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New Energy, New Geopolitics

Background Report 3: Scenarios, Strategies, and Pathways

JUNE 2014

*A Report of the CSIS Energy and National Security Program
and the Harold Brown Chair in Defense Policy Studies*

CSIS

**CENTER FOR STRATEGIC &
INTERNATIONAL STUDIES**

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1 Introduction¹

In the last 10 years, U.S. shale gas and tight oil production has skyrocketed, supplying not only national but global markets, to the benefit of many. Between 2005 and 2014, U.S. crude oil production rose nearly 65 percent and natural gas production was up 34 percent—both increases a result of tight oil and shale gas development.² The shale gas supplies from Pennsylvania alone equal the entire natural gas export capacity of Qatar, the world’s second largest natural gas exporter.³ And the increase from light tight oil production in places like North Dakota and Texas over the last five years is equivalent to that of Iraq’s current production levels. All things being equal, this surge in supply has helped to suppress prices for both oil and natural gas that would likely have been higher due to other supply disruptions. (This effect has been most pronounced in North America, where gas prices in particular have been lower than elsewhere in the world.)

New production techniques have meant that resource deposits around the world previously considered uneconomic to access have become “technically recoverable,” significantly adding to the global resource balance sheet. According to one preliminary assessment, 137 shale formations in 41 other countries, in addition to the United States, hold around 10 percent of technically recoverable global crude oil and 32 percent of global natural gas.⁴ Deposits beyond the countries examined increase these recoverable amounts still further. For a world increasingly dependent on energy to drive economic growth and prosperity, this is a good news story.

For those who look at the world through a geostrategic lens, however, assessing the impact of these new resources is a more complex task. They raise a number of questions

1. *New Energy, New Geopolitics: Balancing Stability and Leverage*, by Sarah O. Ladislaw, Maren Leed, and Molly A. Walton, was published by CSIS in April 2014. Related to that volume are three “background reports,” providing greater detail on (1) energy impacts, (2) geopolitics and national security impacts, and (3) scenarios, strategies, and pathways. This is the third and final of those background reports.

2. Calculations based on U.S. Energy Information Administration (EIA). 2014 projections from EIA, *Short-Term Energy Outlook (STEO)*, November 2013, <http://www.eia.gov/forecasts/steo/archives/nov13.pdf>; data for 2005 is from EIA, *Short-Term Energy and Summer Fuels Outlook (STEO)*, April 2014, <http://www.eia.gov/forecasts/steo/index.cfm>.

3. BP, *BP Statistical Review of World Energy 2013* (London: BP, 2013), http://www.bp.com/content/dam/bp/pdf/statistical-review/statistical_review_of_world_energy_2013.pdf.

4. U.S. Energy Information Administration (EIA), “Technically Recoverable Shale Oil and Shale Gas Resources: An Assessment of 137 Shale Formations in 41 Countries Outside the United States,” June 13, 2013, 10, <http://www.eia.gov/analysis/studies/worldshalegas/>. Notable, this assessment includes only 41 countries around the world and does not include some of the most hydrocarbon-rich countries such as those in the Middle East and the Caspian region.

about who stands to gain, who stands to lose, and what opportunities for advantage might emerge in both the energy and geopolitical realms. Since the advent of the so-called “shale gale” or “unconventionals revolution,” myriad energy analysts, geopolitical strategists, foreign policy experts, industry titans, and government officials, including heads of state, have offered their views on the potential strategic impact of the changing energy landscape on global economic and geopolitical relations. Some see limited significance, while others predict profound and radical change.

Given the scope and intensity of the discourse surrounding this new source of energy production and its potential effects, the Center for Strategic and International Studies (CSIS) believed its expertise in energy, regional affairs, and national security could provide a useful and unique synthesis of the complex interactions under debate. Assembling a broad multifunctional team, CSIS undertook a year-long exploration of the potential geostrategic implications of shale gas and tight oil, with the intention of providing policymakers with a structured way to consider the potential risks and rewards of the new shale gas and tight oil resources.⁵ This analysis is not meant to be regionally comprehensive; rather it represents an overarching survey across categories of key international players, with deeper analysis in certain cases.⁶

The first background report “Energy Impacts” outlines the changes that have taken place in U.S. and global energy markets thus far, including a description of U.S. tight oil and shale gas production and the domestic impacts, how the shifts in the U.S. energy posture (i.e., slowing consumption and increasing production) are affecting global energy markets, and the challenges faced by other countries who seek to replicate the U.S. experience.

The second background report, “Geopolitical and National Security Impacts,” lays out some of the geopolitical adjustments being made around the world in response to energy changes (both actual and perceived), and what these adjustments—both in terms of energy markets and geopolitics—have meant for U.S. national security. So far, perception is leading reality when it comes to the geopolitical and associated national security impacts that have resulted from tight oil and shale gas. Many countries and companies are acting on early interpretations of this trend. Some will be rewarded, while others may lose out (especially on the investment side).

5. For the purposes of this report, when we discuss unconventional oil and gas in the context of the United States, we use the terms “shale gas” and “tight oil” as they are at the heart of the U.S. oil and gas production surge under examination and are responsible for much of the impacts analyzed in this report. When we discuss the potential for the production of unconventional resources outside of the United States, we use the term “unconventionals” because the authors recognize that oil sands, heavy oil, coal bed methane, and other types of unconventional oil and natural gas have significant potential around the world and are often included under the unconventional category. Similarly, when discussing the future trajectory of production, we use the term “unconventionals” because future assessments look at the global potential in addition to the United States. For more detail, see Appendix 1 in Sarah O. Ladislaw, Maren Leed, and Molly A. Walton, *New Energy, New Geopolitics: Balancing Stability and Leverage* (Washington, DC: CSIS/Roman & Littlefield, 2014).

6. This report focuses on North America, Asia, Europe, the Middle East, and Russia. Though it does not go in depth on Africa, Latin America, or Southeast Asia, these regions are touched on throughout the report.

This final background report, “Scenarios, Strategies, and Pathways” examines how the U.S. government is attempting to incorporate shale gas and tight oil developments into current U.S. energy and national security strategy. This strategy is still evolving and many view policy statements thus far as unevenly connected to actions. Going forward, U.S. policymakers face a choice between two strategic paths for managing shale gas and tight oil resources—what this report terms “energy stability” or “energy leverage.” The energy stability pathways suggests the United States’ energy advantage should be used to enhance energy security around the world, on the theory that more stable energy markets will foster strong economies and enhance geopolitical stability. The energy leverage pathway views the energy advantages presented by U.S. oil and gas production as tools that can be employed in the service of broader geopolitical or economic objectives.

The difficulty in deciding on a way ahead is complicated by the uncertainty about the future of unconventionals themselves. This report posits a range of possible futures in that regard, in order to inform risk judgments associated with the potential strategic pathways. Ultimately, the report concludes that energy stability is most prudent and robust against a range of possible outcomes, and makes a number of recommendations for how such a strategy could be implemented.

2 | Current U.S. Energy Strategy

The first two background reports looked at the effect of the shale gas and tight oil energy phenomenon, in a broader energy context, on various players in the international community and on the U.S. national security environment. Some of those effects have come directly from the new realities that shale gas and tight oil production has created, while others have resulted from the Obama administration's policy responses. The shale gas and tight oil revolution is just one factor complicating the development of an updated U.S. energy policy that was already in flux due to a series of shifts in the global energy landscape and the debate over whether to pursue a low-carbon pathway to deal with climate change.

The Shale Gas and Tight Oil Revolution Is Just One Factor Complicating the Development of an Updated U.S. Energy Policy

A U.S. strategy for how best to deal with shale gas and tight oil development is still evolving. The pace and magnitude of production keep changing, as does the industry's understanding of the resource base (e.g., technology, pricing, players, rules, infrastructure, impacts on other resources and the environment). Keeping pace has proven a challenge, as evidenced by growing perceptions of a gap between stated U.S. policies and what happens in practice.

Of course, shale gas and tight oil are just one component of the United States' broader energy strategy. Context, and a bit of history, is useful in understanding how their development fit within that bigger picture. The existence of shale gas and tight oil in the United States has prompted a reexamination of the energy scarcity mindset. Yet this is not the first shift, nor is it likely to be the last. It is just one of the several ongoing dramatic alterations to the landscape that has faced domestic and international energy policymakers over the last several years.

The Obama administration's embrace of a global and national low-carbon transformation agenda stood in marked contrast to the policies of the Bush administration, and represented a significant change for energy policy at home and internationally. Tense energy relations with a more climate-oriented Europe and many developing countries eased. Other developed countries such as Australia, Japan, and Canada recalibrated their policies

to adhere more closely to international expectations and (in some cases) to the expectations of their publics. Rapidly emerging developing economies organized to pressure developed countries to deliver on their ambitious rhetoric of climate mitigation, while being careful to avoid problematic commitments themselves. For the world's major oil and gas producers, especially oil revenue-dependent countries like many members in the Organization of the Petroleum Exporting Countries (OPEC), the U.S. embrace of a low-carbon future (especially within the context of ever-rising oil prices) was viewed as a troubling sign of a more serious U.S. attempt to break its reliance on fossil-based energy sources in the name of environmental good. That policy narrative was bolstered by the peak oil theory, a precipitous rise in oil prices from \$35 per barrel to \$150 per barrel in two years and the prospects of \$200 oil.

Almost as soon as a new energy direction had been set, the premise for the transformation was challenged by changing facts. The collapse of energy prices in 2008 (brought about by the onset of the global economic collapse) and the subsequent perceived failure of the international climate regime in 2010 rocked the United States' international energy and climate policies. At the same time, the 2010 oil spill in the Gulf of Mexico and the 2011 nuclear disaster in Fukushima, Japan occurred. Moreover, \$12 per mcf (thousand cubic feet) gas prices in the United States spurred the extensive use of hydraulic fracturing, extended reach lateral wells, and massive accumulation of lease acreage—generally on private lands—which in combination launched the rise of shale gas production. The transfer of that technology to liquids rich and tight oil plays like the Bakken in North Dakota and then the Eagle Ford in Texas produced a similar surge in U.S. liquids output. All told, the net effect has been a fundamentally different energy reality than the one the United States had anticipated for the last 40 years; and a significant departure from what was envisioned even six short years ago.

Amidst this change, there are a few constants. Among the most important is a widely shared concern about the U.S. role in global energy markets. The worries (especially among members of OPEC) sparked by the U.S. pursuit of a green agenda about how the United States might engage in those markets has merely been exacerbated by the arrival of an abundant, affordable domestic resource. Questions about what the U.S. role will be—and the potential for U.S. detachment from the greater global market—have made market participants and watchers acutely interested in U.S. energy policy pronouncements and associated actions.

U.S. Energy Policy: What We Have Said

Because of these shifting dynamics and the uncertainty surrounding the U.S. role in global energy markets, U.S. energy policy pronouncements and associated actions have come under increased scrutiny.

The most comprehensive articulation of the Obama administration's view of how new energy realities affect U.S. national security, and thus its policies, was offered by then

National Security Adviser Tom Donilon in a speech delivered in April 2013.¹ His speech outlined five key impacts the new energy reality had on the United States, and four resulting policy responses. Donilon argued that the United States' new energy posture (1) directly strengthens the domestic economy; (2) allows the United States to engage from a position of greater strength; (3) raises supply in global gas markets, to the benefit of the United States and its allies; (4) does *not* indicate the United States can or should disengage from the Middle East or the rest of the world; and (5) does not materially affect the fact that climate change represents a national security challenge. Given those effects, Donilon continued, the administration's policy would be to (1) lead global energy and climate policy through domestic steps (investments in alternative energy sources, emissions limitations, etc.); (2) work to manage potential sources of energy-related conflict; (3) help other countries to increase energy supply, build capacity, and strengthen institutions that enable international cooperation; and (4) work with other nations to reduce greenhouse gas emissions, prepare for climate impacts, and facilitate alternative energy source adoption.

The speech was widely seen as striking a balance between recognizing advantages that the new energy posture affords the United States, its commitment to the rest of the world, and the need to aggressively pursue global climate change action. It was also seen as the first clear expression of the Obama administration's position on the national security consequences of the new U.S. energy posture. Because facts and data regarding the production trends and safety of oil and gas drilling operations had been continually evolving, until Donilon's speech no explicit formulation of these views had been offered as comprehensively, clearly, or publicly. Since the speech, however, a variety of administration officials amplified and reinforced its themes. The most notable comments have generally fallen into one of three categories: the importance of pursuing solutions to the climate change challenge, staying engaged in global affairs, and relative strength.

On the climate change front, Secretary of State John Kerry, Secretary of Energy Ernest Moniz, and President Barack Obama have all repeatedly stressed the importance of dealing with climate change at home and through global leadership, and identified it as a major national threat. In an effort to counter isolationist sentiment, Secretary Moniz, National Security Advisor (NSA) Susan Rice, and the State Department's Special Envoy for International Energy Affairs Carlos Pascual have all raised the issue of sustained global engagement in energy markets and the Middle East more broadly as a major area of decided policy for the United States. President Obama and Donilon have spoken most directly about the strength the United States derives from the new energy resource production.

The administration is but one voice in the debate, however. Members of Congress, industry leaders, energy analysts, and journalists are active participants in a deep, publicly held exploration of what shale production means for the United States and the rest of the world. Members of Congress have held hearings to discuss and express views on the

1. White House, "Remarks by Tom Donilon, National Security Advisor to the President at the Launch of Columbia University's Center on Global Energy Policy," April 24, 2013, <http://www.whitehouse.gov/the-press-office/2013/04/24/remarks-tom-donilon-national-security-advisor-president-launch-columbia->

Obama Administration Statements on U.S. Energy Policy

Ambassador Carlos Pascual, State Department's Special Envoy and Coordinator for International Energy Affairs, Mar. 5, 2013¹

“It is absolutely in our self-interest to stay engaged. Oil is a global commodity. Gas is increasingly becoming a global commodity. Instability in the Middle East, in Africa, in other parts of the world, instability in transit lanes, immediately have an impact on global prices.”

National Security Advisor Tom Donilon, Apr. 24, 2013²

“Reduced energy imports do not mean the United States can or should disengage from the Middle East or the world. Global energy markets are part of a deeply interdependent world economy. The United States continues to have an enduring interest in stable supplies of energy and the free flow of commerce everywhere.”

Secretary of State John Kerry, Video Message: Pacific Islands Forum (PIF) Climate Change Roundtable, Sept. 2, 2013³

“My friends, the science is clear. It is irrefutable. And it is alarming: If we continue down our current path, the impacts of climate change will only get worse. Without strong—and immediate—action we can all expect new threats to critical infrastructure, regional stability, public health, economic vitality, and, in some cases, even long-term viability of states.”

President Barack Obama, UN General Assembly Address, Sept. 24, 2013⁴

“We will ensure the free flow of energy from the region to the world. Although America is steadily reducing our own dependence on imported oil, the world still depends upon the region's energy supply, and a severe disruption could destabilize the entire global economy.”

Secretary of State John Kerry, Release of the Fifth Assessment of the Intergovernmental Panel on Climate Change, Sept. 27, 2013⁵

“Climate change is real, it's happening now, human beings are the cause of this transformation, and only action by human beings can save the world from its worst impacts. . . . The United States is deeply committed to leading on climate change. We will work with our partners around the world through ambitious actions to reduce emissions, transform our energy economy, and help the most vulnerable cope with the effects of climate change.”

Secretary of Energy Ernest Moniz, CSIS, Oct. 24, 2013⁶

“The geopolitics of natural resources and the supply and demand balance does remain an important security concern. It would be a misconception to think that because of our increased domestic production that somehow we have become free of this question of the global oil market, global oil price, and global oil price volatility.”

“It's not debatable that we need to respond, prudently, to the risks of climate change.”

President Barack Obama, ArcelorMittal Cleveland Steel Factory, Nov. 14, 2013⁷

“We produce more natural gas than anybody in the world. Just yesterday, we learned that for the first time since 1995, the United States of America produces more of our own oil here at home than we buy from other countries. . . . And that is a huge competitive advantage for us. Part of the reason companies now want to move—we were just talking about it—this plant, if it’s located in Germany, energy costs are double, maybe triple; same in Japan. So this gives U.S. a big edge.”

National Security Advisor Susan Rice, Nov. 14, 2013⁸

The four core U.S. interests in the [Middle East] are: “confronting aggression against our allies and partners, ensuring the free flow of energy to world markets; dismantling terrorist networks that threaten people everywhere; and preventing the development, proliferation or use of weapons of mass destruction.”

President Barack Obama, Wall Street Journal CEO Council, Nov. 19, 2013⁹

“You just take the example of energy. They say America is poised to change our geopolitics entirely because of the advances we’ve made in oil production and natural gas production. It means manufacturing here is much more attractive than it used to be. That’s a huge competitive advantage.”

1. IHS CERAWEEK, “Remarks by Ambassador Carlos Pascual, State Department’s Special Envoy and Coordinator for International Energy Affairs,” March 5, 2013.

2. White House, “Remarks by Tom Donilon, National Security Advisor to the President at the Launch of Columbia University’s Center on Global Energy Policy,” April 24, 2013, <http://www.whitehouse.gov/the-press-office/2013/04/24/remarks-tom-donilon-national-security-advisor-president-launch-columbia->

3. Pacific Islands Forum (PIF) Climate Change Roundtable in the Republic of Marshall Islands, “Video of Secretary Kerry presented at Pacific Islands Forum 9PIF) Climate Change Roundtable,” September 1, 2013, <https://www.youtube.com/watch?v=90zWSXWk9iw>.

4. White House, “Remarks by President Obama in Address to the United Nations General Assembly,” September 24, 2013, <http://www.whitehouse.gov/the-press-office/2013/09/24/remarks-president-obama-address-united-nations-general-assembly>.

5. U.S. Department of State, “Release of the Fifth Assessment of the Intergovernmental Panel on Climate Change,” September 27, 2013, <http://www.state.gov/secretary/remarks/2013/09/214833.htm>.

6. Dr. Ernest Moniz, keynote speech at CSIS event “Energy Security 40 Years after the Embargo,” October 24, 2013, <http://csis.org/event/energy-security-40-years-after-embargo>.

7. White House, “Remarks by the President on the Economy in Cleveland, OH,” November 14, 2013, <http://www.whitehouse.gov/the-press-office/2013/11/14/remarks-president-economy-cleveland-oh>.

8. The Middle East Institute, “Remarks by National Security Advisor Susan E. Rice at the 67th Annual Middle East Institute Awards Banquet,” November 14, 2013, <http://www.mei.edu/content/remarks-national-security-advisor-susan-e-rice>.

9. White House, “Remarks by the President to the Wall Street Journal CEO Council,” November 19, 2013, <http://www.whitehouse.gov/the-press-office/2013/11/19/remarks-president-wall-street-journal-ceo-council>.

production of these resources, as well as what the new U.S. energy posture means for our domestic and international policy. As just one example, before leaving office in 2012, Senator Richard Lugar, ranking member of the Senate Foreign Relations Committee, introduced a bill suggesting that the United States should direct liquefied natural gas exports to North Atlantic Treaty Organization (NATO) allies.

The chorus of voices proclaiming the significance of the new U.S. energy posture is partially to blame for widespread speculation about its true meaning. Some claim the “North American production will be as transformative to the market of the next five years as was the rise of Chinese demand over the last 15 years.”² Others claim that the “continental surplus of hydrocarbons points to North America effectively becoming the new Middle East by the next decade.”³ Some believe the abundance of natural gas in the United States will threaten the role of oil in the economy and force the U.S. oil sector to have a “Kodak moment.”⁴ Such lofty claims serve to heighten expectations about the significance of the U.S. oil and gas production surge and what it might mean for other countries.

Ultimately, governments and energy market participants take solace in policy statements with which they agree, but pay much closer attention to how well those pronouncements align with actions. Many energy watchers feel that, thus far, there is a disconnect between U.S. rhetoric and actions. Some of the most frequently cited instances of rhetoric outpacing actions relate to how the United States intends to treat exports of both liquid natural gas (LNG) and crude oil.

Contours of U.S. Shale Gas Export Policies Remain Unclear

To be clear, the Obama administration does a great deal of work through its domestic and international activities to promote some of the core goals and outcomes expressed by top policymakers. These include encouragement of open investment frameworks and more access to production abroad, promoting unconventional oil and natural gas best practices and “tutorials” around the world, and seeking to advance common aims among countries through countless international forums.

However, one of the most anxiety-producing conversations to date is the ongoing processes for approving exports of natural gas and crude oil to world markets. With respect to LNG, the rapid increase in U.S. shale gas production has kept prices low, spurring many domestic producers to seek higher returns elsewhere. In particular, the price differentials between the United States and Asia-Pacific gas markets are, at the moment, particularly attractive. Even after accounting for the costs of liquefaction and shipping (which more than double the price of North American natural gas delivered in Asian markets), U.S.

2. International Energy Agency (IEA) quoted by Bassam Fattouh, “Shifting oil and oil product markets and the impact on the Middle East,” presentation at CIEP, The Hague, November 5, 2013, http://www.clingendaelenergy.com/inc/upload/files/2._Oxford_Middle_East_presentation_secured.pdf.

3. Edward Morse quoted by Bassam Fattouh, “Shifting oil and oil product markets and the impact on the Middle East.”

4. Philip Verleger quoted by Bassam Fattouh, “Shifting oil and oil product markets and the impact on the Middle East.”

producers still believe that the price points are high enough to provide a healthy return on investment.⁵

Reflecting these calculations, in 2011 various companies began to submit LNG export applications to the U.S. Department of Energy (DOE). Approval of licenses to countries with whom the United States has a free trade agreement (FTA) is basically automatic, as the conclusion of these agreements is deemed to meet the required standard of being in the public interest.⁶ For applications that seek to export to non-FTA countries, the DOE must undertake a review to determine whether the public interest standard is met, which includes submission of the applications for public comment. During this comment period, the burden of proof lies with the license's opponents to demonstrate that the project is *not* consistent with the public good.

Project sponsors must then obtain environmental and safety authorization from the Federal Energy Regulatory Commission (FERC) to either build a new LNG terminal (“green field”) or expand an existing terminal (“brown field”). These modifications are necessary because almost all U.S. LNG terminals were designed to receive natural gas imports, so they lack the essential feature for exporting—a liquefaction facility.⁷ FERC oversees the siting and construction of LNG facilities, to include conducting the required environmental assessments.

In May 2011, the DOE granted a long-term authorization to export to non-FTA countries to the Sabine Pass facility in Louisiana to export up to 2.2 billion cubic feet (bcf) per day for 20 years. Shortly after this approval, the domestic politics of exporting natural gas abroad⁸ caused the DOE to “pause” its export approval process to more broadly assess whether natural gas exports in general were indeed in the public interest. The DOE commissioned the National Energy Research Associates (NERA Economic Consulting) to conduct a study on the potential economic impacts of increased LNG exports. Issued in December of 2012, the study concluded that exports were in fact consistent with the public interest, and that within a range of 6–8 bcf/day they would not raise domestic prices be-

5. That said, in most of these deals, the buyers are taking the price risk, not the producers.

6. As of October 31, 2012, the United States has FTAs that requires national treatment for trade in natural gas with Australia, Bahrain, Canada, Chile, Colombia, Dominican Republic, El Salvador, Guatemala, Honduras, Jordan, Mexico, Morocco, Nicaragua, Oman, Panama, Peru, Republic of Korea and Singapore. Not all countries that have an FTA with the United States have this clause (e.g. Costa Rica and Israel.) At present the only major Asian gas consumer with an FTA with the United States is the Republic of Korea. Other major consumers such as Japan, China, and India are all non-FTA countries. Also, all the major European LNG consumers like Germany, UK and Spain are non-FTA countries. See U.S. Department of Energy, “How to Obtain Authorization to Import and/or Export Natural Gas and LNG,” <http://energy.gov/fe/services/natural-gas-regulation/how-obtain-authorization-import-andor-export-natural-gas-and-lng>.

7. The liquefaction process—condensing gas into liquid by cooling it to approximately –260°F—vastly reduces the volume of natural gas and makes it significantly easier to store or transport.

8. There has been an intense debate within the United States regarding the wisdom of LNG exports. The LNG-intensive industrial and manufacturing communities argue that exports will drive up U.S. prices, increase operating costs, and negatively affect U.S. competitiveness. Export proponents counter that restricting LNG exports violates U.S. obligations under the World Trade Organization (WTO), hampering U.S. arguments against others who might not comply in other business sectors. Still others worry that the window for exports is closing, and that if the United States does not act soon, other producers will step in to meet demand.

yond \$1.09/mcf (relative to the reference case).⁹ Following the reports the DOE once again began authorizing applications, approving three more 25-year licenses for non-FTA country exports in 2013 alone for Freeport, Lake Charles, and Cove Point.

So far, the DOE has granted conditional approvals to six LNG liquefaction and export projects. Sabine Pass is the only one that also has approval from FERC. Five more have been conditionally approved to export to non-FTA countries: Freeport terminal (two facilities), Lake Charles, Cove Point, Cameron facility, and as of March 24, 2014, Jordan Cove. Several projects like Cameron and Cove Point have received Final Environmental Impact Statements or Environmental Assessments by the FERC staff and now await decision by the FERC Commissioners. The combined capacity of these six projects represents 9.3 billion cubic feet (bcf) per day, more than Germany's total gas consumption. At the end of March 2014, 24 export projects were in the queue for DOE approval.

While the non-FTA permit process has started to move forward, two concerns remain. The first is whether the permit process will speed up. Since approving the Freeport terminal in May 2013, DOE has approved applications at a rate of about one every two months or so. Some of the companies seeking permits assert that this pace is too slow and will cause their projects to miss the window of economic viability. The second issue is the outstanding question of whether or not there is a volumetric limit to the amount of natural gas the government will ultimately allow—a so-called implicit “export cap.” The economic studies commissioned at the outset of the export approval process (causing a year-long pause) indicated that exports of 6–8 bcf/day fell within a safe range without risking major natural gas price increases in the United States and therefore leveling some economic harm. Now that the accumulative volume of exports approved is above that range (though some have suggested the range is more appropriately 6–10 bcf/day, so there may be a bit more room to maneuver) the question is whether or not the DOE will pause to do another study, slow down, stop permitting, or continue to move forward apace. Given these two areas of uncertainty—timing and overall level of allowable exports—many industry leaders have called for a reversal of the current process, so that a company would first go through the (much more expensive and demanding) FERC approval process and then seek a DOE export license. This would ensure that only projects with commercial viability would be eligible for approval consideration from the DOE. As it stands, many companies contend that a number of the projects in the queue for approval, established on a first-come first-serve basis, are holding up projects that have a better financial chance of success. Details aside, the main question is whether and how the United States seeks to manage its overall volume and destination of exports. While to date there has been no sign that country destination (other than the FTA and non-FTA distinction) grants any special treatment within the permitting process, it is clear that overall volumes of exports and possible impact on U.S. prices remains an area of key concern.

9. W. David Montgomery et al., “Macroeconomic Impacts of LNG Exports from the United States” (Washington, DC: NERA Consulting, December 3, 2012), 11, http://energy.gov/sites/prod/files/2013/04/f0/nera_lng_report.pdf.

The Timing and Scale of Tight Oil Exports Are Even More Uncertain

Just as the boon in shale gas has shifted the U.S. mindset from one of scarcity to abundance and its role from one of importer to exporter, the growth of tight oil—in particular light sweet crude—has left the United States with more than its refineries can efficiently or profitably process.¹⁰ This has caused a similar debate to develop around crude oil exports, and the potential of revisiting the laws that govern them.

The legal architecture governing hydrocarbon exports is rooted in the Energy Policy and Conservation Act (EPCA) of 1975, passed in reaction to the oil embargo of 1973.¹¹ Under the law, the president is to establish a rule prohibiting the export of crude oil (and natural gas) produced in the United States, with the authority to grant exemptions based on the purpose of export, the class of seller or purchaser, country of destination, or other reasonable classification. There are a variety of other statutes that dictate the export of crude, either restricting or permitting crude exports based on production location (e.g., Alaskan crude exports are allowed because there was no other way to get the oil to market). Relevant laws include the Mineral Leasing Act, the Export Administration Act of 1979, the Exports of Alaskan North Slope Oil Title (technically part of the Mineral Leasing Act), the Outer Continental Shelf Lands [OCS] Act), and the Naval Petroleum Reserves Production Act. All were adopted during a time when exports were viewed as detrimental to national security. Each is administered by the Department of Commerce, which has issued guidelines for crude export licenses.

Until recently, the ban on crude oil exports enacted 35 years ago had little impact on U.S. production or prices because demand far outstripped domestic supply. However, these conditions have now been reversed with the advent of tight oil. With the rapid uptick over the past five years, U.S. production is at its highest level in 25 years, and the United States finds itself in a position of abundance in terms of natural gas liquids, natural gas, and crude oil (of some grades). The United States still imports heavier crudes, but it is awash with light sweet crude oil. Just a few years ago the United States was a net importer of propane (one of the natural gas liquids); now more than one third of U.S. propane is exported. Just as is the case in natural gas, the United States has shifted from a position of oil shortage to one of surplus—and no clear policy direction to reflect this reality has been set. Over the next couple of years, the U.S. refining sector will be less able to process these light

10. When looking at the actual data, claims that the United States has more oil supply than demand appear confusing. After all, U.S. production has hit about 8 million barrels per day, while U.S. liquids consumption is close to 18 million barrels per day (some of which is consumed in the form of biofuels, natural gas liquids, etc.), and there is still a crude shortage. The issue is the types of crude for which U.S. refining infrastructure is designed. Many U.S. refineries are configured to process heavy crude oil, while U.S. production is mostly light. Light sweet crude and condensate imports are expected to reach zero by 2016, according to some projections. Over the next few years, some analysts project that the United States will have an oversupply of 500,000–600,000 barrels per day of light sweet crude, continuing until either refineries make expensive configuration changes or light crude exports are authorized.

11. Natural gas exports are also governed by EPCA, but the licensing process is administered by the Department of Energy based on less restrictive guidelines set forth in the Natural Gas Act of 1938.

Currently Authorized Crude Oil Exports (for which companies may apply for a license)

- Crude from Alaska's North Slope that travels through the Trans-Alaska Pipeline System (TAPS)
- Up to 25,000 barrels per day of heavy crude oil (American Petroleum Institute [API] gravity of 20° or less) from certain fields in California
- Crude to Canada for consumption or use therein
- Crude from Alaska's Cook Inlet
- Crude that is of foreign origin that has not been mixed with U.S. oil (i.e., re-exports that are not of U.S. origin)
- Some instances of swaps with Mexico and/or Canada
- Crude exported in connection with refining or exchange of oil in the Strategic Petroleum Reserve

sweet crude oils in an efficient manner and the resulting impact on prices could harm U.S. production and the profitability of the refining sector.

Reflecting this disconnect, the debate regarding the crude export ban has intensified. Energy Secretary Moniz recently acknowledged the need to reexamine the ban, stating “there are lots of issues in the energy space that deserve some new analysis and examination in the context of what is now an energy world that is no longer like the 1970s.”¹² Not everyone agrees, however. Senators Edward Markey¹³ (D-MA) and Robert Menendez¹⁴ (D-NJ) both issued letters urging the Obama administration to resist appeals to lift the crude export ban, arguing that despite the current atmosphere of abundance, oil remains a strategic asset and export restrictions are vital to U.S. national interests and as such justifiable under World Trade Organization (WTO) regulations.

A variety of commentators¹⁵ and oil producers¹⁶ have publicly stated their support for lifting the ban on crude exports, joined by free trade advocates. One of the most politically

12. John Kemp, “Obama could lift U.S. oil-export ban without Congress: Kemp,” Reuters, December 18, 2013, <http://www.reuters.com/article/2013/12/18/usa-oil-exports-idUSL6N0JX2U920131218>.

13. Senator Edward J. Markey, letter to Ambassador Froman, December 3, 2013, http://www.markey.senate.gov/documents/2013-12-3_Markey_OilExports_Froman.pdf.

14. Senator Robert Menendez, letter to President Barak Obama, December 16, 2013, <http://1.usa.gov/1dj6qyZ>.

15. Blake Clayton, “The Case for Allowing U.S. Crude Oil Exports: Policy Innovation Memorandum No. 34,” Council on Foreign Relations, July 2013, <http://www.cfr.org/oil/case-allowing-us-crude-oil-exports/p31005>.

16. Emily Pickrell, “ConocoPhillips chief pushes for U.S. oil exports,” *Houston Chronicle*, November 19, 2013, <http://www.mysanantonio.com/business/eagle-ford-energy/article/ConocoPhillips-chief-pushes-for-U-S-oil-exports-4994572.php>.

appealing claims is that unhindered trade flows will reduce gasoline prices in the United States, which, though undoubtedly a possibility, is by no means a certain one. Citibank recently argued in a research note that U.S. gasoline prices would fall by up to 12 cents per gallon because U.S. crude exports would drive down the price of Brent crude, a global benchmark (the global price of gasoline tracks to Brent).¹⁷

Beyond these arguments, the primary reason producers—and many consumers—favor freer trade is that the ban distorts the energy market and leads to inefficiencies. For example, inconsistencies in export policy create artificial arbitrage opportunities that are exploited by some market participants. For those seeking investments, an export ban may jeopardize production by artificially lowering prices in the United States. Lower expected returns slows investment in new wells, the argument goes, and reduces the growth of future production, sacrificing jobs, economic growth, and government revenue. Opponents of the ban also argue that noncompliance with international trade agreements under WTO makes the United States—a longtime, vocal proponent of free trade—look like a hypocrite. (Again, proponents of the ban cite national security exceptions to these agreements, and argue that the U.S. position is clearly defensible in that context.)

Thus far, despite a stated policy aim of enhancing the energy security of others around the world, the Obama administration has yet to take a formal position on whether crude oil exports are desirable, over the short term or longer term, or even of the specific conditions under which they should be considered. Coupled with a slow process of approving natural gas exports to countries with which the United States does not have a free trade agreement, market watchers at home and abroad are left wondering exactly how the Obama administration's broad statements on energy policy are intended to play out in practice.

International Reactions

International reactions have been mixed. On the natural gas side, potential consumers have barraged the United States with interest and inquiries into its gas export policy. Just as natural gas producers are keen to take advantage of new consumers in Asia, one of the most dynamic markets in the world, so too are consumers, who, as noted in the second background report, view supply diversification as a key facet of their energy strategies. Just as in Europe, some in Asia believe that an increased presence of North American gas in Asian markets would provide additional leverage to moderate the power of traditional suppliers in price negotiations. The hope is that exports from the United States would undermine the current oil-linked pricing structure.

Japanese and European consumers and governments have been by far the most aggressive in pushing for more U.S. exports, while China and India have been less vocal but are still interested. Actors in both regions have spoken publicly about the desire for more

17. Claudia Assis, "U.S. drivers see little benefit at the pump from shale bonanza: FT," Market Watch, *Wall Street Journal*, December 11, 2013, <http://blogs.marketwatch.com/energy-ticker/2013/12/11/u-s-drivers-sees-little-benefit-at-the-pump-from-shale-bonanza-ft/>.

clarity on U.S. gas export policy, raise it routinely in meetings with U.S. policymakers, and have highlighted it as an important area of interest for ongoing trade negotiations. Their efforts have been supported and echoed by several voices in Congress who see exports as a way to bolster ties with these countries. Efforts go beyond the formal, government-to-government interactions: recently, news outlets reported the creation of “LNG Allies,” an advocacy group representing both Eastern European gas consumers and certain shale industry advocacy groups in the United States.¹⁸

International pressure to revisit the U.S. ban on crude oil exports has been much less pronounced to date for two primary reasons. First, the application and approval process for crude oil exports is far less transparent than the one for natural gas exports. Companies apply for export permits to the Bureau of Industry and Security at the Department of Commerce for all export permit licenses. The applications, as well as approved or denied permits, are never made public nor do officials from the agency typically justify their reasons for approval or denial. U.S. crude oil exports typically come to light after they occur (industry analysts find out through the Energy Information Administration [EIA]) and some are never revealed because the company chooses not to export the crude. Recently, several news and market analyst organizations submitted a Freedom of Information Act request for more information on what licenses had been approved or denied and what licenses applications were currently pending. This signaled a new era of scrutiny for a process that heretofore occurred behind closed doors. Second, the U.S. oil market complex has not yet reached its so-called “saturation point” where producers and refiners have no other option than to apply for a permit to export crude to non-approved markets. Oil market analysts suggest that between the end of 2014 and 2015 the oil companies and refiners will run out of good options to absorb excess light tight oil (so far the system has absorbed the crude by backing out imports of other light oil imports, exporting crude to Canada, increasing refinery processing rates, or lightly processing the crude to allow it to be exported as a petroleum product, as well as increased light product exports).

Several congressional officials and a number of voices from industry began calling for an end to the ban on crude oil exports early in 2014. Europeans have also raised the issue within the context of their ongoing trade talks with the United States. It is quite likely that other voices would join in that plea for exports when and if the United States bans a particular export application. It is simply too early to tell how this issue will play out, but as the debate ripens, multiple stakeholders are anxiously awaiting the Obama administration’s clarification of its position on crude oil exports.

Every national government faces scrutiny over how clear a line can be drawn from its public pronouncements to its specific policies. The U.S. government, given its openness and role as global leader, may be among the most carefully studied in this regard. That basic condition is heightened in the case of shale gas and tight oil, both because of the scale and pace of development and because of the geographic concentration of production thus far.

18. Amy Harder, “Europe to America: We Want Your Gas,” *National Journal*, January 16, 2014, <http://www.nationaljournal.com/daily/europe-to-america-we-want-your-gas-20140116>.

The Obama administration's policy statements have tried to articulate to the world how it intends to manage its resource abundance, but its pronouncements have created expectations and raised uncertainty about the details in ways that leave many unclear about future actions. While not limited to future decisions about exports, how the United States decides to proceed on this issue is a key bellwether for industry and governments alike.

3 | Potential Strategic Pathways for the United States

The evolution of shale gas and tight oil production has occurred so fast that U.S. policymakers have been challenged to respond with a largely unexpected new energy posture for the United States. The difficulty of setting a clear path is compounded by the uncertainty around the future of unconventional oil and gas development. Will it remain essentially a U.S. phenomenon, or will other countries begin to realize their own production potential? How long might production continue to rise? How long will it take to decline? Therefore, as policymakers craft an energy strategy moving forward, it behooves them to evaluate a range of potential futures in regards to global unconventional oil and gas production pathways, because the best U.S. strategy for one set of production scenarios might be ill suited for another.

In its broadest formulation, the shale gas and tight oil revolution has essentially meant that the *means* available to U.S. leaders to apply toward strategic ends have increased. Those *ends*, however—broadly framed as fostering a stable, prosperous country and world—remain the same. Thus the key question is about *ways*—that is, how best to utilize the new means (shale gas and tight oil) to achieve the ends of stability and prosperity. Most observers have argued for one version or another of two general pathways, one of “energy stability” and the other of “energy leverage.”

This first pathway, “energy stability,” argues that the United States’ shale gas and tight oil advantage should be used to enhance energy security around the world, on the theory that more stable energy markets will foster strong economies and enhance geopolitical stability. This pathway is challenging, precisely because stability in energy markets is so difficult to achieve. Supply and demand changes, combined with often mismatched investment, infrastructure, and political timetables that require rapid supply responses, have long made stable energy systems elusive. The premise of this approach is at once about balancing supply and demand, but also rests on the view that domestic energy economies seek strength, resilience, and stability through reliable connections to well-supplied global markets. From an unconventional oil and gas perspective, an energy stability pathway has several fundamental components: (1) the encouragement of unconventional production worldwide, (2) the protection and promotion of free trade, and (3) actions to address global climate change.

This approach is consistent with the international regimes governing energy and trade that the United States has helped to create. Several international institutions and agreements enshrine the U.S. long-standing commitment to these core principles. For example, the International Energy Agency (IEA) was created in response to the 1973–1974 oil crises, founded by the major global energy consumers at the time. At its inception, the group was intended to serve as a counterbalancing force to OPEC and a structure for organizing a system of strategic stockpiles (oil supplies kept in storage either by governments or by companies) that the collective could draw down upon in the case of a supply disruption. Since that time the group has come to represent a series of principles about how best to ensure the collective provision of secure, reliable, affordable, and environmentally sound energy resources. Its core areas of focus include:

- **Energy security:** Promoting diversity, efficiency and flexibility within all energy sectors.
- **Economic development:** Ensuring the stable supply of energy to IEA member countries and promoting free markets to foster economic growth and eliminate energy poverty.
- **Environmental awareness:** Enhancing international knowledge of options for tackling climate change.
- **Engagement worldwide:** Working closely with nonmember countries, especially major producers and consumers, to find solutions to shared energy and environmental concerns.¹

This notion of stable supply, free markets, diversity, efficiency, and flexibility are at the heart of the last 40 years of U.S. international energy policy, supported by a long series of efforts to increase supplies and promote trade in all energy sectors in all regions of the world. Under this view, adequately supplied markets that are efficiently functioning and able to respond to global supply disruptions are seen as the single best way to ensure energy security, and in turn global stability, for the largest number of market participants.

The second pathway—“energy leverage”—views the energy advantages presented by the U.S. shale gas and tight oil production as tools that can be employed in the service of broader geopolitical or economic objectives. Here, the United States would seek to maximize its own shale gas and tight oil production, and use the resulting energy supplies and economic benefits to strengthen its global leadership position. While it is unlikely that the United States would overtly stop promoting development of resources abroad, a less intentional manifestation of this approach could come from the United States being less concerned about adequacy of global supply (due both to its own supply situation and to the desire to sell its oil- and gas-derived products elsewhere.)

1. International Energy Agency, “About Us,” <http://www.iea.org/aboutus/whatwedo/>.

Other options consistent with an energy leverage approach include either limiting gas exports, with the aim of capturing as much domestic economic benefit from global price differentials as possible (and for as long as lower prices do not stymie domestic production), or directing exports to allies and friends—a popular suggestion from several voices in the U.S. Congress. While the geopolitical implications of limiting exports overall or limiting exports to only allied or friendly countries could have significant geopolitical reverberations, it has appeal in some parts of the world. Already, European and Japanese politicians have used gaining access to U.S. energy supplies as one of the ways to sell an international trade agreement at home.

Another way to exercise leverage is to use relative energy adequacy as the context for sanctioning countries dependent on energy exports or imports for their livelihood. Myriad government officials have noted that the sanctions regime against Iran was partially enabled by the increased production of tight oil in the United States and the moderating effect that had on energy prices during sanction implementation. In truth, U.S. unconventional production was only one factor contributing to price stability; weaker global economic growth and Saudi production increases also likely played a role. Posing the counterfactual about whether the international community would have pursued the current line of sanctions against Iran absent the new U.S. energy posture is less relevant than whether U.S. policymakers will perceive the current sanctions regime as an example of success worthy of replication in the future. In sum, will the United States see its newfound energy wealth as providing greater geopolitical defense, or will it go on the offensive?

Rhetorically, the Obama administration's statements on its energy strategy contain elements of both "energy stability" and "energy leverage." Its actions are similarly mixed. Some Europeans have noted the benefits to U.S. competitiveness and that natural gas prices elsewhere in the world are between two and five times those in the United States. The slow processing of gas export permit applications only serves to further suspicion that a leveraging strategy is at work.

When U.S. actions and words fail to align or comments from disparate groups within the U.S. system reveal opposing viewpoints, other countries start to debate the United States' strategic intentions. At its worst, other countries interpret inconsistencies in the U.S. position as disingenuous, with the United States telling the international community that it is committed to global markets while simultaneously trying to capture the price advantage and foreign policy flexibility. At its best, other countries empathize with the U.S. position and view the lack of U.S. resolution on some core policy questions as a sign of a thoughtful deliberative process to understand how long this advantage might last and assess the best path forward for achieving the greatest national and global benefits.

To some degree, perceptions of policy inconsistencies are impossible to avoid. At the same time, aligning policy pronouncements and actions as closely as possible makes policies more effective and reduces frictions—economic, political, and diplomatic—that can be time consuming and costly. The number of key energy policy issues still to be determined

offer ample opportunity for much more. The question for U.S. policymakers, therefore, is whether a consensus can be built around a broader energy strategy—energy stability, energy leverage, or a conscious and more explicit blending of the two—to minimize those frictions in the months or years ahead. Building that consensus requires a deliberate examination of how each policy approach holds up against a range of possible unconventional futures.

4 | Future Unconventional Energy Scenarios

A plethora of factors could profoundly influence the trajectory of future unconventional production. Scenarios postulating these futures abound, and vary significantly in their detail and scope. To inform this exploration, the study team examined four potential futures out to 2025,¹ a time frame chosen as the midpoint for assessment because it provides a reasonable future range through which to assess potential outcomes. To extend that analysis, the study team added a high-level projection of how each scenario might play out to 2040.

The scenarios are illustrative and are not meant to encompass the full range or complexity of possible energy futures. For example, they do not incorporate critical considerations like economic fluctuations (significant resurgence of economic growth or significant economic downturn), climate change impacts (stemming from either policy or natural developments), price volatility over shorter time frames and likely reactions, or the potential for other major supply sources like Iran, Iraq, Venezuela, or Nigeria to evolve in nonlinear ways. Such detail, critical in certain instances, was not needed for the purposes of this study, which aimed to foster creative thinking about a range of possible outcomes and implications.

Their basic features are as follows:

- *Baseline Scenario.* This scenario assumes that unconventional oil and natural gas production is basically and predominantly a U.S. (in the case of oil) and North American (in the case of natural gas) story.
- *Breakthrough Scenario.* This scenario assumes that the U.S. experience continues apace, but also that the vast stores of unconventional oil and gas around the world are unlocked as other nations successfully overcome the cost, technological, and environmental barriers inhibiting current production.

1. For the purposes of this analysis, the study team, in cooperation with the original authors, used modified versions of scenarios by the Energy Research Institute of the Russian Academy of Sciences (ERI RAS), *Global and Russian Energy Outlook up to 2040* (Moscow: ERI RAS, 2013), http://www.eriras.ru/files/Global_and_Russian_energy_outlook_up_to_2040.pdf; and IEA, *World Energy Outlook 2011: Are We Entering a Golden Age of Gas?* (Paris: IEA, 2011), <http://www.worldenergyoutlook.org/goldenageofgas/>.

- *Failure Scenario.* In this scenario, unconventional oil and gas around the world remain undeveloped, and the success experienced in the United States begins to reverse itself toward the end of this decade. By 2025 the United States is back to an oil and gas production profile that looks very similar to what was expected before the current boom took off (i.e., the strategic outlook of 2005–2008).
- *Gas Breakthrough Scenario.* This scenario assumes that unconventional gas production increases globally, but that tight oil maintains a minimal share of global oil production.

Each of these scenarios could arise from a variety of factors and trends. They could be significantly altered by national policies, political instability, economic shifts (either global or regional), and technological advances. For example, the Shale Failure scenario could theoretically arise from technology barriers in some countries or more stringent environmental requirements (to mitigate production risk concern or for the purposes of climate change). A Shale Breakthrough scenario could result from technological innovations that improve performance or reduce costs, and/or by more production-permissive regulatory environments and open investment frameworks that allow greater competition for the development of these resources, backed by aggressive government incentives. The Gas Breakthrough scenario could result from a greater push by governments to utilize natural gas in the transport sector, the decline of coal and nuclear sources for either cost or environmental reasons, technology or resource base limitations on the unconventional oil side, and the potential policy choices made by China (e.g., a reduction in energy intensity and carbon intensity, natural gas use, transportation policy). While the exact pathways leading to each resource outcome were incorporated into scenario modeling, the details are not specified here, as the intent of the discussion that follows is to explore the sensitivity of various policy choices across a range of outcomes.

Scenarios' Implications

The four scenarios collectively portray a wide range of potential outcomes for unconventional production, with different implications and potential winners and losers. On the whole, however, a series of insights emerge.

- ***A natural gas breakthrough could be transformative.*** A world in which gas captures greater market share from oil and is used more widely in the economy could be a subtle but significant trend with geopolitical implications. Natural gas is a versatile and clean fuel (low carbon dioxide and particulate emissions) that could not only penetrate further into electricity, electric power, residential or commercial heating and transportation sectors, but also as a feedstock for a wide variety of petrochemical products. Under the right circumstances, natural gas provides a unifying role for climate change action-oriented economies pre-2030. As markets shift in such significant ways, market players will undoubtedly try to secure the best

possible vantage point within the new markets. This could lead to stiff competition and, in some cases, geopolitical tension.

- ***The variation in unconventional oil outlooks is not that significant.*** In the four scenarios posited here, unconventional oil production plays a role in two: Baseline and Breakthrough. In both cases, the timelines for production are sufficiently long that the eventual volume does not represent a huge portion of the market nor does it have a large impact on prices. In either case, OPEC could lose or gain market share, but given the huge variability from other producers, the range of potential demand, and other variables, this is not likely to be a huge factor that could lead toward reshaping global oil market dynamics. The country that is likely to be most significantly affected by the future of unconventional oil is the United States, as it is the only major country for which a success or failure could swing its status as either a net importer or net exporter over the forecast period.
- ***The shift toward markets in the East is the defining feature of every possible future.*** Every scenario examined here results in a perpetuation of the shift east in energy demand. For the United States, this reality becomes problematic in a Shale Failure environment, as U.S. production would decline at some point in the 2020s, after market relationships will have firmly solidified their eastern orientation. Asia, and China in particular, drives demand growth across all four scenarios, giving its overall economic health an outsized impact on the global energy system. A collapse or significant slowdown in Asia's growth projections, however, would throw a serious wrench into the global investment and marketing plans of some of the world's largest companies.
- ***A Failure scenario is most likely to create additional impetus for conflict or tension.*** Though energy resources are not the only factor at play in current areas of international contention (the South and East China Seas and the Arctic, for example), their resource potential becomes more valuable as markets tighten, as they would in a Failure (and, for oil, a Gas Breakthrough) scenario.
- ***Climate goals must be more actively pursued no matter how the future unfolds.*** The scenarios illustrate that policy choices related to environmental goals, pollution reduction, or climate change could have a major impact on fuel and technology choices. The emergence of stricter standards on greenhouse gas pollution or a price on carbon could reconfigure fuel choices and thus the overall market. Depending on the policy choices, natural gas, being a more climate-friendly fossil fuel than its counterparts, could lead to greater fuel switching. In the absence of a global climate agreement, individual countries or regions could take on their own policies. Pollution levels in China could force the hand of the leadership to aggressively reduce emissions and pursue cleaner sources more aggressively than they are doing today. The United States, if it turns back toward climate-oriented policies, could also drastically reorient its fuel choice. The emergence of a global climate agreement at the United Nations (UN) climate talks could also impact the trajectory of unconventional

oil and gas and have an impact on of the energy sector writ large, with oil and coal being the primary losers, and natural gas following suit.

PRODUCERS

- ***The United States is most sensitive to alternative futures.*** What happens in terms of U.S. shale gas and tight oil production will have a major impact on trade flows, as it will determine the U.S. role as either an importer or exporter. On the gas side, in all but a Shale Failure scenario, the United States is an exporter, prompting the rerouting of natural gas trade flows and providing greater flexibility of supply to all consumers while contributing direct benefits to the U.S. economy. With respect to oil, in either a Baseline or Breakthrough future the United States would continue to import some amount of oil, but to a much lesser extent than in the Failure or Gas Breakthrough scenarios. While the global energy situation will change depending on what happens in the United States, because production to date has been largest in the United States, its economic and geopolitical future is most closely tied to how sale trends play out. Canada and Mexico, the two largest energy trade partners for the United States, will also face significant impacts depending upon U.S. production.²
- ***The next decade will prove critical for Russia.*** Russia and its market share are disadvantaged in both the Baseline and Breakthrough scenarios due to unconventionals. However, the Gas Breakthrough scenario is a mixed bag, as higher oil prices (and the limited production of unconventional oil) would enable increased conventional production. Russia's ability to turn to new markets (in the East) will be important for it to retain market share; this goal is most helped by a Shale Failure future, but much more dependent on internal reforms in all others. This reality suggests that Russia has a relatively narrow window over the next decade to undertake those reforms if it wishes to best position itself against uncertainty. The direct link between revenues and energy production makes Russia highly price sensitive, a vulnerability that is most problematic in either a Baseline or Breakthrough future.
- ***Implications for OPEC countries vary.*** Low prices and greater supply of unconventionals from the Breakthrough scenario negatively impact OPEC, though it fares better in other cases (and to be fair, much of the impact is from factors beyond just existence of unconventional oil and gas). In the Failure/Breakthrough scenario, OPEC is able to increase market share for oil, and as its own domestic energy demand increases is able to meet the demand with gas, exporting the surplus. In the medium term, the biggest questions are the status and impact of Iraq and Iran, and when or if their production comes back online and what that does to other members of OPEC and the sensitive balance between Saudi Arabia, Iran, and Iraq—and, if countries begin to pursue domestic reforms, the pace and scope of these reforms.

2. Canada shares robust shale gas development in the breakthrough scenario.

REENTRANTS, NEW ENTRANTS, AND RESOURCE DEPENDENTS

- ***Shale Failure is preferable for certain producers if unconventional don't exist at home.*** For this group of countries, less well-supplied markets are generally better from a revenue standpoint; for those importing products from abroad (e.g., Mexico) this would be more of a mixed bag. Countries like Mexico or Algeria might benefit from a Breakthrough-like future on the margins, but probably not to a sufficient degree that it would bring about a shift in preferences (i.e., may prefer shale failure to guarantee the greatest likelihood of oil price stability, all things being equal).
- ***New Africa production will face near-term challenges but is likely to work out in the long run.*** Most of the pressure for new entrants from Africa in each scenario takes place in the mid-term, when markets are well supplied and the need to bring on new investment is less intense. Over all longer-range forecasts, both oil and gas resources will be needed. The impact of unconventional is merely to delay those projects, though this may slightly perpetuate the period of potential instability on the continent.

CONSUMERS

- ***All major consumers benefit from greater abundance.*** From a consumer perspective, the better-supplied gas markets that result in all but the Failure scenario offer more diverse import options and prices lower than would otherwise be the case (though regional differences persist in each of the hypothesized futures). Oil importers benefit most from the Breakthrough and Baseline scenarios, but would face higher prices and fewer supply options under a Failure or Gas Breakthrough future.
- ***Promoting unconventional oil and gas developments could reduce import dependence in some places, especially China.*** The ability for China to domestically produce its own unconventional resources as envisioned after 2020 in all but the Breakthrough scenario (though just for gas in the Gas Breakthrough scenario) would afford China greater supply diversity and security, and could alleviate its over-reliance on environmentally unfriendly coal.
- ***Resource competition in Asia could intensify and shift to the Indian Ocean over time.*** China, Japan, and Southeast Asia are now in a full-fledged competition to attract energy supplies. While the presence of unconventional oil and gas brings at once greater market stability but also more leverage over pricing and contract negotiations, no region in Asia is able to shift its own energy posture vis-à-vis domestic unconventional oil and gas production, thereby intensifying competition to lock in resources destined for the region. This competition has already begun to shift West toward emerging resource producers in Asia. The geopolitical nature of China's relationship to Africa relative to some of its neighbors (e.g., Japan, South Korea) is another source of possible tension as China and India both seek to establish a network of basing and logistical networks to establish a presence in the region.

- ***Europe will continue to face challenges in every possible scenario explored.*** While Europe would accrue the benefits of greater supply mentioned above in a Baseline or Breakthrough scenario to some degree, Europe will remain import dependent overall. In a Breakthrough world of high unconventional oil and gas production, higher-cost European resources are shelved in favor of lower-priced unconvensionals and lower prices reduce incentives to aggressively pursue renewable alternatives. In the Failure scenario, the absence of unconventional oil and gas would decrease the EU's flexibility and cause it to face competition in the market from a greater range of consumers; on the other hand, this could prompt a more aggressive push toward renewable sources. In every scenario, Europe would continue to face competitiveness challenges, though to varying degrees, which in turn will affect the level of pressure on European environmental objectives.

In the face of such great uncertainty about how the unconventional revolution might unfold, the examination of a range of possibilities provides a basic framework against which U.S. policymakers can assess the risks associated with their future policy choices. To date, U.S. officials have offered an approach that has elements of both an energy stability approach and an energy leverage approach. How well these options hold up against the framework offered by the scenarios, and the implications for the way ahead, are the subjects of the next chapter.

5 | Which Path to Choose? Stability vs. Leverage

The range of potential energy futures and impacts highlights the core tension over whether the United States can best enhance global prosperity and stability by focusing on energy policies that benefit broad notions of energy security more directly or by seeking to enhance its own economic and energy advantage to then bring to bear in service of those ends (i.e., an energy-stability or energy-leverage pathway). The meaning of the choice is inherently limited by the fact that the United States cannot by itself assure any amount of energy or geopolitical stability. That said, given its position both within the energy sector and more broadly, U.S. actions and perceived conduct can clearly influence the actions of others.

The question then becomes: Which possible strategic pathway is the most robust against a range of possible future scenarios?

Energy Stability

To recap, the key assumption underpinning an energy-stability approach is that energy's contributions to U.S. and global stability and prosperity are greatest in an environment of global market stability. Conceptually, this would mean taking steps aimed at increasing global supply, while simultaneously attempting to minimize disruptions to producers most vulnerable to price volatility or decline.

In the context of the scenarios discussed in the previous chapter, the desired supply increases would likely resemble those postulated in the Breakthrough scenario. The United States has a well established track record of promoting greater production, albeit with mixed success. Certain countries, such as Brazil, Azerbaijan, and Colombia, have followed suit, but more often than not openness to investment has been a function of domestic politics and global oil prices. During much of the 2000s, many hydrocarbon-rich countries went through a period of renationalization or investment regime revision in order to capture more of the rent associated with oil and gas production during a period of rising prices. The United States was not immune to this trend, with several calls for windfall profit taxes. In addition, even in markets where the investment regime is fairly open and consistent, industry often suffers from leads and lags of the project development cycle and are exposed to price spikes and collapse from time to time.

Other countries also govern their energy resources under a different framework. Saudi Arabia, for example, does not pursue a policy of open investment and maximizing production. For them, managing the resource base for the long-term economic benefit of the country is a guiding principle. As the global swing supplier, Saudi Arabia plays a different and important role in the market by being able to quickly and ably respond to oil supply disruptions or demand downturns by taking oil on and off the market. There is an economic benefit to be derived from that overall level of spare capacity, and under an energy-first framework, Saudi Arabia would likely seek to maintain its role as a global market balancer. To the extent that well-supplied markets and even lower prices cause countries with fluid investment regimes to work harder to attract and maintain investment and diversify their economies, this would also be consistent with an energy stability-oriented framework.

The United States would also play a role by encouraging production of unconventional oil and gas abroad. Indeed, it has already done so to some extent, having been active in this area of diplomatic engagement since the early days of shale gas development. Through its Unconventional Gas Technical Engagement Program (UGTEP), the U.S. government works with other countries to talk about the regulatory and environmental aspects of tight oil and shale gas development and to facilitate outreach with those in government and the private sector at the state and local level. The government-to-government conversations also include discussions of the types of investment regimes needed for the development of these resources. While important, the U.S. government role is limited in this regard. Private companies are responsible for the production of these resources, and they own the technology and possess the know-how to produce these resources. It is only by enabling these companies to explore and develop this potential over a period of time in other parts of the world, something over which the U.S. government has no direct control, that significant new developments will even be possible.

To promote flexibility, adaptability, and efficiency in the market, an energy-stability approach would also involve encouraging trade in energy resources. This would include a broad, transparent, and rapid expansion of natural gas exports, as well as the initiation of exports of crude oil. Ironically, the Breakthrough scenario envisages a world in which there is less overall energy trade among certain countries as a function of more supplies being located closer to home. It might also suggest a continued and clear U.S. commitment to protect sea lanes of communication. Over the longer term, the United States might consider a policy of more broadly sharing responsibility for this mission as global markets continue to shift and concern morphs from one of U.S. sustained protection to one of U.S. shared protection and absence of conflict or tension over this role.¹

1. International efforts to combat piracy, which involve a vast number of countries from around the world, offer one potential model upon which greater cooperation might be based. However, many U.S. officials remain leery of moving too quickly down this path, noting that the level of interaction required to do truly effective burden sharing requires exposure of key capabilities that would be relevant in any “hot” military conflict. At present, therefore, willingness to take cooperative steps too far with regards to China, for example, while the relationship continues to contain elements of both cooperation and competition, is limited.

RISKS

Even if the United States were to succeed in accelerating increases in global energy supplies—by no means a straightforward proposition—such an approach would certainly result in greater risk in some areas. Geopolitically, many risks are already evident in the challenges many producers, in particular, are facing today (worsened, to varying degrees, by U.S. shale production to date). While responses to these risks are impossible to gauge correctly, all things being equal, a response by other major oil producers aimed at energy market stability would involve conforming to market signals about the need for more or less oil and gas supplies.

Again, the Breakthrough scenario offers insights into some of the likely strains greater energy supply might induce—for example, the threat that lower energy prices could pose to Russia’s economy. How this might play out within Russia is difficult to anticipate, but it would almost certainly lead to greater geopolitical instability and uncertainty. European oil producers would likely be further disadvantaged, though the negative economic effects could be offset or overcome by the broader benefit to the economy as a whole from lower-than-otherwise energy prices. Europe would also presumably become less dependent (though not independent) on Russian energy imports, which might either force Russia to either refrain from using energy as a coercive tool in order to maintain market share, or, if Russia’s share fell, offer Eastern Europe in particular a greater sense of independence in building a broader or deeper set of political and economic relationships.

Given Russia’s continued heavy reliance on energy revenues, one key to an energy-stability strategy would be its ability to successfully enter Asian markets. While this is likely to be determined by factors well beyond price, anything the United States could do to help facilitate those energy ties, as free from geopolitical strings as possible, would be very important.

Finally, while maximizing unconventional energy supplies appears advantageous from an energy security side, it could be problematic from the perspective of mitigating climate change. Any energy approach that fails to precipitously decrease global emissions by 2050 will be inconsistent with U.S. and globally stated goals on emissions reductions, and as such raises the risks to global security and prosperity. From a climate change vantage point, a dramatic increase in unconventional production helps to perpetuate the existence of a fossil-based energy system. Absent the ability to find scalable replacements to the current system, however, a low-carbon pathway may have negative repercussions of its own (i.e., low-carbon solutions that do not work place an enormous strain on a country’s economy).

Under an energy-stability rubric, the United States would likely seek to broaden international cooperation around shared interests, to include the protection of sea lanes and stability in the Persian Gulf region. This would relieve the United States of some of the fiscal burden from free riders, and more closely reflect the common concerns around security of trade flows, hopefully increasing trust and defusing sources of tension. That said, this aspect of the strategy is fraught with difficulties. The United States has already

increased its emphasis on strengthening regional organizations in Asia, the Middle East, and Africa, but working through centuries-old legacies of distrust is slow going. Attempts to rush things can be counterproductive. Practically, it is not clear that the implementation of a strategy that sought a more equal allocation of responsibility for mutual security interests would look substantially different than what is already under way. What might change, however, would be a more explicit statement that the United States was intending to step back from its dominant role. Again, this could be immediately destabilizing. Such a move would need to be managed with extreme caution so as to reassure all parties that the evolution would be gradual and conditions based.

In addition to the risks within the energy-stability approach, there are risks associated with its overall robustness. That is, in addition to the possible geopolitical outcomes of the United States adopting such a strategy, there is the potential that a key assumption upon which the strategy rests—i.e., that significant unconventional production is possible—fails. In considering this possibility, the question then becomes what implications could the selection of an energy-stability approach have on the U.S. ability to address such a circumstance? Returning again to the scenarios, the basic issue is how well does a strategy aimed at encouraging a Shale Breakthrough fare in the event of a Shale Failure? If unconventional oil and gas production do not prove as prolific as current thinking suggests, and the United States has pursued a pathway of stability by encouraging free and open markets, trade in energy, and market responsiveness, the United States would likely experience a global energy market more able to adjust to sudden decline in one major supply source and capable of finding near-term and longer-term accommodations.

In addition, while significant readjustments would likely be painful for both consumers and producers, the United States would presumably benefit from having acted in accordance with free market principles.

Energy Leverage

A leverage strategy views the energy advantages presented by the U.S. shale gas and tight oil production as tools that can be employed in the service of broader geopolitical or economic objectives. This strategy rests on greater U.S. production relative to other countries, and implies a much different set of actions than might be taken under an energy-stability approach.

Under a leveraging rubric, the United States would seek an outcome that roughly approximates the Baseline scenario (see previous chapter), though absent other producers coming on line in the mid- to late 2020s. Rather than encouraging the spread of investment and know-how, the United States would seek to restrict it as much as possible, and to extract as much economic benefit as possible from rising production. The United States could either limit production once its domestic needs were met, or (more likely) maximize production and seek to target exports to friends and allies to enhance its attractive power. The United States would continue to press for free trade in other areas to grow markets from

the presumed continued growth of its manufacturing sector, while claiming a national security interest in restricting energy exports.

RISKS

As with the energy-stability approach, there are multiple risks associated with a leveraging strategy. As noted earlier, one of the most obvious is the vulnerability that perceived hypocrisy on trade might pose to the trade of other U.S. goods and services. (That said, the United States might be able to weather such criticism with no real consequence simply due to its relative economic power.) A bigger question might be how successful the United States could actually be in maintaining its relative advantage. While private capital might continue to be attracted to U.S. shores, a strong play by the United States could cause others with sufficient national means to significantly enhance their efforts to exploit their own unconventional resources. Given that China already perceives a window of vulnerability in this regard, Beijing might be strongly incentivized, for example, to formulate a robust response to an assertive U.S. approach. The same might be true, though for different reasons, for Middle East producers. Presumably one of the primary regions in which the United States might seek to use energy to its advantage would be in Asia, offering carefully meted carrots to various players in an attempt to smooth other sources of competition and tension. While the success of such efforts might be one of the main attractions of a leveraging strategy, it could simultaneously serve to exacerbate tensions between the United States and Middle East if OPEC suppliers see their markets soften as a result, or if the United States unwittingly drives those “left out” in its calculations into closer relations.

With respect to the protection of sea lanes of communication, with a leveraging strategy the United States would maintain a strong and sustained commitment to remain the ultimate guarantor of the security of global sea lanes, offering it the sole ability to shape access in accordance with its desires. While this may be stabilizing in the short run (and a more explicit leveraging strategy may improve the U.S. fiscal position such that such commitments would be more easily fulfilled), should the United States be forced to reduce those commitments in the event of a Shale Failure or other economic downturn, the effects could be extremely destabilizing. In general, a stronger but less obviously energy-dependent United States would further exacerbate the challenge national security leaders have today of explaining sustained U.S. interests in the Middle East in particular, and would almost certainly limit their options should conflict break out in the region. (Ironically, a more economically powerful United States might be better able to afford a robust military but be less willing to employ it, at least in traditional ways. More defense resources, in turn, could ease the current imperative to find new mechanisms for applying military power in different, more efficient and effective ways.)

At its core, a strategy that rests on the United States picking winners and losers might serve the short-term objectives in any given situation, but it is likely to create second- and third-order effects that will not only be difficult to anticipate, but will also increase the potential for other problems to arise.

With respect to its overall robustness against other possible outcomes, a leveraging approach represents substantial risk. Again, if others are spurred to more actively pursue their own production in response (and opposition) to U.S. actions, there may be little the United States could do to stand in their way. In addition, the bedrock of a leveraging approach is that U.S. production continues to rise, a reality that could fail to materialize for any number of reasons. Thus the timeline for how long a substantial U.S. advantage might last is extremely uncertain. If a Shale Failure were to occur, the United States would need to “*mea culpa*” its way back into the arms of competitive market participants that may remember U.S. unwillingness to engage during a time of increased production.

Perhaps the greatest danger of the leveraging approach is to overestimate what energy leverage really achieves in the world of broader geopolitical aims. Foreign policy is rife with examples of peace pipelines, energy weapons, and a host of other initiatives for which geopolitical aims were hitched to energy projects that simply did not go forward or, if they did, failed to deliver the intended effect.

One of the core questions within this exercise is whether or not other major global actors would reinforce an energy-stability approach (a necessary ingredient for the broadest success of this option) should the United States choose to more ardently pursue it. In all likelihood, most countries would temper their responses based on their own interests, but U.S. leadership would help shift things in that direction. Again, neither the energy-stability nor the energy-leverage pathway is likely to be followed or achieved in their entirety. Evaluating them against the range of outcomes makes the risks and rewards associated with each more explicit.

Ultimately, either by design or by accident, the United States and other countries are unlikely to pursue a purely energy-stability or leverage-oriented pathway. This is because energy policy is a mix of complex domestic and international factors, geopolitics is even more complicated by the larger universe of energy- and nonenergy-related elements that influence the relationships among countries. Rather than all this uncertainty leading to stasis, however, it is precisely the unknown nature of energy developments, geopolitical forces, and national security interests that argues for steering as much as possible towards an energy-stability pathway.

6 | Recommendations

U.S. policymakers should take the following actions to implement an energy-stability approach:

1. ***Promote greater production and more efficient energy use at home and abroad.*** The United States has a well-established track record of promoting common energy principles, albeit with mixed success. Countries like Colombia, Brazil, and Azerbaijan have opened up their oil and gas sectors to outside investment. Many other countries have not followed this path, however, and govern their energy resources under a different framework. Saudi Arabia, for example, does not pursue a policy of open investment and maximizing production. For them, managing the resource base for the long-term economic benefit of the country is a guiding principle. As the global swing supplier, Saudi Arabia plays a different and important role in the market by being able to quickly and ably respond to oil-supply disruptions or demand downturns by taking oil on and off the market. In many instances, this recommendation points to direct U.S. support for energy reform among the big producer, reentrant, and revenue-dependent countries outlined in this report (and others).
2. ***Beyond current activities, further encourage production of unconventional oil and gas abroad.*** Indeed, the United States has already been active in this area of diplomatic and technical engagement since the early days of shale gas development. These efforts are most effective when they involve companies that are on the front line of developing these new resources.
3. ***Encourage trade in energy resources to promote flexible, adaptable, and efficient markets.*** Ideally this would include an expansion of natural gas exports, as well as the initiation of exports of crude oil, at the very least it requires a more flexible and expeditious approach to exports and a more direct explanation of the country's longer-term policy on the export of these commodities.
4. ***Maintain continued and clear U.S. commitment to protect sea lanes of communication.*** In the near term, it is important to instill confidence in both the willingness and the capability of the United States to maintain its role as lead provider of this global common good while working toward more collective approaches to the greatest possible extent. Over the longer term, however, the United States might consider a policy of more broadly sharing responsibility for this mission as global

markets continue to shift and concern morphs from one of U.S. sustained protection to one of U.S. shared protection and absence of conflict or tension over this role. It is equally as important to be clear about the potential for this eventual shift and explicit about steps being taken toward those ends.

5. ***Scale back domestic rhetoric on the “independence” afforded by new energy posture.*** U.S. leaders are responsible both for providing for the safety and security of the citizenry and for reflecting that citizenry’s priorities. That said, public appreciation for the United States’ continued reliance, both direct and indirect, on global energy markets is critical if efforts to deter threats to regional stability, or to respond to instability if necessary, are to be successful. U.S. leaders must be candid about the risks that unconventional pose to the rest of the world, and modest about the potential benefits they offer, in order to mitigate the growing gap between public and national interests.
6. ***Bolster commitment to culture of innovation—especially vis-à-vis climate challenge.*** The United States should continue to support investment in and application of new technologies that made shale gas and tight oil and other types of frontier energy “breakthroughs” possible. This is especially true when it comes to maintaining research and investment commitments to clean and efficient energy technologies that will be central to a long-term strategy on climate change.
7. ***Utilize the opportunity to bolster foreign policy ties or geopolitical dynamics where energy has traditionally played a central role.*** This new energy trend most fundamentally alters energy-related trade ties. To the extent that those trade shifts are disturbing or even potentially destabilizing to certain relationships or regional dynamics, seek out opportunities to shore up new areas of cooperation and ways to deepen engagement despite the shifts in commercial trade ties.

7 | Conclusion

Shale gas and tight oil production in the United States is an energy trend with a pace and scale of development that took observers, even seasoned ones, by surprise. The resource development has had important impacts on the global energy sector. It has changed energy trade flows, altered the investment outlook for energy projects, and reordered the climate change debate to more squarely focus on the role of gas in meeting low-carbon goals. Most significantly it has helped to change the energy posture of the United States from one of growing import dependence and worsening balance of payments to one where the United States is importing less (and likely to start exporting), and has improved its global business competitiveness.

To date, the broader geopolitical impacts have remained limited. It is too soon to say whether the production surge will fundamentally transform global oil and gas markets. Moreover, the uncertain trajectory of U.S. production and the even more uncertain outcome of efforts to produce unconventional abroad make anticipating the future impacts of this trend all the more treacherous.

So far, perception is leading reality when it comes to geopolitical and national security impacts. Many countries and companies will act on early interpretations of this trend. Some will be rewarded, while others may lose out (especially on the investment side). In general, shale gas and tight oil are driving the focus of markets to the east more quickly than was previously anticipated. Softer markets put pressure on most oil and gas producers (exporters) to reform or improve their domestic energy policies to ensure greater resilience. Finally, major consumers and importers are searching for ways to tap into the relative economic advantage achieved by the United States.

The lack of clarity in U.S. intentions underlying many of the geopolitical consequences to date reflect the fact that a clear U.S. position has been slow to emerge, and remains unclear to many observers. As stated earlier, this is understandable given the speed at which this new energy posture has occurred in the United States and given the degree of uncertainty about how this energy trend will continue. That said, it is possible to foresee the general range of potential outcomes. Review of those outcomes suggests that there is less risk associated with pursuing policies that hew more closely to an energy-stability, rather than an energy-leveraging, approach.

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