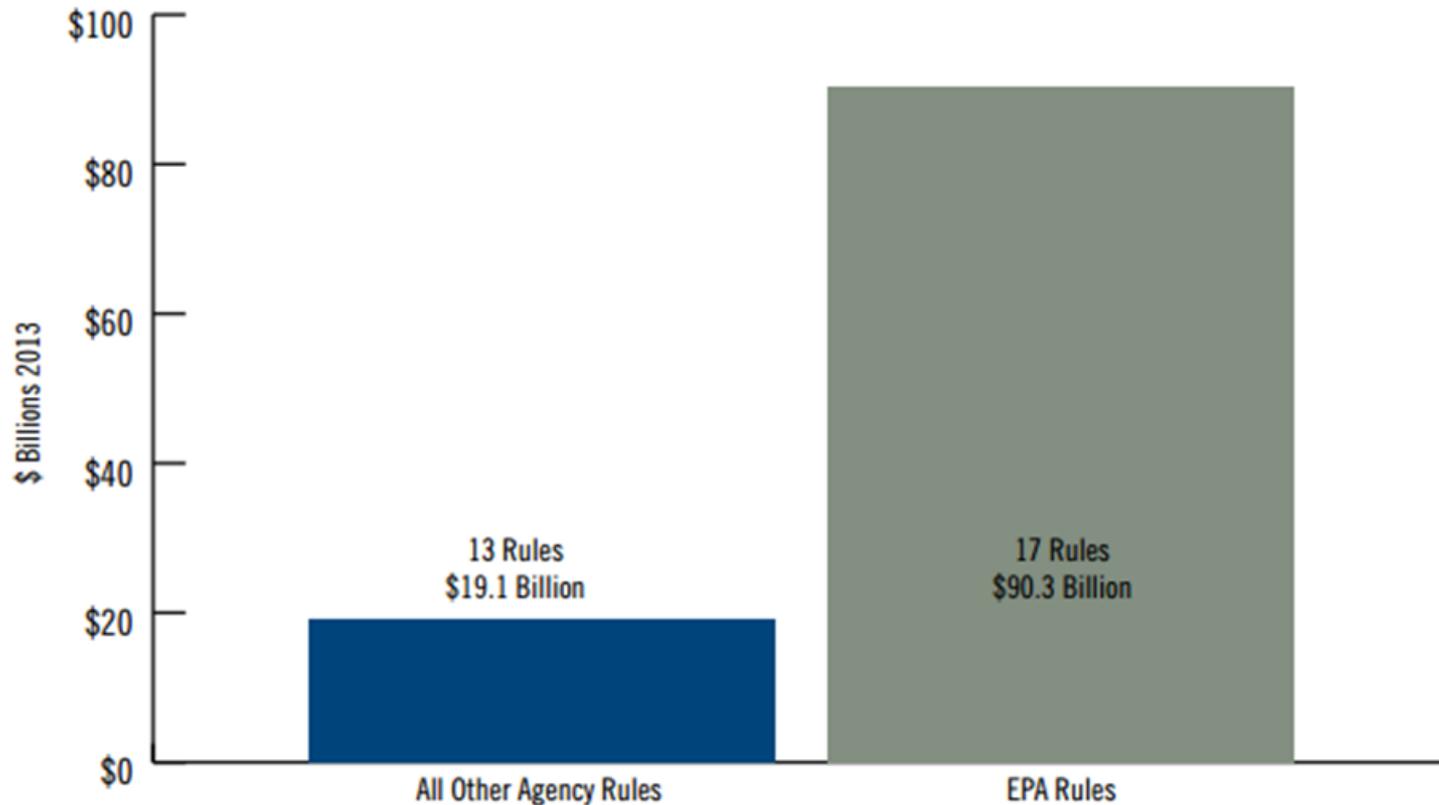


Aggregate Emissions  
(Six Common Pollutants)

# The Impacts of Regulation

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

EPA vs. All Other Federal Agencies



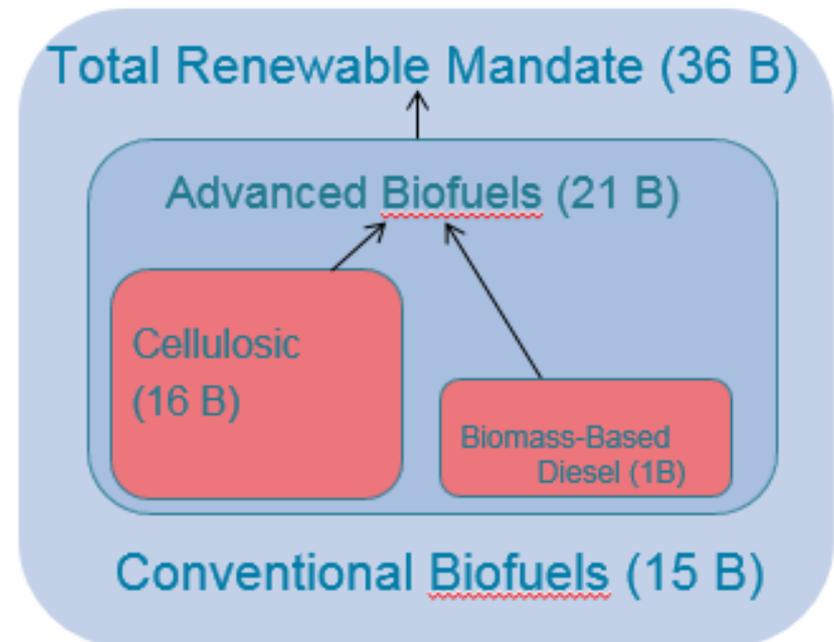
# The Renewable Fuel Standard

## Energy Policy Act of 2005

- Congress first established the Renewable Fuel Standard (RFS) under the Energy Policy Act of 2005 (EPAAct, P.L. 109-58).
- Mandated a minimum of **7.5 billion gallons** of renewable fuels to be used in the fuel supply by 2012.

## Energy Independence and Security Act of 2007

- 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



# 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 CO<sub>2</sub>e
- 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

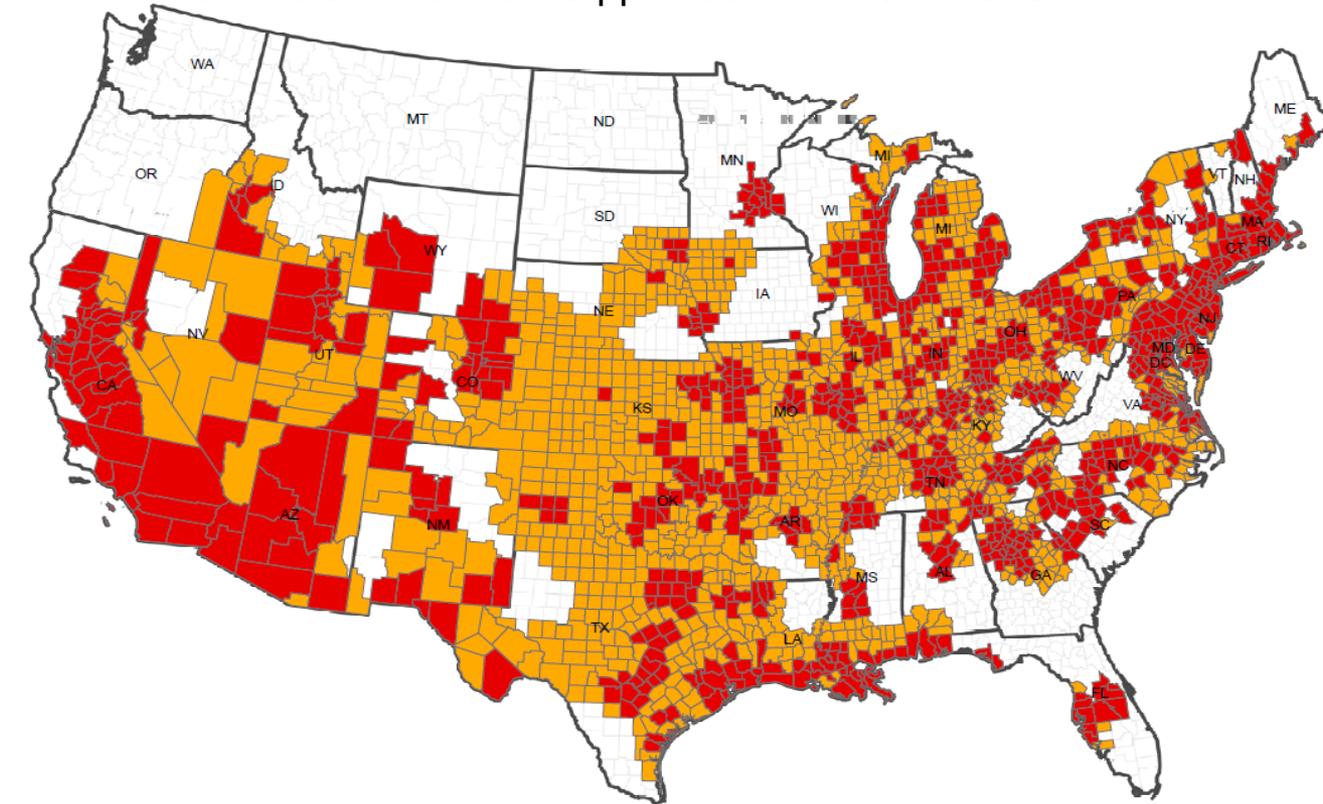
Attainment and Nonattainment Areas in the U.S.  
8-hour Ozone Standard



- 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



■ Monitored CBSAs and rural counties that would be violating a 65 ppb standard  
■ Unmonitored areas that are anticipated to violate a 65 ppb standard based on spatial interpolation

Based on a 3-year period, 2011-2013.  
Source: URS, July 7, 2014

**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

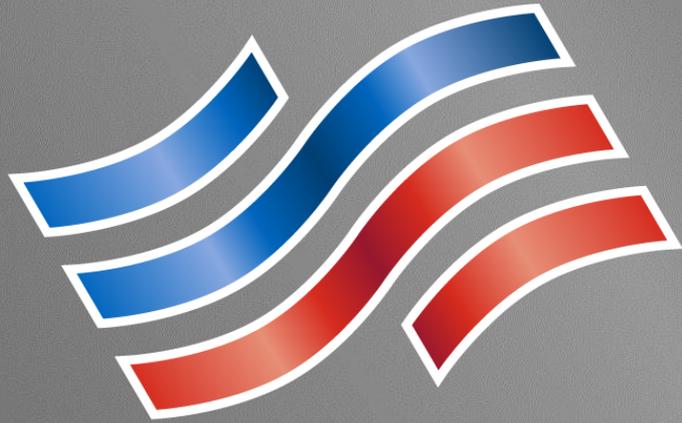
By 2020, a 60 ppb standard will severely impact SSEB states:

State	Gross State Product loss (2017–2040, billions)	Lost Jobs per year (thousands)	Total Compliance Costs (millions)	Decrease Yearly Average Household Consumption	Increase in Residential Vehicle Ownership/Operation (2017–2040, millions)
AL	\$24	22,683	\$667	\$970	N/A
AR	N/A	10,489	\$240	\$470	\$19
FL	\$58	52,576	\$4,500	\$470	\$866
GA	\$52	45,634	\$9,000	\$850	\$1,900
KY	\$32	29,166	\$1,000	\$830	\$104
LA	\$53	116,983	\$189,000	\$2,360	\$10,000
MD	\$121	90,226	\$81,000	\$2,940	\$16,000
MS	\$10	12,769	N/A	\$770	N/A
MO	\$29	40,249	\$9,400	\$1,060	\$932
NC	\$150	127,360	\$98,000	\$1,820	\$28,000
OK	N/A	13,716	\$846	\$660	N/A
SC	\$41	37,045	\$26,000	\$1,200	\$4,000
TN	\$26	20,956	\$1,500	\$570	\$159
TX	\$48	182,347	\$113,000	\$970	\$10,000
VA	\$46	36,123	\$11,000	\$990	\$1,600
WV	\$21	14,276	\$658	\$930	\$16

# Questions?

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