
**The Promise of (and Obstacles to)
America's Emerging
Growth Story**

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Economic Growth Program
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NEW AMERICA FOUNDATION

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I. Overview

Economic growth depends on the periodic emergence of several new big drivers of investment and job creation.

In the 1990s, it was the information technology revolution. In the coming decade, it will be the nexus of the oil and gas revolution and the manufacturing revival.

Like the information technology revolution, the oil and gas revolution will affect nearly every part of the U.S. economy by lowering the cost of energy and increasing American competitiveness.

And it will do so in a way that is inherently supportive of middle-class prosperity because it creates good-paying middle-class jobs and strengthens America's tradable sector.

Overview (cont.)

The stronger productive base provided by energy and manufacturing will in turn give us the means to increase other growth-enhancing investments in education and R&D and to strengthen our system of economic security.

The key missing piece of the story is a major program of infrastructure investment—which is needed to create jobs and realize the full potential of America’s energy resources and manufacturing capacity.

But America’s economic growth story faces serious obstacles: economic crisis in Europe, economic weakness and renewed trade pressures from China, and the coming fiscal cliff and public sector retrenchment in the U.S.

II. The Story Begins with Oil & Gas

Technological developments have expanded America's recoverable oil and natural gas resources.

Because of the ability to recover gas from shale formations with horizontal drilling, the U.S. could surpass Russian production of natural gas by 2017, according to the International Energy Agency.

The shale gas share of total natural gas production accounted for 23% of total production in 2010 and could rise as high as 60% in 2035.

**Shale Gas Share of Total Natural Gas Production
(trillion cubic feet)**

	2010	2035			
	Actual	Reference	Low EUR	High EUR	High TRR
Total natural gas production	21.6	27.9	26.1	30.1	34.1
Shale gas	5	13.6	9.7	16	20.5
Other	13.7	11.3	11.4	11.2	11.1
Shale gas share of total	23%	49%	37%	53%	60%

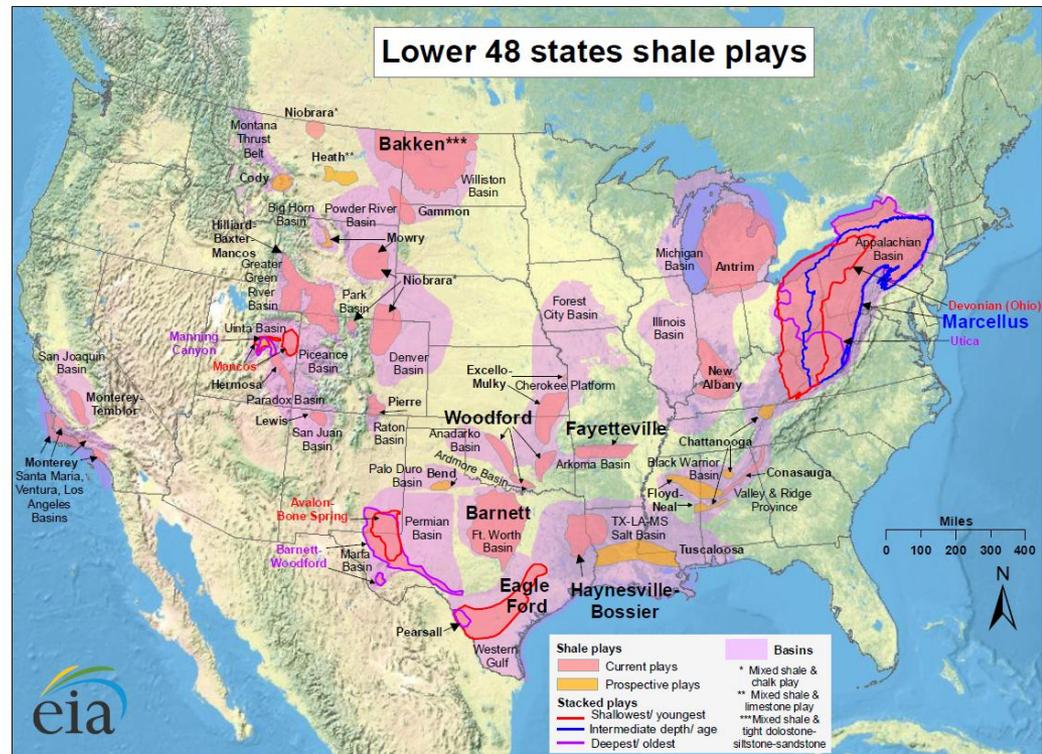
Source: Energy Information Administration
 EUR - Estimated Ultimate Recovery
 TRR - Technically Recoverable Resources

Shale Gas in the Lower 48

Natural gas resources are widely distributed across the country.

This ensures that nearly every region will benefit from the natural gas revolution, either as a producer or a consumer.

The natural gas revolution thus has the potential to be a true national economic growth story.



Source: Energy Information Administration based on data from various published studies. Updated: May 9, 2011

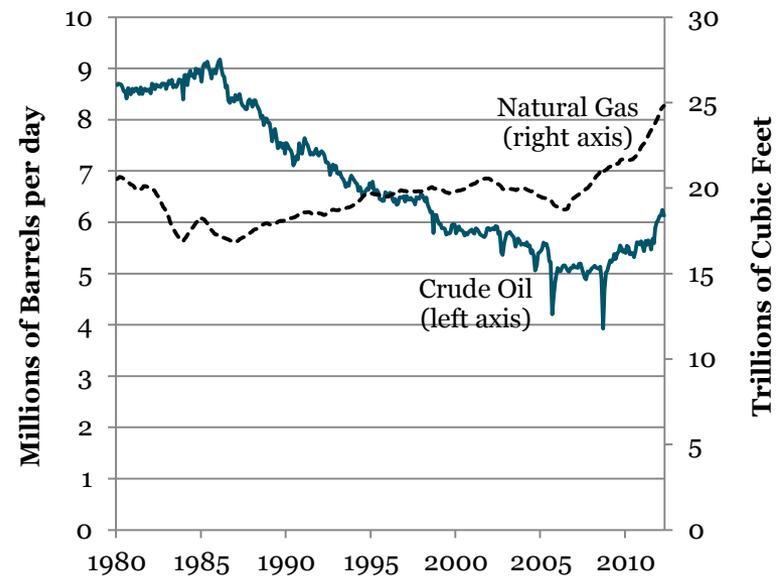
Oil & Gas Production Boom

Domestic oil production has increased rapidly in the past few years giving the U.S. the largest increase in oil production outside OPEC.

U.S. oil production has increased from 5.0 million barrels per day (mb/d) in 2008 to 6.1 mb/d in April 2012, a 24% increase.

During the same time period, domestic gas production rose from 20.8 trillion cubic feet per year to 24.8 trillion cubic feet per year, a 19% increase.

U.S. Natural Gas and Crude Oil Production



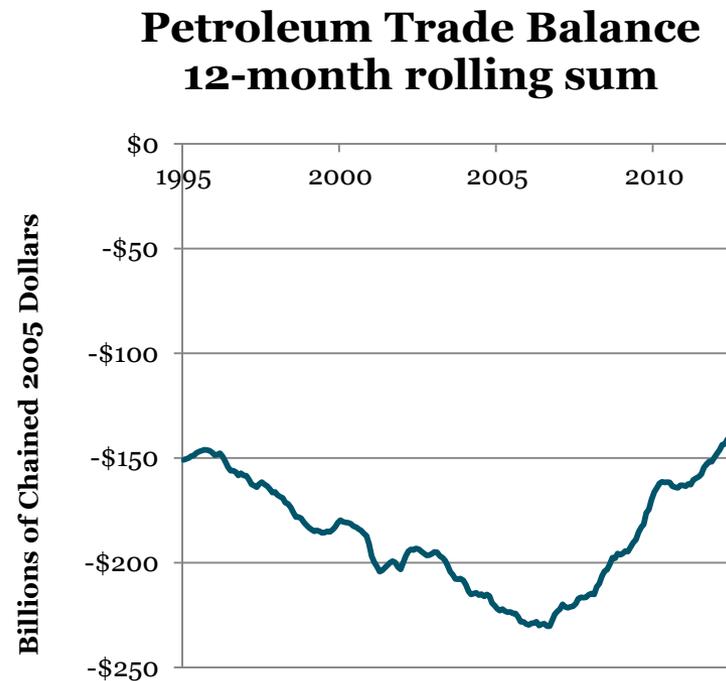
Source: Energy Information Administration

Improves the Trade Balance

Increased oil and gas production improves the trade balance. This means fewer dollars will go abroad and more investment and job creation will take place at home.

In 2005, the U.S. imported 60 percent of its oil. In 2011, that number had decreased to less than half.

The trade deficit in petroleum has fallen from \$230 billion in 2006 to \$141 billion in 2012. Increased production and greater energy efficiency could eliminate the petroleum trade deficit by 2020.



Source: U.S. Census Bureau

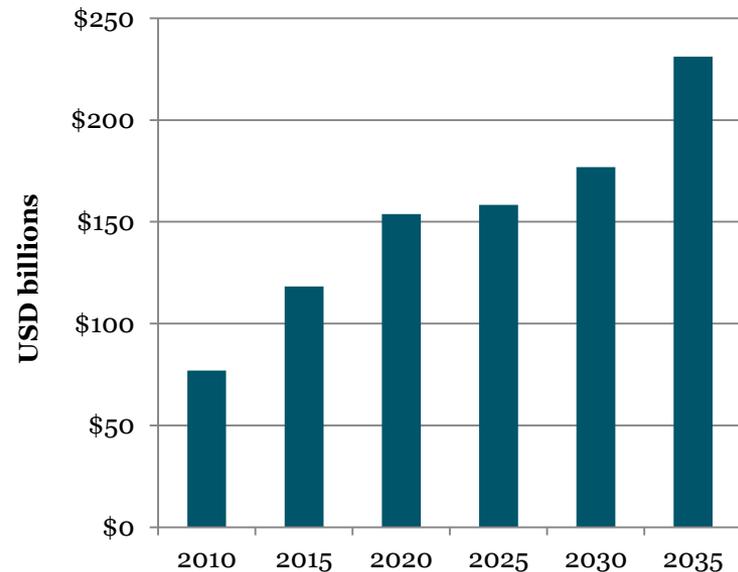
Increases GDP

Higher domestic production of oil and gas increases capital investment and creates economic activity in other sectors.

The expansion of oil and gas production spurs investment in other industries such as manufacturing, petrochemicals, engineering, computer design, transportation, and support services.

Shale gas production alone contributed \$76 billion to GDP in 2010; that will increase to \$154 billion in 2020.

Estimated Value Added of Shale Gas



Source: IHS Global Insight

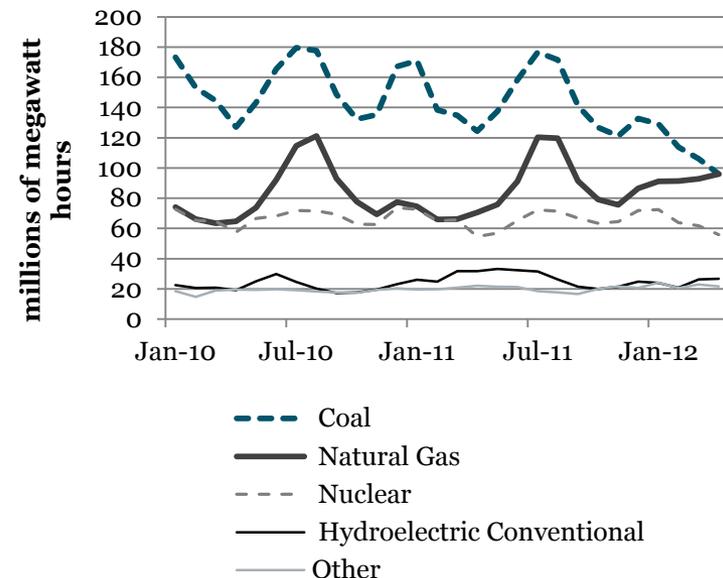
Energy Savings and Lower Production Costs

Increased natural gas production will reduce energy costs for consumers and businesses.

In April 2012, for the first time in decades, as much electricity was generated from natural gas as it was from coal.

Lower prices of natural gas could add an annual average of \$926 per year to disposable household income from 2012 to 2015.

Electricity Production by Source



Source: Energy Information Administration

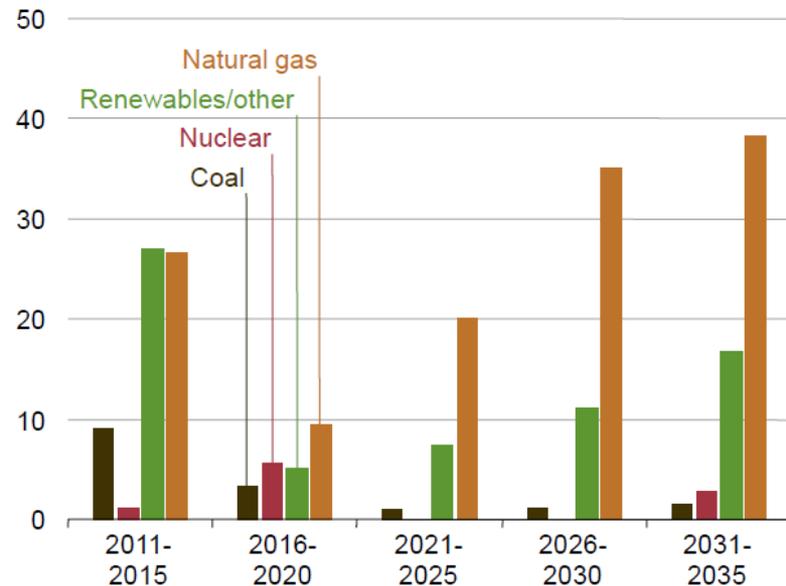
Cleaner than Coal

Generating electricity with natural gas emits less greenhouse gases than coal-fired power plants.

According to the EPA, natural gas produces half as much carbon dioxide, less than a third as much nitrogen oxide, and one percent as much sulfur oxide as coal-fired power plants.

The switch from coal to natural gas power plants has caused U.S. emissions to fall by 430 million tons (7.7%) since 2006 - the largest decline in the world.

Figure 95. Electricity generation capacity additions by fuel type, including combined heat and power, 2011-2035 (gigawatts)



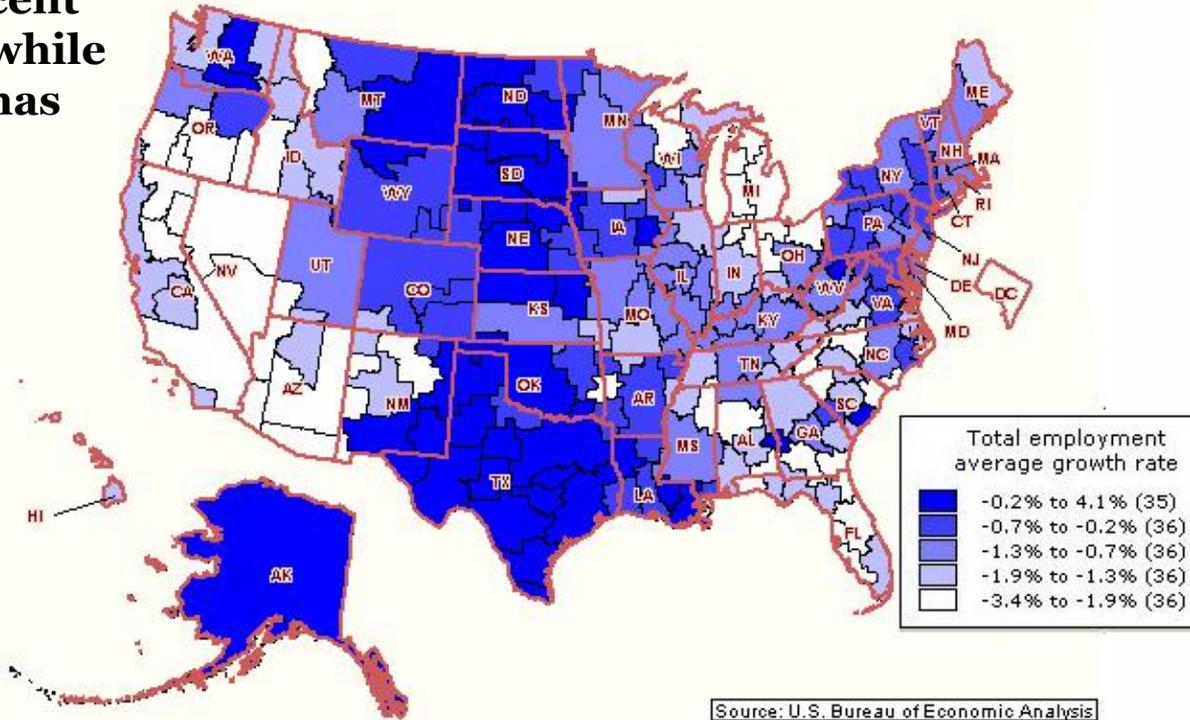
Source: Energy Information Administration

III. Job Creation and Investment

Oil and gas employment has expanded 39 percent since January 2007, while overall employment has fallen 3 percent.

Regions with oil and gas have experienced the fastest growth in both employment and incomes.

Total Employment Growth from 2007 to 2010



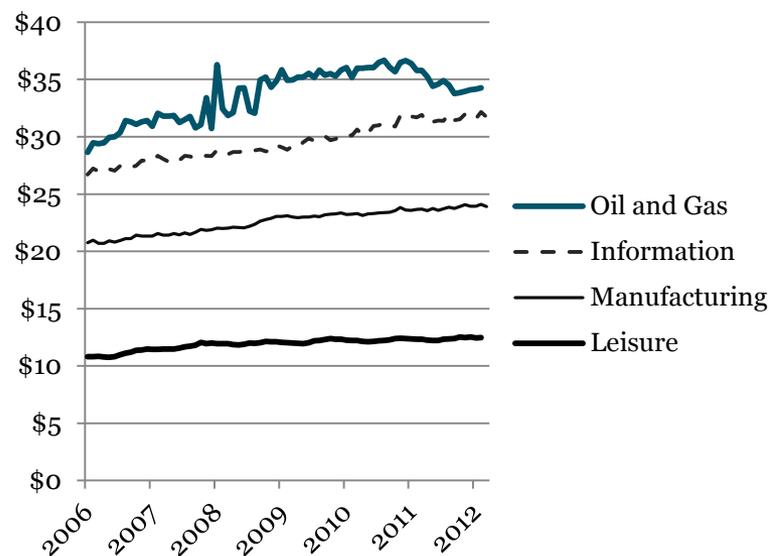
More Jobs with Higher Incomes

The oil and gas sectors accounted for 9% of all jobs created last year.

The oil and gas extraction industry directly employs 195,000 Americans with higher-than-average wages.

The oil and gas extraction industry pays higher wages on average (\$33.89) than information (\$31.40) or manufacturing (\$23.83) and much higher than low-end services such as leisure and hospitality (\$12.46).

Average Hourly Wages by Industry



Source: Bureau of Labor Statistics

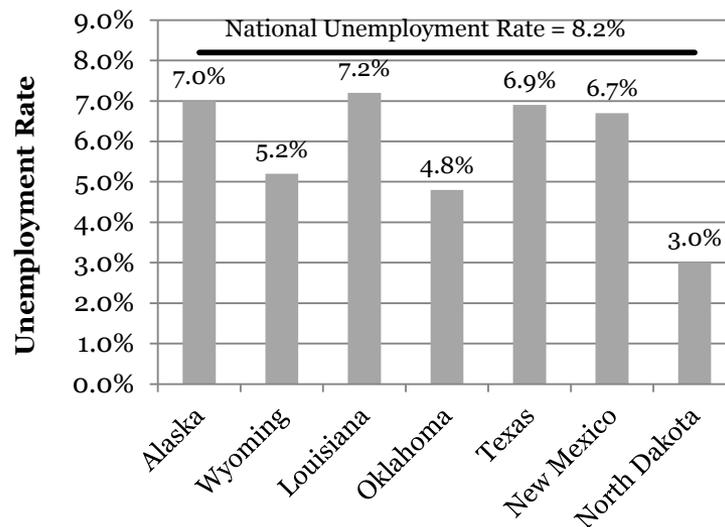
Oil and Gas is a Jobs Multiplier

The oil and natural gas sectors have a large multiplier effect: for every new job in oil and gas extraction, more than three new jobs are created elsewhere in the economy.

In 2010, the shale gas industry supported 600,000 jobs; this will grow to nearly 870,000 in 2015 and to over 1.6 million by 2035.

The 7 states with the highest share of oil and gas output have unemployment rates lower than the national rate.

Seven States with Highest Share of Oil and Gas Output Have Lower Unemployment Rates



Source: Bureau of Labor Statistics, Bureau of Economic Analysis

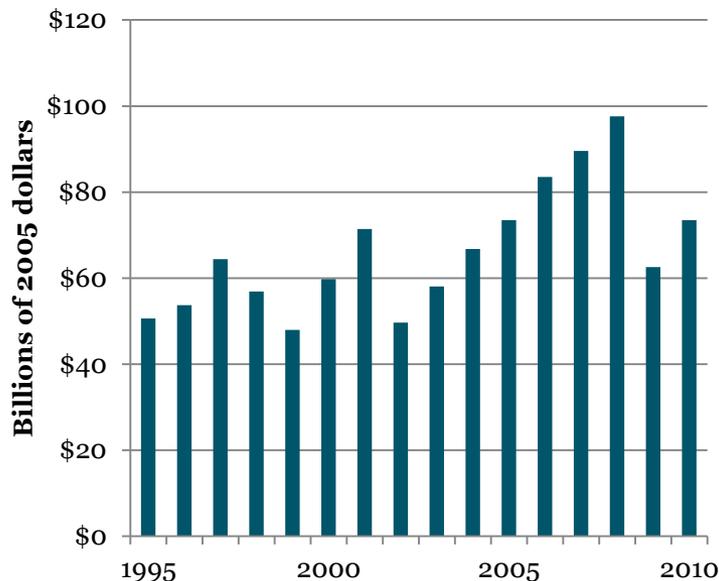
Oil and Gas Drives Investment

Investment in oil and gas increased from \$50 billion in 2002 to \$74 billion in 2010.

According to IHS, capital expenditures in shale gas alone are projected to increase from \$33 billion in 2010 to \$48 billion by 2015 and will total \$1.9 trillion between 2010 and 2035.

Oil and gas has positive spillover effects for manufacturing, information, utilities, transportation, and mining, which together account for over 50% of all capital investment.

Capital Investment in Petroleum and Nat Gas



Source: Bureau of Economic Analysis

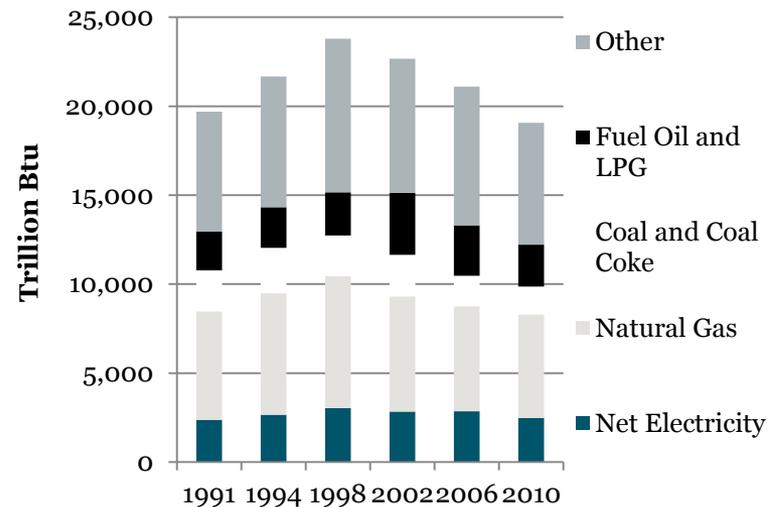
IV. The Catalyst for a Manufacturing Revival

Lower energy costs and increased energy efficiency have improved the competitiveness of American-based companies, particularly in manufacturing, which has gained 237,000 jobs since June 2009.

Industries that are intensive users of natural gas as a feedstock, such as the chemical industry, have benefited from lower natural gas prices.

Cloud computing and big data are also beneficiaries, owing to their heavy use of electricity.

Manufacturing Energy Consumption by Type, trillion Btu



Source: Energy Information Administration

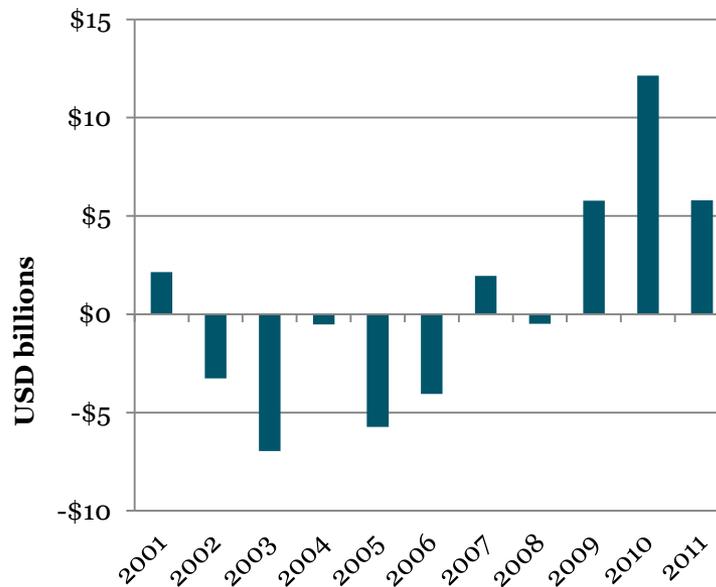
Rebirth of the Chemical Industry

Chemical producers are moving production back to the U.S. to take advantage of abundant and cheap natural gas and natural gas liquids.

The trade balance for chemical manufacturing swung from a deficit of \$4 billion in 2006 to a surplus of \$12 billion in 2010.

The increase is largely due to increased production of plastics, basic organic chemicals, and resin and synthetic rubber.

Net Exports of Chemical Manufacturing



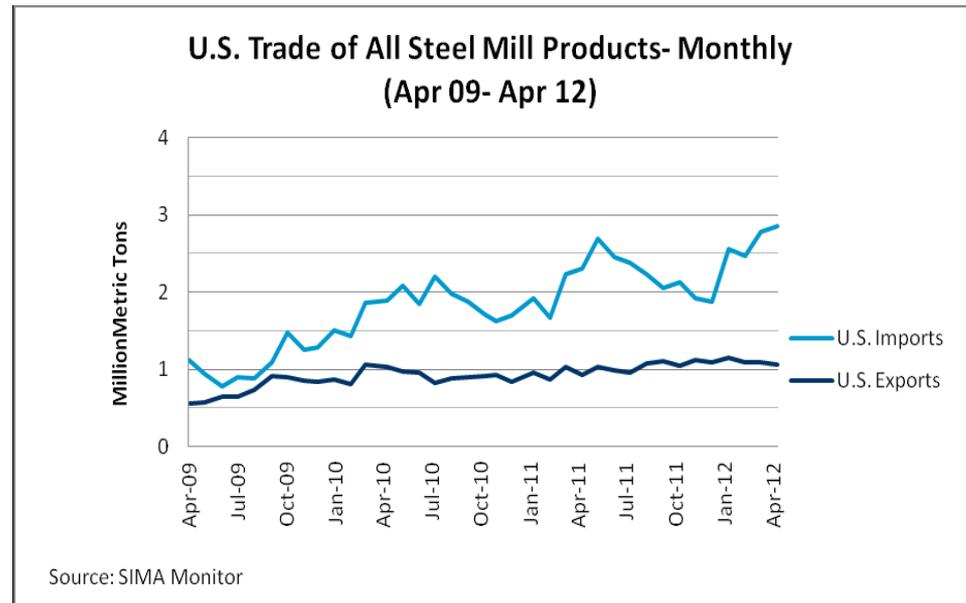
Source: International Trade Commission

More Steel Demand, More Steel Production

Extraction of natural gas requires steel while lower natural gas prices make domestic steel production more competitive.

In the near term, demand has been met by rising imports, but more companies are investing in domestic production capacity.

Vallourec & Mannesmann, U.S. Steel, and Kobe Steel are investing a combined \$1.2 billion in new production capacity in Ohio.



V. The Rise of New Industries

Inexpensive natural gas opens up the potential for the rise of new industries, including:

- The conversion of part of the U.S. transportation fleet to natural gas.
- The creation of a liquefied natural gas (LNG) export industry.
- More reliable and cheaper energy for information technology and cloud computing.



Photo Credit: Department of Energy

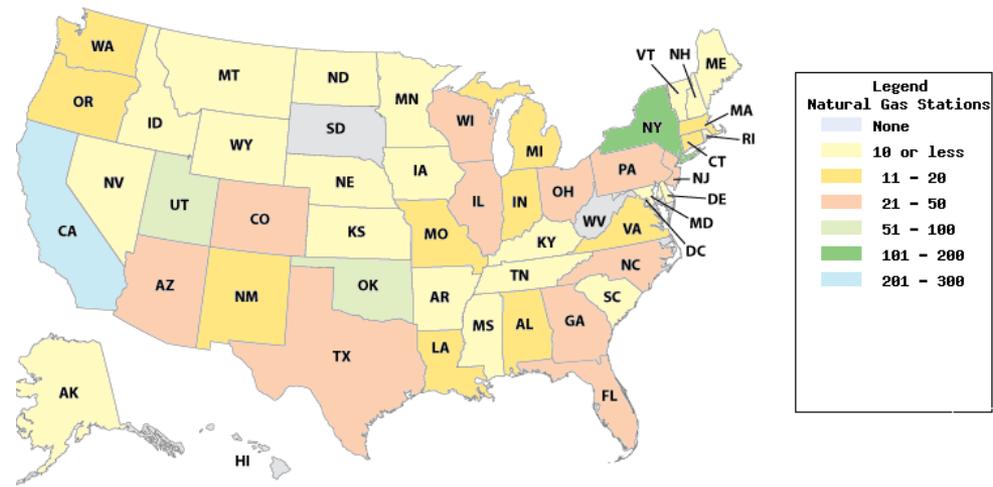
A Better Transportation Fuel

Many short-haul vehicles—delivery trucks and buses—already run on natural gas but long-haul trucks do not because of the lack of infrastructure. Converting the long-haul transportation fleet, which accounts for a quarter of all fuel use, to natural gas would reduce oil imports.

This would spur an expansion of the U.S auto industry to build new natural gas trucks and the U.S. construction industry to build the refueling infrastructure.

There are 500 public compressed natural gas refueling stations, compared to 160,000 gasoline stations.

Natural Gas Refueling Stations



Liquefied Natural Gas Exports

Abundant natural gas at home and high natural gas prices abroad are spurring the development of an LNG export industry.

Applications to liquefy and export 14 billion cubic feet per day have been filed with the Department of Energy.

Bernstein Research projects world demand for LNG to nearly double during the next decade, providing a growing world market for U.S.-produced LNG.

Natural Gas Overview: World LNG Prices

Federal Energy Regulatory Commission • Market Oversight • www.ferc.gov/oversight

World LNG Estimated June 2012 Landed Prices



Synergies with Tech and Big Data

Data centers account for 1.7-2.2% of total electricity consumption in the U.S. This is projected to increase significantly as the importance of big data grows.

Low natural gas prices will ensure that big data is competitive in the U.S.

Technology companies like to build data centers where electricity is reliable and cheap and the climate is relatively mild to avoid high cooling costs.



Photo Credit: Flickr/bandarji

VI. Shoring Up America's Fiscal Position

Between 2010 and 2035, the natural gas boom will generate nearly \$1.5 trillion in federal, state and local taxes and royalties.

In Pennsylvania, tax revenues from Marcellus shale gas exceeded \$1.2 billion in 2011.

Increased tax revenues will in turn enable us to make other growth-enhancing investments in education and R&D and improve our quality of life by helping pay for health care and retirement security.

Impact of Marcellus Shale on Revenue and Employment in Pennsylvania

	State and Local Taxes, USD millions	Employment
2009 actual	573	60,168
2010 actual	1,085	139,889
2011 planned	1,231	156,695
2012 planned	1,402	181,335
2015 forecast	1,677	215,979
2020 forecast	2,003	256,420

Source: Pennsylvania State University

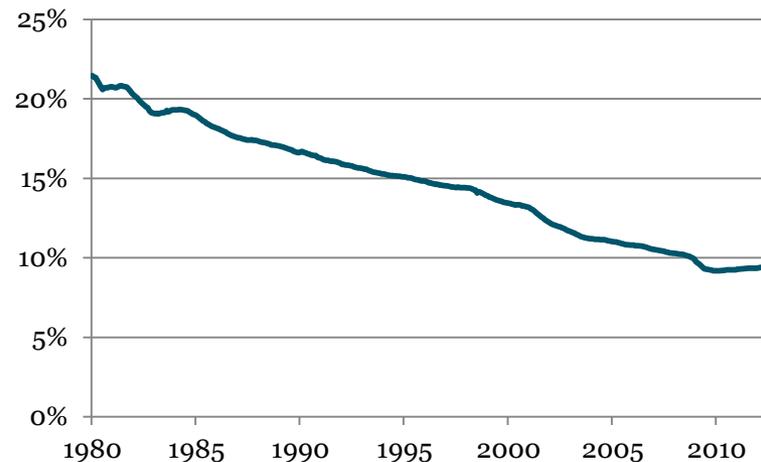
VII. Infrastructure Investment is the Missing Piece of the Story

As important as the oil and gas revolution and the manufacturing revival are, these sectors employ less than 10% of the workforce.

Major new investments in our communication, transportation and water infrastructure are necessary to realize the full promise of the income and wealth creation potential of the new growth story.

They are also necessary to create enough jobs and growth to return the economy to full employment.

Manufacturing and Oil and Gas Employment* Share of Total



* Includes manufacturing, oil and gas extraction, and mining support activities

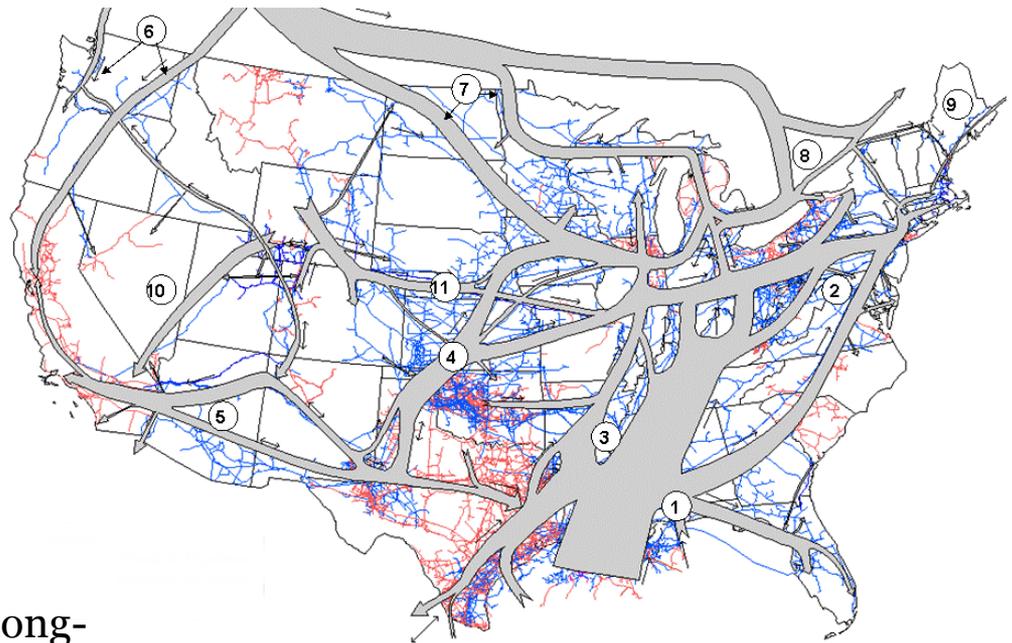
Source: Bureau of Labor Statistics

The New Growth Story is Held Back by Inadequate Infrastructure

Because of several decades of under-investment, poor infrastructure is holding back the development of our energy resources and the expansion of our manufacturing sector.

We need a natural gas pipeline system to get cheaper energy to all markets in the U.S.

We need a network of natural gas fueling stations in order to convert long-haul trucking to natural gas.



Water and Transportation Infrastructure is Critical

And because natural gas development entails heavy water use, we need to expand our water treatment and wastewater disposal system to preserve the quality of America's water supply.

We need to modernize our system of freight transportation and our inland waterways to accommodate LNG exports and expanded manufacturing.

We need to build new deep water ports to handle the new super-tankers that promise to revolutionize shipping.



Photo Credit: Federal Energy Regulatory Commission

VIII. Serious Obstacles Remain

Ongoing domestic deleveraging will continue to act as a drag on consumer spending and business investment.

Regulatory uncertainty about appropriate environmental standards for shale gas development could deter new exploration.

The U.S. lacks the appropriate government-supported financing mechanisms for major new infrastructure investment.

Household Debt as Share of Disposable Income Remains Elevated



Source: Federal Reserve, Bureau of Economic Analysis

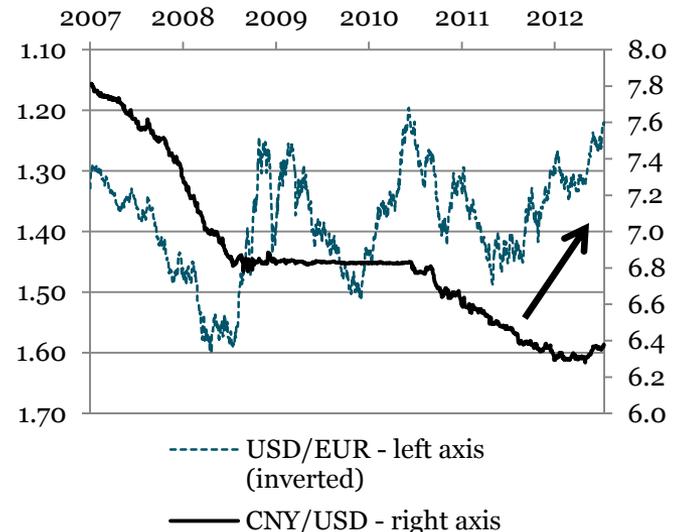
Headwinds from a Deteriorating World Economy and the Fiscal Cliff

Weak growth from Europe and Asia, together with premature fiscal consolidation, could undermine the economic recovery and prevent investment in the new economic growth story.

According to the CBO, the fiscal cliff would cause the economy to enter recession in the first half of 2013 and reduce GDP by an estimated 3.9%.

Competitive currency devaluations from Europe and China could undercut the U.S. manufacturing revival.

Dollar Strength May Undermine the Recovery



Source: Federal Reserve

The End

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