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Congress of the United States
House of Representatives
COMMITTEE ON ENERGY AND COMMERCE
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MEMORANDUM

May 6, 2013

To: Subcommittee on Energy and Power Democratic Members and Staff

Fr: Committee on Energy and Commerce Democratic Staff

Re: Hearing on "U.S. Energy Abundance: Exports and the Changing Global Energy Landscape."

On Tuesday, May 7, 2013, at 10:00 a.m. in room 2123 of the Rayburn House Office Building, the Subcommittee on Energy and Power will hold a hearing on "U.S. Energy Abundance: Exports and the Changing Global Energy Landscape." This hearing is expected to focus primarily on liquefied natural gas (LNG) exports.

I. TRENDS IN NATURAL GAS PRODUCTION, CONSUMPTION, AND PRICES

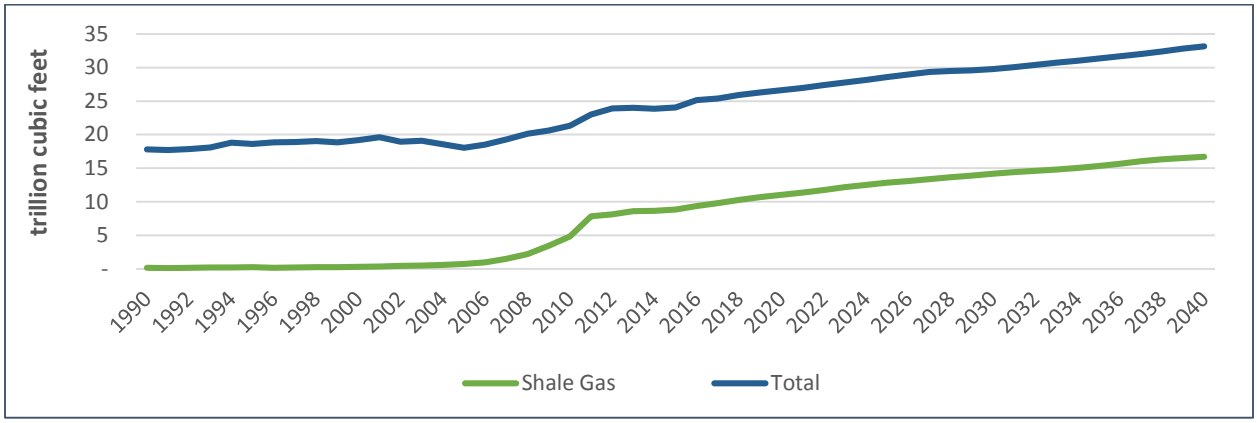
A. Natural Gas Production

A decade ago, experts predicted that the United States would become increasingly dependent on natural gas imports to meet domestic demand. In recent years, however, natural gas producers have discovered new ways — using a combination of hydraulic fracturing and horizontal drilling — to access natural gas trapped in shale formations, such as the Marcellus Shale located underneath Pennsylvania, New York, and West Virginia. Between 1990 and 2012, natural gas production in the United States increased by 34%. The Energy Information Administration (EIA) projects that under existing policies natural gas production will rise by an additional 39% by 2040, primarily as a result of increased development of shale gas, tight gas, and coalbed methane resources.[1] Shale gas production alone is on track to more than double by 2040 (Figure 1).[2]

[1] Tight gas is unconventional natural gas that is trapped in impermeable sands or hard rock and is generally produced through hydraulic fracturing.

[2] U.S. Energy Information Administration, *Annual Energy Outlook 2013, Market Trends: Natural Gas* (April 2013) (online at www.eia.gov/forecasts/aeo/MT_naturalgas.cfm).

Figure 1. Natural Gas Production in the United States, 1990-2040



Source: EIA, Annual Energy Outlook 2013

B. Natural Gas Consumption

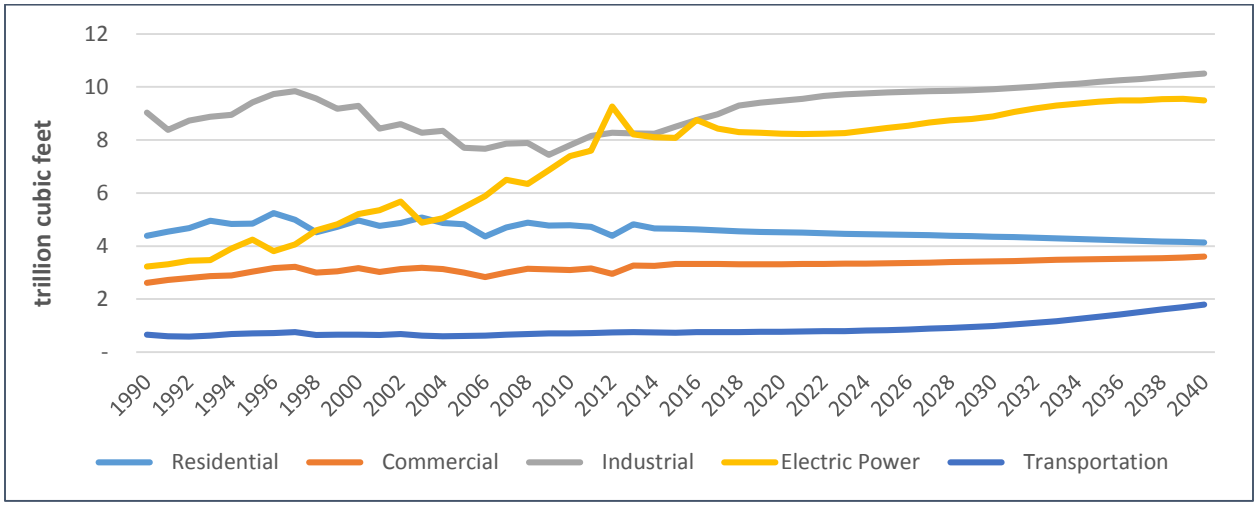
EIA predicts that under existing policies U.S. total natural gas consumption will increase from 24.4 trillion cubic feet in 2011 to 29.5 trillion cubic feet in 2040. In the electricity sector, consumption of natural gas for power generation is projected to increase by an average of 0.8% per year, as relatively low natural gas prices continue to make natural gas cost-competitive with coal.[3] As energy-intensive industries also take advantage of low natural gas prices, natural gas consumption in the industrial sector is expected to increase steadily year-over-year.[4] The transportation sector is projected to increase its demand by the largest percentage, as more vehicles begin to use natural gas as a fuel, while remaining a small component of the country's overall consumption of natural gas (Figure 2).[5]

[3] *Id.*

[4] *Id.*

[5] *Id.*

Figure 2. Natural Gas Consumption by Sector, 1990-2040

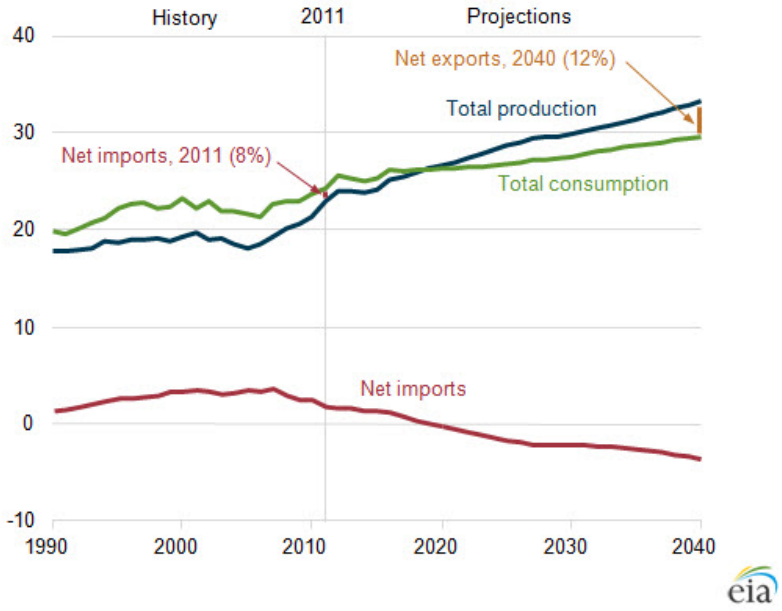


Source: EIA, Annual Energy Outlook 2013

C. Natural Gas Imports and Exports

In 2011, the United States consumed more natural gas than it produced, resulting in net imports of almost 2 trillion cubic feet. As domestic production outpaces consumption, EIA projects that the United States could become a net exporter of natural gas by 2020 (Figure 3).[6]

Figure 3. Total U.S. Natural Gas Production, Consumption, and Net Imports, 1990-2040



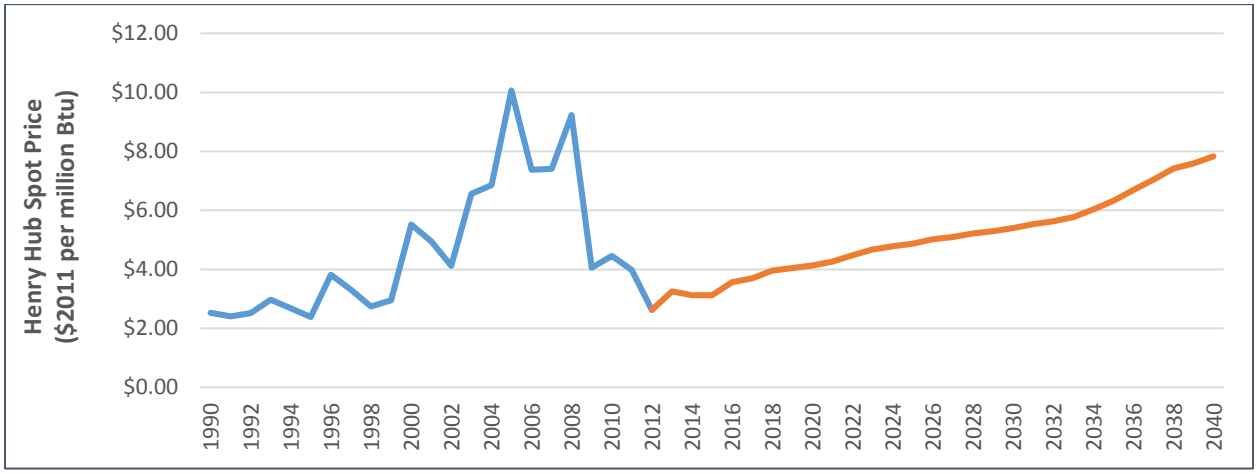
[6] *Id.*

D. Natural Gas Prices

The growth of shale gas production in the U.S. has created a glut of gas supply, lowering the domestic price. This has generated benefits for manufacturers that use natural gas as a feedstock or fuel but has made drilling less economically viable for gas producers. Natural gas prices are much lower in the United States (less than $4) than in Europe (around $10) and East Asia ($12-$15), a differential that is expected to continue for an extended period of time. Unlike oil, there is no global natural gas market. Instead, there are distinct regional natural gas markets in North America, Europe, and Asia.

Although natural gas prices have been low in recent years, EIA predicts that natural gas prices will rise as producers have to move into basins where extracting natural gas is more difficult and costly. This additional and more expensive production will be needed to "support continued growth in natural gas consumption and exports."[7] EIA estimates that Henry Hub spot prices for natural gas will increase by 2.4% per year to $7.83 per million British thermal unit or Btu (in 2011 dollars) in 2040 (Figure 4).[8]

Figure 4. Past and Projected Natural Gas Prices: 1990-2040



Source: EIA, Annual Energy Outlook 2013

II. LIQUEFIED NATURAL GAS EXPORTS

As a result of over-supply at home and low domestic natural gas prices, companies have filed 26 applications with the Department of Energy (DOE) to export liquefied natural gas. Under the Natural Gas Act, DOE is required to grant an application to export natural gas to a country without a free trade agreement with the United States unless it finds that the proposed export will not be consistent with the public interest. For export to countries with a free trade agreement, the Natural Gas Act requires DOE to deem such applications consistent with the

[7] *Id.*

[8] *Id.*

public interest and grant them without modification or delay. As a practical matter, each potential LNG export facility applies to export to both sets of countries. The Federal Energy Regulatory Commission (FERC) is responsible for issuing permits for specific LNG export facilities.

In May 2011, DOE granted an authorization for LNG exports from the Sabine Pass project in Louisiana. DOE commissioned a two-part study to help it decide how to address the remaining applications. The first part of the study was an EIA report released in January 2012 that examined the impacts of LNG exports on domestic energy markets. The second part of the study is a private contractor (National Economic Research Associates or NERA) study of the economic impacts of a range of LNG export levels. DOE opened the NERA study to two rounds of public comments.

Proponents of LNG exports point to a number of studies that project positive, but modest, net economic, jobs, and trade balance benefits from such exports. They contend that the resulting increases in domestic natural gas prices will be modest and will have limited impacts on domestic manufacturing and energy intensive industries. Proponents also argue that the global natural gas market will effectively limit the amount of economically competitive U.S. exports (i.e., as exports increase, domestic prices will rise and the price gap between U.S. exports and other sources of natural gas will shrink or disappear). Proponents argue that exports would reduce global carbon emissions by displacing coal generation in some countries. Moreover, supporters contend that LNG exports to Japan, South Korea, and Europe lower natural gas prices for U.S. allies and provide them with leverage in negotiations with other natural gas suppliers, such as Russia.

Opponents argue that LNG exports will raise domestic natural gas prices in the United States, harming domestic manufacturing, energy intensive industries, and other natural gas consumers. They also contend that most of the natural gas needed for export would come from increased domestic production, primarily from shale gas resources, and that increased gas drilling will have adverse impacts on air quality, carbon emissions, water quality, and other natural resources. Increased domestic natural gas prices could also increase U.S. carbon emissions as a result of a shift back to coal generation. In addition, the liquefaction process itself is energy intensive so LNG export facilities would have significant carbon emissions. It is unclear whether LNG exports would reduce carbon emissions abroad.

III. CRUDE OIL PRODUCTION AND PRICES

Domestic crude oil production has increased significantly over the past few years, reversing a decline that began in 1986. According to EIA, U.S. crude oil production increased from 5.1 million barrels per day in 2007 to 6.3 million barrels per day in 2012, the highest level since 1997.[9] EIA expects crude oil production to continue to grow rapidly, increasing to an

[9] U.S. Energy Information Administration, *Annual Energy Outlook 2013, Table A11: Liquid Fuels Supply and Disposition* (Apr. 2013) (online at www.eia.gov/forecasts/aeo/pdf/appa.pdf); U.S. Energy Information Administration, *Historical*

average of 6.8 million barrels per day in 2013 and 7.2 million barrels per day in 2014.[10] Drilling in shale and tight oil plays in the Williston Basin's Bakken formation in North Dakota and Montana, the Western Gulf Basin's Eagle Ford formation in Texas, and the Permian Basin in West Texas accounts for most of the projected rise in production.

In 2005, the United States imported 60% of the petroleum it consumed.[11] In 2012, the United States imported about 40% of the petroleum that it consumed, the lowest level in decades, a decline attributed primarily to a rise in domestic oil production, increased use of biofuels, and adoption of higher fuel efficiency standards for vehicles.[12] EIA projects that U.S. petroleum imports will fall to 32% of consumption in 2014, the lowest level since 1985.[13]

Unlike natural gas prices, oil prices are set on a global market. In a May 2012 report, the Congressional Budget Office (CBO) concluded that "disruptions in the supply of oil anywhere in the world rapidly result in higher oil prices worldwide."[14] Higher levels of domestic oil production do not prevent or mitigate these price spikes. CBO examined gasoline prices in Canada, the United States, and Japan between 1999 and 2011. CBO found that gasoline prices in those countries rose and fell in tandem with the world market, even though Japan produced almost no oil, Canada was a net oil exporter, and the United States produced less than half of its oil. More domestic supply did not protect Canadian consumers from price shocks (Figure 5).[15]

Data on Crude Oil Production: 1859-2011 (online at www.eia.gov/dnav/pet/pet_crd_crpdn_adc_mbblpd_a.htm).

[10] *Id.*

[11] U.S. Energy Information Administration, *Short Term Energy Outlook* (Apr. 9, 2013) (online at www.eia.gov/forecasts/steo/pdf/steo_full.pdf).

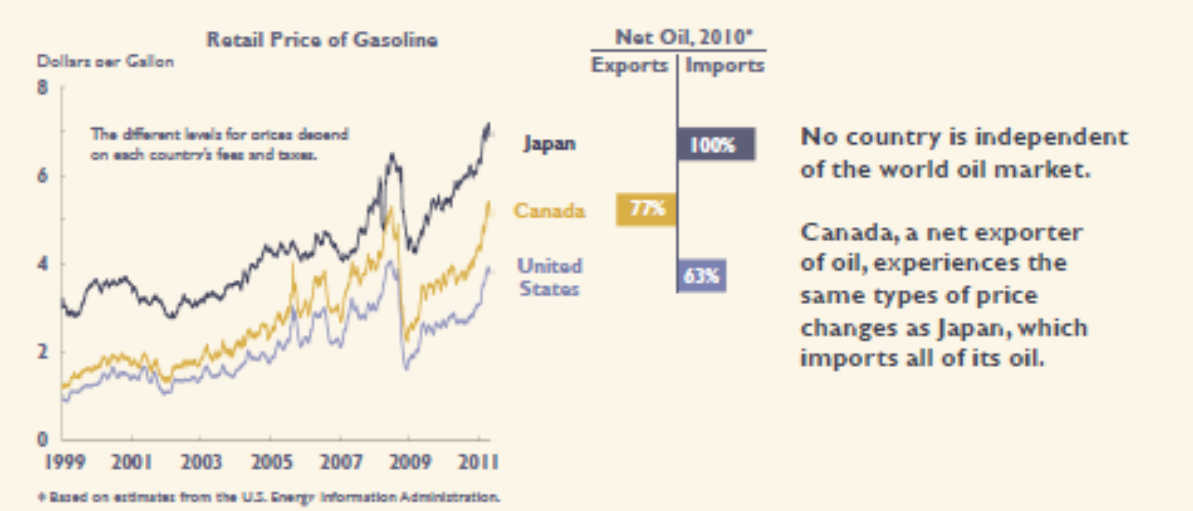
[12] *Id.*

[13] *Id.*

[14] Congressional Budget Office, *Energy Security in the United States*, at 6 (May 9, 2012) (online at www.cbo.gov/sites/default/files/cbofiles/attachments/05-09-EnergySecurity.pdf).

[15] *Id.* at 8.

Figure 5. Average Retail Gasoline Prices in Japan, Canada, and the U.S. (1999-2011)



Source: Congressional Budget Office

IV. WITNESSES

The following witnesses have been invited to testify:

The Honorable J. Bennett Johnston
Chairman
Johnston & Associates

The Honorable Byron Dorgan
Co-Chair, Energy Project
Bipartisan Policy Center

Mike Halleck
President
Columbiana County Board of Commissioners

Amy Jaffe
Executive Director of Energy and Sustainability
University of California Davis Graduate School of Management

James Bradbury
Senior Associate, Climate and Energy Program
World Resources Institute

Michael Breen
Executive Director
Truman National Security Project