Written Testimony of
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Introduction

Committee Chairman Upton, Chairman Whitfield, Ranking Member Rush, and distinguished Members of the Committee, thank you for the opportunity to testify at today's American Energy Initiative hearing. My name is Daniel Ahn and I serve as the Chief Commodities Economist at Citibank in New York. Earlier this year, my colleagues and I published a report entitled, "Energy 2020: North America, the New Middle East?" and I would like to take the opportunity to share and update its conclusions.

North America has recently become the fastest growing hydrocarbon producer and exporter in the world and this trend should accelerate to the end of the decade. This energy renaissance has been driven by both declining domestic consumption and the successful deployment of new technologies to extract hitherto inaccessible oil and gas resources, notably in tight and shale rock formations.

These two trends - declining demand and burgeoning supply- should have dramatic consequences for national energy security, as well as the U.S. and global economy. I estimate that new U.S. oil and gas production could add at least $200 to $300 billion dollars in revenue, which in turn could stimulate many hundreds of billions more in economic activity, investment, and consumption, creating at least two and as high as three and a half million new jobs.

Furthermore, American dependence on imported oil outside of North America should shrink or even be eliminated entirely. The U.S. current account deficit, which saw trillions of dollars passed on to foreign oil exporters, could be slashed by two thirds, strengthening the credibility of the U.S. dollar. Global oil prices could fall by 15% to 20%. Energy-dependent manufacturing industries such as refining, petrochemicals,

fertilizers, iron, steel, and aluminum smelting should strategically benefit. Natural-gas fueled vehicles could proliferate.

Distinguished committee members, a minor industrial revolution is in the making in the American heartland, testament to the technical ingenuity and flexibility of American workers and enterprises and the bounty of our natural resources.

The North American Energy Revolution

The United States (and North America more broadly) is in the midst of a historic energy revolution that could see its total supply rival that of Saudi Arabia or Russia in global oil and gas markets. To place this in historical context, the United States was once the world's largest oil producer for much of the 20th Century, after Russian production collapsed during the Revolution of 1917. The United States maintained this status for half a century, notably providing the oil necessary to fuel the critical Allied war effort throughout the two World Wars. However, faced with aging fields, American production peaked in 1970 and subsequently declined despite new production from Alaska. Increasing reliance upon imported oil proved a critical economic vulnerability during the oil shocks of the 1970s, fueling a painful period of economic malaise and high inflation.

But 2007 proved a turning point, with record-high oil prices above $100 per barrel triggering two transformative factors that proved the "peak oil" pundits wrong again. First, domestic production has made a dramatic comeback, most remarkably from tight geological formations such as shale oil and shale gas, thanks to the combination of horizontal drilling and hydraulic fracturing. This has been supplemented by burgeoning

supplies from deepwater offshore drilling, tar sands, gas-to-liquid conversion, and other sources.

Second, American consumption has dramatically fallen since 2007. Part of this is attributable to the deep economic recession of 2008. However, even after the overall economy bottomed out and grew again in 2009, U.S. oil demand has continued to fall. Research suggests this is the delayed structural reaction to the record oil price increases of the 2000s, as seen in decreasing industrial and residential/commercial demand and flattening automobile usage.

We project that these trends, both on supply and on demand, may continue and even accelerate to the end of the decade, driving a tectonic shift in the global energy landscape.

Energy Supply and Demand Projections to 2020

- From 2011 to 2020, we project U.S. petroleum liquids production to rise from 9 to 15.6 million barrels per day, an increase of +6.6 million barrels per day, about 7-8% of current global supply. Tight/shale oil and deepwater supply are the largest source of new production, but conventional production from Alaska, heavy oils, gas-to-liquids, bio-fuels, and other sources also contribute.
- We project U.S. dry gas production to rise from 62 billion cubic feet per day in 2011 to 76 billion cubic feet per day by 2020, an increase of +14 billion cubic feet per day , roughly 6% of current global supply. The lion's share of this comes from shale and tight gas, but associated gas, coal bed methane, and other sources also contribute.

- We project U.S. domestic demand to fall by another -2 million barrels per dayfrom 19 million barrels per dayin 2011 to 17 million barrels per dayby 2020, thanks to lower gasoline demand, improved industrial and vehicle efficiency standards, and switching from liquids to natural gas.

I stress that these projections were not meant to be forecasts but rather a benchmark of what is geologically, technologically, and economically achievable in the absence of other constraints.

To put this in perspective, the incremental increase in supply from the United States alone is greater than the current total production of Iran and Iraq combined. This should drive the United States to approach or even surpass Russia and Saudi Arabia as the world's foremost hydrocarbon producer by 2020. Coupled with the less celebrated but no less important structural decline in U.S. oil demand, the pieces are in place for North America to become virtually self-sufficient in hydrocarbons by 2020. Energy independence is within reach.

Impact on the U.S. and Global Economy

The energy revolution would not only upend the global energy market and strengthen U.S. energy security but also drive something akin to a miniature "Industrial Revolution" in the United States, with hundreds of billions of dollars in new economic activity, the reindustrialization of the U.S. manufacturing sector, more income in consumer wallets, and millions of new jobs. Coming at a time when the United States is still struggling to shake off the aftermath of the 2008 recession, it appears almost too good to be true.

On top of the booming hydrocarbon extraction industry itself, the economic renaissance should be spearheaded by those commercial sectors best placed to take advantage of inexpensive energy inputs, such as petroleum refining, petrochemicals, fertilizers, iron, steel, and other metals smelting, clay, glass, paper, etc. For example, the U.S. has already become the second lowest-cost producer of ethylene, a key component of plastics and other petrochemicals.

Beyond this, the energy boom should generate significant "multiplier" effects as firms make new orders for machinery and other investment goods and services, hire new workers that increase consumption for other goods and services, and thereby ripple through the economy and drive virtuous cycles of economic activity, This multiplier effect should be magnified as this stimulus is coming when the United States is still growing below economic potential and has large idled capacity and millions of unemployed workers.

The complexity and interconnectedness of the U.S. economy and the nature of counter-factual analysis makes assessing the overall economic impact of this energy revolution a difficult endeavor. For example, one must take into account how an additional dollar in the paycheck of an oil rig worker may cause him to buy that new toaster he needs. But this new demand for toasters increases the price of toasters everywhere. This in turn causes general inflation to rise, which may cause the Federal Reserve to tighten monetary policy earlier than it otherwise would have. This in turn would sway the decision of the oil rig worker whether to buy a new toaster or not. Nevertheless, with the aid of a computer model, in effect a simulated miniature U.S. economy, some credible estimates can be calculated.

Economic Impact Estimates

- I estimate that U.S. real Gross Domestic Product (GDP) by 2020 should be 2.0 - 3.3% or from $370 to $640 billion (in 2005$) higher than it otherwise would have been. In other words, the U.S. economy would grow +0.25 to +0.4% faster on average per annum to 2020.
- 1.4% or $270 billion of this additional economic output comes directly from the oil and gas supply windfall. An additional $90 billion (0.5% of GDP) comes from the savings that consumers enjoy thanks to lower demand for oil. Finally, an additional $260 billion (1.3% of GDP) comes from "multiplier" effects.
- This new economic activity may generate from 2.2 to as many as 3.6 million new jobs. Perhaps 1.6 million new jobs would be created in the manufacturing sectors, with the remaining two million jobs in the broader economy.
- The current account deficit, at -3.2% of GDP or -$496 billion as of 2011, may fall to as low as -0.8% of GDP, or an elimination of more than two thirds of the U.S. current account deficit.
- Thanks in part to the lower current account deficit and improved creditworthiness, the U.S. dollar should appreciate from +1.6% to +5.4% in real terms.
- Lastly, the new supply and lower demand may cause global oil prices to decline by 15-20%, from current $100-120 per barrel range to the $70-90 per barrel range, with dips as low as $50 per barrel.

Risks and Policy Challenges

As mentioned above, the projections above are a "good-case" scenario where the full geological, technological, and economic potential of American hydrocarbon resources are unleashed. But significant risks confront the full realization of this scenario. Careful studies are required to allow the development of a proper regulatory framework that safeguards U.S. environmental, economic, and strategic goals without choking off market efficiency. A full discussion of the risks and policy challenges would take many more hearings, but one can generally categorize these into four buckets:

Categories of Policy Risks and Challenges

- Technical and Logistical
- Environmental
- Economic
- Geopolitical

The most obvious challenge is the need for thousands of workers and skilled technicians and sophisticated machinery to actually extract the oil and gas. However, national oil and gas companies have increased their total capital expenditures on labor, machinery, and other investment spending six-fold since the 1990s, while costs only grew three-fold and now appear to have plateau-ed and possibly even begin to decline.

Also daunting are the logistics of properly storing and transporting this burgeoning supply of oil and gas from the American midcontinent to the population centers on the coasts, when the national pipeline infrastructure had been historically geared toward absorbing petroleum from the Gulf of Mexico and the Atlantic Basin into

the midcontinent. The controversy around TransCanada's Keystone XL pipeline expansion is a poster child of the policy challenges.

Environmentally, the main concerns revolve around hydraulic fracturing, and its impact on emissions, water supplies, and seismic activity. The Environmental Protection Agency is scheduled to release a widely anticipated scientific study on the impact of hydraulic fracturing on drinking water later this year.

Even economically, the energy revolution is not an unmitigated boon. For example, the United States may confront a relative decline in the non-energy-intensive areas of manufacturing due to the strengthened U.S. dollar that hurts export competitiveness and the diversion of resources and labor from these sectors to the energy sector, a phenomenon known as "Dutch disease."

Geopolitically, the United States may be tempted to bask in its new energy independence and retreat from its security obligations around the world. But the expression "energy independence," by which people typically mean hydrocarbon net self-sufficiency, should not be confused with the absence of interdependence. The globally integrated and fungible nature of oil markets has tightly bound all consumers and producers together. To borrow an image from William Nordhaus, one can think of the oil markets as a large bathtub in which producers fill and consumers draw out simultaneously. Hence, even if the United States was completely self-sufficient, a disruption in supply would drive prices up around the world, including the United States, in tandem.

Conclusion

Distinguished members of the Committee, we share the privilege of observing in our lifetimes a remarkable technology-driven revolution in the U.S. and North American energy scene, one that holds great promise in improving our economy and national security. Challenges and risks confront us but with the proper study and consideration, I am confident that they can be met.

Executive Summary of Written Testimony

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1. The United States and North America more broadly, is in the throes of a historic energy revolution, driven by two factors: declining consumption and growing production.

2. Gasoline and other refined petroleum consumption in the US have been in decline since 2007, in part due to cyclical economic weakness but also structural factors. This structural trend is expected to continue due to demographic shifts, higher vehicle efficiency standards, and other energy efficiency savings.

3. Meanwhile, North American production of hydrocarbon liquids and gas has skyrocketed. Most notably, new production from unconventional sources such as tight and shale rock formations have been made possible thanks to the deployment of hydraulic fracturing and horizontal drilling technologies.

4. Given the confluence of these two factors and what is geologically, technologically, and economically feasible, we project that North America can potentially achieve energy independence (i.e. oil/gas net self-sufficiency) by 2020.

5. The economic consequences of this energy revolution are momentous. The United States may see a minor Industrial Revolution, led by the energy and energy-intensive manufacturing sectors, but generating virtuous cycles of job-creating activity through the rest of the economy.

6. I estimate that the cumulative economic impact would be 2% to 3.3% of US real GDP (+0.25% to +0.4% faster growth on average per annum), creating as high as 2 to 3.6 million new jobs.

7. The US current account deficit may decline by two thirds or more, strengthening the US dollar as the global reserve currency of choice and improving our national credibility. Furthermore, long-term oil prices may decline by 15-20%, lessening the drag of high energy prices on the US and global economy.

8. However, risks and challenges remain that may prevent the full realization of this vision, particularly in four categories: logistical, environmental, economic, and geopolitical. These diverse challenges must be met with a proper regulatory framework that properly balances US environmental, economic, and strategic goals.