



# Joint Economic Committee

## *Republicans*

Representative Kevin Brady  
Chairman

### REPUBLICAN STAFF ANALYSIS

## North American Energy—Closing the Growth & Jobs Gap

### *Lower Cost and Increased Output Reduce Natural Gas Prices, Oil Imports*

June 5, 2013

*Advanced drilling methods are increasing output and employment, generating economic benefits on multiple fronts. The increased demand for workers based on increased productivity and the surge of capital investment in the oil and natural gas industry provide real inducements for economic growth in sharp contrast with “green” energy subsidies and political job stimulus puffery. The oil and gas sector can be a major force in closing the growth and jobs gap left by a weak recovery from the recession.*

*Part I details how domestic oil and gas production directly benefits the economy.*

*Part II shows the related expansion in transport infrastructure, refining, manufacturing, and exports.*

*Part III will address policy questions.*

### Domestic Oil & Gas Boom Addresses Multiple Problems

The field of energy is fraught with misunderstandings. As a result, the reaction to truly fortuitous developments can be confused. The technological revolution in shale oil and gas production is as near an unequivocal benefit as there can be. This is not the time to start taking the energy supply for granted or to doubt the national benefits of domestic production. Increasing the domestic supply of oil and gas will:

- **Improve the U.S. trade balance,**
- **Realize cost savings for the U.S. economy,**
- **Moderate the world oil price,**
- **Create productive jobs,**
- **Increase government revenue,**
- **Increase capital investment, and**
- **Induce economic growth.**

The federal government ought to do everything in its power to facilitate the safe expansion of domestic crude oil and natural gas supplies.

***The federal government appears conflicted about the success of domestic oil and gas development—it should not be.***

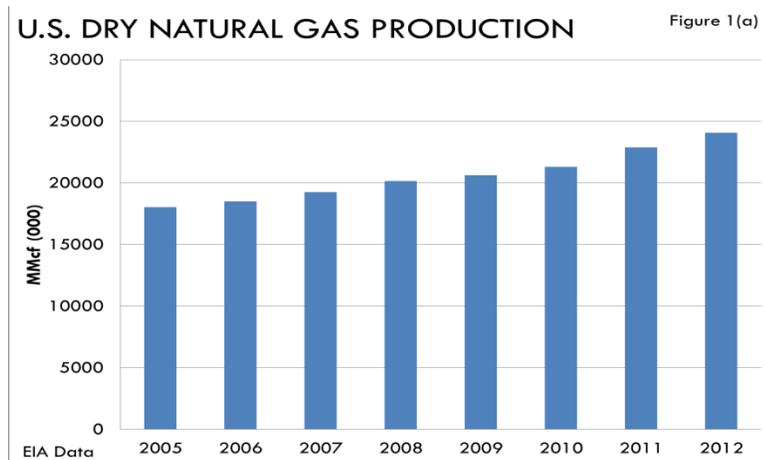
***The economic benefits of domestic development are clear and direct, and a godsend given the weak GDP growth.***

***Technology has substantially reduced the footprint of oil and gas exploration and development.***

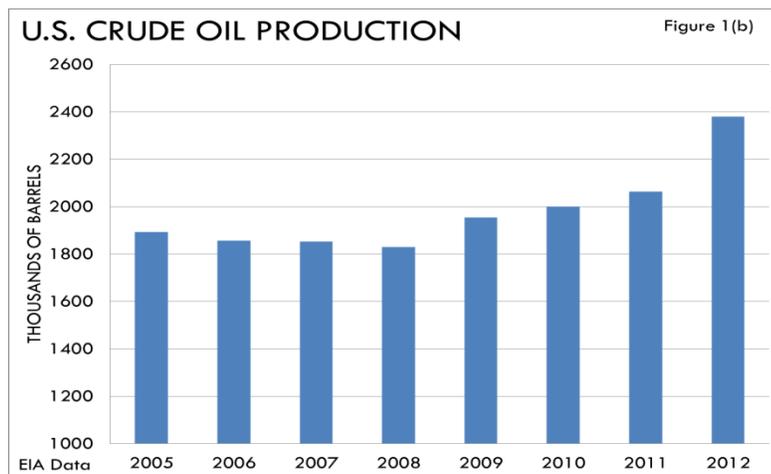
## Technology Increases Domestic Oil and Gas Supplies

U.S. natural gas production hit a low in 2005 and in anticipation of continued decline, construction commenced on shipping terminals for receiving liquefied natural gas (LNG) from overseas.<sup>1</sup> However, with remarkable speed a recovery technology that had been known for decades, hydraulic fracturing, gained commercial applicability on a large scale and not only arrested but reversed the domestic decline in natural gas output, which reached a record in 2012, preempting the anticipated need for LNG imports.

***Hydraulic fracturing reversed declines in U.S. natural gas and oil output, preempting the need for overseas LNG imports and cutting crude oil imports.***



U.S. crude oil production hit a low in 2008, in the midst of a world oil price surge no less. But hydraulic fracturing also works in oil fields and similarly turned around the rate of crude oil production, boosting output in 2012 to the highest level since 1995.

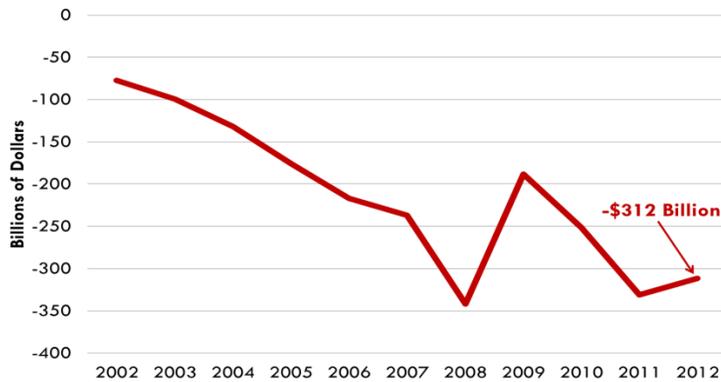


## Balance of Payments Deficit

The increases in domestic oil and natural gas production have been reported widely, but not the fact that the U.S. balance of payments for crude oil fell sharply again after the recession and is near the level of 2008. The price of oil had spiked to \$145 per barrel (WTI) in 2008 and threatened to cause a recession all its own, but before the world found out how much further the

<sup>1</sup>To ship natural gas other than by pipeline it is liquefied by cooling it to -260°F. LNG receiving terminals are regasification facilities.

## U.S. Crude Oil Balance of Payments Figure 2



Source: Bureau of Economic Analysis

***In 2012, the U.S. paid out \$312 billion net for crude oil imports. Domestic oil and gas production can keep more of that money at home.***

oil price would rise and how severe the economic impact would be, the financial crisis set off a collapse in oil demand. Even with much of Europe in recession and an anemic U.S. recovery, the U.S. refiners' acquisition cost of crude oil was above \$100 per barrel last year—four times higher than a decade ago—and U.S. payments for crude oil imports are almost as high as in 2008 despite the reduced import volume.

The U.S. economy is not as vulnerable to oil price shocks as it once was, but oil imports still account for 45 percent of consumption. If the country had to import natural gas as well, the vulnerability would be still greater. Other major economies are dependent on imports for both oil and gas, and newly developing economies import increasing volumes as they grow. The Energy Information Administration (EIA) expects oil consumption of emerging economies (non-OECD) to catch up with that of developed countries (OECD) this year and for worldwide consumption to reach 93 million barrels per day (b/d) by 2019, up from 83 million b/d in 2008. Natural gas consumption in non-OECD countries already exceeds that of the OECD, and EIA projects it to increase nearly three times faster. EIA expects natural gas to be the world's fastest growing fossil fuel with average annual consumption growth of 1.6 percent from 2008 to 2035.<sup>2</sup> The possibility of continued upward price pressures should not be ignored.

***Upward price pressure in energy is likely to continue as world consumption of oil and natural gas continues to rise.***

## Domestic vs. World Oil & Gas Prices

**Lower cost and increased productivity.** Hydraulic fracturing is an enhanced recovery method that costs more than conventional production in which hydrocarbons rise up naturally through wells to the surface. Conventional production eventually reaches secondary and tertiary phases in which resource recovery is artificially enhanced at additional cost. Hydraulic fracturing together with horizontal drilling works on vast, formerly inaccessible geological formations and has produced much greater yields than the enhanced methods used on conventional wells. The unconventional technology is enabling the United States to produce much

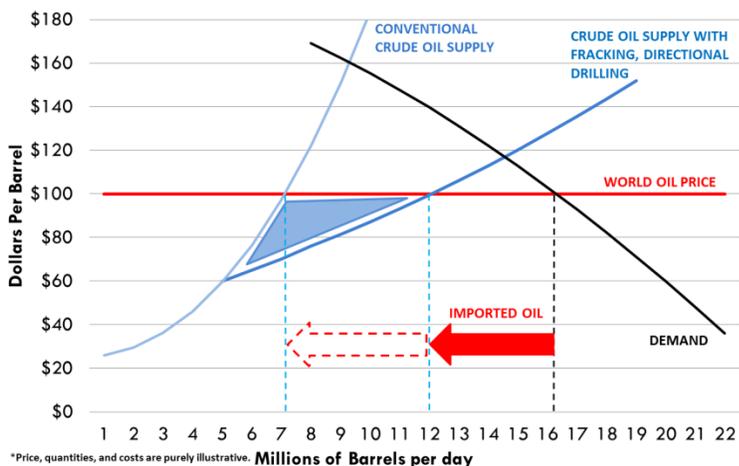
<sup>2</sup> *International Energy Outlook 2011* (most recent edition).

more oil and natural gas at home for less cost than the acquisition cost of foreign oil and gas. Domestic producers increase their market share when their cost of producing the next barrel of oil or cubic foot of gas is less than the price of imports.

*Domestic energy production creates real gains for the economy.*

*Natural gas production and export demand relate to the relative profits of drilling for oil and how foreign governments that control large conventional natural gas reserves respond to U.S. LNG price competition.*

Crude Oil Supply to U.S. Liquids Fuel Market\* Figure 3



The blue lines in the schematic above represent the domestic oil supply—light blue without and dark blue with the large-scale efficiency of hydraulic fracturing and horizontal drilling technology. The blue shaded area between the two lines represents the gain to the U.S. economy. As technology improves and the dark blue line shifts down and to the right, it displaces oil imports and increases the economic gain to the nation.<sup>3</sup> The same holds for lower cost domestic natural gas production, except that the dark blue line in the gas market has shifted farther to the right and intersects U.S. natural gas demand *below* the price of overseas LNG imports.

**Natural gas exports.** There is an incentive to export natural gas overseas where the price is higher by enough to cover the cost of transportation. Gas liquefaction facilities for export now are being added to shipping terminals once thought to require only regasification capability for receiving LNG. Japan faces some of the highest LNG prices and is a likely customer. The blue area will become larger as a result of serving overseas demand.

It must be noted, however, that hydraulic fracturing and horizontal drilling can be applied either to natural gas or oil fields and will follow the greater profit margin. A shift from gas to oil has occurred already as the domestic price of natural gas dropped. The high world oil price and the substantial volume of U.S. oil imports in the presence of a low gas price provide a continuing incentive to focus hydraulic fracturing on drilling for oil.

It also should be noted that large conventional gas reserves exist abroad with production costs lower than those of hydraulic fracturing. Because

<sup>3</sup> It also saves costs relative to some conventional domestic oil supply, represented by the part of the shaded triangle to the left of the dotted line running through it.

governments control these reserves and shipping constraints limit competition among them, prices in other geographic markets do not necessarily reflect cost. Indeed, the convention abroad is to relate natural gas prices to the world crude oil price, which some of the governments that sell gas manipulate in their capacity as oil producers and members of OPEC.

When the U.S. natural gas supply was dwindling, the large natural gas reserve holders—the largest among them are Russia, Iran, and Qatar—began talk of forming a “gas OPEC” to try and coordinate price increases, although the mechanics would have been more difficult than for oil. Now that their international gas customers may gain access to competing supply through hydraulic fracturing, prices for conventional gas may be cut to meet U.S. and whatever other competition arises from use of the technology.

**Impact on world oil & gas prices.** It is a long-standing premise, formed during the decades of declining U.S. oil and gas production, that incremental U.S. production, such as in Alaska or offshore, cannot affect the world crude oil price, and those who oppose domestic development of these resources tend to belittle their value to American consumers on that basis. But their premise is wrong for several reasons.

First, it assumes that OPEC will keep the world oil price up if demand falls or supply increases with offsetting cuts to its production. But that means sacrificing export volume and market share. It is not reasonable to assume that OPEC acts only on price and not export volume, since its revenue is the product of both. It is reasonable to assume that OPEC will not fully offset substantial increases in the U.S. oil supply, which means there will be downward pressure on the price. The same holds true for countries that currently have market power in some geographic markets for natural gas and come to face competition from U.S. LNG exports.<sup>4</sup>

Second, the world oil market functions by virtue of unencumbered transportation at low cost around the globe. Embargoes, blocked shipping lanes, and war may obstruct oil and gas deliveries causing prices to spike. The United States stocks crude oil in the Strategic Petroleum Reserve (SPR) for this reason. Relying more on indigenous supply and less on imports certainly can mute the impact of volatility in overseas supply and will allow the SPR to go further. The U.S. ability to export natural gas also can be a stabilizing force in overseas gas markets when disruptions occur.

Third, the increasing supply of oil and gas at home will cause the regional price to fall, if the incremental supply is not accessible by consumers in the world market, which it may not be for lack of sufficient transport capacity. The EIA now uses European Brent rather than West Texas Intermediate (WTI) crude for its international benchmark price, because the latter reflects

***Increasing domestic energy supply has reduced the U.S. natural gas price, midcontinent crude oil prices, and is moderating world energy prices.***

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<sup>4</sup> “In Reversal, Neighbors Squeeze Russia over Natural-Gas Prices,” *Wall Street Journal*, May 1, 2013, p. A1.

inland oil market conditions with as much as a \$20 per barrel discount. The natural gas supply is even more captive with greater impact on the regional price because shipping costs, other than by pipeline, are higher than for oil.

### Benefits of Cheaper Fuel

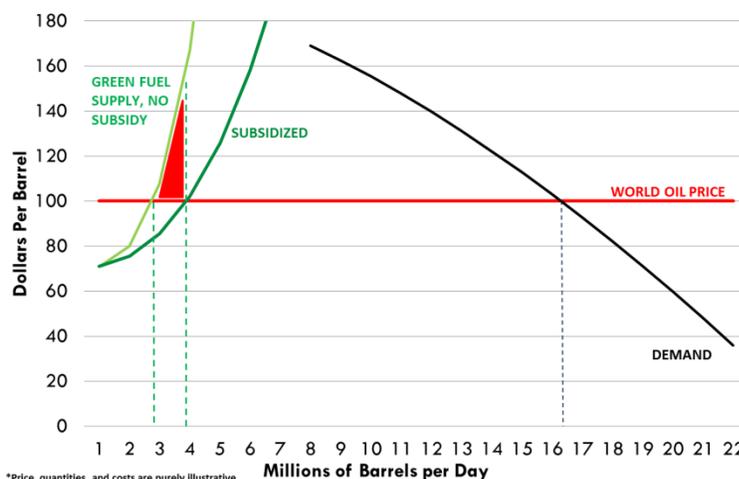
The relatively high cost of LNG transport allows substantial geographic price differentials to persist with price in North America determined by indigenous supply and demand whereas the relatively low cost of shipping crude oil has led to a worldwide market. Thus increased gas supply mostly lowers price whereas increased oil production mostly lowers import quantity. Both are good for the economy. Market forces determine how the benefit of lower cost and more production is distributed by the same principles as in other industries. Benefits can accrue to consumers via lower prices, the chain of supply and the workers it employs—median annual wages of workers in mining, oil, and gas extraction were \$46,100 in May 2011, compared with \$34,460 for workers in all industries—land owners in the form of royalties, oil and gas companies and their suppliers in the form of profits, and various levels of government in the form of taxes as well as payments for lease bonus bids and royalties, if the wells are on state- or federally-owned land. It should be noted that government does not collect lease bonus bids, royalties, or taxes from imported crude oil, and subsidized alternative fuels do not generate the economic gain described and thus no incremental tax revenue.

*The economic gains from increasing the domestic energy supply are widely shared and increase government revenues.*

**Subsidized fuels increase costs.** Alternative fuels may hold a small market share as additives in the fuel supply or as low-cost byproducts from unrelated production. But to expand their use with subsidies means replacing imported oil with more expensive fuel. It is instructive to consider

*Subsidizing fuels does not create self-sustaining economic benefits but burdens the economy.*

"Green" Supply to U.S. Liquids Fuel Market\* Figure 4



the green lines representing supply curves for alternative fuels with and without subsidies in Figure 4. The red area between the light green and red lines is a loss to the economy. Various countries have cut support for

alternative energy because of this drag.<sup>5</sup> Europe actually is burning more coal again because it is cheaper than the available alternatives.

## Environment

U.S. regulations of oil and gas are more stringent for all phases of industry operations than in most countries. Technology actually has reduced the footprint of oil and gas field exploration, development, and production, enabling the use of fewer wells on smaller well pads drilled with smaller, lighter drilling rigs. If there are places with better environmental protections, it may be a reason to adopt them, but not to thwart domestic production in favor of foreign oil and gas. Shipping oil across the oceans and unloading it in U.S. ports has environmental costs and risks as well that one must recognize in comparing different sources of supply.<sup>6</sup>

***The footprint of oil and gas field exploration, development, and production has become smaller.***

## Conclusion

Increased domestic oil and gas production at lower cost is beneficial to the economy. The production increases preempted an anticipated need for overseas LNG imports and are reducing the amount of imported oil. The reverse proposition—that importing more oil and LNG at higher cost would make us better off—requires explanation. Meeting the country’s energy needs at lower cost is a direct benefit and can help to accelerate the sluggish pace of recovery from a recession that still leaves millions unemployed. Strangely, the federal government seems conflicted about embracing the fortuitous developments. There is much talk of wanting cleaner energy, faster economic growth, more jobs, and more tax revenue, but the policies are oddly detached from the real opportunities there for the taking.

***Claiming that importing more oil and gas would make us better off would require explanation.***

A forthcoming Staff Analysis in the energy series will detail how the shale gas and oil revolution drives expansion in transportation, refining, manufacturing, and exports, and is especially helpful to communities that had been struggling economically. Another forthcoming Staff Analysis will examine the policy issues that Congress must address to take maximum advantage of the shale gas and oil revolution.

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<sup>5</sup> It does not matter whether the government subsidizes production or consumption of more costly fuels, mandates their use, or taxes the less costly conventional ones more, the economy will require proportionately more resources to produce the same amount of output as a result.

<sup>6</sup> Those who dislike the proposed Keystone pipeline linking Canada to the Gulf Coast for other than local reasons ignore the comparison with importing oil by ocean tanker from more distant (and less friendly) sources. Pipelines are the safest, cleanest, and operationally least conspicuous mode of oil transport; and the Keystone pipeline would traverse a very lightly populated area of the country.