

Will America Be Energy Self Sufficient or Not?

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“In 2008, the rise in oil prices was accompanied – and partly fueled – by a belief that an era of permanent scarcity was at hand. This mentality had deep roots extending back to the 1970s, when the United States went from being a minor importer of oil to a major importer. In the 2008 rendition, falling oil output was considered simply inevitable. The only questions were at what rate petroleum imports would rise and whether that rate would be slower.

The outlook was much the same for natural gas. Production would inevitable decline, and the country was on the way to spending \$100 billion a year to import liquefied natural gas from West Africa, the Middle east, even Australia and Russia. The energy burden on our trade deficit would only increase, adding to our economic distress.”

“America’s New Energy Reality”, *The New York Times*

What we expected in 2007

“U.S. crude oil production is projected to increase from 5.2 million barrels per day in 2005 to a peak of 5.9 million barrels per day in 2017 as a result of increased production offshore, predominantly from the deep waters of the Gulf of Mexico.” – EIA, 2007

And today?

“From 5.0 million barrels per day in 2008, U.S. crude oil production increased to 6.5 million barrels per day in 2012.” – EIA, 2013

What we expected in 2007

“The (EIA) projects that LNG imports will meet much of the increased U.S. demand for natural gas” – EIA, 2007

And today?

“U.S. dry natural gas production increases 1.3 percent per year, outpacing domestic consumption by 2019 and spurring net exports of natural gas.” – EIA, 2013

What we expected in 2007

“Net imports of energy on a Btu basis are projected to meet a growing share of total U.S. energy demand.” – EIA, 2007

And today?

“The U.S. could become a net exporter of liquid fuels under certain conditions.” – EIA, 2013

What we said then....

“Although natural gas prices declined from \$10 per thousand cubic feet (mcf) in December 2005 to about \$6 recently, the Energy Information Administration (EIA) expects prices to return to the unprecedented price levels of last year as we move back into this winter’s heating season.” – U.S. Dept of Commerce, 2006

“Since 2000, when energy prices began to climb, especially for natural gas, the U.S. has lost more than 3.7 million high-wage manufacturing jobs.” – Consumer Energy Alliance, 2008.

“...these levels of higher natural gas prices would (1) cause the economy to grow moderately more slowly through 2008, but the effects would not be enough to cause a recession; (2) reduce the growth in industry output and job creation in the economy; and (3) induce individual and business consumers to use less natural gas and, alternatively, use more electricity..” – U.S Dept of Commerce, 2006

....And more recently.

“Today, the spot price of natural gas is about \$3 per million BTUs, saving the U.S. economy some \$264 million a day. ” – Wall Street Journal, 2013

“Oil and gas extraction could, by 2020, add as many as 3.6 million net new jobs in the U.S. and Canada—and, through increased tax receipts, cut the U.S. budget deficit by 60%.” – 2012 Citigroup Study

“U.S. manufacturing companies could employ approximately one million more workers by 2025 due to benefits from affordable energy and demand for products used to extract the gas...Lower feedstock and energy costs could help U.S. manufacturers reduce natural gas expenses by as much as \$11.6 billion annually.” – PWC, 2011

President Obama – then and now

2006

“It is hard to overstate the degree to which our addiction to oil undermines our future. Without any change to energy policy, US demand for oil will jump 40% in 20 years. Over the same period, worldwide demand will jump 30%....We cannot drill our way out of the problem.”



2013

“We have increased oil production to the highest levels in 16 years. Natural gas production is the highest it's been in decades.” (Obama 2012)

“Nowhere is the promise of innovation greater than in American-made energy. We've opened millions of new acres for oil and gas exploration, and more than 75% of our potential offshore oil and gas resources. Right now, American oil production is the highest that it's been in 8 years. Last year, we relied less on foreign oil than in any of the past 16 years.” (Obama 2013)

EIA's Imported Energy Predictions

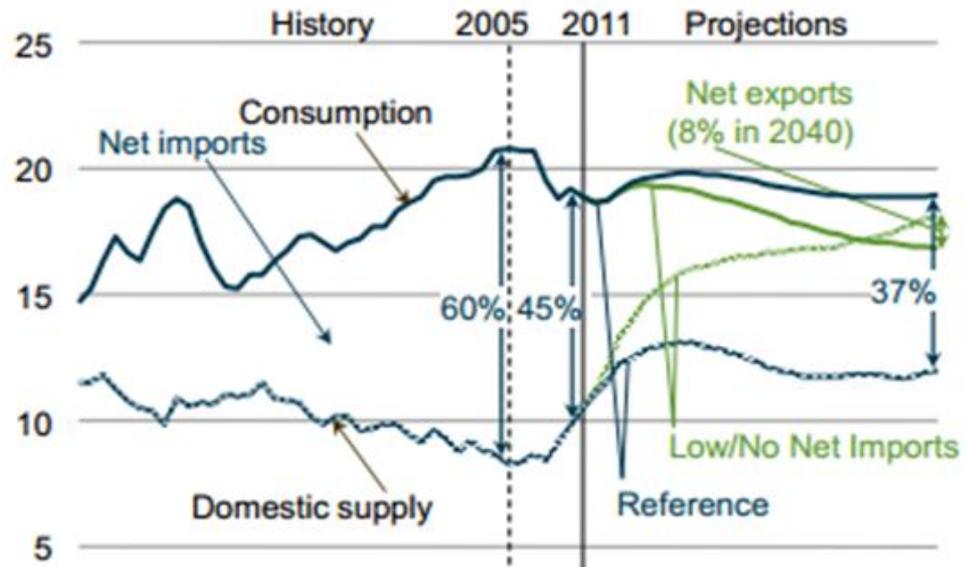
2007

The net liquids import share of total supply, including both crude oil and refined products, drops from 60 percent of total liquids supply in 2005 to 54 percent in 2009, before increasing to 61 percent in 2030.

2013

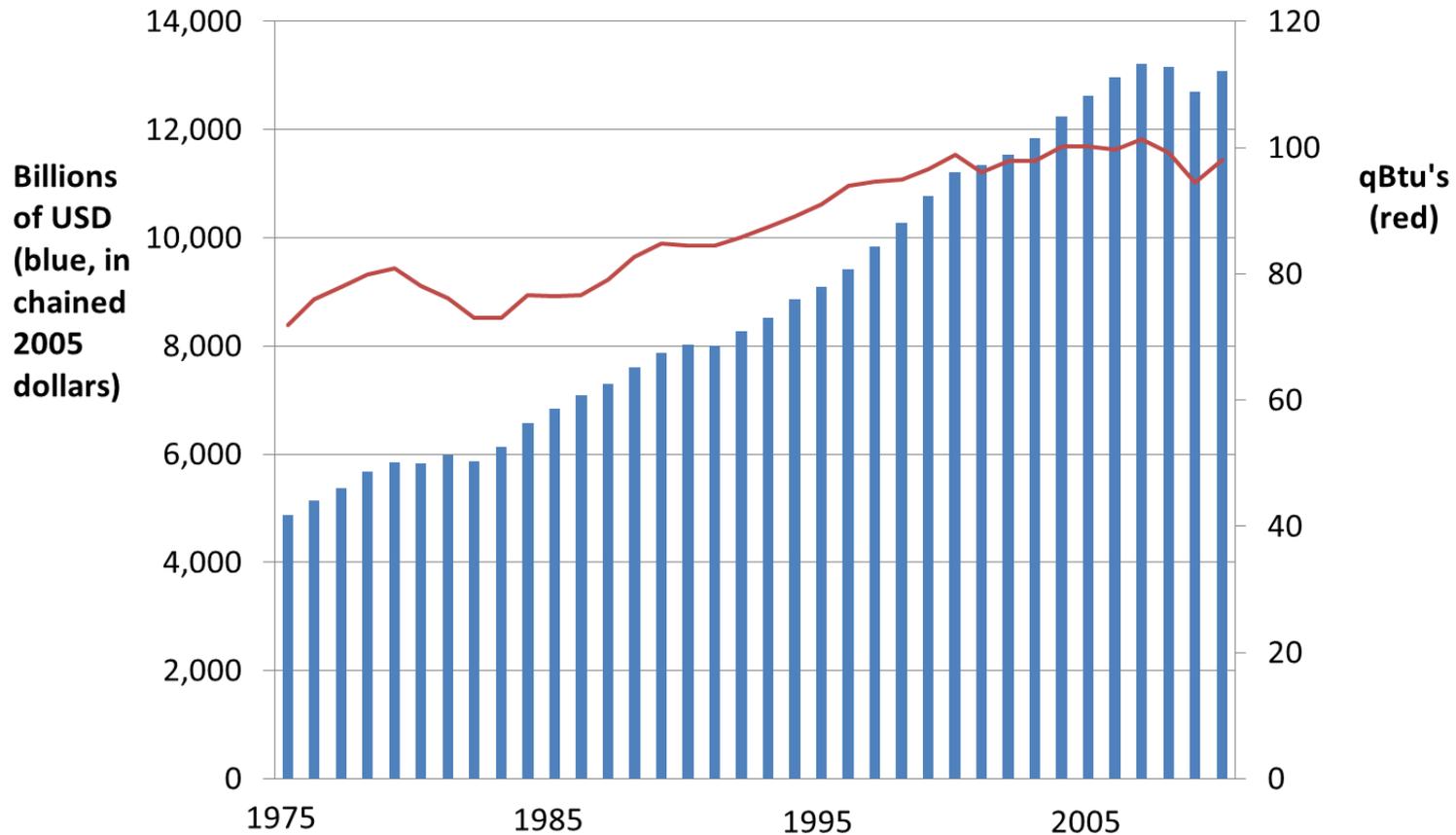
The net import share of U.S. liquids consumption grew steadily from the mid-1980s to 2005 but has fallen in every year since then. U.S. net imports of petroleum and other liquids decline through 2019, while still providing approximately one-third of total U.S. supply. The net import share of U.S. petroleum and other liquids consumption continues to decline, falling to 34 percent in 2019 before increasing to 37 percent in 2040. The U.S. could become a net exporter of liquid fuels under certain conditions.

Figure 1. Net import share of U.S. liquids supply in two cases, 1970-2040 (million barrels per day)



Energy and the Economy

US GDP vs Quadrillion Btu's Consumed, 1975 - 2010



The Role of Oil and Natural Gas in the U.S. Economy

- **95% of US transportation fuels comes from oil.**
- **Natural gas accounted for 30% of electricity in 2012.**
- **75% of all energy used in the U.S. is from oil and natural gas.**
- **US oil and gas employs 9.6 million, or 5.5% of the US workforce**
- **One energy job creates 2.7 supporting jobs**
- **Overall, the industry adds \$2 trillion to the US economy, or 7.5% of GDP.**

Energy and the Economy

2000

- Overall U.S. employment* was **115.3 million**
- Energy sector employed **454,684**

2007

- Overall U.S. employment* was **123.8 million**
- Energy Sector employed **700,643**

2013

- Estimated overall U.S. employment* **123.3 million**
- Estimated **864,000** employed in the energy sector

It is easy to see that the energy sector is steadily increasing despite a declining economy.

**Excluding government employees*

SOURCE: U.S. Bureau of Labor Statistics

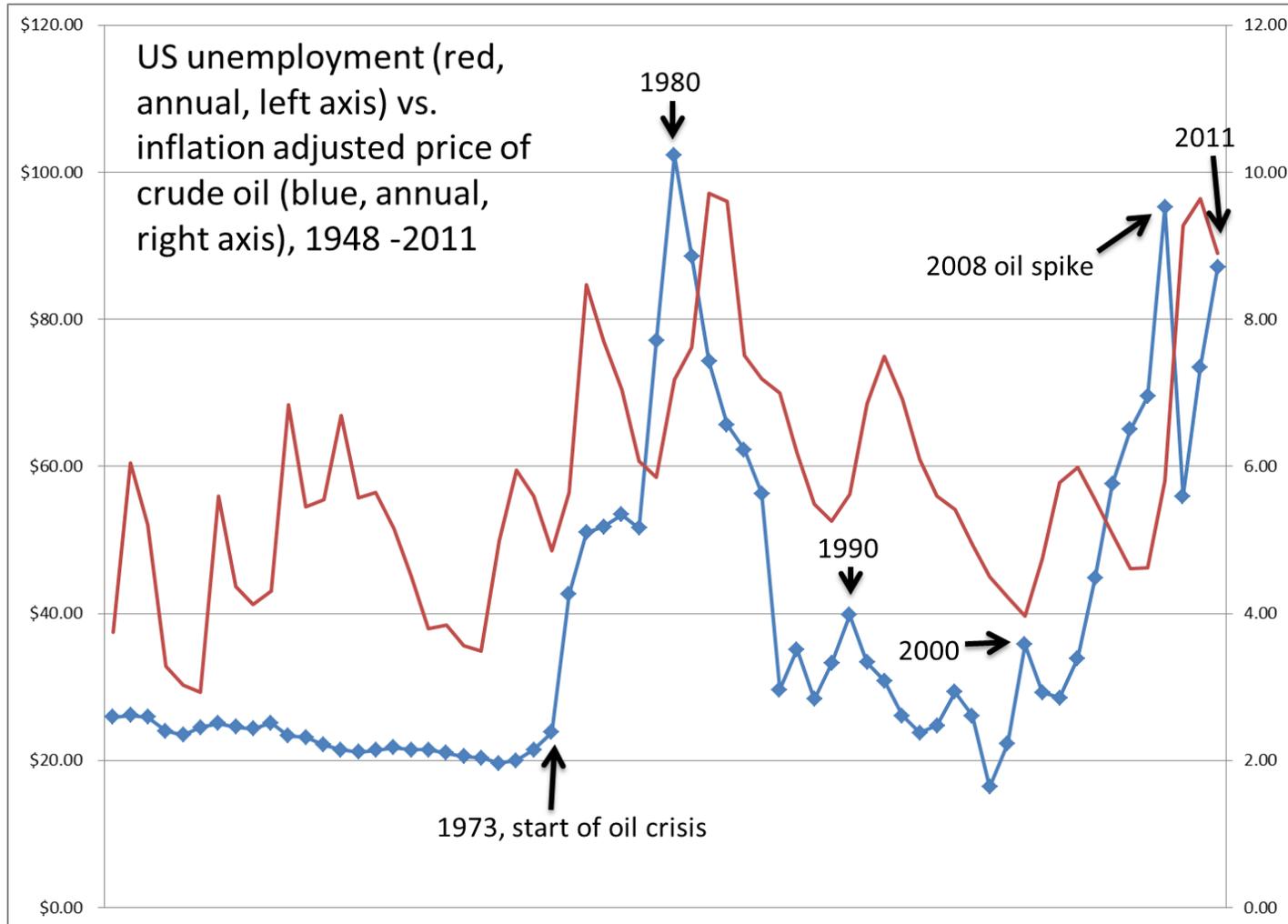
Table 8: Averages Wages for Selected Industries, 2001–2011

Battelle analysis of Bureau of Labor Statistics, QCEW data and enhanced file from IMPLAN.

Industry Cluster	MS Average Wages, 2010	U.S. Average Wages, 2010	Average Wage Difference
Refineries	\$ 100,870	\$ 112,960	-11%
Power Generation	\$ 91,962	\$ 98,516	-7%
Management of Companies & Enterprises	\$ 70,636	\$ 98,215	-28%
Extraction/Resource Development	\$ 67,337	\$ 98,992	-32%
Total Energy Cluster	\$ 63,456	\$ 87,524	-27%
Paper Manufacturing	\$ 57,738	\$ 58,610	-1.5%
Power T/D	\$ 55,856	\$ 75,819	-26%
Renewable Eng & Storage	\$ 52,511	\$ 100,591	-48%
Professional, Scientific, & Technical Services	\$ 50,576	\$ 77,313	-35%
Wholesale Trade	\$ 47,273	\$ 63,628	-26%
Finance & Insurance	\$ 46,366	\$ 84,516	-45%
Information	\$ 40,547	\$ 74,382	-45%
Manufacturing	\$ 40,482	\$ 57,511	-30%
Construction	\$ 40,218	\$ 49,588	-19%
Petroleum Products & Wholesale	\$ 38,335	\$ 55,874	-31%
Transportation & Warehousing	\$ 37,872	\$ 44,198	-14%
Health Care & Social Assistance	\$ 37,695	\$ 43,732	-14%
Total Private Sector	\$ 33,524	\$ 46,451	-28%
Real Estate & Rental & Leasing	\$ 29,438	\$ 43,779	-33%
Agriculture, Forestry, Fishing & Hunting	\$ 28,119	\$ 26,626	6%
Retail Trade	\$ 22,622	\$ 26,655	-15%
Arts, Entertainment, & Recreation	\$ 21,026	\$ 32,278	-35%

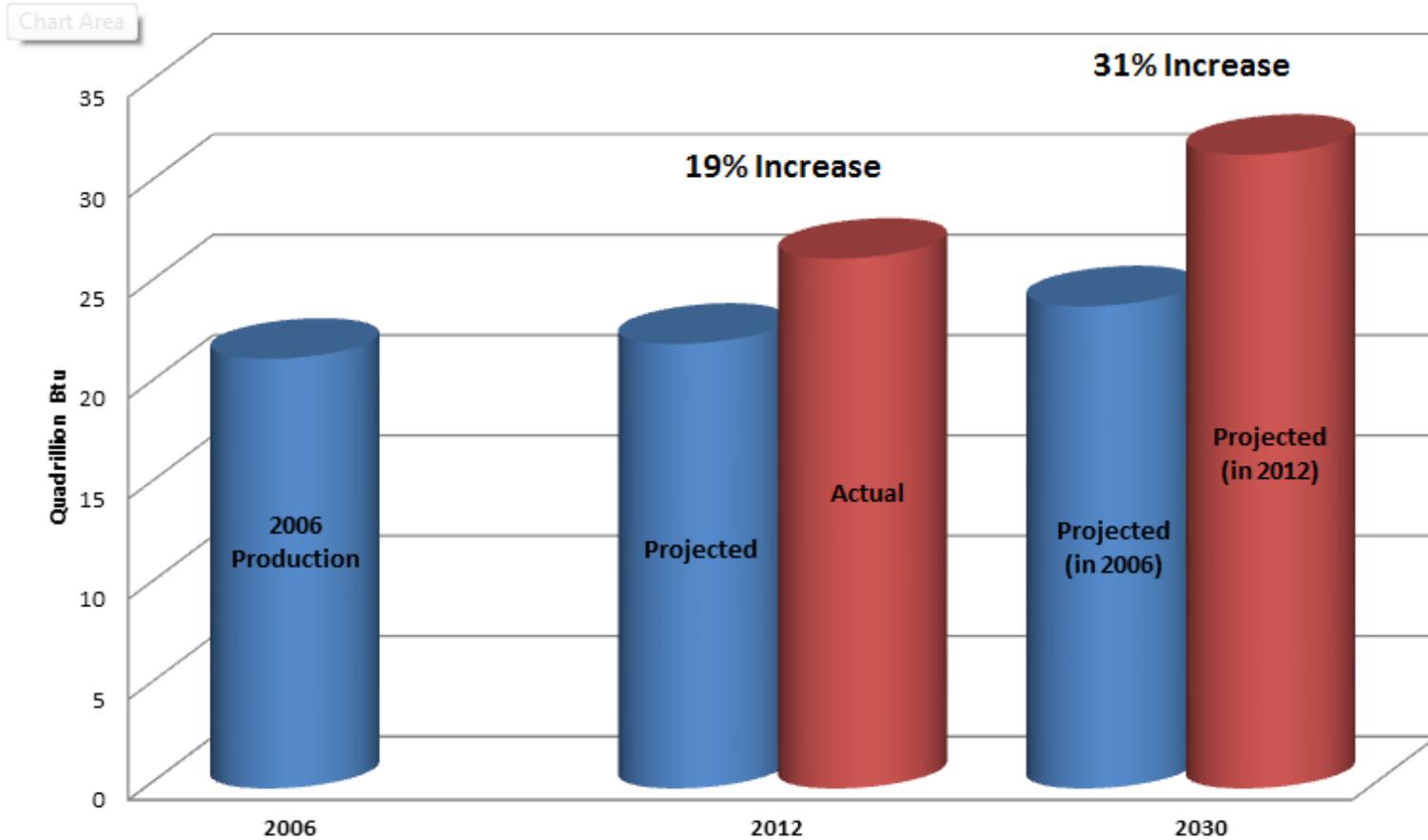
SOURCE: Battelle Analysis of Bureau Labor Statistics, QCEW data and enhanced file from IMPLAN

Crude Prices and U.S. Employment

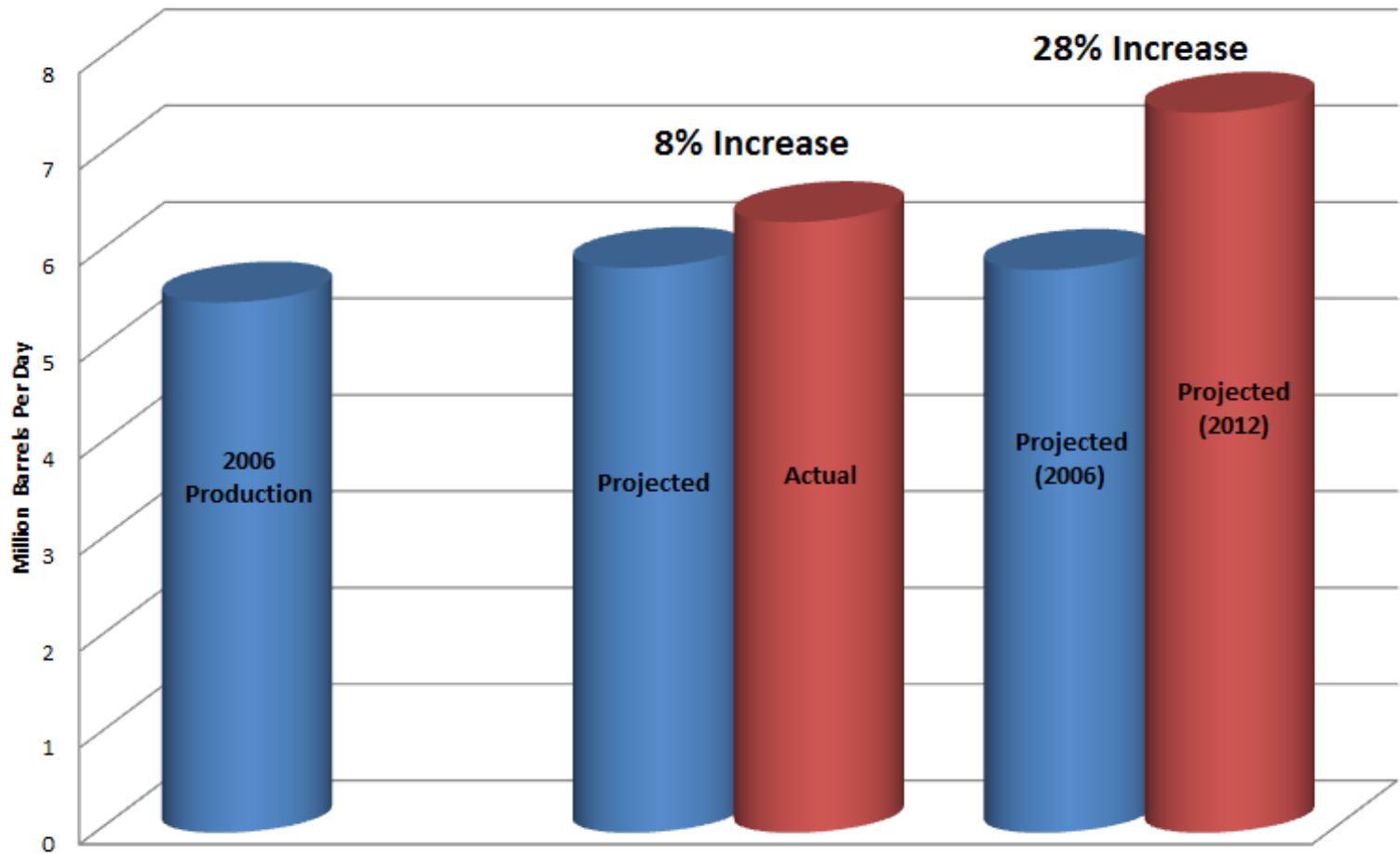


Natural gas production

Unexpected Gains in Natural Gas Production

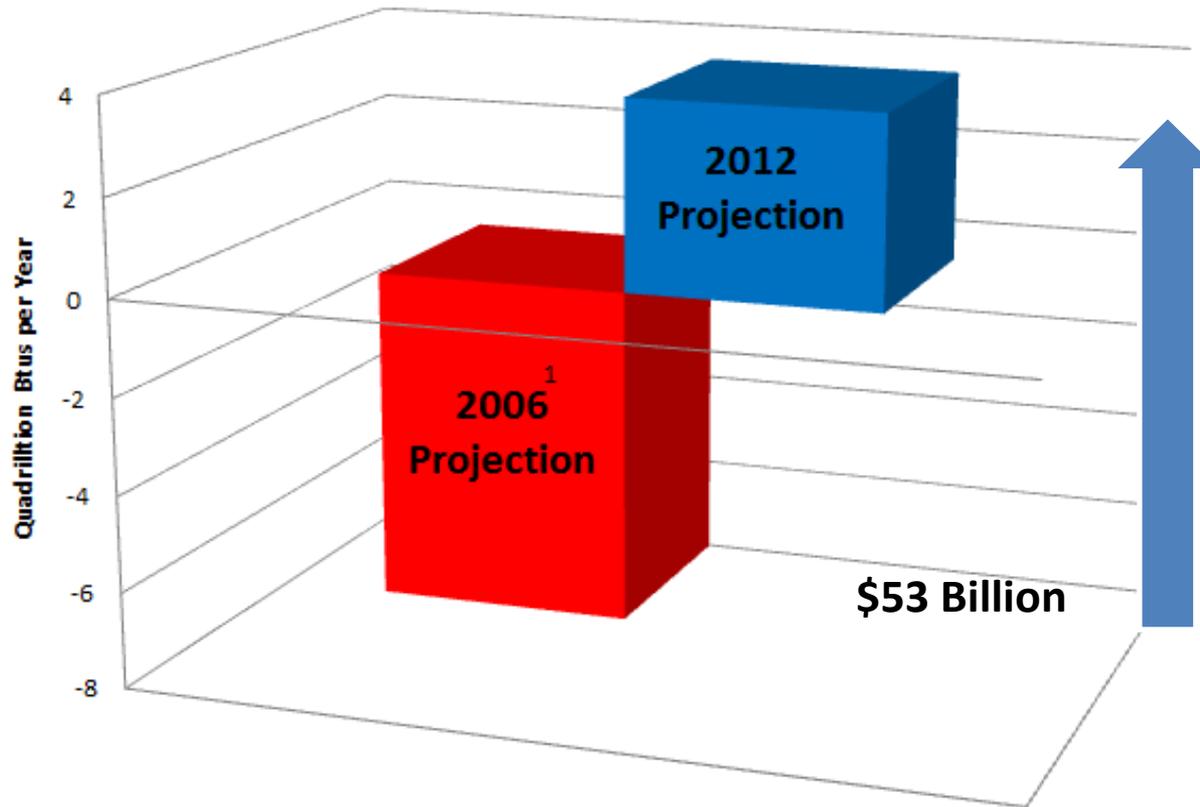


Oil production



Natural gas – from import dependence to export opportunity

Natural Gas Projections for 2030



American Energy Production

Total Energy Production

1. China
2. United States
3. Russia

Coal Production

1. China
2. United States
3. India

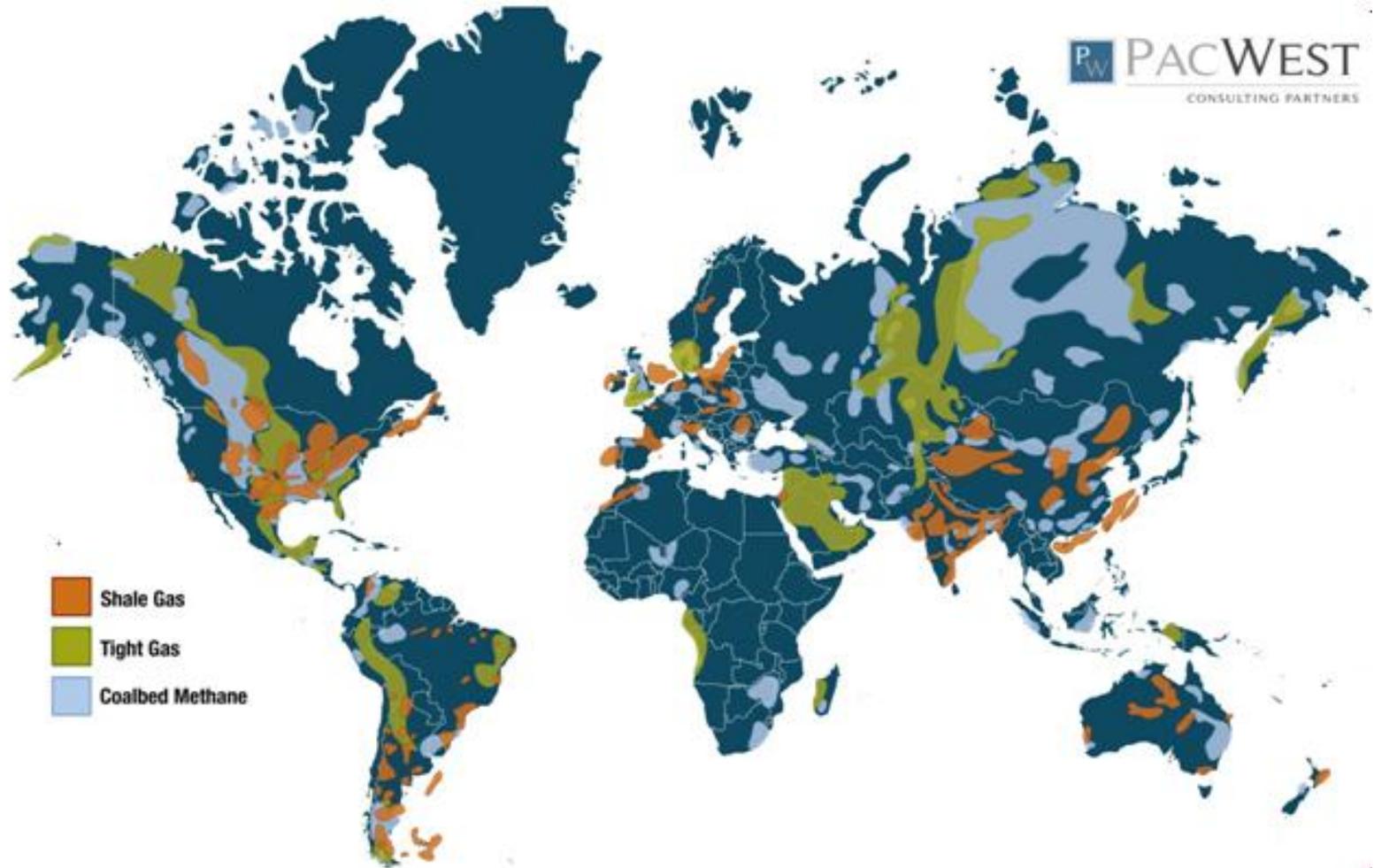
Natural Gas Production

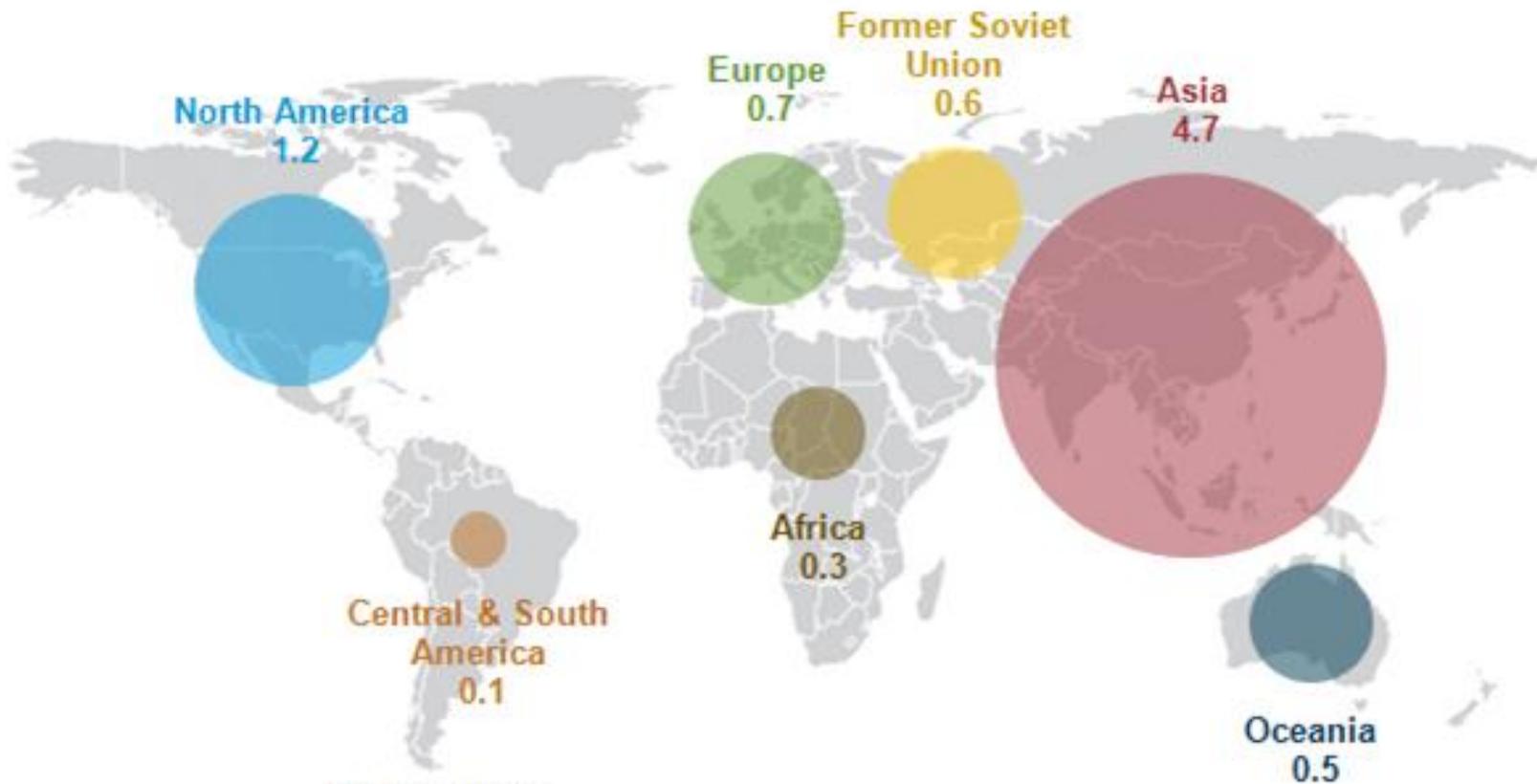
1. Russia
2. United States
3. Iran

Oil Production

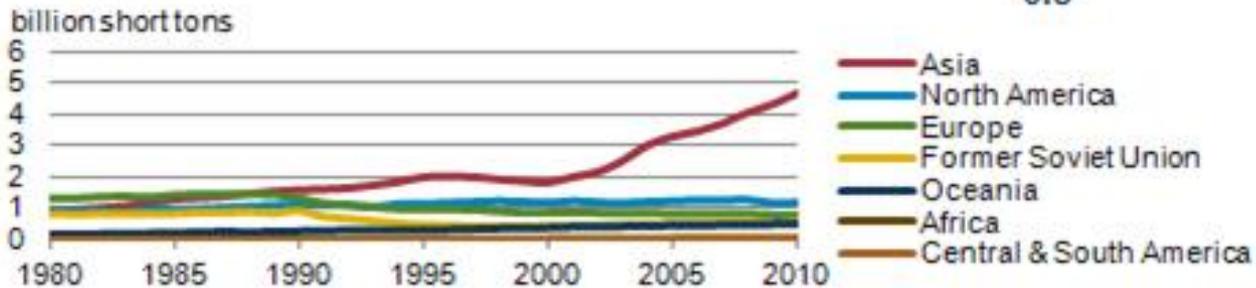
1. Saudi Arabia
2. United States
3. Russia

Shale is abundant outside of the U.S.





2010



What are the implications of our energy advantage?

“This new discourse is shaped not only by the surge in oil and gas production. But is also represents a growing recognition of what this means for the overall economy. Traditionally, the major arguments in favor of domestic oil and gas production have mainly been about energy security and balance of payments. But now this surge is recognized as an engine of economic growth. Increasing domestic supply means that fewer dollars are going overseas and more of them are staying at home, going into investment and job creation.”

“America’s New Energy Reality”, The New York Times

Reasons manufacturing opportunities are REAL

- Labor costs in the developing world – namely China – have been rising relative to the more developed world.
- Real wages in American manufacturing have declined by 2.2 percent since 2005 – largely driven by the financial crisis
- The recently commercialized extraction of shale gas has lowered U.S. energy costs relative to the rest of the world – breathing new life into struggling industries such as steel production
- The dollar has been weakening relative to the Chinese renminbi.
- Combined, these factors make invest in U.S. manufacturing more attractive for both domestic and foreign firms.

Threats to energy and manufacturing

1. “Off limits” policies
2. Structural costs of business
3. Lack of focus on job creation
4. Professional opposition groups
5. Washington, D.C.



“Common sense” solutions

1. Embrace energy; turn it loose
2. Embrace innovation
3. Focus on the main thing – jobs
4. Rational, predictable, effective regulation
5. Fix Washington, D.C.



Mississippi's Power Generation and Distribution

Power Plants (by Megawatts)

- 1 - 49
- 50 - 299
- 300 - 799
- 800 - 2,229

Power Plants (by Fuel Type)

- Bituminous Coal
- Black Liquor, Natural Gas, Distillate Fuel Oil, Bituminous Coal
- Black Liquor, Natural Gas, Wood & Wood Waste Solids, Residual Fuel Oil, Agriculture Crop Byproducts
- Black Liquor, Natural Gas, Wood & Wood Waste Solids, Tires
- Distillate Fuel Oil
- Landfill Gas
- Natural Gas
- Natural Gas, Bituminous Coal
- Natural Gas, Bituminous Coal, Distillate Fuel Oil
- Natural Gas, Bituminous Coal, Sub-bituminous Coal, Distillate Fuel Oil
- Natural Gas, Distillate Fuel Oil
- Natural Gas, Distillate Fuel Oil, Residual Fuel Oil
- Natural Gas, Lignite
- Natural Gas, Residual Fuel Oil
- Natural Gas, Wood & Wood Waste Solids, Propane
- Nuclear
- Waste Heat

Electric Transmission Lines

- 500 kv
- 230 kv
- 161 kv
- 138 kv
- 115 kv
- 46 kv

Sources: Power Plant information based on information from the Energy Information Administration of the U.S. Dept. of Energy

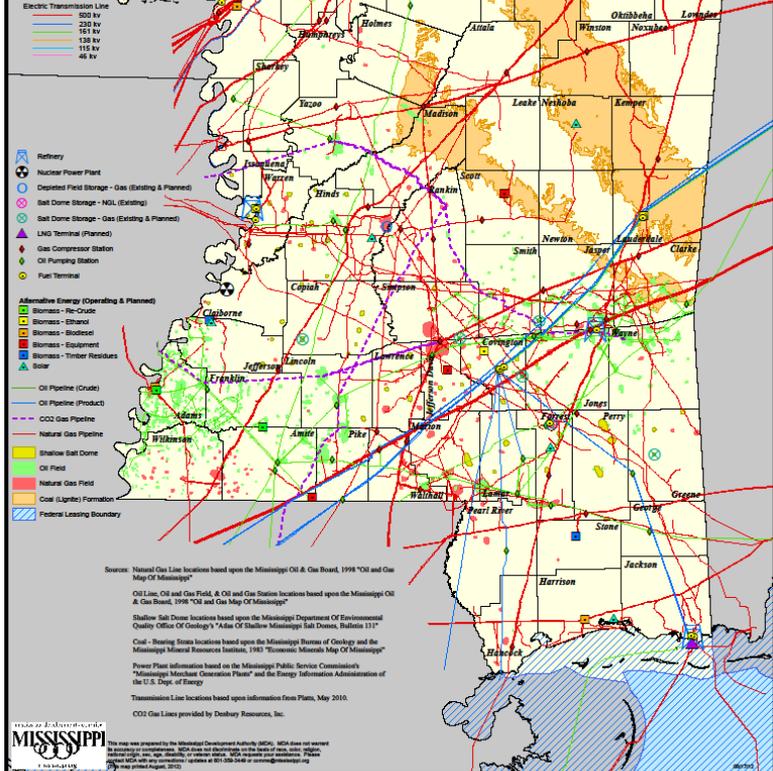
Transmission Line locations based upon information from Plans, May 2010.

MISSISSIPPI

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Mississippi's Energy Infrastructure



MISSISSIPPI

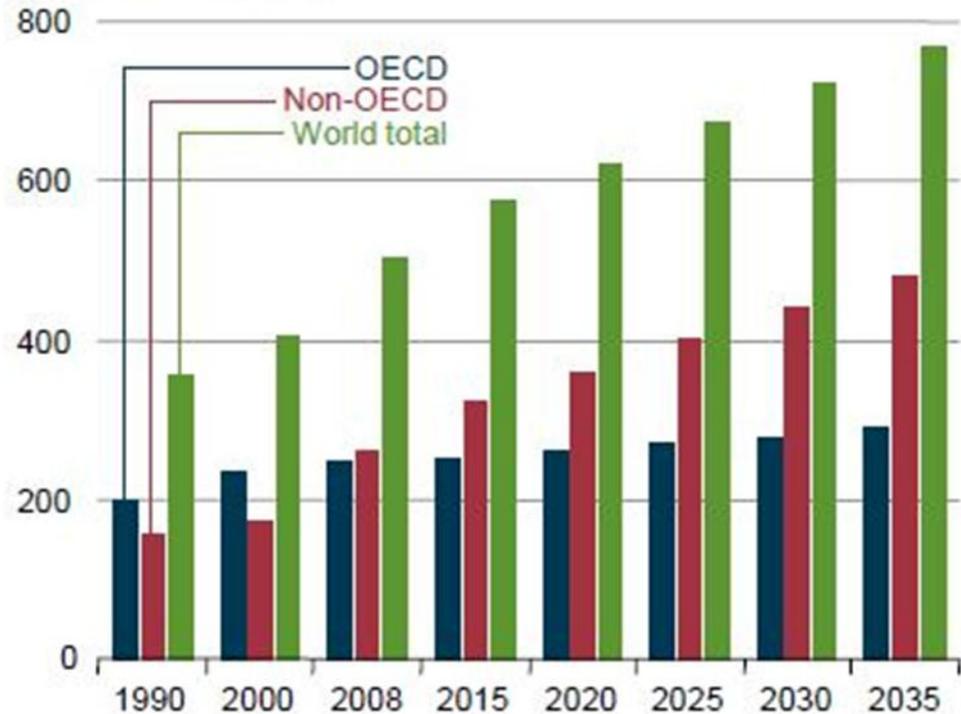
Global energy economy and dilemma

In 2010, the world energy economy was \$6.5 trillion dollars.

By 2035, the world will use 47% more energy. A proportional rise in the world energy economy increases the size to \$9.6 trillion dollars.

Most energy demand will be in developing countries – China, India, Indonesia, etc.

Figure 12. World energy consumption, 1990-2035 (quadrillion Btu)



Sources

- Energy Information Agency, www.eia.org
- *Economic Impacts of the Oil and Natural Gas Industry on the US Economy in 2011* prepared for the American Petroleum Institute by PWC
- American Petroleum Institute, www.api.org
- U.S. Bureau of Labor Statistics, www.bls.gov
- *Strategy for Energy-Based Economic Development* prepared for the Mississippi Energy Institute by Battelle Technology Partnership Practices