Energy Availability and the Future of the Fertilizer Industry

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Energy: the engine of our economic growth
The U.S. will require 10 percent more energy in 2040 and more than half of it will be met by oil and natural gas.

Source: EIA
U.S. oil and natural gas production is increasing as a result of technological innovations

Note: Bars in orange show EIA’s Short-term Energy Outlook forecast.
Source: Energy Information Administration.
Shale resources are widely dispersed across the U.S.
New technology allows for additional access to resources.
The technology is designed to protect the environment.

Natural gas and oil wells have redundant layers of cemented steel piping, called casing, providing a shield between oil and gas production and the environment.

A typical natural gas and oil well is constructed with three million pounds of steel and cement.
What Administration officials have to say about hydraulic fracturing

- Former Interior Secretary Ken Salazar (Sept 2013)
  “Hydraulic fracturing is creating an energy revolution in the United States. I would say to everybody that hydraulic fracturing is safe.”

- Former Energy Secretary Steven Chu (Sept 2013)
  “Drilling for shale gas can be done safely.”

- Then-EPA Administrator Lisa Jackson in 2012:
  “In no case have we made a definitive determination that the fracking process has caused chemical contamination of groundwater.”
Shale production is offsetting declining production from other U.S. oil and natural gas resources.
The price of natural gas has fallen relative to crude oil

Changes in the price of crude oil and natural gas

Source: EIA
Rising US natural gas output pushed natural gas prices to record discounts against international gas prices

Average US farm prices of selected fertilizers

- Anhydrous ammonia
- Nitrogen solutions (30%)
- Urea 44-46% nitrogen
- Ammonium nitrate
- Sulfate of ammonium
- Super-phosphate 44-46% phosphate
- Diammonium phosphate (18-46-0)
- Potassium chloride 60% potassium

Source: USDA
Industrial production expands in response to competitive advantage of low natural gas prices

- Industrial production benefits from strong growth in shale gas production
- Lower natural gas prices lower costs of both raw material and energy
- Chemical and fertilizer facilities are seeing increased utilization with lower natural gas prices
- Energy-intensive industry can be more competitive in the global market
Shale energy can lead to American prosperity

$1,200

American consumers’ annual savings due to lower gas prices resulting from shale energy development
(IHS Global Insight)
EIA estimates of Midwest expenditures for heating fuels

Share of Midwest homes by primary space heating fuel

- Natural gas: 68%
- Heating oil: 21%
- Propane: 8%
- Electricity: 2%

- Wood: 1%

Last winter vs. This winter expenditures

- Natural gas:
  - Last winter: $638
  - This winter: $703

- Heating oil:
  - Last winter: $2,092
  - This winter: $2,006

- Propane:
  - Last winter: $1,333
  - This winter: $1,469

- Electricity:
  - Last winter: $953
  - This winter: $971

Source: EIA
Shale development equals more jobs

Construction Industry  
Drilling Industry  
Chemical Industry  
Trucking Industry  
Hospitality Industry  
Steel Industry
Oil and natural gas jobs pay well
(average annual wages)

- Oil and natural gas extraction: $152,101
- Pipeline transportation: $111,080
- Drilling oil and gas wells: $90,252
- Support activities for oil and gas: $80,003
- Oil and gas pipeline construction: $66,542
- U.S. average: $49,289

Shale development equals more government revenue

Contributed $74 billion in 2012 and expected to grow to $126 billion by 2020. On cumulative basis, estimated to generate $1.6 trillion in tax revenue between 2012-2025.
EIA forecasts relatively low natural gas prices for decades

Source: EIA
Factors Affecting Price
Changes in gasoline and diesel prices mirror changes in crude oil prices

Average prices as of December 5, 2013

Sources: NYMEX (WTI crude oil) and AAA (gasoline and diesel)
Many factors affect the price of oil, but in the end it comes down to supply and demand.
Estimated unplanned OPEC crude oil production outages (thousands barrels per day)

Source: EIA, Short-term Energy Outlook, November 2013
World crude oil and liquid fuels production growth

million barrels per day

Forecast

2012
- OPEC countries
- Latin America

2013
- North America

2014
- Russia and Caspian Sea
- North Sea
- Other Non-OPEC

Source: Short-Term Energy Outlook, November 2013
Non-OPEC crude oil and liquid fuels production growth
(million barrels per day)

Source: Short-Term Energy Outlook, November 2013
For the first time since 1949, the U.S. became a net exporter of petroleum products in 2011

Source: EIA
Crude oil and petroleum product imports have declined as a share of consumption.

Source: EIA
Potential of Domestic and Canadian Resources
87% of federal offshore acreage is off-limits to development

U.S. Offshore Undiscovered Technically Recoverable Federal Oil and Natural Gas Resources
(billion barrels - Bbl and trillion cubic feet - Tcf)

Development of Canadian oil sands would benefit the U.S. economy

2011 Trade in Goods

For every dollar of goods the U.S. imports, we get back...

From Canada: 89¢
From OPEC: 33¢

Source: http://www.census.gov/foreign-trade/balance/
FILLING AMERICA’S TANK
Within 11 years Canada & U.S. can provide all our liquid fuel needs

Sources of liquid fuel supply: 2024

- **24%** Oil from rest of world
- **10%** Biofuels
- **13%** Oil from Canada
- **53%** US oil production

**EIA forecast**

**Potential**

10%

18%

72%

Sources: EIA; Wood Mackenzie
America’s choice

increase
oil & natural gas development

jobs
+ 1,100,000 jobs

government revenue
+ $127 billion

energy production
+ 4 million barrels’ worth of oil and natural gas per day

raise
oil & natural gas taxes

jobs
- 48,000 jobs

government revenue
- $29 billion

energy production
- 700,000 barrels’ worth of oil and natural gas per day
Voters voice strong support for increased domestic oil and natural gas development

Harris Poll Results on Increased U.S. Oil and Natural Gas Development

<table>
<thead>
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<th>Importance of energy security</th>
<th>Lead to more jobs</th>
<th>Help lower energy costs</th>
<th>Support building Keystone XL pipeline</th>
<th>Support O&amp;NG development</th>
<th>Support offshore development</th>
<th>Increasing energy taxes may hurt consumers</th>
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<td>75%</td>
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Source: Harris Interactive telephone poll, November 6, 2012
For more information visit:
www.api.org
www.energytomorrow.org
www.energycitizens.org
Why does gasoline fuel cost what it does?

Source: EIA, based on average October price of $3.34 per gallon
Gasoline prices can vary by state because of the difference in state taxes

Combined local, state and federal gasoline taxes (cents per gallon), October 2013
Second Quarter 2013 Earnings by Industry
(cents of net income per dollar of sales)

- Pharmaceuticals: 32.3
- Beverage & Tobacco: 20.5
- Chemicals: 18.6
- Computers: 15.8
- Electrical: 11.2
- Apparel & Leather: 9.3
- All Manufacturing: 9.1
- Machinery: 8.9
- Oil & Natural Gas: 7.9
- Furniture: 5.5
- Food: 5.2
- Textiles: 4.9
- Motor Vehicles: 4.9
- Iron & Steel: 0.8
Who owns U.S. oil and natural gas companies?
Answer: tens of millions of Americans

Source: Who Owns America’s Oil and Natural Gas Companies, SONECON, October 2011
The oil and natural gas industry is one of the most heavily taxed industries in America

**Effective Tax Rates Among Industries**
(averaged over 2007-2012)

- Retail: 37.7%
- Health Care Provider Services: 34.9%
- Utilities: 32.6%
- Industrial Conglomerates: 15.8%
- Insurance: 17.8%
- Pharmaceuticals: 21.3%
- Media: 23.1%
- Computer and Peripherals: 25.6%

**Oil and Gas**: 44.6%

Tax rate is total income taxes, which include income taxes imposed by federal, state, and foreign governments, divided by pretax income. Source: S&P Research Insight; S&P 1500 by GICS Industry Code.
Refrineries and Fuels
Number of refineries declines but capacity expands

*Operable as of January 1st of each year.
Source: EIA, Petroleum Supply Annual.
Expanding alternative fuels for transportation: current laws

The Blend Wall

We are rapidly approaching the point when EPA’s ever increasing alternative fuel mandates exceed what can be safely blended into the nation’s vehicles.

NERA predicts gasoline prices could be 30% greater AND diesel prices 300% greater by 2015.

The Energy Policy Research Foundation estimates that as a result gasoline prices could increase from 20 cents per gallon up to $1.00 per gallon by next year.