

Testimony of Neelesh Nerurkar, Specialist in Energy Policy at the Congressional Research Service, on “Changing Energy Markets and U.S. National Security,”

House Committee on Foreign Affairs Subcommittee on Terrorism Nonproliferation and Trade

December 16, 2011

Good morning Chairman Royce, Ranking Member Sherman, and distinguished Members of the Committee. My name is Neelesh Nerurkar. I am a Specialist in Energy Policy at the Congressional Research Service (CRS). CRS appreciates the opportunity to testify about how energy markets are changing. I will provide context, with a focus on oil. Note, CRS takes no position on policy questions posed by these market developments.

Changing Global Energy Markets

I would like to highlight two related developments in global energy markets.

First, rapid, energy-intensive economic growth in developing countries raised global energy demand in recent years. Economic growth is the main driver of energy demand. In 2008, energy consumption in developing countries exceeded that of the world’s advanced economies for the first time ever.¹ In 2009, China overtook the United States to be the world’s largest energy consumer.

Energy supply was unable to keep up with demand at previously prevailing prices, which contributed to rising energy prices, particularly for oil, and gave rise to energy security and economic concerns.² Energy production is capital intensive, projects have long lead times, and face policy and geopolitical constraints in some places. Oil prices fell with the global economic downturn in 2008 but have subsequently rebounded. Demand from developing countries pushed global oil consumption to new highs in 2011.

A second, related development has been supply growth from new, complex, and/or relatively expensive sources of oil and related liquid fuels. High energy prices motivated investment, technology development, and policy incentives. This is contributing to energy supply growth from conventional, unconventional, and renewable sources around the world. A number of examples come from the United States and elsewhere in the Western Hemisphere. For instance, U.S. tight oil and shale gas production, U.S. and Brazilian ethanol production, Brazil’s offshore pre-salt oil resources, and Canada’s oil sands.

The Oil Market and U.S. Developments

The world consumes 88 million barrels a day of oil and related liquid fuels according to the Energy Information Administration.³ About 40% of this demand is met with oil from the

¹ “Developing country” here refers to countries that are not part of the Organization for Co-Operation and Development (OECD), a group of the world’s advanced economies. From 1998 to 2008, non-OECD energy consumption grew at 4.6% per year on average versus 0.8% growth in the OECD. BP, *2011 Statistical Review of World Energy*, June 2011, www.bp.com/statisticalreview. Analysts expect non-OECD energy consumption growth to remain more rapid than that of the OECD in the foreseeable future.

² For background, see CRS Report R42024, *Oil Price Fluctuations*, by Neelesh Nerurkar and Mark Jickling.

³ As per convention in oil market analysis, the “oil market” includes crude oil, natural gas liquids, and alternatives such

Organization for the Petroleum Producing Countries (OPEC), which includes major oil producers in the Middle East, Africa, and South America. The world's largest oil producing countries outside of OPEC are Russia and the United States.

The United States is the world's largest oil consumer, using 19 million barrels a day, and largest oil importer.⁴ For context, oil provided 37% of 2010 primary energy consumption and 94% of the energy used for transportation. It is the only fuel for which we are a large net importer. Net imports meet about 45% of U.S. oil consumption, down from a peak of 60% in 2005.

Net U.S. imports are gross oil imports minus refined product exports.⁵ They declined by 4 million barrels a day in six years. Nearly half this decline can be attributed to lower U.S. oil consumption, a result of the economic downturn and high oil prices. The remaining reduction is due to higher domestic production of oil and other liquid fuels, particularly onshore crude oil, ethanol, and natural gas liquids. The largest crude oil production increases have come from North Dakota and Texas. "Tight oil" production from North Dakota's Bakken formation has increased rapidly in recent years, enabled by technology advances in horizontal drilling and hydraulic fracturing.⁶ Ethanol production has been supported by federal policy and higher gasoline prices.⁷ Among the largest declines in U.S. production have been in Alaska and California.

Despite lower net imports, U.S. imports from Canada increased by 20% between 2005 to 2011 year to date,⁸ aided in part by growth in oil sands output. Canada was and continues to be the largest source of U.S. imports. The next three largest sources of imports in 2005 were Saudi Arabia, Venezuela, and Mexico. Imports from each of them have fallen by between 20 and 50% since then. Though imports from OPEC have fallen by a million barrels a day, it remains the source of half of U.S. imports, with most of that coming from OPEC members outside the Persian Gulf, such as Venezuela, Nigeria, and Algeria.

Three Additional Energy Market Factors

Several factors to consider when looking at energy market changes include:

First, the impact of high energy prices, investment, technology, and policy incentives are not limited to oil. They are also driving rapid growth in renewable electricity generation in the United States, China, and elsewhere. Also, drilling technology innovations have increased unconventional natural gas supplies and helped keep U.S. natural gas prices low. Shale gas has dramatically changed the U.S. natural gas market, so much so that some companies are considering export of liquefied natural gas from the lower 48. Other countries are now moving to develop their own shale gas resources.

as biofuels. This is all included in the 88 million barrel a day figure. Estimates for full year 2011 come from U.S. Energy Information Administration (EIA), *Short Term Energy Outlook*; December 6, 2011, <http://www.eia.gov/forecasts/steo/report/>.

⁴ EIA, *Annual Energy Review 2010*, Tables 1.3, 2.1b-2.1f, 10.3, and 10.4, October 19, 2011.

⁵ CRS Report R41765, *U.S. Oil Imports: Context and Considerations*, by Neelesh Nerurkar.

⁶ Tight oil is oil contained in geologic formations with low porosity and permeability such as shales. Hydraulic fracturing is where pressurized fluid is used to expand fractures in rocks to allow oil and gas to flow through. The fluid is mostly water, and also includes proppant (such as sand or ceramic beads, which keeps open cracks in rocks), and chemicals.

⁷ Federal support for ethanol includes the Volumetric Ethanol Excise Tax Credit, currently set to expire at the end of the year, the Renewable Fuels Standard, and other policies.

⁸ 2011 data on imports from specific countries is the average available year-to-date (January- September, 2011) figures from EIA, *Petroleum and Other Liquids*, <http://www.eia.gov/petroleum/>, accessed December 12, 2011.

Second, some new energy sources involve environmental and fiscal trade offs. For example, the use of hydraulic fracturing to recover natural gas or oil has raised concerns about water resource risks,⁹ and oil sands development has raised concerns about greenhouse gas emissions and ecosystem impacts. There are also fiscal trade offs where new energy sources require government support, for instance the excise tax credit for ethanol.

Finally, the oil market is globally integrated; oil market events anywhere in the world can affect oil prices everywhere. For example, even though the United States imported very small amounts of oil from Libya prior to the crisis there earlier this year, the crisis contributed to higher cost for oil imported in the United States whether it was imported by ship or pipeline, or produced at home.¹⁰ The scarcity that supply disruptions create leave importers of that oil competing to secure supplies from other sources. Foreign oil market disruptions could likely affect the price for oil in the United States even if we produced as much oil as we consumed.

Conclusion

Rapid, energy intensive economic growth in developing countries has contributed to higher energy prices. Higher prices have enabled supply growth from new sources by incentivizing investment, technology development, and government support. However, some of these sources have higher commercial, environmental, and fiscal costs. Domestic supply growth and reduced consumption have decreased oil imports, but we do and will remain connected to a global market where supply disruptions can cause economic and energy security concerns, even if they occur in countries that we do not import oil from.

Thank you for the opportunity to appear before the committee. I will be happy to address your questions.

⁹ CRS Report R41760, *Hydraulic Fracturing and Safe Drinking Water Act Issues*, by Mary Tiemann and Adam Vann.

¹⁰ CRS Report R41683, *Middle East and North Africa Unrest: Implications for Oil and Natural Gas Markets*, by Michael Ratner and Neelesh Nerurkar.

**United States House of Representatives
Committee on Foreign Affairs**

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