PRINCIPAL AUTHORS

Sarah O. Ladislaw
Maren Leed
Molly A. Walton

CONTRIBUTING AUTHORS

Michelle Melton
Andrew Metrick
Jane Nakano
Frank A. Verrastro

New Energy, New Geopolitics

Background Report 2: Geopolitical and National Security Impacts

JUNE 2014

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

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Center for Strategic & International Studies
1616 Rhode Island Avenue, NW
Washington, DC 20036
202-887-0200 | www.csis.org

Rowman & Littlefield
4501 Forbes Boulevard
Lanham, MD 20706
301-459-3366 | www.rowman.com

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1 Introduction[1]

In the last ten 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 about who stands to gain, who stands to lose, and what opportunities for advantage might

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, and (3) scenarios, strategies, and pathways. This is the second of those background reports.

2. Calculations based on U.S. Energy Information Administration (EIA). 2014 projections from EIA, *Short-Term Energy Outlook (STEO)* (Washington, DC: EIA, 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)* (Washington, DC: EIA, April 2014), http://www.eia.gov/forecasts/steo/report/us_oil.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. 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/. Notably, 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.

emerge in both the energy and geopolitical realmss. 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.

This second background report 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—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).

The 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

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" because 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 into depth on Africa, Latin America, or Southeast Asia, these regions are touched on throughout this report.

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 pathway 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 The Geopolitical Impacts of Global Energy Shifts

The energy changes spurred by the shale gas and tight oil revolution have had broader geopolitical effects. It is important not to overstate the geopolitical impacts of energy changes that have occurred to date or what might happen in the future. The geopolitical impacts to date cannot be rigorously quantified and are, more often than not, but one element of a complex network of domestic and international factors influencing decision-making. Sometimes perception can be an important leading indicator of future realities; at other times it simply amounts to a good deal of hand-wringing with little practical effect. Which outcome will result from the changes already apparent in international relations is still uncertain, and the outcome is not wholly dependent on energy developments. That said, a deliberate evaluation of how energy shifts are changing nations' thinking about themselves and their roles in the world shows that adjustments are ongoing, and could become extremely consequential.

Despite the uncertainty about how much shale gas and tight oil will ultimately be developed, the energy changes spurred by the shale gas and tight oil revolution have already had broader geopolitical effects. Unsurprisingly, these effects are uneven across countries and regions. In some areas of the world, energy is a defining feature of the economic and political landscape. The Middle East, for example, holds 52 percent of the global oil reserves and 41 percent of gas reserves, and 9 out of 13 countries are dependent on energy-derived revenue for the majority of their government's funding.[1] Even for countries in the region that do not export oil, their economies are heavily influenced by the oil-exporting activities of their neighbors.[2] In other regions, oil is less pivotal to as many aspects of governance and the economy, if still a key component of economic growth. Europe, for example, does not have vast stores of hydrocarbon wealth, but energy is still an important issue on national and regional agendas.

Although concrete geostrategic impacts thus far have been limited, there have clearly been changes in national and international perceptions. In many cases it is too early to see how those perceptual adjustments might align with new realities. In several parts of

1. EIA, "International Energy Statistics," http://www.eia.gov/cfapps/ipdbproject/IEDIndex3.cfm?tid=5&pid=53&aid=1.

2. The Middle East can be divided into oil-exporting states and labor-exporting states. Jordan, Egypt, and Lebanon in particular take in billions in annual remittances every year. It is not just a question of the states that produce oil; the whole region relies on oil exports.

the world, new energy potential in the form of shale gas and tight oil have played a contributing role to certain geopolitical dynamics and underlying domestic debates. Big energy producers like Russia and Saudi Arabia, producers aspiring for a greater role in world markets like Iran, Iraq, and Mexico, oil-revenue-dependent countries like Algeria, Nigeria, and Yemen, large energy consumers like China, Europe, and Japan, and the United States, have all considered their domestic or foreign policies in response to perceived changes in strategic context resulting (or expected to result) from tight oil and shale gas development.

As described in the first background report "Energy Impacts," while many oil market analysts foresee significant potential for softer markets due to some combination of relatively slow demand growth and/or increases in supply, most project that, on the whole, oil markets will be reasonably well balanced over the coming decade.[3] U.S. tight oil production has had a number of impacts on global oil markets, and a moderating impact on price. Contrary to expectations just a few years ago, for example, non-OPEC oil producers, primarily the United States but also Canada, are the major contributors of new oil supplies to the market. It is the reaction to this new market structure that has influenced the geopolitical environment, especially for a number of big producers who seek to guard against energy price collapse and defend their market share.

Big Producer: Russia

Russia is an energy titan on the global stage, and holds the world's largest natural gas reserves. Up until 2013, when it was dethroned by the United States in the wake of the shale gas and tight oil revolution, Russia also held the title of the world's largest hydrocarbons producer. Much of what Russia produces it also exports: almost 70 percent of its crude oil production[4] and 27 percent of its natural gas production[5] in 2013. These levels earn it the position of the world's second-largest oil exporter, and the largest exporter of natural gas.

These exports are central to the Russian economy; the revenue they generate accounts for 40–50 percent of Russia's total budget revenue (80 percent from oil and 20 percent from gas) and over 70 percent of its total export revenue.[6] The economic imbalance this represents has been highlighted by the International Monetary Fund (IMF), which recently expressed concern about the overdependence of the Russian economy on oil-derived

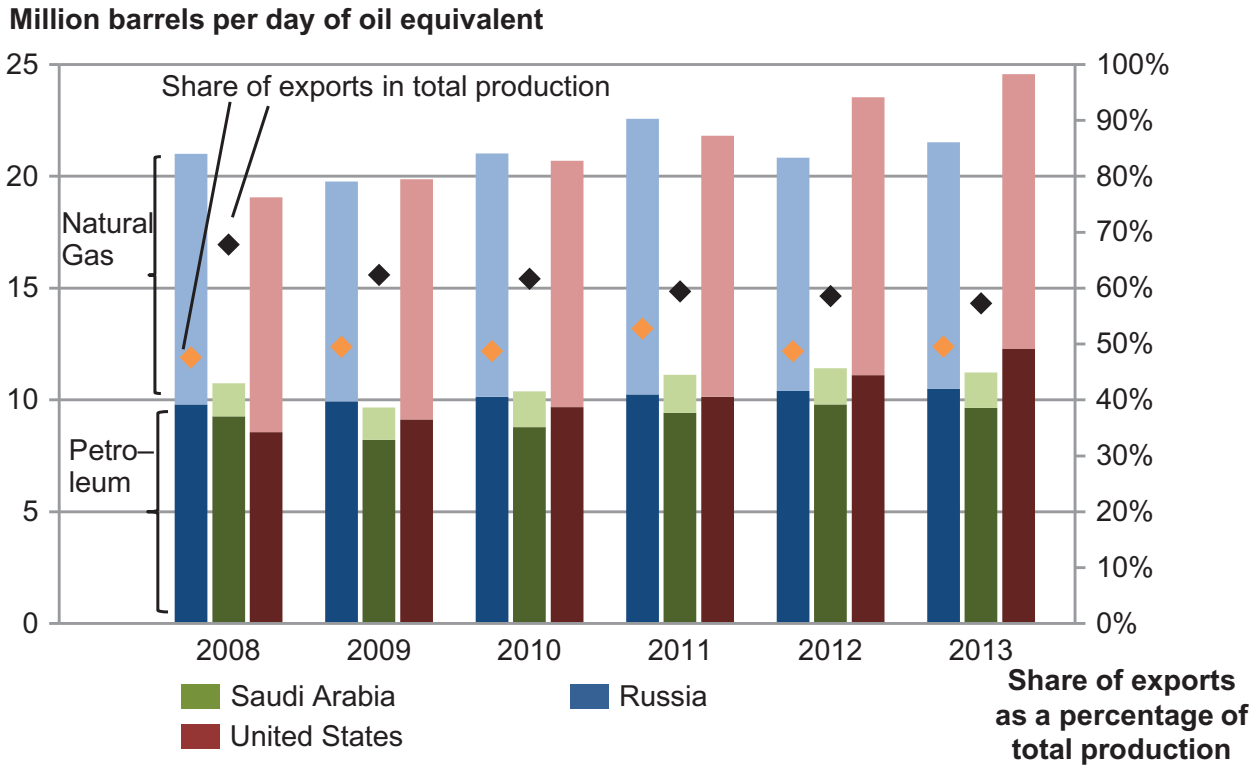
3. BP, "BP Energy Outlook 2013"; EIA, *International Energy Outlook (IEO) 2013* (Washington, DC: EIA, 2013) http://www.eia.gov/forecasts/ieo/pdf/0484%282013%29.pdf; International Energy Agency (IEA), *World Energy Outlook 2013* (Paris: IEA, 2013), http://www.worldenergyoutlook.org/publications/weo-2013/; 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.

4. 7.4 million of 10.97 million barrels per day in October 2013. IEA, *Oil Market Report* (2014).

5. 2012 average. EIA, "Russia Country Analysis Brief," November 26, 2013, http://www.eia.gov/countries/country-data.cfm?fips=rs.

6. Figures for 2012. "Russian Tax Breaks for Shale, Offshore Oil Seen on Jan. 1," Reuters, March 18, 2013, http://www.reuters.com/article/2013/03/18/russia-oil-tax-idUSL6N0C7FLT20130318.

Figure 1. Estimated U.S., Russia, and Saudi Arabia petroleum and natural gas production, 2008–2013



Note: Petroleum production includes crude oil, natural gas liquids, condensates, refinery processing gain, and other liquids, including biofuels.

Source: Original chart appeared in U.S. Energy Information Administration (EIA), "U.S. Expected to be Largest Producer of Petroleum and Natural Gas Hydrocarbons in 2013," October 4, 2013, http://www.eia.gov/todayinenergy/detail.cfm?id=13251. To re-create the chart, liquids production data is from a query from the EIA's Short Term Energy Outlook (STEO) database (accessed 2/20/2014). Consumption data for liquids for Saudi Arabia for 2008–2012 is from EIA's International Energy Statistics and for 2013 is from OPEC World Oil Outlook 2013. Consumption data for liquids for the U.S. and Russia is from the STEO query. Data for natural gas production is from the EIA's International Energy Outlook 2013 and converted to Mboed. Natural gas consumption for the U.S. and Russia is from EIA's International Energy Outlook 2013. Natural consumption for Saudi Arabia is from EIA's International Energy Statistics.

revenue and economic activity. As just one example of Russia's vulnerability in this regard, the IMF concluded that oil prices below $100 per barrel in 2013 contributed to the country's economic woes.[7] Energy's central role in Russia's landscape also extends into its domestic politics. It is widely recognized that the energy industry plays an outsized political role, not only within Russia, but in its relations with members of the former Soviet Union and with Europe more broadly.[8]

7. "Russian Economy at Risk from Oil Markets, IMF says," UPI, December 11, 2013. http://www.upi.com/Business_News/Energy-Resources/2013/12/11/Russian-economy-at-risk-from-oil-markets-IMF-says/UPI-79371386766465/.

8. The centrality of energy in Russian domestic and foreign policy calculations is a recurring theme in most research about Russian domestic politics or foreign relations. Lauren Goodrich and Marc Lanthemann,

Despite frequent characterizations of it as an industry in decline, Russia's oil and gas production has been rising. This has offset falling production in other regions (mainly Europe), allowing Russia to retain its market share despite increased U.S. production.[9] That said, the sector faces steep challenges ahead. Despite vast domestic energy resources, current production levels cannot be maintained without substantial reinvestment in existing production areas or the development of new ones.[10]

In a highly acclaimed book, longtime Russian energy expert Thane Gustafsen identifies several challenges for Russia.[11] First, traditional areas of production in Western Siberia are in decline. In addition, current production is in fields discovered during the Soviet era, and exploration of new fields is lagging. The potential for new production exists, but is most likely to come from technologically complex and expensive frontier areas, with which Russia has almost no experience. Second, the likelihood of a lasting decline in revenues to the Russian government could have destabilizing consequences. The third challenge is reforming the structure of the industry and its ties to the state. To do this, four changes are needed: tax reform, diversity, flexibility in regulation, and openness to foreign participation. Finally, Gustafson questions whether or not the tight oil revolution could in the end obviate the need to address the three previously mentioned issues.

For Russia, the emergence of shale gas and tight oil in the United States has had three major effects that have wide geopolitical ramifications: (1) it has reinforced the imperative for Russia's "look East" energy strategy; (2) it has increased the pressure for domestic energy and economic reform; and (3) it may offer Moscow an emerging advantage in the Arctic.

MARKET SHIFTS FED BY THE SHALE GAS AND TIGHT OIL REVOLUTION HAVE REINFORCED THE RATIONALE FOR RUSSIA'S "LOOK EAST" ENERGY STRATEGY.

Over the last few decades, Russia had viewed the West (especially Europe) as its primary energy market. At least three factors have converged to challenge that view, two of which were due to the surge in U.S. oil and gas production. The first was the lost potential of the United States as an export market for Russian gas. Second, better supplied markets due to U.S. production broadened import options for Europeans, which forced Russian gas producers to cut prices to maintain market share. Third, continued economic troubles in Europe suppressed expected growth, and thus energy demand.[12]

These changes, coupled with the rapid rise of Asian demand, forced a recalculation. Until recently Russia's energy policies had all but ignored Russia's neighbors to the east. This reflected the historically western orientation of Russian political and economic ties,

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"The Past, Present, and Future of Russian Energy Strategy," *Strat for Geopolitical Weekly*, February 12, 2013, http://www.stratfor.com/weekly/past-present-and-future-russian-energy-strategy.

9. EIA, "Short-term Energy Outlook," http://www.eia.gov/forecasts/steo/query//.

10. Thane Gustafson, *Wheel of Fortune: The Battle for Oil and Power in Russia* (Boston: Belknap Press of Harvard University Press, 2012).

11. Ibid.

12. Goodrich and Lanthemann, "Past, Present, and Future."

which was mirrored by its energy infrastructure. That energy network also grew out of practical realities, as production in Western Siberia is relatively close to European markets (much closer than to Asian markets). Finally, though there has been talk about shipping oil and gas to Asia for the past 30 years, there exists the challenge of transporting energy over long distances. But the combination of weakening Western demand, vastly expanding Asian energy needs, and declining production in Western Siberia led Russia to focus much more on shifting production to frontier zones farther east. Indeed, Russia has begun to recognize that it *must* secure Asian consumers in order to maintain a market share at all, let alone retain its current dominance. Many of the trends pointing in this direction were well under way before shale gas and tight oil became an economic reality. But they have had an effect.

In addition to making the shift east more urgent for Russia, shale gas also threatens Russian plans to compensate for declining production in Western Siberia by developing new projects in Eastern Siberia and the Far East, a hugely expensive undertaking given the severe climate, geological difficulties, and lack of socioeconomic infrastructure. To defray the costs, Russia has sought investments from Asia. The U.S. ascent as a potential competing energy supplier to Asian markets may significantly alter the commercial viability of at least some of these proposals. In their favor, however, Russia is a massive resource holder and can be a low-cost producer if they choose to be; this, coupled with geographic proximity, increases its attractiveness to Asian consumers.

That said, adequate supplies of oil and gas on global markets mean that Asian economies have more options and Russia must make its terms more attractive. Whether this will prove sufficient is unclear. The increase in available supplies on the market, along with the potential for China to replicate the U.S. unconventional experience over the longer term, may be contributing to Chinese willingness to push hard for the most favorable terms in any Russian arrangement. Reportedly, in negotiating a natural gas deal with Gazprom, the China National Petroleum Corporation has asked that potential Russian gas supplies be linked to the Henry Hub price.

Even though in the past the two countries reached an oil pipeline deal—the Eastern Siberia-Pacific Ocean (ESPO) oil pipeline—natural gas deals remain elusive.

Ultimately, the success of Russia's energy reorientation has been complicated but not derailed by the shale gas and tight oil revolution. Instead, Russia faces a series of internal decisions that will be equally difficult as those it faced before the rise of shale gas and tight oil, but, against the backdrop of new market dynamics, will be much more decisive in determining how its energy and economic future unfolds.

THE SHALE GAS AND TIGHT OIL REVOLUTION ADDS TO EXISTING PRESSURES ON RUSSIA'S ENERGY SECTOR, REINFORCING THE NECESSITY OF REFORM.

Russia can only realize the opportunities presented by an energy-hungry Asia if it invests the necessary capital—politically and economically—in energy sector reform. Russia must

be seen as a stable and reliable supplier in order to gain access to Asian markets and maintain dominance in European markets. There are significant hurdles to overcome if Russia hopes to accomplish this over the medium and long terms. Declining production in Russia's conventional fields raises questions in this regard. Perhaps even more importantly, world leaders view the dominance of Russia's energy sector in its overall economy and the challenges of corruption as deeper structural concerns. Currently Russia's energy sector is run according to domestic political needs. Ensuring profitable future production will require new investments, new technology, and rationalization. In this sense, the shale gas and tight oil revolution in the United States has added impetus for reform. As investment looks more attractive in places with a secure and transparent legal and business climate like North America, Russia has additional incentives to improve its competitiveness. LNG export liberalization and the whole discussion on pipeline export liberalization (as well as increasing domestic competition between Gazprom and independents) are visible signs of this. Competition supports more economically justified projects—like Sakhalin-1 compared to Vladivostok LNG.[13] Steps thus far have been minimal, and do not yet paint a clear picture of how committed Russian leadership is to undertaking major adjustments to its economic and political fabric. And even if the need is recognized, successfully managing the pace of transition promises to be complicated and risky.

Russia's unclear prospects for domestic reform of its energy sector and its strategy in response to perceived downward price pressure loom over the future of its role in the world. On the other hand, lower oil and gas prices may finally force Russia to address other sectors in its economy, which have been crowded out by oil and gas, leading to overall more balanced economic growth. Will the shale gas and tight oil revolution in the United States compel Russia to change its behavior in pursuing its interests? A Russia that feels defensive of its position in the world may be less willing to work with the United States toward common international goals. Alternatively, it may direct greater attention to the building of a strategic relationship with China that challenges a greater U.S. role in the Pacific. Energy cooperation with China is growing with greater presence of Chinese companies in the Russian upstream. Chinese investment is becoming critical for the survival of the largest Russian companies. So it might become not so much an equal partnership but instead increasing Russian dependence on China. Indeed, Russia and China are taking steps to increase their military cooperation, though analysts question whether the relationship extends beyond the tactical.[14] Another alternative is that Russia becomes more assertive with its neighbors, especially in its efforts to exert influence over former Soviet states and members of the Warsaw Pact. The specific role of shale gas and tight oil in these outcomes/actions is unclear, though even if they are a factor, they would be only one of many.

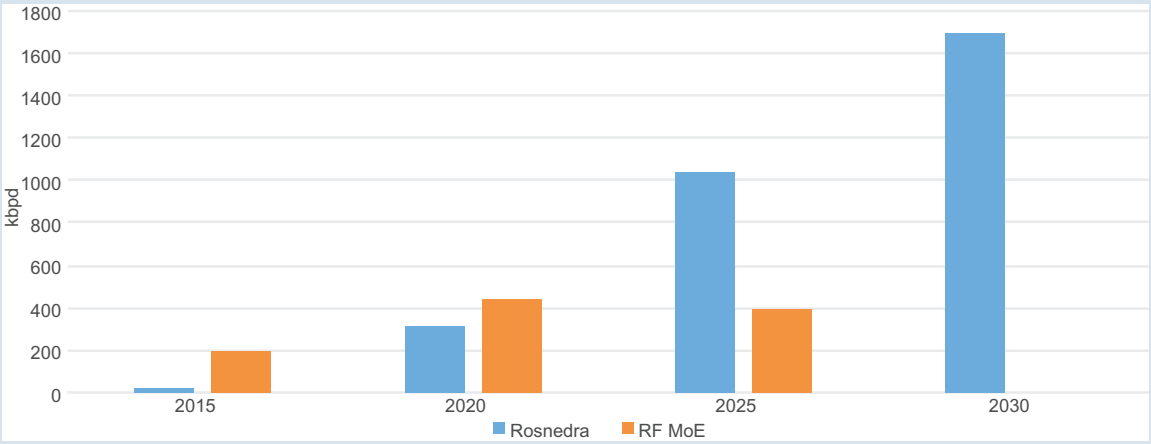
13. Tatiana Mitrova, *Russian LNG: The Long Road to Export*, Russie.Nei.Reports No. 16 (Paris: Institut français des relations internationals, December 2013), http://www.ifri.org/?page=contribution-detail&id=7920.

14. Jeffrey Mankoff, "The Wary Russian-Chinese Partnership," *New York Times*, July 11, 2013. http://www.nytimes.com/2013/07/12/opinion/global/the-wary-chinese-russian-partnership.html.

Russia Changes Its Tune on Shale Gas and Tight Oil

Despite (or perhaps because of) the stiff headwinds faced by the Russian oil and gas industry, in the early days of U.S. shale gas development Russian politicians and industry figures were vocally skeptical about the longevity of the resource trend and uncharacteristically outspoken about the environmental risks associated with the process of hydraulic fracturing.[1] However, as the boom has continued, this initial skepticism has given way to a begrudging acceptance and a desire not to be left behind. A June 2013 study commissioned by the U.S. Energy Information Administration (EIA) found that Russia was the country with the most technically recoverable shale oil resources—75 billion barrels, well ahead of the 58 billion barrels held by the number two country, the United States.[2] These estimates are conservative: they include only one so-called tight oil layer, the Bazhenov shale. Two other resource layers, the Achimov and Tyumen layers, were excluded from the estimate due to a lack of data.[3] The resource base constituted by the Bazhenov shale, which is the source rock beneath Russia's main producing regions in Western Siberia, is anticipated to produce one million barrels per day of new production by 2025.[4]

Figure 2. Russian Projected Tight Oil Production



Source: James Henderson, *Tight Oil Developments in Russia* (United Kingdom: Oxford Institute for Energy Studies, October 2013), http://www.oxfordenergy.org/wpcms/wp-content/uploads/2013/10/WPM-52.pdf.

Indeed, the Russian government has begun to recognize its own tight oil potential as an important source of future production (see Figure 2). Through a series of domestic reforms, the Russian government has started to lay the groundwork for unconventional oil and gas exploration and production. According to news reports, the Russian government began providing tax breaks for unconventional oil development at the beginning of 2014.[5] This follows on a policy enacted in 2012 that approved stimulus measures targeted to tapping unconventional oil resources.

Despite these assessments, significant obstacles remain. These include the level of taxation [the problem is more the form of taxation, based on revenue, not profit, not the level of taxation], time-intensive and expensive licensing procedures, an opaque and challenging business environment in general, environmental regulations, and questions about the sufficiency of oil services equipment.[6] Several notable energy analysts have suggested that the current tight oil production experience in Russia is more expensive than commercial production terms will allow.[7] For production to mature beyond the pilot phase, the government is likely to need a more comprehensive tax regime overhaul. Improvements in technology applications and infrastructure must also continue.

1. Tatyana Shumzy and Ryan Dezember, "Gazprom Sits Out Shale Race," *Wall Street Journal*, February 17, 2012, http://online.wsj.com/news/articles/SB10001424052970204880404577227491587620770.

2. Russia also has substantial technically recoverable shale gas resources, estimated to be 285 trillion cubic feet (making it the number nine country in the world for technically recoverable gas resources). 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/.

3. James Henderson, *Tight Oil Developments in Russia* (Oxford: Oxford Institute for Energy Studies, October 2013), http://www.oxfordenergy.org/wpcms/wp-content/uploads/2013/10/WPM-52.pdf.

4. Ibid.

5. Reuters, "Russian Tax Breaks for Shale, Offshore Oil Seen Jan. 1," March 18, 2013, http://www.reuters.com/article/2013/03/18/russia-oil-tax-idUSL6N0C7FLT20130318. The tax break is a sliding scale that will discount the mineral extraction tax by 50 to 100 percent, depending on the permeability of the rock.

6. Henderson, Tight Oil Developments in Russia, 4.

7. Thane Gustafson, "The Choices Ahead for Russian Oil: Run Deep or Run Cold?" (presentation, 2013 CERES Conference: Energy and Security in Eurasia, Georgetown University, Washington, DC, April 8, 2013), http://ceres.georgetown.edu/story/1242716114326.html); Henderson, *Tight Oil Developments in Russia*.

THE SHALE GAS AND TIGHT OIL REVOLUTION MAY BE LESSENING OTHERS' INTEREST IN THE ARCTIC TO RUSSIA'S ADVANTAGE.

The opportunities presented by new shale gas and tight oil projects have changed the economics not only of Far East gas projects, but of those in the Arctic as well. Large projects to export Russian gas to the United States (such as the Shtockman project) have been postponed. International companies deferred Arctic development due to environmental and reputational risk. Independent companies that conducted initial offshore exploration off the west coast of Greenland did not find commercially viable quantities of natural resources. And the last remaining company actively pursuing Arctic development in U.S.-claimed waters recently delayed those plans. Despite this, Russia and Norway continue to devote significant investment funds toward the development of the oil and gas resources in the Barents and Kara Seas. Russia sees Arctic resource development as essential to its future economic development, while Norway seeks Arctic natural resources to replace diminishing North Sea Oil assets. Russia's continued pursuit of Arctic projects is a recognition not only of the potential economic benefits but also of the wider range of interests[15]

15. Including shorter transportation distance for shipping of oil and gas from Yamal and Barents Sea to Asia.

Opportunities and Challenges in the Arctic

As the polar ice cap melts rapidly, the five Arctic littoral countries face new economic opportunities as well as social and environmental challenges. Warming temperatures make more accessible the estimated 90 billion barrels of oil and 1,669 trillion cubic feet of natural gas in the Arctic. However, to strike a balance between economic development and ecosystem preservation is a concern for the Arctic countries. Increased onshore and offshore Arctic drilling enhances the risk of potential oil spills, and the sensitive marine ecosystems are undergoing significant changes due to warming ocean temperatures.[1] The Arctic countries have established the Arctic Council as a high-level intergovernmental forum to provide a means for promoting cooperation, coordination, and interaction. These countries include Canada, Denmark, Finland, Iceland, Norway, Russian Federation, Sweden, and the United States of America.[2]

1. Heather A. Conley, *Arctic Economics in the 21st Century: The Benefits and Costs of Cold* (Washington, DC: CSIS, July 2013), http://csis.org/files/publication/130710_Conley_ArcticEconomics_WEB.pdf.

2. Arctic Council, "About the Arctic Council," http://www.arctic-council.org/index.php/en/about-us/arctic-council/about-arctic-council.

Moscow believes a strong position in the Arctic will support.[16] Thus far, the Arctic remains a region of international cooperation. Other Arctic nations, including the United States,[17] continue to work through intergovernmental forums such as the Arctic Council on developing a stable international legal framework for addressing commercial and environmental issues in the Arctic region. But Russia's broader involvement there may give it an advantage in shaping that future going forward.

Big Producer: Saudi Arabia

Though Saudi Arabia's role in energy markets is different than Russia's, as another large producer many of the implications of shale gas and tight oil production are similar. Saudi Arabia is the world's largest producer and exporter of petroleum liquids, and is home to the largest proven conventional oil reserves in the world.[18] The Saudi economy remains heavily dependent on petroleum and petroleum-based fuels and liquids, both for internal consumption and, more importantly, for meeting its revenue needs. In 2011, for example, petroleum exports accounted for almost 90 percent of the kingdom's export revenues.[19]

16. Russian Arctic projects are extremely expensive. Russia itself does not have enough competence in Arctic offshore hydrocarbon production, so all these projects could be developed only in strong cooperation with the majors (which have necessary technologies and experience).

17. The U.S. Coast Guard, for example, recently released an entire strategy.

18. EIA, "Saudi Arabia: Country Analysis Brief," http://www.eia.gov/countries/analysisbriefs/Saudi_Arabia/saudi_arabia.pdf.

19. Organization of the Petroleum Exporting Countries (OPEC), *Annual Statistical Bulletin 2012* (Vienna: OPEC, 2012), http://www.opec.org/opec_web/static_files_project/media/downloads/publications/ASB2012.pdf.

Saudi Arabia is also the largest consumer of petroleum in the Middle East, with oil used both in the heavily subsidized transportation sector as well as for power generation, cooling, and desalinization, among other uses.[20] With a growing population, rising domestic consumption in these areas has been identified by senior officials from the national oil company, Saudi Aramco, as a serious threat to export volumes and revenues.[21]

DECLINING U.S. MARKETS REINFORCE A REORIENTATION TOWARD ASIA THAT WAS ALREADY UNDERWAY.

Saudi Arabia, like the rest of the world, had recognized the broad shift toward Asia as the main driver of future global economic growth. Saudi interactions with Asia have expanded in almost every area (economic, diplomatic, and military). Some would characterize this more as a significant reorientation from decades of the dominance of strong (though not always easy) ties between the kingdom and the United States, indicating that the kingdom is pursuing a "Look East" policy, seeking to hedge against its relationship with the United States by shoring up its partnerships with Asian nations.[22] Others suggest the Saudis are logically exploring the implications of more extensive relations with East Asia. For its part, China is keen on securing a reliable and stable supplier for the long term. Many of its trade and investment decisions are intended to reinforce Saudi perceptions that China will be a long-term customer for Saudi exports.[23]

Although a trend long in the making, the new U.S. posture has contributed to this realignment of Saudi attention. Saudi Arabia has carefully tried to balance its commercial need to fill market demand in the East with maintaining strong commercial and strategic ties with the West, as evidenced by joint ventures such as the Motiva oil refinery in Texas.[24] With fewer oil exports destined for the United States (although arguably there is a floor to how low they can go, given purchasing commitments associated with Motiva as well as Aramco's pricing structure, which takes into account competitively priced alternative crudes) the growth market for Saudi Arabia is even more focused on China and other Asian economies.

As indicated above, Saudi Arabia derives a substantial portion of its operating revenues from the export of oil and natural gas liquids (NGLs). (NGLs are not subject to OPEC quotas, meaning there is likely no upward political limit on NGL trade expansion with Asia.) The purchasers of Saudi crude oil, NGLs, and refined petroleum products are geographically diverse, but are also increasingly found in Asia and the Far East.

Saudi Arabia has approximately 2 million barrels per day of refining capacity outside of its borders through joint ventures and equity investments, not just in the United States, but

20. EIA, "Saudi Arabia: Country Analysis Brief."
21. Remarks of Khalid al-Falih, CSIS roundtable, 2013.
22. Naser al-Tamimi, "China-Saudi Arabia Relations: Economic Partnership or Strategic Alliance?," HH Sheikh Naser Al-Sabah Publication Series no. 2, Durham University, June 2012, 3, http://dro.dur.ac.uk/9683/1/9683.pdf.
23. Ibid., 7.
24. Clifford Krauss, "Texas Refinery Is Saudi Foothold in U.S. Market," *New York Times*, April 4, 2013, http://www.nytimes.com/2013/04/05/business/texas-refinery-is-saudi-foothold-in-us-market.html?_r=0.

also in China, Japan, and South Korea.[25] These refineries are designed to run Saudi crude as part of their feedstock stream, ensuring the need for exports (and securing markets for Saudi crudes) to those destinations. In addition, the kingdom continues to integrate large refining and petrochemical projects at home, with recent investments in Jubail (a joint venture with French company Total), Yanbu (a joint venture with Chinese company Sinopec), and Japan. The Yanbu project was seen by some as particularly significant, as it represented the first-ever large investment in the Saudi oil industry by a Chinese company.[26]

The trade goes both ways. Saudi Arabia is China's primary trading partner in the Middle East, importing a lot of China's labor-intensive products, as well as labor itself. And China imports more than just oil for power generation or transportation purposes from Saudi Arabia. Imports include a rising amount of chemicals to make plastic. Trade between the two partners skyrocketed from $1.3 billion in 1990 to $73.4 billion in 2012.[27] WhileSaudi Arabia maintains strong ties (including trade) with the United States as well, the kingdom's relationships with both the West and the East are much more evenly weighted than in the past.

SOFT MARKETS FED IN PART BY TIGHT OIL COMPLICATE SAUDI ARABIA'S ROLE AS A MARKET BALANCER AND ADD AN ADDITIONAL IMPETUS FOR DOMESTIC REFORM.

In addition to broadening its global footprint, Saudi Arabia has also taken steps over the last five years to build up significant spare capacity (oil production that can readily be brought online) to help protect oil markets from unmanageable price spikes. At present production levels, Saudi spare capacity (estimated at over 2 million barrels per day) accounts for the bulk (roughly 90 percent)[28] of available global excess or unused near-term production capability.[29] The ability to tap into that spare capacity, along with global inventories and strategic reserves, has allowed prices to remain in a narrow band since the precipitous price run-up in 2007–2008. This increase in Saudi oil output has also contributed to the market's ability to forestall a price spike as sanctions further restricting Iranian oil sales have proceeded.

The combined slowdown in growth and rise in supply (including from U.S. tight oil) means that Saudi Arabia could be in a position to hold more spare capacity relative to overall market size than it has in a long time. This position is forcing Saudi leaders to think about how to manage adequate, rather than limited, spare capacity in global oil markets at least in the near to medium term. Some have speculated that Saudi Arabia might become so threatened by additional new crude supplies that they could try to flood the market, driving down prices (in extreme cases). This could make tight oil development (as well as other high-cost

25. EIA, "Saudi Arabia: Country Analysis Brief."
26. Al-Tamimi, "China-Saudi Arabia Relations," 6.
27. Ibid., 18; and "China, Saudi Trade Reaches Record High of $73.4 Billion," Xinhua, January 31, 2013, http://english.people.com.cn/90883/8115328.html.
28. EIA, "Short-Term Energy Outlook," March 11, 2014, http://www.eia.gov/forecasts/steo/report/global_oil.cfm.
29. Cornelius Fleischhaker et al., *Saudi Arabia: Selected Issues* (Washington, DC: IMF, June 24, 2013), 4, http://www.imf.org/external/pubs/ft/scr/2013/cr13230.pdf.

production) uneconomic and/or preclude the emergence of other major oil producers trying to reenter the market (specifically Iran). Others argue that such action is implausible, either because of the kingdom's domestic budget pressures or because the kingdom couldn't sustain the accompanying low prices and revenue long enough to achieve the desired effects.

Revenue dependence could also be a driver for Saudi Arabia to undertake domestic energy pricing and subsidy reform. Though reform efforts had been recognized priorities before the surge in U.S. oil production, the shale gas and tight oil revolution may reinforce the case for change. The need for sustained high export revenue is further exacerbated by Saudi Arabia's response to recent regional unrest. Saudi leaders increased public spending to help quell internal dissatisfaction, thus increasing the levels of public support that would be the target of future reform efforts. Because the shale gas and tight oil revolution increased the potential for soft oil markets, the threat to Saudi Arabia's domestic economy could be significant. (Many argue, however, that this risk is manageable, as Saudi Arabia has sufficient resources to weather hard times for both the short and the medium term.)

Saudi policymakers are already looking for avenues that would lessen those pressures: namely, through an expansion of natural gas production from both conventional and unconventional sources. On the conventional side, Saudi Arabia has the world's fifth-largest natural gas reserves (behind Russia, Iran, Qatar, and the United States). To better exploit those resources, the kingdom has embarked on a diversification strategy that includes massive investments in refining and petrochemicals, both at home and abroad. Inspired by the U.S. experience, the kingdom has also begun to explore development of its own unconventional natural gas reserves.[30] Saudi efforts to increase natural gas production are not intended for exports, but instead at decreasing internal oil dependence by substituting natural gas for oil in power generation and aiding in the on-shoring of energy-intensive manufacturing to feed job growth. Such substitution would help not only to meet rising domestic demand, but also to protect valuable oil exports. To date, Saudi conventional gas production (about 3.5 trillion cubic feet per year in 2011) is dedicated for internal use only. With natural gas demand projected to nearly double between 2011 and 2030, however, the kingdom will require a combination of an ambitious and successful exploration program, politically sensitive price reform, the adoption of efficiency initiatives, and the integration of renewables.[31]

The prospects for Saudi shale gas production appear favorable. At present the majority of Saudi natural gas is associated with crude oil production, but increasingly the kingdom is devoting new resources to finding nonassociated gas fields. In its current five-year plan to expand natural gas output, several nonassociated gas fields in the Arabian Gulf have been identified and all are expected to be in production by 2018. Upstream activity is also

30. Saudi Arabia was not part of the study conducted by EIA on global shale gas and tight oil potential, but Ali Al-Naimi has estimated over 600 trillion cubic feet of unconventional gas reserves, more than double Saudi Arabia's conventional gas reserves. Florence Tan and Meeyoung Cho, "UPDATE 2: Saudi Arabia to Join U.S. as Shale Gas Producer," Reuters, October 14, 2013, http://www.reuters.com/article/2013/10/14/saudi-gas-idUSL6N0I40XR20131014.

31. EIA, "Saudi Arabia: Country Analysis Brief."

planned for the Empty Quarter (the Rub al-Khali desert) with foreign investor participation, though all are anticipated to be relatively expensive to develop. In addition, under the Upstream Unconventional Gas Program, Saudi Aramco will also be exploring for shale gas in the Red Sea and elsewhere.

WEAKENING ENERGY TIES HELP FEED A BROADER CONCERN OVER THE UNITED STATES' CONTINUED COMMITMENT TO STABILITY IN THE REGION.

Charles Freeman, a former U.S. ambassador to Saudi Arabia, characterized the Middle East as occupying a "pivotal geostrategic space" between Asia, Europe, and Africa. Its enormous energy resources make it a hub for global finance and business. "What happens in the Middle East affects the world's economic, political and strategic equilibrium."[32]

As energy markets shift, this helps feed a perception that the Middle East's (and Saudi Arabia's, by extension) centrality to U.S. interests is increasingly being debated. A combination of events and circumstances (some energy-related, some not) have prompted many to opine on whether the United States remains committed to Saudi Arabia and the Middle East generally, especially as a war-weary American public and a government facing fiscal belt tightening seek a new consensus on the U.S. role in the world.

The U.S. military withdrawal from Iraq and drawdown in Afghanistan, a reduced dependence on U.S. oil and gas imports, budget cuts, a refocus on rebuilding at home, the announced U.S. "rebalance to Asia," a complex evolution of policy on Syria, and ongoing negotiations with Iran are all identified as contributors to the current period of tense relations between the United States and Saudi Arabia.

In response to this development, the Obama administration has taken great pains to reemphasize U.S. policy and doctrine that has guided U.S. involvement in the Middle East (first expressed by President Roosevelt at Yalta in 1945), as well as a continued commitment to keeping global trade routes open and safe (the Carter doctrine, 1980). In the past year alone, statements by President Obama, Vice President Biden, Energy Secretary Moniz, and successive National Security Advisers Donilon and Susan Rice have all sought to reinforce a continued American commitment to the Middle East and its people.[33] Reports by several noted security experts echo the refrain.[34] But doubts persist. In early 2014 President Obama announced a previously unscheduled trip to the kingdom to help mend what the

32. Ambassador Charles W. Freeman, "Coping with Kaleidoscopic Change in the Middle East" (remarks, Arab-U.S. Policymakers Conference, Washington, DC, 2013).

33. For a detailed discussion, see Sarah O. Ladislaw, Maren Leed, and Molly A. Walton, *New Energy, New Geopolitics: Background Report 3: Scenarios, Strategies, and Pathways* (Washington, DC: CSIS/Roman & Littlefield, 2014).

34. Anthony Cordesman, "The Other 'Pivot to Asia': The Shifting Strategic Importance of Gulf Petroleum," CSIS, November 18, 2013, https://csis.org/publication/other-pivot-asia-shifting-strategic-importance-gulf-petroleum; Brad Plumer, "How the Oil Boom Could Change U.S. Foreign Policy," *Washington Post*, January 16, 2013, http://www.washingtonpost.com/blogs/wonkblog/wp/2014/01/16/how-the-u-s-oil-boom-is-changing-the-world-in-6-charts/.

New York Times termed a "frayed" relationship between the two nations.[35] The U.S.'s changed position in energy markets (along with the Saudi response) is clearly one aspect of the changing nature of the global landscape.[36]

Reentrants: Iran, Iraq, Mexico

If the shale gas and tight oil revolution has put pressure on the world's largest oil and gas producers, its implications for smaller, but still significant, producers who are seeking to reenter or expand their market presence are similarly important. The conventional wisdom throughout much of the 2000s was that oil and gas resources were increasingly scarce and hard to reach, at least for international oil companies. Resources to which international companies had access—such as those in the Arctic, Canadian oil sands, and ultra-deepwater offshore—were technologically complex and expensive. Conversely, countries with relatively easily accessible oil—like Iraq, Iran, and Mexico—had high geological potential to produce more resources at relatively low cost and with older technology. But they were controlled by national oil companies, had the wrong commercial, legal, political, or regulatory environments, or were plagued by security challenges (Libya is another example, though not explored in this report). While the three countries all have had varying production histories (Figure 3), together they have proven unable to substantially grow their production over the course of the last few decades.

Over the last thirty years, **Iraq** has swung in and out of world oil markets in dramatic fashion. It produced near 2.5 million barrels per day in 1980, but production plummeted during the Iran-Iraq war. It quickly rebounded to nearly 3 million barrels per day in the late 1980s, only to drop dramatically in the early 1990s in the wake of the first Gulf War. Production spiked again in the mid-1990s as a result of the UN's oil-for-food program, but dropped off (although not as much or as steeply as in previous declines) during the second Gulf War. Production gradually but steadily rose over the course of Operation Iraqi Freedom, and by 2013 Iraq was once again producing about 3 million barrels per day, enough to make it the eighth largest crude oil producer in the world.[37]

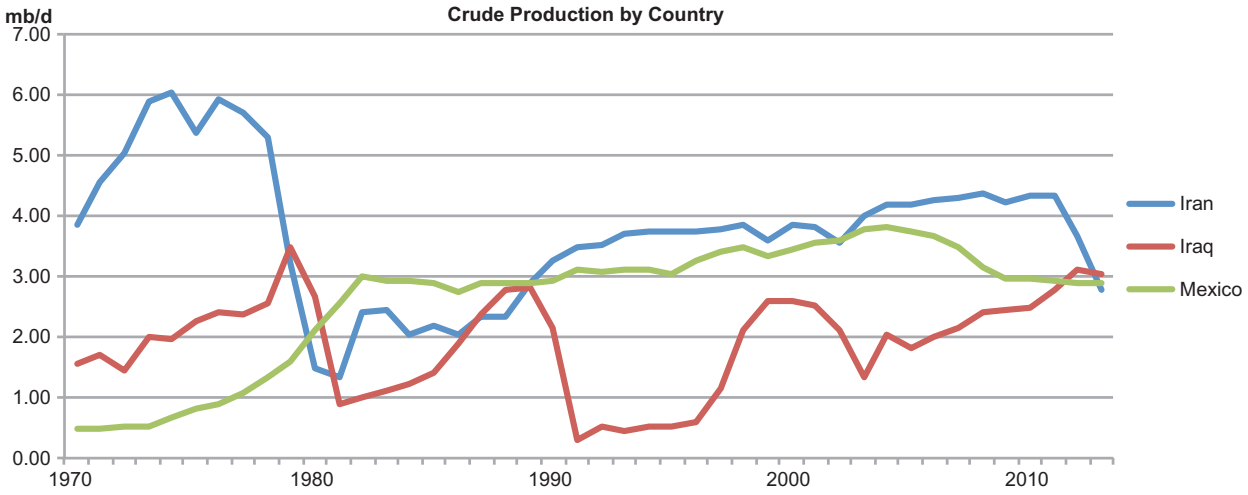
Despite this achievement, Iraqi production remains well below its potential. Iraq has the fifth-largest proven crude oil reserves in the world. It has ambitious production targets, but also growing domestic consumption, and has been unable to raise output to meet them due to continued internal political and security challenges. Politically, ongoing disputes between the central Iraqi government and the Kurdish Regional Government have

35. Mark Landler, "Obama Is Said to Plan Fence-Mending Trip to Saudi Arabia," *New York Times*, January 31, 2014, http://www.nytimes.com/2014/02/01/world/middleeast/obama-is-said-to-plan-fence-mending-trip-to-saudi-arabia.html.

36. In addition, the kingdom is faced with several other challenges that could potentially impact its energy production and role in the global energy market, including succession, the Sunni-Shia split, the new generation of leaders, and the potential for unrest to lead to instability and high oil prices. While these are not the focus of this analysis, it is important to note the complexity of potential challenges that face the kingdom.

37. EIA, "Top World Oil Producers, 2012 (Thousand Barrels per Day)," http://www.eia.gov/countries/index.cfm.

Figure 3. Liquids Production of Iran, Iraq, and Mexico, 1970–2012



Source: 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; EIA, "Short-Term Energy Outlook," February 2014, http://www.eia.gov/forecasts/steo/report/global_oil.cfm.

depressed production levels in the county's north. Meanwhile, in the south, security issues and infrastructure challenges have resulted in a much slower ramp-up in production than the government would like.

Iran is another nation with vast but underexploited production potential. It holds the world's fourth-largest proven oil reserves and second-largest natural gas reserves, but its production has stagnated for the last two decades. In earlier years this was principally the result of contract terms that were unattractive to international companies. More recently, increased U.S. and then international sanctions—over and above existing sanctions from the mid-1990s—have specifically targeted the Iranian hydrocarbons sector in an attempt to force changes to Iran's nuclear program.[38] Over the years, but especially since 2012, sanctions have taken a toll on the Iranian oil and gas sector; production volumes continue to decline, recovery rates are low, and investment needed to stave off decline is wanting. Despite a production goal of 5 million barrels per day in 2015, according to EIA estimates, Iran only produced 2.8 million barrels per day in November 2013, of which 1.1 million was exported.[39] The sanctions have crippled Iranian government revenues, which are heavily dependent on the oil and gas sector. Global willingness to absorb Iranian supply reductions was, many claim, greatly enhanced by the expectation that U.S. tight oil production would more than offset the amounts taken off the market by sanctions (thus stabilizing prices). The demonstration of this calculus is widely perceived to have been instrumental in

38. The United States has had sanctions in place since 1979. They have since been broadened three additional times, in 1995, 2005, and late 2011.

39. EIA, "Iran's oil exports not expected to increase significantly despite recent negotiations," December 10, 2013, http://www.eia.gov/todayinenergy/detail.cfm?id=14111.

Table 1. Oil Prospects for Iraq, Iran, and Mexico

	Current Oil Production	*Oil Export Levels*	*Oil Reserves*	*Existing Constraints*	*Progress toward Reentry*
Iraq	~3 million barrels per day	~2.2 million barrels per day	8th largest crude oil producer in the world, 5th largest proven crude oil reserves	Ongoing political instability including wars; lack of oil and gas law and security issues	Slow return of foreign investment
Iran	~3.6 million barrels per day	~1.9 million barrels per day	4th largest proven oil reserves, 2nd largest natural gas reserves	Lack of investment due to poor contract terms; more recently sanctions	Latest round of nuclear talks offers optimism for possible future sanctions relief
Mexico	~2.9 million barrels per day	~0.8 million barrels per day	9th largest producer in the world, 10.2 billion barrels proven oil reserves	Lack of investment due to constitutional restriction	Constitutional reform achieved in December 2013, secondary laws to be released spring/ summer 2014

Note: Oil export levels are measured as total petroleum production minus total consumption and were calculated for 2012. Current oil production is for 2012, and includes crude oil, including lease condensates, natural gas plant liquids, and other liquids.

Source: EIA. "International Energy Statistics," http://www.eia.gov/cfapps/ipdbproject/IEDIndex3.cfm.

internal Iranian political developments, and in bringing the country's new leadership to the negotiating table over their nuclear program.

Mexico is a major non-OPEC oil producer, holds large oil and gas reserves, and is a significant source of U.S. crude oil imports (11 percent in 2012). But while Mexico's oil revenues account for a large part of its budget (about 30 percent)[40] and its overall export earnings (16 percent),[41] production has been falling. Mexico produced about 2.9 million barrels per day in late 2013, compared with a peak of about 3.9 million barrels per day less than 10 years ago.[42] This steady decline is due to both falling productivity from existing fields and a failure to invest in development of future production. Consequently, Mexico's proven reserves in 2012 were roughly 21 percent of what they were in 1999.[43] Mexico's energy troubles are compounded by rising domestic demand, driven primarily by its rapid economic development. As a result of these trends, Mexico's exports fell by nearly 56 percent

40. Stephanie McCrummen, "Mexican President Proposes Historic Changes to State-Owned Pemex Oil Monopoly," *Washington Post*, August 12, 2013. http://www.washingtonpost.com/world/mexican-president-proposes-historic-changes-to-state-owned-pemex-oil-monopoly/2013/08/12/7f848d4c-0380-11e3-bfc5-406b928603b2_story.html.

41. EIA, "Mexico: Country Analysis Brief," http://www.eia.gov/countries/analysisbriefs/Mexico/Mexico.pdf.

42. EIA, "Short-Term Energy Outlook," http://www.eia.gov/forecasts/steo/query.

43. EIA, "Mexico: Country Analysis Brief."

between 2003 and 2012 (from 1.8 million barrels per day in 2003 to 0.8 million barrels per day in 2012) and, without change, will continue to do so.[44] The issue is compounded by a lack of investment in refining capacity, leading to a rise in expensive petroleum product imports. Despite attractive geological prospects, both onshore and offshore, investment in Mexico's energy sector is significantly deterred by severe restrictions on international involvement, including investment in the development of oil and gas resources.

SOFTER MARKETS RAISE THE STAKES FOR REENTRANTS TO GET BACK ON THE MARKET, PUTTING INCREASED PRESSURE ON OPEC COHESION.

The overall softness of oil markets, compounded by U.S. tight oil production, has presented a serious challenge to OPEC, which aims to regulate production to set price levels. The rush on the part of Iraq (and the anticipated rush, in the case of Iran) to recapture market share represents a direct challenge to this central tenet, and would likely further threaten the group's cohesion. OPEC has a spotty record of group coherence and discipline, and its power rests in the few key producers (mostly Saudi Arabia) with the ability to influence price through the size of its spare capacity. Earlier last year a possible rift emerged between the Gulf members and African member producers over quotas.[45] And Saudi leaders have said that surging oil production has already weakened oil prices.[46] As markets become softer, such tensions are bound to get worse. In short, U.S. tight oil production has already begun to widen existing rifts within OPEC, which would be exaggerated still further as member countries Iran and Iraq attempt to recapture market share.

THE NEW ENERGY LANDSCAPE ACCELERATES INTERNAL NEED FOR REFORM.

The rapid rise in U.S. shale gas and tight oil production undermined the complex politico-economic calculus for restricting access. Countries that believed that they could count on rising prices to offset production declines—or believed that their oil was so necessary on the world market that it would insulate them from the consequences of their behavior—have been disabused of their assumptions for the near to medium term. For formerly significant hydrocarbon producers who are reemerging after years of isolation (Iraq), are excluded from international energy markets (Iran), or are suffering from steep production declines (Mexico), the shale gas and tight oil revolution has served as a further impetus for change.

In the last few years, Iraq, Iran, and Mexico have all shown signs of potential reforms that could, if successful, eventually bring about greater oil and gas production. Although

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44. EIA, "Short Term Energy Outlook."

45. "UPDATE 2: Libya Says Wants Higher Oil Quota in OPEC," Reuters, April 22, 2013, http://www.reuters.com/article/2013/04/22/libya-oil-idUSL5N0D91GO20130422; George Joahn, "OPEC to Meet amid Iran-Saudi Tensions," AP, May 30, 2013, http://bigstory.ap.org/article/opec-meet-amid-iran-saudi-tensions.

46. Sarah Kent, Nicole Lundeen, and Summer Said, "Gulf Oil Producers See Shale Boom Hurting U.S. Prices," *Wall Street Journal*, December 2, 2013, http://online.wsj.com/news/articles/SB10001424052702304854804579234430152978624.

not solely attributable to the impact of the shale gas and tight oil revolution, rising U.S. production has contributed to each country's calculus about reform of its oil and gas sector.

The overthrow of Saddam Hussein in 2003 opened the door to reform in the Iraqi oil sector, to include the introduction of private investment. These developments led to a substantial increase in production, and Iraq appeared poised to reclaim its prominent role as a supplier in global markets. As noted above, Iraq has made some progress in its desire to be a significant player in the global market, but continued barriers to expanded production are hampering progress at the same time that the entrance of greater tight oil supply is modifying the investment climate for Iraqi oil projects. Issues associated with infrastructure (pipeline, port capacity, and storage facilities), security, and internal disputes have all contributed to recent decline in exports.[47]

Iran's most recent removal from and potential reentry into world oil markets has been more recent than Iraq's but no less dramatic. Sanctions have cost Iran significant market share. Iran is exporting, on average, 1.5 million barrels per day less than in 2011, and production declined by almost 1 million barrels per day between 2011 and 2013.

In late 2013 Iran negotiated an interim deal with the P5+1[48] to suspend some of the existing sanctions, though what is now permitted does not come close to the production levels associated with Iran's previous market share. But in addition to coming to the negotiating table (which was doubtless the result of multiple factors, not just sanctions or the shale gas and tight oil revolution), Iran has—perhaps more tellingly—begun to discuss other reforms. These include revising the terms under which it negotiates contracts with international oil companies and the types of contracts it will allow, in a bid to rapidly woo those companies back to their country once (if) sanctions are lifted. There have been media reports that Iran is actively courting Western companies in case a final agreement on the nuclear program is made.[49] Such steps are an imperative, as Iran's oil minister recently admitted that the oil and gas sector needs $100 billion in investment in the next five years.[50] If Iran were to find its way back into the markets, the effects would be significant. If a resolution is found on the nuclear issue and Iran restructures its energy sector, the reform could be one part of a broader reemergence of Iran on the world stage, leading to a number of potential regional and global realignments—most notably, how U.S. reconciliation with Iran impacts the current U.S. relationships in the region. As another example, China is acutely interested in how a stronger Iran might behave, especially vis-à-vis Saudi

47. Iraq exports fell from 2.42 million barrels per day in 2012 to 2.39 million barrels per day in 2013. "Iraq Oil Exports Dip in 2013," AFP, January, 22 2014, http://www.google.com/hostednews/afp/article/ALeqM5iYn1w4eyYQ4ZG1z9T-fTrLOm4r2g?docId=ac3129d1-c4a2-44a3-bd03-8653f8639d14.

48. That is, the five permanent members of the UN Security Council (P5) (the United States, Russia, China, the United Kingdom, and France) plus one more, Germany.

49. Tara Patel, "Total CEO Defends France's Trade Overtures to Iran," Bloomberg, February 12, 2014, http://www.bloomberg.com/news/2014-02-12/total-ceo-defends-france-s-trade-overtures-to-iran.html.

50. Benoit Faucon, "Iran Courting Western Oil Companies in Case Sanctions Are Eased," *Wall Street Journal*, November 21, 2013, http://online.wsj.com/news/articles/SB10001424052702303755504579206060767796256?KEYWORDS=faucon; Robin Mills, "Western Oil Companies Show Revived Interest in Iran," *LobeLog*, October 10, 2013, http://www.lobelog.com/western-oil-companies-show-revived-interest-in-iran/.

Arabia. China's current engagement with both nations is carefully balanced, because it imports energy from both.[51] As a major market for both suppliers, China exerts some degree of leverage over each, so long as it does not have to choose between them.[52] The strategic benefits of the relationship, however, are not equivalent. As the sanctions process has made clear, China—one of the five permanent members of the UN Security Council—is much more strategically important to Iran as a trade partner and ally than Iran is to China.

As in Iraq, Mexico's reform process has also been in the works for years. Mexico has long realized that its declining production and increasing demand are a looming concern for its energy sector and overall economy. Mexico has significant reserves (10.2 billion barrels of proven oil) and has great offshore potential that has been producing for some time, but its offshore fields are in decline. The costs to develop the technology that can go ever deeper offshore have been too high relative to cheaper U.S. projects in the Gulf of Mexico, stalling progress on this front. However, additional incentive was provided by the realization that Mexico's shale gas resources—needed to satisfy domestic consumption—were undeveloped despite similar geology to shale resources in Texas. As a result, the Mexican government undertook revisions to its constitution and is now working on implementing legislation. However, as with most things, the devil is in the details.

Before the economic collapse of 2008, the realization of the tight oil potential in the United States, and recognition of the potential for wider unconventionals production, the assumption was that the market could readily absorb whatever increased production emerged from one or more of these countries. These two events—falling demand and other sources of supply, predominantly tight oil—have accelerated the need for internal reform in each of these nations, with the expectation that "first-comers" will gain a key advantage. Most oil market watchers foresee a relatively well-supplied global oil market well out into 2030, even without major production increases or recoveries from places like Iran and Mexico (though some include Iraq). Iran, Iraq, and Mexico have been hit by the perception that they may not be able to afford a wait-and-see approach: if they want to pursue a more aggressive oil and gas position in the world market, domestic reform must come now. These countries also understand that such reform takes time to achieve—and that ramping up production (assuming no exploration) can take several years. Thus, the imperative for change, already strong, has become even stronger.

The impact of energy sector reform in Mexico (and in the other potential reentrants as well) would not just be about the market. The liberalization of the oil sectors in each nation could provide the impetus to broader economic adjustments, some of which could have geopolitical impacts. For example, if Mexico's energy reforms ultimately prove successful, renewed production under new rules could be one factor helping drive a more prosperous Mexico to a place of significant leadership in Latin America, perhaps competing for influence with the United States in the region (and also potentially competing in the

51. Jon B. Alterman, "Gulf Analysis Paper: China's Balancing Act in the Gulf," CSIS, August 2013, http://csis.org/publication/gulf-analysis-paper-chinas-balancing-act-gulf.

52. Ibid.

manufacturing sector). Increased Mexican oil production would also likely realign some geopolitical relationships. Historically the United States has been the primary consumer of Mexican oil, and it is likely to continue to be one of the main consumers of any heavy or medium oil Mexico produces. However, if Mexico begins to produce unconventional light tight oil—the kind the United States already has enough of—it will need to find new markets and will develop new relationships with consumer countries, particularly in Asia.

All three countries have a need to increase production, and all three are world-class resource holders with, under the right circumstances, the potential to bring on a great deal of conventional oil and gas supplies over the next 10 to 15 years. In order to attract investment over that time frame, each has to undertake significant economic, political, and security reforms. The enactment of such reforms, or lack thereof, will feed into regional and global relations, and the stability of the countries.

Revenue Dependents

In addition to the producers discussed above, there are numerous other contributors to global oil and gas markets whose economies are particularly sensitive to changes in energy prices. Most members of the Gulf Cooperation Council (GCC) (which includes Saudi Arabia, Kuwait, the United Arab Emirates, Qatar, Bahrain, and Oman) fall into this category, as do Algeria, Libya, Algeria, Venezuela, Yemen, and others. For most of these countries, hydrocarbon price fluctuations cut both ways. On the one hand, many countries use oil and gas export revenues to support high levels of government patronage. In this sense, these countries benefit from high global price levels. On the other, many of these same countries highly subsidize internal energy consumption, and in this respect they benefit from low global prices.[53]

Most energy-revenue-dependent countries are well aware of the danger of overreliance on export revenue. Over the past two decades many have undertaken efforts to diversify their economies. Through such efforts, several countries in the Gulf region have been moderately successful in reducing their dependence on hydrocarbons. Yet their ability to maintain domestic stability in the face of sustained price declines is contingent on implementation of structural and social reforms, which they have lacked the political will to implement in the past.

POTENTIAL FOR MODEST FUTURE PRICE DECLINES RAISES RISKS OF INSTABILITY.

While the tight oil revolution has not brought about the large drop in oil prices some expected, many analysts continue to project such an effect in the future, either because of

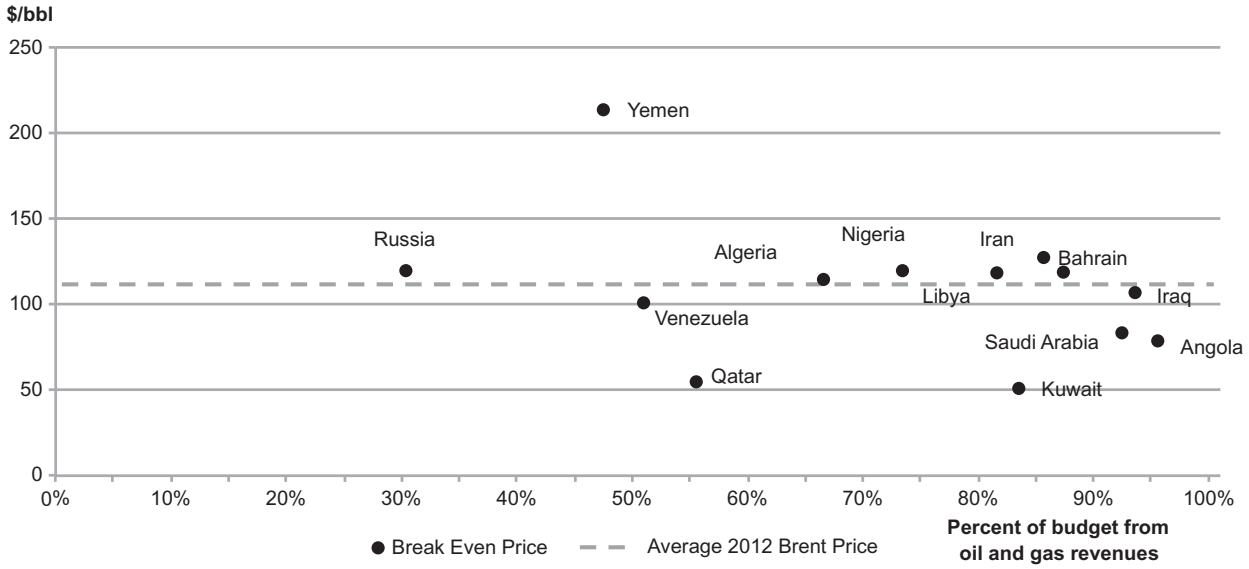
53. These structural sensitivities extend beyond producers. Egypt, for example, spends roughly 30 percent of its government budget on fuel subsidies; cheaper oil and gas means those costs fall. And Jordan, which imports more than 95 percent of the energy it consumes, would face a significantly reduced bill if prices fell (or a much greater one should they rise).

continued rises in U.S. production, new sources of supply, or both. These expected effects are changing the economics of planned development, production, and infrastructure projects in multiple countries that are highly dependent on energy revenues. Given that many countries in this basket (e.g., Algeria, Nigeria, Libya, Yemen, and Venezuela) are living well beyond their oil revenue budget as it stands at current prices (see Figure 4), their ability to maintain the basic structure of their economies is already under threat.

Many of them are also, to varying degrees, politically unstable. There is no concrete evidence that a loss of oil-derived revenue will cause instability, but as softer energy markets narrow the margin for finding the proper balance between revenue, production, and stability, risks are rising.

As is the case elsewhere, the shale gas and tight oil revolution contributes to the growing economic vulnerability and raises the stakes in some oil and gas revenue-dependent capitals to revisit business as usual and investigate restructuring their oil and gas industries. This challenge coincides with a particularly tumultuous period in the Persian Gulf. The political climate in these countries is (broadly speaking) tense, so the initiation of

Figure 4. Break-Even Prices for Revenue Dependent Countries



Sources: Break-even price data for Angola, Venezuela, and Nigeria: Ali Aissaoui, "MENA Lingering Turmoil and Its Effect on Energy Investment Climate: A Reassessment," APICORP Economic Commentary 8, nos. 8–9 (August–September 2013): http://www.apicorp-arabia.com/Research/Commentaries/2013/Commentary_V8_N12_2013.pdf; break-even price data for Qatar, Kuwait, Saudi Arabia, Libya, Iraq, Bahrain, Algeria, Iran, and Yemen: IMF, *Regional Economic Outlook: Middle East and Central Asia* (Washington, DC: IMF, November 2013), http://www.imf.org/external/pubs/ft/reo/2013/mcd/eng/pdf/mreo1113.pdf; break-even price data for Russia: 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; revenue data for Venezuela: "Venezuela Industry Report: Energy," Economist Intelligence Unit, November 2013; revenue data for all other countries: latest available IMF, "Article IV Report," http://www.imf.org/external/country/index.htm; average Brent price data: EIA, "Short Term Energy Outlook," February 11, 2014, http://www.eia.gov/forecasts/steo/report/prices.cfm.

reforms could inject yet another form of volatility into the environment. Although it is not a perfect analogy, the experience of Algeria stands as a cautionary example. Low oil revenues and budgetary challenges in the late 1980s contributed to the Algerian political elites' decision to open up the political system and hold elections. When the military intervened to prevent the Islamic Salvation Front (FIS) from taking power, political discord spiraled into a decade-long civil conflict that took around 200,000 lives. Governments in the region are acutely aware that reforms gone awry could unleash similar tumult, adding to the already plentiful list of reasons such changes might otherwise be resisted.

That said, there are a number of Gulf nations for whom less-than-expected demand and rising supply is not as significant. Qatar, the largest LNG exporter (though possibly replaced by Australia in the near future) is among those best positioned to work its way through softer markets, both because of its significant reliance on exports of natural gas rather than oil and the reasonable strength of its non–oil and gas GDP growth, largely due to strong investment income and a small population.[54] The Qatari Central Bank has $50 billion in assets,[55] and the Qatar Investment Authority is valued at around $115 billion,[56] compared to Qatari government expenditures in 2012/2013 of $48.9 billion.[57] Qatar's gross national savings as a percentage of GDP are also the highest in the world.[58] It is also the only country in the GCC that does not face the significant challenge of rising domestic energy consumption threatening export capacity.[59] However, like its neighbors, higher domestic spending has driven an increase in Qatar's break-even oil price in recent years. A budget deficit in Qatar could threaten the government's large planned capital expenditures, which are a major component of its non-hydrocarbon GDP.[60] At present, regional gas condensate pricing has insulated Qatar to some extent, but Qatar remains indirectly vulnerable to unrest associated with oil price challenges or other triggers (such as succession struggles in Saudi Arabia) that could spill over from its neighbors.

Kuwait has also taken advantage of relatively high energy prices in recent years to help shore up its overall financial footing. The country has low public sector debt (3.7 percent of GDP in 2012)[61] and large financial resources upon which it can draw, largely

54. The IMF notes that "Qatar is unique in having avoided the big drop in hydrocarbon revenues in 2009 due to the long-term nature of its gas contracts as opposed to spot prices for oil that are relevant for other GCC countries' hydrocarbon revenues." IMF, "Qatar: Selected Issues," December 2012, 4.

55. Qatar Central Bank, *Quarterly Statistical Bulletin*, June 2013, http://www.gulfbase.com/ScheduleReports/8b86625d_QuarterlyStatisticalBulletin-June2013.pdf.

56. SWF Institute, "Qatar Investment Authority," http://www.swfinstitute.org/swfs/qatar-investment-authority/.

57. Note that the Public Corporations Sector makes up a large share of the economy and is *not* included in central government revenue/expenditure figures. It includes QP, Qatari Diar and Barwa, QNB, Qatar Airways, Al Jazeera, and QTel.

58. CIA, *World Factbook*, "Qatar," https://www.cia.gov/library/publications/the-world-factbook/geos/qa.html.

59. Jim Krane, "Stability versus Sustainability: Energy Policy in the Gulf Monarchies," Cambridge Working Papers in Economics 1304, February 2013, http://www.econ.cam.ac.uk/research/repec/cam/pdf/cwpe1304.pdf.

60. The IMF credits Qatar's expansionary spending and strong capital expenditures with helping it recover quickly from the financial crisis. It also notes that "capital expenditures will continue to be a major driving force of the nonhydrocarbon economy" in Qatar.

61. IMF, "Kuwait: Selected Economic Indicators, 2007–2013."

located within its sovereign wealth fund, the Kuwait Investment Authority (KIA). (The KIA both gathers oil revenues and releases money to the government to cover its budget expenditures.) Kuwait has run budget surpluses for 14 consecutive years,[62] and its 2012 surplus was equal to a third of its GDP, the highest in the world.[63] Its central bank has around $30 billion in total assets,[64] and the KIA is worth approximately $386 billion.[65] It also has the lowest break-even oil price within the GCC to meet its current level of budget expenditure, estimated at $55 per barrel for 2013.[66] Thus, while rising public spending is expected to eat into (and by 2017 could completely crowd out) future savings, Kuwait has thus far seen few significant domestic impacts from the rise of shale gas and tight oil.

The United Arab Emirates (UAE) is another Gulf state for which softening oil markets have thus far proven manageable. The UAE did experience budget deficits after the 2009 fall in oil prices and the corporate debt crisis in Dubai in 2009–2010. It has since recovered, however, with budget surpluses of between 2 and 4 percent of GDP in 2011–2013.[67] The UAE has increased investment in non-oil, non-gas sectors of the economy and, as a result, is better postured to absorb short-term oil price declines. Its investments, worth hundreds of billions of dollars,[68] are diversified through a number of different sovereign wealth funds managed independently, but each focused on promoting strong economic returns. The Abu Dhabi Economic Vision 2030 has outlined the UAE's ambitious plans to help it weather future reductions in oil revenue, including increasing non-oil GDP as a percentage of real GDP from 41 percent in the mid-2000s to 64 percent by 2030.[69] Whether the UAE can actually achieve the goals it has set remains the key uncertainty for its outlook.

The challenges facing North and West Africa and Venezuela are more daunting. Algeria remains vulnerable to future challenges, as its break-even oil price is $120 per barrel, among the highest in the region. Coupled with the outsized role of the oil and gas sector in the overall economy—97 percent of overall export revenues, 70 percent of government

62. IMF, "Kuwait: Selected Issues and Statistical Index," June 18, 2012, http://www.imf.org/external/pubs/cat/longres.aspx?sk=26008.0. This brief cites 13 years of surpluses; Kuwait also had a surplus in 2012/2013, bringing the total to 14 years.

63. CIA, *World Factbook*, "Kuwait," https://www.cia.gov/library/publications/the-world-factbook/geos/ku.html. It is worth noting that if political gridlock did not hold up so many capital expenditure projects in Kuwait, the non-oil GDP would be higher, Kuwait's budget surplus as a percentage of its GDP would be lower, and there would be a greater likelihood of future economic stability. Kuwait's high surpluses are partly a reflection of its inability to invest or spend its revenues in a timely manner.

64. Central Bank of Kuwait, "Monthly Statistics," http://www.cbk.gov.kw/WWW/index.html.

65. Sovereign Wealth Fund (SWF) Institute, "Kuwait Investment Authority," http://www.swfinstitute.org/swfs/kuwait-investment-authority/.

66. City of London Investment Management Company, Ltd., "Frontier Markets Semi-Annual Outlook," March 2013, http://www.citlon.com/special_reports/FrontierOutlook.pdf.

67. Economist Intelligence Unit estimates.

68. The Abu Dhabi Investment Authority (ADIA) alone has an estimated value of $627 billion. Other sovereign wealth funds in the UAE include the Abu Dhabi Investment Council (unknown worth; it was split from ADIA), Mubadala, the Investment Corporation of Dubai, and the International Petroleum Investment Corporation (IPIC). SWF Institute, http://www.swfinstitute.org.

69. Government of Abu Dhabi, "The Abu Dhabi Economic Vision 2030," 2008, https://www.abudhabi.ae/egovPoolPortal_WAR/appmanager/ADeGP/Citizen?_nfpb=true&_pageLabel=p_citizen_homepage_hidenav&did=131654&lang=en.

revenues, and 37 percent of GDP in 2013[70]—Algeria's ability to withstand soft markets over time is questionable. Algeria has a short-term cushion, as its Revenue Regulation Fund (FRR), established in 2000, is worth $54.8 billion,[71] and its gross national debt is relatively low (11 percent of GDP in 2011).[72] It also has substantial foreign currency reserves, valued at $182.9 billion in March 2013.[73] But the government's lack of desire to open up to significantly higher foreign investment has hampered Algerian efforts at economic diversification and perpetuated its overall fragility.

Nigeria is a significant oil producer and exporter, and is a member of OPEC. Nigeria has the second largest proven crude reserves in Africa and is the continent's largest oil producer. However, even before the shale gas and tight oil revolution in North America, Nigeria has faced significant problems and underinvestment in its oil sector, primarily due to regulatory uncertainty and security concerns. In addition, oil theft and sabotage are ongoing problems. Nigerian oil production peaked in 2005 at 2.44 million barrels per day, and is currently around 1.9 million barrels per day.[74]

Nigeria's crude is mostly light, sweet crude oil, the same type of oil being produced from tight formations in the United States. As U.S. imports have declined, European imports have increased significantly (40 percent in 2011 and 2012). To date, Nigeria has been able to find a market for the crude that was backed out of the United States, but it has been forced to accept lower prices. Moreover, it is not clear whether the outlets are capable of absorbing Nigerian crude over the long term.

This is an acute problem for the Nigerian government, which receives approximately 75 percent of its revenue from crude exports. Even if prices do not fall on the global market, Nigeria may continue to be forced to accept lower prices in order to find a buyer for its crude. If oil prices do soften, the resulting revenue losses may only compound the country's problems. Lower prices might provide an incentive for Nigeria's leadership to crack down on oil theft—which is estimated at 100,000 barrels a day and is a significant lost government revenue (other estimates are closer to 300,000 barrels per day, at a cost of $1 billion per month).[75] More likely, though, is increased elite infighting over dwindling rents, which could exacerbate preexisting political tensions both within the Delta and in Nigeria more broadly.

Venezuela is one of the world's largest crude oil exporters and is another significant producer that could be adversely impacted by lower world oil prices. However, Venezuela is in a different position from Nigeria and some other revenue-dependent countries, for two

70. African Economic Outlook, "Algeria: Economic Developments 2013," *AFRIBIZ*, June 2013, http://www.afribiz.info/content/algeria-economic-developments-2013.

71. SWF Institute, "Algeria: Revenue Regulation Fund," http://www.swfinstitute.org/fund/algeria.php.

72. IMF, "World Economic Outlook Database," April 2013, www.imf.org.

73. Banque d'Algérie, *Statistical Bulletin*, June 2013, http://www.bank-of-algeria.dz/. Converted from Algerian dinars at current exchange rates.

74. EIA, "Nigeria: Country Analysis Brief," http://www.eia.gov/countries/cab.cfm?fips=ni.

75. Helima Croft and Christopher Louney, "Geopolitical Update: Nigeria: House of Cards?" Barclays, February 19, 2014, 4, https://live.barcap.com/PRC/servlets/dv.search?contentPubID=FC2010792&bcllink=decode.

reasons. First, the grade of crude oil it exports does not directly compete with rising U.S. production. Venezuela mostly exports heavy, sour crude, which refiners on the U.S. Gulf Coast are configured to process. The production in the United States is unlikely to displace Venezuelan barrels. Second, Venezuela owns several refineries in the United States, which are guaranteed destinations for a substantial amount of Venezuelan crude. The U.S. imported 912,000 barrels per day in 2012, on par with import levels since 2009. This is a decline from a peak of 1.6 million barrels per day in 1997, but it is a slow decline that began in earnest in the early 2000s.

Nonetheless, Venezuela is not immune to the impacts of the tight oil revolution. Any long-term shift in U.S. demand for Venezuelan crude would impact the country, as the United States is by far its most important export destination. Another important effect could come from increased competition from Canadian heavy crude, which could depress prices for Venezuelan oil in the U.S. market. Lower prices would hinder the Venezuelan government's ability to support its costly social spending. As with other revenue-dependent countries, lower oil prices could hasten the need for reform in the oil sector or could precipitate fights over the remaining rent. Moreover, a world of declining oil prices would likely result in lower quantities of subsidized oil and petroleum product exports. Venezuela currently provides significant quantities of these products to its neighbors at below-market prices (according to EIA, this amounts to 400,000 barrels per day). Low prices would put financial stress on Venezuela that could jeopardize these subsidized exports, reducing Venezuelan influence in Latin America and the Caribbean. The result would be an acceleration of the already declining production trend in the country, exacerbating the cycle already occurring: the government needs more revenue, relies more heavily on its state-owned oil company, resulting in lower production, and the need for more revenue.

Consumer: China

Though China's centrality to both global energy and geopolitical futures has emerged repeatedly in the preceding discussion, a more thorough examination of how the shale gas and tight oil revolution has affected its position and thinking is warranted. Since the economic opening in the late 1970s, China has become one of the fastest-growing economies in the world, averaging annual GDP growth of 10 percent over multiple decades.[76] Notwithstanding several indications of a subsequent slowdown, today China is the world's second largest economy and destination of foreign direct investment as well as the largest manufacturer and merchandise exporter in the world. These trends are propelling China to become one of the most significant forces in the global energy market. China recently became the largest energy consumer in the world,[77] and is projected to consume more than

76. Wayne M. Morrison, *China's Economic Rise: History, Trends, Challenges, and Implications for the United States* (Washington, DC: Congressional Research Service, February 3, 2014), https://www.fas.org/sgp/crs/row/RL33534.pdf.

77. EIA, "China: Country Analysis Brief," http://www.eia.gov/countries/cab.cfm?fips=CH.

twice as much energy as the United States by 2040.[78] Having surpassed Japan as the largest net oil importer in the world in 2009, China consumed an estimated 10.7 million barrels per day of oil in 2013, accounting for nearly one-third of global oil demand growth that year.[79] Also, a net gas exporter until 2007, the country relied on imported gas for about one-third of its domestic demand in 2012.[80]

GREATER ENERGY SUPPLIES ENHANCE CHINA'S ENERGY SECURITY POSITION BUT DO NOT ALLEVIATE ITS OVERALL VULNERABILITY.

China's strong economic growth has been driving the country's growing energy consumption and energy import dependence. This has raised the prominence of energy security as a strategic concern for the Chinese leadership, as its legitimacy is predicated on continued economic performance.

The robust production of shale gas and tight oil energy in the United States helps improve China's sense of energy security by increasing the overall availability of oil and natural gas. As noted earlier, oil and natural gas previously destined for the United States have become available for Asian markets, including China. During the supply uncertainty after the Fukushima nuclear disaster, redirected LNG supplies from the Persian Gulf prevented a severe supply crunch in Asia. Also, the emergence of the United States as an additional supplier is thought to have stabilized oil prices in the face of disruptions, a major benefit to China, which imported 5.4 million barrels per day of crude and 706 billion cubic feet of liquid natural gas in 2012 alone.[81]

From a security of supply vantage point, the U.S. shale gas and tight oil revolution and its unfolding impact on traditional producers in the Persian Gulf are main factors prompting China to take stock of its relationship with the Middle East and North Africa. China's dependence on Middle Eastern energy supplies is growing, and it is increasingly concerned about the implications of a potential reduction of U.S. presence in this region. While many key Asian consumers have long depended upon a U.S. ability and willingness to enhance stability in the Gulf and secure the energy trade flows out of the region; uncertainties abound about the U.S. willingness to continue playing that role and how China feels about having a similar reliance on the United States. In 2013 China purchased roughly half—2.9 million barrels per day—of its total crude oil imports from the Middle East.[82] By comparison, the United States purchased 1.9 million barrels per day—one-fifth of its total crude imports—from the region.[83] As Chinese demand rises and U.S. imports continue to fall, this divergence is expected to widen. As a result, Chinese leaders are facing questions about what they can and should do to protect the security of that supply.

78. EIA, *International Energy Outlook 2013*.
79. EIA, "China: Country Analysis Brief."
80. Ibid.
81. Ibid.
82. Ibid.
83. EIA, "Petroleum & Other Liquids: Data," http://www.eia.gov/petroleum/data.cfm.

The potentially growing need to protect its energy supply has served as at least one justification for China's ambitious military modernization plans, and in particular its naval capabilities. China introduced the country's first aircraft carrier in September 2012,[84] and it has plans to build a second, larger one. While there appears a prevalent view among Chinese (and other) scholars that the Chinese navy is not yet capable of playing a security role in the Persian Gulf, the protection of oil transit routes has increased the importance of the Indian Ocean in Chinese strategic thinking and has fed some of the actions that have concerned capitals not only regionally but in the United States as well. China is conducting an increasing number of naval exercises in the Indian Ocean, demonstrating its ability to operate in the Lombok and Malacca straits, both key energy chokepoints.[85]

Chinese leadership thus far has been inclined to stay out of the Gulf's political affairs. A mercantilist approach has served China's economic interests well, partially enabled by the United States' deep engagement in the region. As regional dynamics shift, however, some Gulf states appear keen on the Chinese assuming a new role, whether as a balancer to U.S. power or to supplement bilateral relationships with the United States.[86] Just as China is unclear about future U.S. intentions in the Middle East, so too are Middle Eastern states. This desire to hedge against this uncertainty is driving interest in a greater Chinese presence, "especially with visible U.S. fatigue at the posture it has maintained in the Gulf for decades."[87]

While falling U.S. imports from the Middle East have offered an opportunity for China to increase its supply from the region, China is not putting all its eggs in one proverbial basket. Its broader strategy has been to pursue supply diversity in order to hedge against regional security concerns and transportation risks.[88] China sees huge potential, for example, in further tapping into the African energy markets, despite challenges and risks such as underdeveloped infrastructure, poor governance, and the threat of instability. But even with Beijing's keen interest, African countries as of 2012 still provided only 23 percent of China's crude oil imports. China has also sought energy sources closer to home, developing new relationships in Central Asia.[89] While its various investments may bear fruit over the long term, the simple reality remains that, given China's tremendous energy needs, the Middle East is likely to remain a significant supplier to China.[90] There are no signs that unconventional sources will dislodge conventional ones within China's global energy strategy in the foreseeable future.

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84. China's first aircraft carrier, *Liaoning*, is a Soviet-era ship bought from Ukraine in 1998 and refitted in China.

85. Ananth Krishnan, "New Indian Ocean Exercise Shows Reach of China's Navy," *The Hindu*, February 5, 2014.

86. Alterman, "Gulf Analysis Paper: China's Balancing Act in the Gulf."

87. Ibid.

88. Jian Zhang, "China's Energy Security: Prospects, Challenges, and Opportunities," Brookings Institution, July 2011, http://www.brookings.edu/research/papers/2011/07/china-energy-zhang.

89. "China in Central Asia: Rising China, Falling Russia," *The Economist*, September 14, 2013, http://www.economist.com/news/asia/21586304-vast-region-chinas-economic-clout-more-match-russias-rising-china-sinking.

90. Zhang Shaobo "张绍波,"中国的海外石油供应分析" [China's overseas oil supply analysis], *China Energy News*, January 28, 2013, http://paper.people.com.cn/zgnyb/html/2013-01/28/content_1193371.htm.

Chinese Military Modernization

Though largely a regional concern, governments around the world have been paying close attention to China's efforts to update and enhance its military capabilities. Since the 1980s China has undertaken a series of reforms aimed at modernizing the People's Liberation Army (PLA) and its various components. These efforts have involved changes to doctrine, force structure, and military systems. In essence the PLA strategy has been to reduce capacity but increase its capabilities and overall proficiency. As part of these efforts, the PLA is moving to improve military training and education, and has launched programs explicitly targeting college graduates.

In financial terms, China's defense spending has grown dramatically since 2001, fueled by strong economic growth. As growth rates have started to slow, so too have the rates of defense spending increases. Defense investment remains robust, however, and is still increasing at an average of 9 percent per year.[1] China's commitment to robust military spending is allowing them to field increasingly modern military capabilities, especially with respect to their naval forces.

These capabilities have increasingly been on display. China has continued to challenge its neighbors with territorial claims in the South and East China Seas and the Sea of Japan. For example, in November 2013 China sparked a global reaction by declaring a new air defense identification zone that covered internationally disputed territories. Further, such provocations often incorporate new platforms, such as amphibious assault ships and unmanned aircraft. For example, China has flown unmanned aircraft near the disputed Senkaku/Diaoyu islands in the East China Sea. Many around the world, including its closest neighbors, see these activities as evidence that China aspires to at least regional hegemony. These trends are in turn spurring "increasingly competitive military procurement" throughout the region, contributing to the first increase in global defense spending since 2009.[2]

1. International Institute for Strategic Studies, *The Military Balance: 2014* (London: Routledge, 2014), 209–210.

2. Robin Millard, "China's Military Rise Forcing Asian Defence Splurge," AFP, February 2014; David Lerman, "Global Defense Spending to Grow after Years of Decline," Bloomberg, February 3, 2014, http://www.bloomberg.com/news/print/2014-02-03/global-defense-spending.

China's longer-term plan for solving its energy problems lies within its own borders. Shale gas potentially gives China a previously unforeseen domestic option for improving its supply security. Given that China is home to the largest volume of technically recoverable shale gas resources in the world at 1,115 trillion cubic feet,[91] it hopes it can develop its unconventional resources to reduce its import dependence. Toward that end, since 2012 the

91. EIA, "Technically Recoverable Shale Oil and Shale Gas Resources."

Chinese government has unveiled a variety of measures to help promote the development of shale gas. The successful commercialization of unconventional gas resources is seen as a way to help facilitate fuel-switching away from coal and to minimize import dependence. However, China is at a very early stage in unlocking the shale resource potential and faces challenges stemming from a lack of adequate technology and technical expertise, necessary infrastructure, and market conditions.

THE SHALE GAS AND TIGHT OIL REVOLUTION HAS DAMPENED CHINA'S "UNITED STATES IN DECLINE" NARRATIVE.

As the United States has reoriented its focus to the Pacific, the shale gas and tight oil revolution has turned down the volume of the "United States is in decline" narrative that emerged after the economic recession of 2008.[92] In fact, the notion of "U.S. in decline" was closely correlated with the prevalent sentiment in China that it had ascended to be a "first-class global power" and that "China's development model of strong political leadership that effectively manages social and economic affairs" offered a viable alternative model for other developing countries that might not wish to closely emulate Western democracies.[93] The latter sentiment reflected Chinese pride in the country's ability to weather the 2008–2009 global financial crisis relatively unscathed, thanks to the effective implementation of a $500 billion stimulus package and a loosening of monetary policies to encourage bank lending. By delivering a range of macroeconomic benefits like GDP growth and job creation, the United States' new energy posture has challenged the view held by many Chinese elites that economic recession augured waning U.S. influence.[94] The "declining U.S." narrative was further contradicted by the prospect of U.S. shale gas and tight oil production eventually enabling exports to countries in Asia. As U.S. policymakers announced the "rebalance" to the region, China initially argued to its East Asian neighbors—with some justification—that the rebalance was unduly focused on military and security elements, which Beijing claimed unnecessarily stoked regional tensions. The prospect of U.S. shale gas exports to the region has helped to undermine that argument, adding a strategic dimension to the obvious economic benefits for Asian consumers.

Similarly, the presumption by most countries that nations with which the United States has free-trade agreements will be first in line for U.S. energy exports has given a boost to the prospects for concluding the Trans-Pacific Partnership (TPP) agreement. In fact, the renewed interest in TPP by key regional players—most notably Japan's recent

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92. While many Chinese thinkers adhered to the view that U.S. power had waned, they were not the primary authors of the argument. Instead, they pointed to multiple assessments, including those done by entities such as the United States' own National Intelligence Council, that the relative advantage in global power the United States had enjoyed was shrinking. National Intelligence Council, *Global Trends 2025: A Transformed World* (Washington, DC: GPO, November 2008), http://www.dni.gov/files/documents/Newsroom/Reports%20and%20Pubs/2025_Global_Trends_Final_Report.pdf.

93. Kenneth Lieberthal and Wang Jisi, *Addressing U.S.-China Strategic Distrust*, John L. Thornton China Center Monograph Series no. 4 (Washington, DC: Brookings Institution, March 2012), 9, http://www.brookings.edu/~/media/research/files/papers/2012/3/30%20us%20china%20lieberthal/0330_china_lieberthal.pdf.

94. Ibid.

inclusion—seems to have encouraged China to take a fresh look at the possibility of seeking entry into the negotiations.

Some Chinese strategists fear that declining U.S. dependence on Middle Eastern oil may give Washington both the opportunity and the incentive to use that freedom strategically in a possible future conflict with China (for instance, by creating a blockade restricting China's energy supplies). Such views are indicative of what some security/defense experts have termed a perceived "window of strategic vulnerability" between the present period of increasing energy independence enjoyed by the United States and some future point where China manages to equalize the situation by taking full advantage of its domestic unconventional energy resources to tame its own thirst for imported energy. One practical geostrategic consequence of this perception may be the further intensification of China's aforementioned crash naval modernization program and a greater sense of urgency to realize the more robust naval fleet's full potential.

The recalculations for China are of course not limited to those directly involving the United States. Some Chinese analysts have argued that the 2011 "triple disaster" in Japan that effectively crippled the country's nuclear industry provided China with a strategic opportunity to take advantage of its longtime rival's newfound weakness. Beijing's vigorous response to Tokyo's September 2012 nationalization of several islets in the Senkaku chain may reflect such thinking. Bolstered by the prospects of comparatively cheap U.S. energy supplies, however, Japan and others in the region may view themselves as in a better position to respond more forcefully to Chinese assertiveness.

THE SHALE GAS AND TIGHT OIL REVOLUTION OFFERS NEW POSSIBILITIES TO SHIFT THE ENERGY CONVERSATION BETWEEN THE UNITED STATES AND CHINA FROM ONE OF COMPETITION TO ONE OF COOPERATION.

In the recent past, Chinese international energy policy has been portrayed as anticompetitive and a possible threat to U.S. soft power influence. In the early 2000s China's state-owned oil companies became visibly active in pursuing energy assets around the world, investing in various oil ventures (e.g., upstream development, pipeline contracts, and refinery projects) in over 20 countries. China's overseas oil investment had been relatively small in terms of value and volumes when compared to overseas investments by large multinational oil companies. But the concern was largely that China's pursuit of global energy acquisitions, which relied heavily on public financing, was absorbing political risk that was prohibitive to private concerns and that these investments would "remove" energy resources from the competitive market.

In 2005 the U.S. Congress mandated a study on the geostrategic impact of China's overseas energy acquisition strategy. Some lawmakers were particularly concerned by China's energy overtures to countries with which the U.S. government had a sensitive relationship (e.g., Iran and Sudan) and what such relationships might mean for U.S. national security

interests.[95] There were also growing concerns about the possible military objectives of Chinese investments in the U.S. energy sector.

The changing U.S. energy profile has allowed some of these fears to dissipate. Although some continue to wonder about the extent to which the availability of below-market terms have aided Chinese national oil companies' successes at the expense of their privately owned competitors, closer bilateral energy ties are emerging as a result of the U.S. shale gas and tight oil revolution.

At the government-to-government level, cooperation between the two countries to promote greater and environmentally safe shale gas production has been a high priority, as exemplified by the United States-China Shale Gas Resource Initiative launched at the end of 2009.

In the commercial arena, the Chinese have invested heavily in the United States. Since 2008, U.S. shale gas plays have attracted over $133.7 billion in investment, including $26 billion from 21 joint ventures between U.S. and non-U.S. companies.[96] A list of Chinese investments in U.S. shale gas projects includes the $1.1 billion deal made by China National Offshore Oil Corporation (CNOOC) with Chesapeake Energy in October 2010, the $2.5 billion deal made by China Petroleum and Chemical Corporation (Sinopec) with Devon Energy in January 2012, Sinochem's $1.7 billion joint venture with Pioneer Natural Resources in May 2013, and Sinopec's $1.0 billion deal with Chesapeake Energy in July 2013.

The investment has been a two-way street. To U.S. oil and gas companies and oilfield service companies that wish to capitalize on their shale gas expertise, the Chinese shale gas sector presents significant commercial opportunities. For example, Chevron has been exploring for shale gas in Guizhou Province since early 2012, while ConocoPhillips, in partnership with Sinopec, is undertaking a joint study on unconventional oil and gas development, including resource surveys and test well drilling, in Sichuan Province. As for service companies, Baker Hughes is working with Honghua Group, China's largest oil-drilling equipment exporter, to assess shale gas prospects in China.

Despite ample evidence that increased investment and production from Chinese energy companies has added to the global balance of resources rather than subjugated them to Chinese strategic aims, the often opaque relationship between Chinese companies and their government stokes suspicion about deeper Chinese strategic motives. This suspicion extends to Chinese companies' involvement in investments in the U.S. energy sector. In 2012 a major Chinese company acquired a Canadian oil company with ownership positions in the U.S. Gulf of Mexico. As part of the U.S. government's review of the purchase, the Canadian company was forced to sell off the U.S. assets in order to realize the acquisition. This experience was deeply frustrating to the Chinese, bringing back memories of the

95. This congressionally mandated study is entitled "National Security Review of International Energy Requirements," also known as the Section 1837 of the Energy Policy Act of 2005.

96. EIA, "Foreign Investors Play Large Role in U.S. Shale Industry," April 8, 2013, http://www.eia.gov/todayinenergy/detail.cfm?id=10711&src=email.

debacle in 2005 when another Chinese company tried to purchase a California energy company and ultimately withdrew its bid due to the outcry from U.S. politicians.

How these promising, but still guarded, areas of greater energy cooperation between the United States and China will play out remains murky. The new U.S. energy posture and the resulting feeling of U.S. energy adequacy may help to quell elements of suspicion and a sense of competition vis-à-vis China. In the wake of the 2008 economic crisis, policymakers in both China and the United States also seem to have a deeper appreciation of the interdependent nature of their two economies and the need to find a way to help each other succeed for the good of global economic stability. This could include energy and climate change issues. The larger geopolitical thrust of the relationship suggests, however, that tension will remain and countervailing forces will both drive toward greater cooperation and bolster suspicion.

Consumer: Europe

If China's energy demand growth can be characterized as voracious, Europe's could be seen as anemic. Both, however, depend heavily on imports to meet their oil and natural gas needs. In 2009 the European Union (EU)[97] imported 11.2 billion barrels of oil and 14.5 trillion cubic feet of gas per day. These numbers have either remained constant or increased only slightly in the years since.[98] Russia is the primary source of these imports,[99] supplying 33 percent of all European Union crude oil, 25 percent of its natural gas, and 23 percent of its solid fuels in 2011.[100] Norway also supplies a substantial amount of gas to Europe, providing 29.4 percent in 2013.

European energy imports have remained elevated despite declines in demand first spurred by the 2008–2009 global recession. The situation was also exacerbated by Europe's sovereign debt crisis and falling domestic production, which declined almost 8 percent between 2008 and 2013.[101] For example, production from the North Sea, Europe's largest source of oil, is projected to fall by an average of 2.9 percent annually through the end of

97. Defined here as the 27 member states of the European Union (EU-27), excluding Croatia which joined on July 1, 2013, and is not represented in EU statistical information.

98. EIA, "International Energy Statistics: Imports of Crude Oil Including Lease Condensate," http://www.eia.gov/cfapps/ipdbproject/iedindex3.cfm?tid=5&pid=57&aid=3&cid=CG1,&syid=2009&eyid=2010&unit=TBPD; EIA, "International Energy Statistics: Imports of Dry Natural Gas," http://www.eia.gov/cfapps/ipdbproject/iedindex3.cfm?tid=3&pid=26&aid=3&cid=CG1,&syid=2009&eyid=2012&unit=BCF.

99. Eurostat, "Main Origin of Primary Energy Imports, EU-27, 2002–2010," http://epp.eurostat.ec.europa.eu/statistics_explained/index.php?title=File:Main_origin_of_primary_energy_imports,_EU-27,_2002-2010_(percent25_of_extra_EU-27_imports).png&filetimestamp=20121012131852.

100. European Commission, Eurostat, "Imports (by Country of Origin): Solid Fuels—Annual Data (nrg_122a)," "Imports (by Country of Origin): Oil—Annual Data (nrg_123a)," and "Imports (by Country of Origin): Gas—Annual Data (nrg_124a)," http://epp.eurostat.ec.europa.eu/portal/page/portal/energy/data/database.

101. IEA, "Recent Developments in EU Refining and Product Supply" (presentation, EU Refining Forum, April 12, 2013), http://ec.europa.eu/energy/observatory/oil/doc/refining/20130505_eu_refining_forum-halff-iea-20130412.pdf.

the decade. European natural gas production is only slightly better off, expected to decline by 2.6 percent per annum through 2020.[102]

As Europe's energy production continues its decline, the U.S. shale gas and tight oil revolution has largely exacerbated the continent's economic troubles. Europe's recession has morphed into a crisis of economic competitiveness, slow growth, and unemployment. Coupled with increasing dependence on foreign energy imports and diminishing indigenous energy production and refinery capacity, Europe finds itself in a precarious and increasingly vulnerable geostrategic position in a restive neighborhood.

THE SHALE GAS AND TIGHT OIL REVOLUTION HAS HELPED THE UNITED STATES TO REBOUND ECONOMICALLY IN WAYS THAT WIDEN THE GAP WITH EUROPE AND EXACERBATE COMPETITIVENESS CONCERNS.

At the same time that U.S. industry and consumers are benefiting from lower natural gas prices and an abundance of energy supplies, Europe continues to face high domestic energy costs that are already high due to particular climate change policies as well Europe's preferred energy mix. These higher costs are placing pressure on an already weak European economy that is struggling to recover, and the growing worry over falling competitiveness has become one of the dominant preoccupations in many European capitals.

Industrial end-user electricity prices per kilowatt hour in Europe are around double those in the United States, largely as a result of government policy and the economic downturn.[103] These high prices place pressure on industry, and several European companies operating in sectors that are especially energy-dependent (e.g., steel, cement, petrochemicals) are investing in projects in the United States.[104] According to one 2013 report, by 2020 the production of basic chemicals and plastics is projected to double in the United States, while declining by nearly one-third in western Europe.[105] Moreover, the report projects that by 2025 the United States will see nearly $100 billion invested in the chemical and plastics industry as a result of lower prices, in part enabled by shale gas and tight oil energy.[106] Britain's chemical industry offers one example of Europe's challenge. Chemical manufacturing relies on natural gas or much higher priced oil as an input to the feedstock from which chemicals are manufactured, which gives U.S. manufacturers with cheap access to shale gas and tight oil supplies a competitive advantage. Chemicals are Britain's second-largest export earner, and while the industry in Europe and the United States is currently at relative parity, the American Chemical Council predicts that by 2020 the U.S.

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102. EIA, "Oil and Natural Gas Import Reliance of Major Economies Projected to Change Rapidly," January 22, 2014, http://www.eia.gov/todayinenergy/detail.cfm?id=14691.

103. IEA, *World Energy Outlook 2013*, 273.

104. Sylvie Cornot-Gandolphe, *The Impact of the Development of Shale Gas in the United States on Europe's Petrochemical Industries* (Paris: Institut français des relations internationals, November 2013), 24.

105. IHS, *America's New Energy Future: The Unconventional Oil and Gas Revolution and the U.S. Economy—Volume 3: A Manufacturing Renaissance* (Englewood, CO: IHS, September 2013), http://www.ihs.com/info/ecc/a/americas-new-energy-future-report-vol-3.aspx.

106. Ibid.

industry will be 21 percent larger.[107] The most affected European industries are technologically strategic and important job providers, such as Germany's BASF. Germany is deeply impacted by this competitive squeeze and has responded by subsidizing its most energy-intensive firms. However, the EU is currently investigating German state aid policies in this regard.[108] In late February 2014 a commission of German experts advised the German government to scrap the subsidy law.[109]

With European demand for fuel dropping to a 19-year low as a result of Europe's prolonged economic crisis, high unemployment, and energy efficiency measures, profit margins for Europe's refineries have also dramatically diminished. European refineries are oriented primarily for diesel and gasoline fuel production, and must compete with newly constructed, state-of-the-art refineries in the Middle East, the United States, and Asia. The problem of plummeting profits will likely worsen as Europe's fuel demand, down almost 2 million barrels a day in 2013 from 2008 levels, continues to drop.[110] The EU is attempting to save refineries from additional closures with a plan to invest $30 billion in the industry throughout Europe by 2020. However, experts are already predicting that these plants will require an additional $21 billion just to stay in business, let alone generate returns.[111] Sixteen European refineries, or 1.7 million barrels per day of refining capacity, have already been mothballed since 2008, according to the International Energy Agency (IEA).[112]

Updates could help address some, but not all, of European refineries' relative inefficiency. The IEA estimates that energy inputs in EU refineries represent 60 percent of total refining costs, compared to just 20 percent for plants in the United States.[113] East Coast refineries in the United States have benefited from significantly lower energy operating costs from cheap shale gas, as well as from access to cheap tight oil feedstocks. As these U.S. refineries increase product exports, they will further undercut traditional European markets in West Africa and Latin America. The prospect of losing additional export markets has further exacerbated the troubles of European refineries.[114]

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107. Nidaa Bakhsh, "Shale Boom Shakes U.K.'s $33 Billion Chemicals Industry: Energy," Bloomberg, December 13, 2013, http://www.bloomberg.com/news/2013-12-13/shale-boom-shakes-u-k-s-32-billion-chemicals-industry-energy.html.

108. Vanessa Mock, "EU Opens Probe into Germany's Renewable Energy Subsidies," *Wall Street Journal*, December 18, 2013, http://online.wsj.com/article/BT-CO-20131218-702472.html.

109. Madeline Chambers, "Germany Must Scrap Its Green Energy Law, Say Experts," Reuters, February 26, 2014, http://uk.reuters.com/article/2014/02/26/germany-energy-idUKL6N0LV31I20140226.

110. Konstantin Rozhnov, "Europe to Shut 10 Refineries as Profits Tumble," Bloomberg, April 5, 2013, http://www.bloomberg.com/news/2013-04-04/europe-to-shut-10-refineries-as-profits-tumble.html.

111. European Commission (EC) Directorate-General for Energy, "Summary and Conclusions of the EU Refining Roundtable Held in Brussels on the 15th of May 2012," June 1, 2012, http://ec.europa.eu/energy/observatory/oil/doc/refining/20130505_summary_and_conclusions.pdf.

112. Ron Bousso and Dmitry Zhdannikov, "Competitors Have Europe's Oil Refineries Over a Barrel with Collapse in Demand," *The Independent* (Dublin), October 24, 2013, http://www.independent.ie/business/world/competitors-have-europes-oil-refineries-over-a-barrel-with-collapse-in-demand-29695458.html.

113. EC Directorate-General for Energy, "Summary and Conclusions of the First Meeting of the EU Refining Forum held on the 12th of April 2013," May 7, 2013, http://ec.europa.eu/energy/observatory/oil/doc/refining/20130505-conclusions_eu_refining_forum_120413.pdf.

114. Reuters, "European Refiners Squeezed in Africa by Rising U.S. Exports," July 22, 2013, http://www.reuters.com/article/2013/07/22/europe-refinery-idUSL6N0FP2OV20130722.

COUPLED WITH BROADER ENERGY PRICE CHALLENGES, THE SHALE GAS AND TIGHT OIL REVOLUTION HAS INCREASED PRESSURES ON EUROPE'S GREEN AGENDA.

As Europe's economic struggles persist, the growing tension between economic growth and environmental policy objectives is increasingly evident. Europe has been a global leader on climate change and the environment. In March 2007 the European Council adopted the "20-20-20 Agenda," an integrated energy and climate policy that, using 1990 as a baseline, set ambitious targets for reducing greenhouse gas emissions by 20 percent, lowering energy consumption by 20 percent, and raising the share of renewable energy in the European Union's energy mix to 20 percent by 2020.[115] As a follow-on to that agenda, in 2012 the European Union adopted the Energy Efficiency Directive, which established common measures for the promotion of energy efficiency to meet the agreed-upon targets.[116]

Historically the European Union has placed greater policy emphasis on the climate and environment than it has on industrial and competitive aspects when crafting energy policy. However, the tide appears to be turning. The recent climate and energy targets put forth in the European Union's 2030 Greenhouse Gas Regulations, seek to balance emissions reduction and renewables production targets with its economic realities. The new regulations maintain momentum on the path toward emissions reduction with a 40 percent mandatory reduction for individual member states by 2030. The plan also includes a renewables mandate of 27 percent, though unlike the 20-20-20 plan this is applied at a regional level, not as individual targets for member states.

Despite lofty European climate ambitions, there is a growing sense of frustration that European institutions are unable to find common solutions to address ongoing economic, energy, and environmental challenges. Although the European Union governs, coordinates, and de-conflicts European energy and climate change policies among its 28 members, EU member states do maintain some policy control over their national energy policies. As a result, many European countries are increasingly seeking national economic, climate, and energy policy solutions. For example, Germany decided in 2011 to replace the country's 17 nuclear power plants, which supplied 23 percent of its energy in 2010, with renewable energy sources (18.3 percent of total demand in 2010),[117] without consulting the European Union or other neighboring countries. The short-term impact of Germany's "Energiewende" has been a spike in domestic energy prices, which are projected to increase by 20 to 60 percent by 2020.[118] Over the medium term (through 2022), Germany is set to phase out all of its nuclear power plants due to domestic backlash following the Fukushima nuclear accident. The combination of high domestic energy prices, the phase-out of nuclear

115. Antony Froggatt et al., *The Nexus between Climate and Energy Policies in Europe* (London: Chatham House, April 2012), http://www.chathamhouse.org/sites/default/files/public/Research/Energy, percent20Environment percent20and percent20Development/0312summary.pdf.

116. European Commission, "Energy Efficiency," http://ec.europa.eu/energy/efficiency/eed/eed_en.htm.

117. "Crossing the 20 Percent Mark: Green Energy Use Jumps in Germany," *Spiegel Online International*, August 30, 2011, http://www.spiegel.de/international/crossing-the-20-percent-mark-green-energy-use-jumps-in-germany-a-783314.html.

118. "Don't Mention the Atom," *The Economist*, June 23, 2013, http://www.economist.com/node/21557363.

power, the closing of prohibitively expensive energy plants fueled by natural gas,[119] and high and costly renewable quotas has made Germany increasingly reliant on importing French nuclear energy and coal-fired energy plants that use cheaper U.S. coal exports as well as indigenous lignite.

Ironically, despite the political focus on reducing greenhouse gas emissions, Europe imports large volumes of coal from both Russia and the United States.[120] Coal prices have dropped rapidly as demand has fallen in China, due to stronger actions taken by the Chinese government to reduce coal consumption (and combat pollution) and in the United States, due to the cheap availability of shale gas. Lower coal prices have coincided with skyrocketing gas prices for Europe, making coal attractive to European consumers. On average, generating power in Europe is 45 percent cheaper with coal than with gas,[121] and European gas prices are nearly three times higher than in the United States. High European energy prices are exacerbated by national energy policies, such as Germany's expensive renewable energy subsidies. Such market distortions are generating unintended effects, like driving European companies to rely on cheaper coal for power generation in order to keep costs down, rather than using cleaner gas, and increasing greenhouse gas emissions.[122]

The tensions between European industrial competitiveness and its ambitious environmental and climate goals will continue to play out against the backdrop of anemic economic growth and high unemployment.[123] The U.S. hydrocarbon revival has left Europe increasingly isolated in its policy quest for a clean energy future and deeply concerned about the future of its energy-intensive industrial base.

SHIFTING ENERGY MARKETS DO LITTLE TO ALLEVIATE CONCERNS WITH UNPREDICTABLE SUPPLIERS IN RUSSIA, THE MIDDLE EAST, AND NORTH AFRICA.

Another major and long-standing preoccupation in European energy discussions is the continued reliance on energy imports. As markets work through the changes brought by the onset of shale gas, Europe sees no short-term relief from its dependence on Russian imports, which was a contentious issue even before the Ukrainian crisis erupted in March 2014. Some analysts project that Russia will continue to be the lead supplier of gas to the

119. Tino Andresen and Tara Patel, "Europe Gas Carnage Shown by EON Closing 3-Year-Old Plant," Bloomberg, March 12, 2013, http://www.bloomberg.com/news/2013-03-12/europe-gas-carnage-shown-by-eon-closing-3-year-old-plant-energy.html; Lars Paulsson et al., "Power-Profit Slide Threatens German Gas-Plant Closures," Bloomberg, March 8, 2012, http://www.bloomberg.com/news/2012-03-08/power-profit-collapse-threatens-german-gas-plant-closures-energy-markets.html.

120. Eurostat, "European Coal Consumption," May 2013, http://epp.eurostat.ec.europa.eu/statistics_explained/index.php/Coal_consumption_statistics.

121. "Norway Overtakes Russia as EU's Biggest Gas Supplier," EurActiv.com, June 25, 2013, http://www.euractiv.com /energy/norway-overtakes-russia-biggest-news-528854.

122. "The Unwelcome Renaissance: Europe's Energy Policy Delivers the Worst of All Possible Worlds," *The Economist*, January 5, 2013, http://www.economist.com/news/briefing/21569039-europes-energy-policy-delivers-worst-all-possible-worlds-unwelcome-renaissance.

123. Stanley Reed, Stephen Castle, and Melissa Eddy, "Sluggish Economy Prompts Europe to Reconsider Its Intentions on Climate Change," *New York Times*, January 16, 2014, http://www.nytimes.com/2014/01/17/business/energy-environment/sluggish-economy-prompts-europe-to-reconsider-climate-goals.html?_r=0.

European Union over the next decade, with a 30 percent share of Europe's gas market through 2023.[124] After two Russian gas supply shutdowns in 2006 and in 2009, Europe has sought to diversify its energy supply, with limited success. Moreover, climate-related ambitions, which produced legislation such as the proposed Fuel Quality Directive, may restrict new and diverse sources of conventional fuels from more stable suppliers, such as products derived from Canadian oil sands.

Given Europe's continued dependence on energy imports from Russia, southern and central Europe are concerned about two main things. The first is that Russia's internal political system will unravel (because of energy breakdowns or for other reasons), sparking unrest that could disrupt supplies. The second is that Russian leaders will continue to exercise a strong hand over energy exports, using them as a tool in support of their broader strategic goals rather than in concert with free-market principles.[125]

With widespread Russian ownership of European downstream production facilities and recent instability in Ukraine, Europe is vulnerable to future punitive energy and trade measures implemented by Moscow. The European Union has attempted to mitigate the monopolistic practices of the Russian state-owned company Gazprom in Europe. In 2007 the European Union passed its "Third Energy Package" to ensure equal access of all participants to energy infrastructure by separating the ability of a company, such as Gazprom, to own both the means of supply and distribution of the energy, which has led to artificial overpricing.[126] The European Union could potentially fine Gazprom 12 billion euros (as much as 10 percent of global annual sales)[127] and block acquisition of future downstream facilities.

Europe's greatest leverage over its Russian gas dependence may be its ability to adjust its long-term Russian gas contracts and price structure as well as potentially break Russian requirements that the price of oil and gas remain linked. Traditionally, Gazprom has sold gas to European companies under long-term contracts indexed to the price of oil. If these European utility companies do not purchase minimum volumes of oil and gas, they are required to pay a penalty under such contracts. Following the debt crisis and subsequent drop in gas demand, European utilities have challenged these requirements through arbitration. Subsequently, Gazprom has been forced to make concessions via steep discounts and indexing a proportion of its sales to spot prices. Last year Gazprom paid $3.2 billion in refunds to its European customers, and it could pay an additional $900 million this year.[128]

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124. Reuters, "Analysis: Little Chance of Europe Breaking Russia's Gas Dominance," July 18, 2013, http://in.reuters.com/article/2013/07/18/energy-gas-europe-idINL6N0FN2RA20130718.

125. Theresa Sabonis-Helf, "Russia's Evolving Energy Sector," in *New Realities: Energy Security in the 2010s and Implications for the U.S. Military*, ed. John R. Deni (Carlisle, PA: Strategic Studies Institute, January 2014), 4, http://www.strategicstudiesinstitute.army.mil/pubs/display.cfm?pubID=1194.

126. "Gazprom Wants Special Case for Its Pipelines from EU Energy Package," *Ria Novosti*, December 17, 2012, http://rt.com/business/gazprom-energy-package-exceptions-203/.

127. James Kanter, "Europe Threatens Gazprom with Antitrust Action," *New York Times*, October 4, 2013, http://www.nytimes.com/2013/10/04/business/international/europe-threatens-gazprom-with-antitrust-action.html.

128. Guy Chazan and Neil Buckley, "A Cap on Gazprom's Ambitions," *Financial Times*, June 5, 2013, http://www.ft.com/intl/cms/s/0/75027894-cd24-11e2-90e8-00144feab7de.html.

Europeans are also troubled by the state of Russia's energy sector writ large. The ability for Russia to sustain production and/or offset declines is important for Europe, even as Russia turns its focus elsewhere. That said, Russia needs some combination of revenues and investment to update its infrastructure, and thus will continue to need Europe, at least to some extent, as much as the reverse is true. However, the increased availability of supplies on the market has encouraged Europe in its efforts to seek more favorable prices and contracts from Russia.

Moscow also has actively worked to keep Europe from developing alternative energy sources and infrastructure by either proposing competing pipeline projects or offering European companies stakes in these projects, with some positive affect. Moscow is also attempting to dissuade European countries from exploring unconventional oil and gas, voicing concerns about the environmental degradation of hydro-fracturing techniques.[129] However, European Commission energy officials are attempting to keep "all options on the table" politically with regard to unconventional alternatives.

Time may be on Russia's side. Some believe it may take five years or more for Europe to assess its existing quantities of shale gas, an additional five years before infrastructure is in place to begin production, and several more years afterward before any significant quantities of gas are produced.[130] Such a timeline seems to suggest that large-scale development of unconventionals in Europe is quite a long way off.

A desire to diversify has led Europe to seek new supplier relationships, especially from North Africa and the Middle East. Although Europe does not rely as heavily on North Africa and the Middle East for its energy as it does on Russia, in 2011 the European Union imported a combined 20 percent of crude oil from Saudi Arabia, Nigeria, and Iran (though imports from Iran diminished once sanctions took effect),[131] and a combined 29 percent of its natural gas from Algeria, Qatar, and Nigeria.[132] Given ongoing instability in the Middle East and North Africa, these supply relationships are not without risk. In January 2013 European companies were victims of the hostage crisis at the Tigantourine gas facility in *In Amenas,* Algeria, and Royal Dutch Shell suffered an April 2013 attack on an oil well in Baylesa by the Nigerian militant group the Emancipation of the Niger Delta (MEND).[133] These risks are not solely to secure and stable energy supplies, but also to European citizens working for various multinational companies. For example, British-owned BP and Norwegian Statoil both pulled nonessential workers from the region following the In

129. Michael Ratner et al., *Europe's Energy Security: Options and Challenges to Natural Gas Supply Diversification* (Washington, DC: Congressional Research Service, July 11, 2013), http://www.fas.org/sgp/crs/row/R42405.pdf.

130. "Frack to the Future: Extracting Europe's Shale Gas and Oil Will Be a Slow and Difficult Business," *The Economist*, February 2, 2013, http://www.economist.com/news/business/21571171-extracting-europes-shale-gas-and-oil-will-be-slow-and-difficult-business-frack-future.

131. Eurostat.

132. Eurostat.

133. Daniel J. Graeber, "Nigeria Oil Production Slides amid Unrest," *Christian Science Monitor*, May 13, 2013, http://www.csmonitor.com/Environment/Energy-Voices/2013/0513/Nigeria-oil-production-slides-amid-unrest.

Trends in European Defense Capabilities

The 2008–2009 economic crisis put the European economy in the doldrums, leading capitals to slash budgets and embark upon a path of fiscal austerity. Defense spending has not been immune from these trends: cumulatively, the military budget of NATO members, for example, was almost 8 percent lower in 2012 than in 2008 when the crisis began.[1] These cuts came on top of previous reductions in European defense spending spurred by the end of the Cold War, generally sluggish economic performance, and diversion of funding to support aging populations.

As a result of these reductions, future European militaries will be smaller. They will also be proficient across a narrower range of capabilities. From a capacity perspective, the United Kingdom, for example, will not have aircraft carrier capabilities for the next 10 years. Challenges in individual countries are also evident in both NATO's and the European Union's defense efforts. Both organizations have struggled with pooling and sharing their scarce defense capabilities and enhancing their cooperation after extensive deployments in Afghanistan, Iraq, and elsewhere. There is also a lack of multinational procurement programs that would better leverage scarce resources. However, there are some signs of greater cooperation within the alliance, such as between the United Kingdom and France, and among the Nordic countries, but efforts remain short of what is truly needed.[2] Additionally, interoperability challenges and capability gaps persist, and Europe in general suffers from a lack of "enabling" forces that provide logistics, lift, and intelligence support.

At the 2014 Munich Security Conference, U.S. Secretary of State John Kerry and Secretary of Defense Chuck Hagel offered joint remarks on the future of the transatlantic relationship. They urged the European community and NATO to do more to develop collective security capacity, and Secretary Hagel specifically highlighted the need for increased burden sharing and better coordination between NATO members to ensure that investments are efficient and effective.[3] The ability of European allies and partners to move in this direction, however, is limited not only by budgets but by broader political differences.

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1. Sam Perlo-Freeman, Elisabeth Skons, Carina Solmirano, and Helen Wilandh, "Trends in World Military Expenditure, 2012," *SIPRI Fact Sheet*, April 2013, books.sipri.org/files/FS/SIPRIFS1304.pdf; "Financial and Economic Data Relating to NATO Defence: Defence expenditures of NATO countries (1990–2013)," NATO, February 24 2014, http://www.nato.int/cps/en/natolive/news_107359.htm.

2. Heather Conley and Maren Leed, "NATO in the Land of Pretend," CSIS, June 26, 2013, https://csis.org/publication/nato-land-pretend.

3. Charles Hagel and John Kerry, "Remarks at Munich Security Conference" (remarks, Bayerischer Hof Hotel, Munich, Germany, February 1, 2014).

Amenas attack.[134] These attacks reinforce European energy vulnerability to regional and global unrest. It also raises the question whether, as Europe becomes increasingly reliant on the Middle East, West Africa, and the Maghreb, if Europe will be compelled to become more militarily engaged in this region and if they will have sufficient political and military capabilities (see text box below) to successfully respond.

Europe's energy dependence also raises a series of complex geopolitical calculations. For example, Europe's supply of energy from the Middle East has been reduced by self-imposed and unilateral restrictions on imports of Iranian oil and gas. Europe has joined the United States in imposing a series of harsh economic sanctions against the Iranian regime, reducing the country's exports of crude oil by roughly 1 million barrels a day.[135] Could Europe seek to reverse their embargo on Iranian crude imports prematurely to mitigate their energy dependence and decrease their short-term energy costs?

Overall, while Europe benefits from more adequately supplied energy markets just like other consumers, several factors mute the positive economic and geopolitical impacts. Europe is actively seeking ways to reap advantages of this energy trend while maintaining the core tenets of its climate and environmental policies and ensuring economic competitiveness. Finding this balance amid broader economic challenges is proving elusive. Europe will seek to narrow its energy competitiveness gap with the United States and to increase its energy security from Russia and elsewhere by politically demanding that the U.S. export oil and gas to Europe through its negotiated free-trade agreement, the Transatlantic Trade and Investment Partnership (TTIP), or by privately and publicly encouraging the United States to harmonize its energy and climate policies to a more European approach. Today's U.S. shale gas and tight oil revolution offers little assistance and actually aggravates Europe's economic picture.

Consumer: Japan

For Japan, energy scarcity has always been an Achilles heel; the country meets only 15 percent of its own total primary energy needs with domestic sources.[136] The virtual lack of indigenous fossil fuel resources propelled nuclear energy to become a centerpiece of Japan's energy security strategy. By the beginning of the 2010s, the nation's 54 operating nuclear reactors were meeting roughly one-third of its electricity demand, and the government aspired to use nuclear power to meet roughly half of total domestic power generation by 2030. The 2011 accident at the Fukushima plant, however, dashed those hopes. Japanese leaders have since focused on developing a new approach, which of necessity considers the

134. Jon Mainwaring, "Amenas Hostage Crisis: Oil Workers 'Killed' in Algeria Air Strikes," Rigzone, January 17, 2013, https://www.rigzone.com/news/oil_gas/a/123516/Amenas_Hostage_Crisis_Oil_Workers_Killed_in_Algeria_Air_Strikes.

135. EIA, "Sanctions Reduced Iran's Oil Exports and Revenues in 2012," April 26, 2013, http://www.eia.gov/todayinenergy/detail.cfm?id=11011.

136. EIA, "Japan: Country Analysis Brief," http://www.eia.gov/countries/cab.cfm?fips=JA.

future path that unconventional oil and gas might take, in addition to the need to alter the energy mix.

Japan has been the world's largest importer of LNG (for some time), second largest importer of coal, and third largest net importer of oil.[137] But Fukushima induced energy supply constraints that drove the country towards greater use of fossil fuels in power generation, especially natural gas. Nearly a third of Japan's LNG imports come from Southeast Asia, though in the last two years Qatar has surpassed traditional suppliers Malaysia and Indonesia to become Japan's second largest supplier.[138] On the other hand, most of Japan's oil imports (83 percent of crude imports in 2012) come from the Middle East.[139] Like many others, Japan is also seeking greater geographic diversity of its imports and has been striving to secure more imports from Russia, Southeast Asia, and more recently West Africa.

BETTER-SUPPLIED MARKETS FED BY U.S. SHALE GAS AND TIGHT OIL PRODUCTION HELPED AFTER FUKUSHIMA BUT MAY NOT OFFER LONG-TERM PRICE RELIEF.

Although Japan is one of the leading global economies, it is only beginning to emerge from two decades of virtually zero economic growth. A combination of economic malaise and population decline has moderated Japanese energy consumption for some time. Even so, the loss of nuclear power sent Japanese companies rushing to secure additional LNG supplies, even as government officials continue to strive to regain the public support necessary to restart at least some nuclear power plants. Post-Fukushima, Japan's LNG demand increased 24 percent between 2010 and 2012. The 4.3 trillion cubic feet Japan imported in 2012 represented 37 percent of the global volume of LNG demand that year.[140] Meeting this surge in demand dealt a major blow to Japan's national treasury: Japan paid $67.7 billion for LNG in 2012, about double the amount spent in 2010. Not surprisingly, Japan ran a large trade deficit of $78 billion that year—170 percent higher than in 2011. Continued nuclear outage and LNG import reliance further raised Japan's annual trade gap to $112 billion—a 40 percent increase year-on-year, and the highest in its history.[141]

Consequently, the Japanese have begun seeking cheaper LNG sources around the world, assessing the potential for LNG and pipeline gas projects from Russia, natural gas in East Africa, and LNG projects in Australia and North America. In light of high oil prices, U.S. LNG exports based on the Henry Hub (i.e., not linked to global oil indexes) appeal to Japanese importers, who are long accustomed to oil-indexed LNG contracts. Current price differentials between the U.S. and Japanese gas markets—about $4 to $5 per million per British thermal unit in the United States and $15 to $17 per million British thermal unit in Japan—make U.S. LNG imports viable even after costs are added for liquefaction and shipping.

137. Ibid.
138. Ibid.
139. Ibid.
140. Ibid.
141. "Japan's 2013 LNG Imports Hit Record High—MOF," Reuters, January 27, 2014, http://uk.reuters.com/article/2014/01/27/energy-japan-mof-idUKT9N0GJ03120140127.

Efforts to secure access to competitively priced natural gas supplies in the United States and bring them to the Japanese market have led many major Japanese companies to invest in upstream shale projects as well as LNG export projects in the United States.[142] The total volume of U.S. LNG contracted by the Japanese through 2013—if materialized—would amount to be about 17 percent of the Japanese imports in 2012.

Nevertheless, the Japanese view the U.S. shale gas revolution as a key way to advance their own supply security by diversifying both their sources of supply and the associated transportation routes. Its heavy reliance on the Middle East for both oil and LNG imports means these supplies are part of the 40 percent of global oil and 15 percent of global LNG that travel through physical chokepoints like the Strait of Hormuz.[143] In contrast, U.S. LNG supplies—much of which would be loaded in tankers in the Gulf of Mexico—would presumably travel through the open sea after transiting through the Panama Canal, thus avoiding potential conflict areas such as the East and South China Seas. The diversification of suppliers and supply routes would thus help minimize the potential impact in the event that traditional energy transit routes incurred supply disruptions.

While U.S. LNG is an attractive opportunity for Japan in the short term, it is far from sure that it would retain its cost advantage over time. As a series of export projects come to fruition later this decade, Henry Hub price levels will come under upward pressure to reflect the rising level of demand (despite continued projections of rising supply).[144] Consequently, the gap between the Henry Hub price and delivered prices of LNG supplies from non-U.S. sources may narrow to the point where the price differential no longer offsets the costs of liquefaction and transportation from the United States.

THE SHALE GAS AND TIGHT OIL REVOLUTION IS ANOTHER COMPLICATING FACTOR IN INTRA-ASIAN DYNAMICS.

While Japanese may see some significant energy and economic opportunities associated with importing U.S. LNG supplies, they are also concerned about the perceived potential for the U.S. shale gas and tight oil revolution to affect American national security interests. Japan's dependence on the Middle East gives it a vested interest in the stability of that region, so Japan shares others' concerns about how the U.S. tight oil boom might affect the U.S. role going forward. Just as concerning is the possibility that U.S. tight oil production could weaken the revenue-earning power of the Persian Gulf energy exporters, which might impact their ability to remain reliable energy exporters to Japan.

A corollary to this shifting dynamic between the United States and the Middle East is a growing concern among Japanese opinion leaders that a decreased U.S. presence might be

142. Examples include the Freeport project, the Cove Point project, and the Cameron project.

143. IEA, *World Energy Outlook 2012* (Paris: IEA, 2012), 80, http://www.worldenergyoutlook.org/publications/weo-2012/.

144. As suggested by several studies on the economic impacts of LNG exports on the U.S. economy, including W. David Montgomery et al., *Macroeconomic Impacts of LNG Exports from the United States* (Washington, DC: NERA Economic Consulting, December 2012), http://www.fossil.energy.gov/programs/gasregulation/reports/nera_lng_report.pdf.

Southeast Asian Concerns over the South China Sea

- Maritime and territorial disputes in the South China Sea involve six countries—Brunei, China, Malaysia, the Philippines, Taiwan, and Vietnam.
- China's claim in the South China Sea is the most extensive and overlaps with those of the other claimants.
- Competition over natural resources such as fisheries, oil, and gas has been the immediate cause of clashes in this area.
- Beijing has advocated joint development of natural resources and shelving the maritime and territorial disputes. However, the other countries are reluctant to offer such joint development.
- Tensions have been high between China and its neighbors in recent years over the freedom of navigation in this water, including a series of clashes between Vietnamese exploration craft and Chinese patrol boats in 2011, and most recently the Chinese demand that foreign fishing fleets obtain Chinese approval to operate in the disputed part of the South China Sea (per regulation enacted on January 1, 2014) and protests by Manila and Hanoi.
- The South China Sea will likely remain important, given projected continued energy trade flow through the water; today, almost a third of global crude oil and over half of global LNG trade passes through the South China Sea.
- Per the EIA, there are approximately 11 billion barrels of oil reserves and 190 trillion cubic feet of natural gas reserves in the South China Sea, where most current discovered fields cluster in uncontested parts of the sea and are close to the shorelines of the coastal countries.
- Countries with hydrocarbon production activities in the South China Sea are Brunei, China, Indonesia, Malaysia, the Philippines, Thailand, and Vietnam.
- The stability in the South China Sea should be a common interest among energy importers in the region. Southeast Asian energy producer countries with relatively low influence in the global energy market may turn more closely to South China Sea resources under tighter market conditions.

filled or supplemented by China. Japan is wary of the potential for greater U.S.-Chinese cooperation on the protection of sea lanes, for example. Japanese leaders have reservations about the potential for a growing Chinese presence in the Middle East to override existing patterns of energy commerce and maritime security norms in the region, to Japan's detriment. Moreover, Japan and several other countries in Asia (e.g., the Philippines and Vietnam) are wary that China's growing diplomatic presence on the international stage could

further galvanize the country's geopolitical ambitions within Asia, to include territorial conflicts in the East and South China Seas.

Rising rhetoric around U.S. "energy independence" and the implied U.S. isolationist sentiment it entails may feed Japan's anxieties about a growing Chinese regional and global presence. In its ongoing efforts to secure energy supplies, Japan has put a premium on a commercial gas deal with Russia, though there is a high degree of skepticism that Russia can deliver a fair deal. The potential for stronger U.S.-Japanese energy ties could provide both security and leverage for the Japanese as they pursue negotiations with Russia. Russia, whose LNG supply currently accounts for about 10 percent of Japanese imports, is the most, if not only, viable candidate for supplying pipeline gas to Japan. Russia's desire to enhance its Asian market share, coupled with growing Japanese demand, offers the potential for a confluence of interests. Several gas export proposals—both new and old—are currently on the table for negotiation. Some Japanese political elites have even wondered whether Japan's energy buying power could be leveraged to bring about a resolution of disputes with Russia over the ownership of the Northern Territories. But others have cautioned that a heavier reliance on Russian energy may make Japan vulnerable to the vagaries of Russian energy politics. Also, Russian diplomacy over the construction of the ESPO crude oil pipeline is still fresh in the minds of Japanese energy policymakers.[145] In the eyes of some opinion leaders in both Japan and China, Moscow essentially exploited historical tensions between Tokyo and Beijing to yield better financing terms and to advance its economic objectives. The injection of the U.S. shale gas and tight oil revolution into these dynamics may help defuse the geopolitical undertones in Japan-Russia energy relations. It may also curtail temptations for those within Russia who may be inclined to use its energy resource wealth as a tool to advance its geopolitical and security objectives vis-à-vis Japan. On the other hand, Japan may ultimately determine that reliable supply, free from potential political manipulation, is worth more than money, and may choose to rely more heavily on U.S. imports, even if the price rises, rather than risk exposure to Russian uncertainties.

In Japan's more immediate neighborhood, looming anxieties over future economic competitiveness in light of power-supply uncertainty heightens Japan's sense of economic rivalry with South Korea. South Korea is striving to meet its energy needs through a continued build-out of nuclear power plants and growing energy imports, including from the United States. Unlike most other major LNG consumer countries around the world, South Korea already has a free-trade agreement with the United States, making it eligible to receive LNG exports. The Korean Gas Corporation (KOGAS), a state-owned company and

145. Phase one of the ESPO pipeline with an overall length of 2,694 kilometers came online in December 2009 to pump oil from Taishet in the Irkutsk region to Skovorodino near the China-Russia border. The second phase of ESPO, an oil pipeline from Skovorodino to Kozmino, has a length of more than 2,000 kilometers. Moscow's failed attempt to play Beijing off against Tokyo to enhance Russia's geopolitical position in Northeast Asia fueled the aggravation and mutual distrust between these two big consuming countries. Shoichi Itoh, *Russia Looks East: Energy Markets and Geopolitics in Northeast Asia* (Washington, DC: CSIS, July 2011), https://csis.org/files/publication/110721_Itoh_RussiaLooksEast_Web.pdf; ITAR-TASS, "Putin: East Siberia–Pacific Ocean Pipeline's Second Phase Commissioned," *Downstream Today*, December 25, 2012, http://www.downstreamtoday.com/news/article.aspx?a_id=38081&AspxAutoDetectCookieSupport=1.

South Korea's sole LNG wholesaler, is involved in the Sabine Pass LNG project in Louisiana. It is likely that Japan's investments in U.S. projects are at least partially intended to help ensure that Japan can secure some portion of future exports and stave off a significant loss of economic ground to its neighbor to the west.

The brief review above is by no means comprehensive, but it offers some sense of the range of impacts, concerns, and opportunities that have arisen out of the U.S. shale gas and tight oil revolution, and how the changes it has wrought relate to other facets of the complex web of interrelationships that knit the world together. Major producers have had to take stock of the implications of a new source of supply, those seeking to reenter global energy markets are faced with greater urgency to increase production, wholly new opportunities have arisen for potential suppliers, and major consumers have sought to untangle options for new sources of supply. Relationships are being recast, with one eye toward an admittedly uncertain future, as it is by no means yet clear how the global map might ultimately be redrawn. All of this has influenced the contours within which the United States seeks to protect and advance its national security interests, as explored more deeply in Chapter 3.

3 The Shale Gas and Tight Oil Revolution and U.S. National Security

As described in Chapters 1 and 2, even in its early stages the shale gas and tight oil phenomenon is already beginning to have direct impacts on energy markets, which in turn have influenced how countries around the globe conceive of themselves and their interests going forward. These shifts in turn affect the geopolitical environment within which the United States, as the preeminent global leader, seeks to advance its security interests. The link between energy and national security is multifaceted and complex, so the recognition of direct threats is frequently in the eye of the beholder. In other circumstances, however, the connection is clearer. For example, the inability to secure affordable, reliable, energy supplies puts a strain on the economy that can, over time, erode national wealth and the ability of country to organize itself for national security purposes (this is the theory behind the current sanctions regime against Iran). In more acute circumstances, an abrupt disruption of energy supplies or conflict over the provision of strategic energy resources can be used as a precursor to or strategic target in a national security conflict (examples include the Arab oil embargoes of the 1970s, Iraq's invasion of Kuwait, and north and south Sudan's civil war over control of energy resources). These are some of the most obvious examples of connections between energy and national security, but more often the relationship is opaque.

This is currently the case with respect to understanding the specific implications of the shale gas and tight oil revolution for U.S. national security. In general terms, there are two broad areas where it has raised questions at home and abroad: those relating to changed perceptions and those relating to changed realties. Perceptions—of U.S. national interests, of steps the United States might take to advance those interests, and of the relative power that might influence success in those pursuits—create the backdrop against which actions or behaviors, realities, are interpreted. In the complex realm of international relations, leaders constantly try to interpret and foresee others' actions, and to shape perceptions (in part through actions) to align with desired outcomes. The challenge of favorably shaping the security environment is greatest when perceptions and realities—including civil or economic order, control over territory, state monopoly on the application of violence, or the ability to sustain public support for any action aimed beyond a national border—are

Enduring U.S. National Security Interests:

1) The survival of the nation;
2) The prevention of catastrophic attacks against U.S. territory;
3) The security of the global economic system;
4) The security, confidence, and reliability of our allies;
5) The protection of American citizens abroad; and
6) The preservation and extension of universal values.

Chairman of the Joint Chiefs of Staff General Martin Dempsey – 2014 Quadrennial Defense Review

misaligned. These realities are in part informed or influenced by perceptions, but they can also change of their own accord, raising challenges to governments or directly to the safety and security of U.S. citizens.

Because the shale gas and tight oil revolution is both relatively new and thus far geographically limited, the national security "implications" to date have been both limited in scope and largely focused in the area of altering perception. Ironically, the growth of shale gas and tight oil in the United States has raised questions about the United States' future international role, both as guarantor of the "global commons" and as an external stabilizing actor in multiple regions. Economically, thus far shale gas and tight oil have done little to alleviate strains on some of America's traditional national security partners, most notably in Europe and Asia, and in some cases (e.g., European refining and manufacturing) are viewed as threatening those nations' competitive viability. On net, therefore, it is difficult to point to very many instances in which the shale gas and tight oil revolution has had a specific impact on U.S. national security interests. The potential for significant future implications, however, is obvious, though again heavily dependent on which path unconventionals might follow. This section explores the impact of shale gas and tight oil on national security to date.

Perceptions

Have shale gas and tight oil changed perceptions about U.S. national security interests, and/or how the United States might behave in accordance with those interests? Broadly construed, the ability of the United States to advance its national security interests is a function of its economic, diplomatic, and military strength. As noted earlier,

economically the United States' near-monopoly in shale gas and tight oil production thus far has meant that the largest benefits have accrued to the United States, largely reflected in jobs and economic growth, reshoring domestic industries, improving trade balances, and attracting new investment.[1] At the same time, better-supplied energy markets are broadly beneficial to all who purchase in that market and have helped forestall price spikes that might otherwise have resulted from ongoing geopolitical instability in places like Libya, Iran, Nigeria, Syria, Yemen, and Iraq. The perceived impacts of shale gas and tight oil have, however, fed into several U.S. national security streams of thought and debate.

EXAMPLES OF A GREATER ABILITY FOR THE UNITED STATES TO EXERCISE GLOBAL LEADERSHIP DUE TO THE SHALE GAS AND TIGHT OIL REVOLUTION ARE LIMITED.

Thus far, shale gas and tight oil resources appear to have offered the United States some additional room to maneuver on national security issues. That perception is consistent with the broadly accepted proposition that economic power contributes to the U.S. ability to influence world events in its interests, enhancing America's ability to shepherd international consensus on common security concerns.

An obvious example of this is the recent Iran sanctions: American officials and others argue that better-supplied oil markets, in part a function of tight oil production, contributed to the United States' ability to shape and maintain an international consensus on sanctions against the Iranian government.[2] It should be noted, however, that without significant increases by Saudi Arabia coupled with slow growth in global demand, U.S. increases alone would have been insufficient to keep prices where they are, especially given the growth in global disruptions.

While the United States will always maintain the prerogative to take national security actions unilaterally, there is an increasingly bipartisan recognition that some manifestation of international legitimacy—whether conferred by the United Nations, a formal alliance, or merely a number of different capitals—is an implicit necessity in almost any future military action. As the Iran case illustrates, in principle U.S. economic strength contributes to the ability of the United States to serve as a global catalyst and leader in

1. For example, shale gas and tight oil have lowered domestic prices for both direct and indirect energy products, though estimates vary. See Brad Plumer, "Wonkblog: Here's How the Shale Gas Boom Is Saving Americans Money," *Washington Post.com*, December 18, 2013, http://www.washingtonpost.com/blogs/wonkblog/wp/2013/12/18/the-shale-gas-boom-is-saving-americans-money-but-how-much/. Shale development has also fostered billions in additional investment in the United States in both energy and energy-intensive industries. Ajay Makan and Neil Hume, "Shale Gas Boom to Fuel U.S. Lead over Europe and Asia for Decades," *FT.com*, November 12, 2013, http://www.ft.com/intl/cms/s/0/287fbf4e-4b9c-11e3-a02f-00144feabdc0.html#axzz2pGZ6ih2o.

2. Tom Donilon, "Energy and American Power: Farewell to Declinism," *Foreign Affairs*, June 15, 2013, http://www.foreignaffairs.com/articles/139509/tom-donilon/energy-and-american-power.

addressing shared security challenges. While economic power is not the only determinant of America's ability to shape international consensus, many argue that it plays a key role.[3]

One other instance in which shale gas and tight oil appear to have enhanced U.S. leadership opportunities is with respect to the U.S. "rebalance" toward Asia. The effects can be difficult to isolate, but it is likely that shale gas and tight oil and the greater U.S. economic strength they portend (not to mention the possibility for exports of natural gas and possibly oil) have contributed to the United States' ability to draw Asian nations into the trade negotiations for the TPP.[4] The TPP is a major component of America's broader strategy to shape a peaceful evolution within the Asia-Pacific region, especially in light of the regional discomfort over China's military modernization programs. As the primary U.S. national security priority, such effects are significant. But the shale gas and tight oil revolution has had minimal impacts on many of the other thorny challenges in the region, including an erratic, unpredictable, and nuclear North Korea and the overall tension between China and its neighbors over territorial issues.

Yet these examples, important as they are, must be balanced against the scant evidence of enhanced U.S. leverage elsewhere in the world. In the past few years, major international concerns have been raised over violence in Syria, Libya, Mali, South Sudan, and the Central African Republic, among others. The United States has been involved diplomatically and in some cases militarily in each, but in general, other nations' involvement in addressing each case was principally based on their own national interests, with little discernible additional influence afforded to the United States because of its increased production of shale gas and tight oil.

Even tight markets and high prices did not deter the United States from invading Iraq twice or imposing decades-long sanctions on major oil producers, including Iran, Iraq, and Libya. In 1979 those three OPEC nations produced in aggregate over 13.5 mmb/d of oil. Today the volume is less than half that.

THE SHALE GAS AND TIGHT OIL REVOLUTION HAS RAISED QUESTIONS AROUND THE WORLD ABOUT U.S. WILLINGNESS TO EXERCISE GLOBAL LEADERSHIP.

If the shale gas and tight oil revolution has, at least in some instances, enhanced the United States' ability to lead internationally, it has at the same time created questions about whether the United States will continue to *want* to assume as much of a leadership role. This concern has manifested itself most frequently with respect to U.S. intentions in two key areas: ensuring the free flow of global trade, particularly by sea, and acting as the

3. The Defense Department's latest policy document, for example, states that "the U.S. economy . . . remains the foundation of U.S. power." U.S. Department of Defense (DoD), *Quadrennial Defense Review 2014* (Washington, DC: DoD: March 2014), 9, http://www.defense.gov/pubs/2014_Quadrennial_Defense_Review.pdf.

4. Mark Drajem and Edward Klump, "Japan's Bid to Enter Trade Talks Opens Route for U.S. LNG," Bloomberg, March 13, 2013, http://www.bloomberg.com/news/2013-03-17/japan-s-bid-to-enter-trade-talks-opens-route-for-u-s-lng.html.

guarantor of stability in the Middle East in particular (but also elsewhere around the globe). As one unnamed State Department official put it in an article in the fall of 2013, "The question I get asked the most when I'm in China is, 'Is the United States still going to be engaged in trying to maintain peace and stability in the Middle East, and in maintaining sea lanes?'"[5]

Sea Lanes of Communication (SLOCs)

One of the most widely feared forms of economic disruption relates to the maritime trade that travels along SLOCs.[6] Since the end of the Cold War and the demise of the only other naval power capable of operating outside of its own region, the United States has served as the global guarantor of open SLOCs. This assurance has underpinned maritime trade in general, including the flow of energy products.

The shale gas and tight oil revolution has spurred a debate about whether the United States, increasingly less dependent on sea-based energy imports, will continue to play such a prominent role in SLOC protection going forward.[7] Reactions have gone beyond the purely rhetorical, as evidenced by the Chinese navy's rationale for its major maritime modernization efforts. They are necessary, Chinese navy leaders argue, in part to address a declining U.S. interest in sea lane protection and a growing one for China.[8] The same holds true in India, raising the potential for greater Chinese-Indian competition, and further complicating the intra-Asian dynamic. Whether this is merely a convenient justification for actions that both nations might wish to take anyway is unknown, but fears of either a shrinking or ineffective U.S. security umbrella is feeding calls for greater self-reliance in capitals across the globe.

Although the specific shifts in trade routes that may result from shale gas and tight oil in the future are uncertain, the current geographic choke points that offer opportunities for disruption will remain critical. The U.S. government broadly has appreciated this fear and has taken increasingly active steps to reassure the international community that the

5. Warren Stroebel, "Awash in Oil, U.S. Reshapes Middle East Role," Reuters, October 19, 2013, http://www.dailystar.com.lb/Business/Middle-East/2013/Oct-19/235029-awash-in-oil-us-reshapes-middle-east-role.ashx#axzz2obKqBSN6.

6. The issue here is not just that of protecting ships once they are at sea, but also the ability for state actors (primarily) to disrupt sea trade by, for example, closing the Strait of Hormuz or (as some Chinese fear) creating a blockade to prevent energy supply deliveries. U.S. efforts to ensure open SLOCs are evident not only in the leading role the United States has played in building ongoing international coalitions to counter piracy in the Gulf of Aden, the Arabian Sea, the Indian Ocean, and the Red Sea, but in events like the reflagging of the Kuwaiti tanker ships in 1987–1988 during the Iran-Iraq War.

7. See, for example, Tim Johnson, "Rising 'Saudi America' Will Alter Globe, Prolong U.S. Superpower Role," *McClatchydc.com*, November 28, 2013, http://www.mcclatchydc.com/2013/11/28/209033/rise-of-saudi-america-will-alter.html.

8. Updated ships are just one aspect of China's efforts to enhance its ability to ensure open sea lanes. For years Beijing has been investing in commercial and military port facilities known as the "string of pearls," which run along the sea lanes through the South China Sea and Indian Ocean.

free movement of goods remains a core national interest.[9] That said, commentators and experts continue to suggest that the shale gas and tight oil revolution might (or should) weaken the U.S. imperative to follow through on those words in the event of a conflict or disruption.[10]

U.S. Interest in Global Stability

The most obvious and oft-cited national security implication of the shale gas and tight oil revolution is the rising perception that the United States, in part because of the shale gas and tight oil revolution, is, and will increasingly become less interested in the Middle East and North Africa (MENA).[11] Those who hold this view point to an array of indicators that include a decreased U.S. reliance on foreign energy supplies, but also the U.S. departure from Iraq and drawdown in Afghanistan. Some may also reference the U.S. strategic decision to "pivot" or "rebalance" toward Asia. Despite repeated American assurances to the contrary, including President Obama's October 2013 speech to the United Nations,[12] commentators both at home and abroad continue to question the relevance of the Middle East to the United States, whether the United States will act in accordance with its stated continued importance, or both.[13] Indeed, the sheer volume of statements from administration officials and other U.S. leaders about the relevance of the Middle East are an implicit acknowledgment that these questions persist, both at home and abroad.

"Evidence" of either continued U.S. commitment or the lack thereof is cited by both sides in this debate. On the one hand, DoD maintains multiple command headquarters in

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9. See, for example, the Defense Department's latest strategy document, which states that U.S. economic strength is tied to international stability, which is "underwritten by the U.S. military's role and that of our allies and partners in ensuring freedom of access and the free flow of commerce globally." DoD, *Quadrennial Defense Review 2014*. President Obama's introduction to the 2012 Defense Strategic Guidance, which cites U.S. core interests as including "the prosperity that flows from an open and free economic system," as well as the U.S. Navy's 2007 strategy, which states that "credible combat power will be continuously postured in the Western Pacific and the Arabian Gulf/Indian Ocean to protect our vital interests, assure our friends and allies of our continuing commitment to regional security, and deter and dissuade potential adversaries and peer competitors." DoD, *Sustaining U.S. Global Leadership: Priorities for 21st Century Defense* (Washington, DC: DoD, January 2012), http://www.defense.gov/news/defense_strategic_guidance.pdf; and U.S. Department of the Navy, *A Cooperative Strategy for 21st Century Seapower* (Washington, DC: Department of the Navy, October 2007), http://www.navy.mil/maritime/maritimestrategy.pdf.

10. See, for example, AmericanEnergyIndependence.com, http://www.americanenergyindependence.com/security.aspx; and Frank Gaffney and Jerry Taylor, "Does America Need Energy Independence?," Fox Business, May 24, 2013, http://video.foxbusiness.com/v/2405948204001/does-america-need-energy-independence/#sp=show-clips.

11. For example, Middle East analyst Daniel Pipes blogged that the United States' improved energy position means "Washington will be largely freed from having to kow-tow to the oil and gas pashas" in the region. Daniel Pipes, "Symposium: The Geopolitics of U.S. Energy Independence," *International Economy* (Summer 2012), http://www.danielpipes.org/13380/symposium-the-geopolitics-of-us-energy.

12. Barack Obama (address to the UN General Assembly, New York, September 24, 2013), http://www.washingtonpost.com/politics/transcript-president-obamas-speech-at-the-un-general-assembly/2013/09/24/64d5b386-2522-11e3-ad0d-b7c8d2a594b9_story.html.

13. Some point to what they perceived as a lack of a strong U.S. response to unrest associated with the Arab Spring as proof of decreased U.S. commitment. Others argue that greater insulation from price shocks associated with fighting in Libya, for example, decreased domestic pressure on U.S. officials to directly intervene.

the Middle East, and (perhaps to help highlight this point) recently made public the location of the air operations center in Qatar.[14] Administration officials point to record amounts of U.S. arms sales to the region, and Defense Secretary Hagel recently announced new steps aimed at strengthening the U.S. relationship with the GCC.[15] Those who argue that U.S. rhetoric is hollow, on the other hand, point to the unwillingness of the Obama administration to get directly involved in Syria, despite its strong statements about the need for a resolution to the conflict, or to Washington's slow and limited reaction to the deteriorating security situation in Iraq.[16] As one observer recently wrote, Arab audiences are paying less attention to reassurances from various cabinet officials, and are "instead, taking [their] cue from President Obama, who has made no secret of his desire to untangle America from the Middle East's antagonisms."[17]

The question of U.S. commitment is also occasionally paired with speculations about whether others might seek to fill a perceived security void should the United States in fact become less involved. China and Russia are the two states most frequently raised in this context, though it is widely acknowledged that no other nation has the capability or capacity to play an equivalent security role.[18] In sum, it is clear that the shale gas and tight oil revolution has created perceptions that the United States might be less willing to take national security actions, specifically in the areas of protecting sea lanes and in stabilizing the Middle East, even though its economic hand has been strengthened. The principal implications of these perceptions for U.S. national security to date have been increased pressure from international partners on the United States to maintain high levels of diplomatic and military engagement in MENA,[19] and to protect U.S. naval investments to the greatest extent possible as the defense budget falls. Both have been challenging, given ongoing U.S. force reductions and a desire to increase the proportion of military and diplomatic activities in the Pacific as part of the rebalancing strategy.

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14. Thom Shanker, "Hagel Lifts Veil on Major Military Center in Qatar," *New York Times*, December 12, 2013, http://www.nytimes.com/2013/12/12/world/middleeast/hagel-lifts-veil-on-major-military-center-in-qatar.html?_r=0.

15. Karen Parrish, "Hagel Outlines U.S. Posture, Way Ahead in the Middle East," Department of Defense Daily Digest Bulletin, December 7, 2013. These same steps, widely seen as aimed at placating Saudi officials, ran afoul of intra-GCC dynamics. The U.S. announcement was shortly followed by threats from Oman, wary of an enhanced Saudi role, to leave the GCC if measures to extend cooperation go forward.

16. See, for example, Delovan Barwari, "Obama Ought to Reconsider His Middle East Policy," *Huffington Post*, January 2, 2014, http://www.huffingtonpost.com/delovan-barwari/obama-ought-to-reconsider_b_4528983.html.

17. Vali Nasr, "America Must Assuage Saudi Anxiety," *New York Times*, February 5, 2014, http://www.nytimes.com/2014/02/06/opinion/nasr-america-must-assuage-saudi-anxiety.html?_r=0.

18. "Is Russia Taking over the U.S. Role in the Middle East?," *EuroNews*, November 14, 2013, http://euronews.com/2013/11/14/is-russia-taking-over-the-us-role-in-the-middle-east/; Robert Lawrence Kuhn and Florence Eid-Oakden, "China Carving a Role in Middle Eastern Affairs," *South China Morning Post*, December 2013, http://www.scmp.com/comment/insight-opinion/article/1386790/china-carving-role-middle-eastern-affairs. Most analysts conclude, however, that both nations also share the U.S. interest in regional stability.

19. As was reported in December 2013, the point of Defense Secretary Hagel's recent trip to the Middle East was "to prove to Persian Gulf partners that the United States would remain engaged in the region—despite budget pressures at home, a rebalance of interests to Asia and the end of the wars in Iraq and Afghanistan." Thom Shanker, "Hagel Lifts Veil on Major Military Center in Qatar," *New York Times*, December 11, 2013, http://www.nytimes.com/2013/12/12/world/middleeast/hagel-lifts-veil-on-major-military-center-in-qatar.html?_r=0.

Reality

THE SHALE GAS AND TIGHT OIL REVOLUTION HAS DONE LITTLE TO RELIEVE PRESSURES ON TRADITIONAL ALLIES AND PARTNERS IN EUROPE AND ASIA.

If shale gas and tight oil have had relatively little impact on U.S. national security interests but have changed views about how those interests might be protected, the story varies a bit for America's traditional allies and partners. As noted in Chapter 2, Europe, the home of America's broadest security alliance, NATO, continues to struggle with economic growth and competitiveness. At the same time many European states maintain strong, and in some ways growing, economic, political, and security interests in the southern Mediterranean, the Maghreb, the Sahel, the Middle East, and sub-Saharan Africa. Europe also faces a restive and resurgent Russia to its east and an uncertain economic and political future for Turkey, a NATO member and major energy hub for Europe.

The implications of these geo-economic energy realities for the U.S.-European national security relationship have thus far been muted. There has been little impact on the overall capacity of European nations to contribute to combined military operations. While contributions to operations in Iraq and Afghanistan have been significant for many European nations, most capitals have undertaken these obligations at the same time that their overall defense spending has been declining.[20] Indeed, the failure of almost every NATO member to meet its alliance commitment to allocate at least 2 percent of its gross domestic product to defense spending has been a persistent complaint from U.S. policymakers of both parties.

Continued economic difficulties in Europe (to which energy insecurity contributes) may result in America's most reliable and consistent international partners being more unwilling, or politically, economically, or militarily unable, to address shared transatlantic security challenges. There is also increased European insecurity about America's security commitment to Europe. The American "rebalance" toward Asia is taking place as permanently stationed U.S. forces in Europe have been drawing down. The DoD's recent QDR characterizes the U.S. commitment to NATO as "steadfast and resolute," but also hints at additional force reductions in the future.[21] U.S. policy statements, at least in some eyes, reflect an implicit expectation that Europe will take a greater role in responding to security crises in its own neighborhood, specifically in the southern Mediterranean and Africa, and that America will be less engaged. Indeed, Europeans (with U.S. support) have taken the lead in military actions in both Libya and Mali in recent years, and France is increasing its involvement in responding to unrest in the Sahel, such as in Mali and the Central African Republic (with U.S. assistance). (It is still too soon to discern whether the crisis in

20. Ten years ago, the ten European nations with the highest defense budgets spent, on average, 2.2 percent of their respective GDPs. By 2012 that number had fallen to 1.7 percent. Stockholm International Peace Research Institute (SIPRI), "The SIPRI Military Expenditure Database," 2012, http://milexdata.sipri.org.

21. Specifically, the document says that the United States will "continue to adapt the U.S. defense posture in Europe." DoD, *Quadrennial Defense Review 2014*, 18.

The Department of Defense, Shale Gas and Tight Oil, and Operational Energy

According to its latest policy statements, the DoD interprets the most significant impacts of the shale gas and tight oil revolution as enhancing the U.S. economy, which in turn is "the foundation of U.S. power." U.S. economic strength enhances international stability, the 2014 Quadrennial Defense Review (QDR) argues, underwritten by U.S. and others' military activities to ensure free trade flows. The QDR also envisions the prospect that U.S. energy exports will enhance U.S. economic prospects still further.[1]

On the whole, however, the emergence of shale gas and tight oil has done little to affect the DoD's plans to modify its energy use as an operational imperative. Logistics supply lines associated with fuel are seen as a major vulnerability, and there are multiple ongoing efforts to reduce energy needs as well as broaden supply options, including renewable sources.

A more tangible effect of the shale gas and tight oil revolution for military operations relates to changes in energy flows. DoD strategists and logisticians are examining the implications of changes in supply and consumption relationships for U.S. operational plans in various regions around the world. Beyond this specific issue, however, the direct implications of the shale gas and tight oil revolution for the DoD in particular are limited.

1. DoD, *Quadrennial Defense Review: 2014* (Washington, DC: U.S. Department of Defense, March 2014), 9.

Crimea will adjust either European expectations or U.S. policies with respect to Europe, though both are possible.)

Given shared interests in stability in Europe's neighborhood, greater European leadership has been welcomed by Washington. But coupled with widespread defense spending reductions, it has posed some risks as well. The evidence to date suggests that Europe is willing to take actions, up to and including the use of military force, for short periods of time to address instability in MENA. But diminished European capacity, which may shrink still further, means that any military operation of scale, reach, or duration necessitates significant, and potentially growing, augmentation from the United States. This reality derives partially from the sheer relative scale of U.S. forces, but principally from their unparalleled capacity in logistics, intelligence and surveillance, and command and control. Beyond their relatively limited support capabilities, many European allies are eliminating some of their combat capabilities (e.g., heavy armor) altogether. Such steps reduce the potential sources of such capabilities for future coalition operations, should they be required. Ultimately, if Europe is increasingly less able to operate without the United States,

any American-led operation can in turn rely on smaller contributions, drawn from a narrower range of military capabilities.[22]

Increasing interdependence among traditional allies may be a necessary and even desirable efficiency. Yet it also suggests that the United States will be hard-pressed to refrain from participating in most European-led operations, at least in a supporting role. In recent years this model has apparently been acceptable to the broader American public, which has paid relatively little attention to the economic and military support the DoD has provided in European-led missions. At the same time, however, like every employment of military force, these operations are not entirely risk free. In December 2013 alone, for example, four U.S. service members were held captive for a short period of time in Libya, and four more were injured in the Central African Republic. These incidents provoked little response from the American public. It is not difficult to imagine, however, that any single similar instance, if particularly salient (because of who was involved, how they were treated, or myriad other factors), could become a major national preoccupation that could force policymakers' hands.

To date, Europe's, and the transatlantic, relationship with Russia has ebbed and flowed since the collapse of the Soviet Union, with the most flagrant confrontations being the recent 2014 crisis in Crimea, Russia's cutoff of gas to Ukraine in 2009 and in 2006, and Russia's 2008 conflict with Georgia over South Ossetia. To varying degrees these crises have been managed by Europeans, with strong U.S. diplomatic and economic involvement. If Europe grows more dependent on Russian energy supplies and its weakened economy becomes more vulnerable to Russian trade measures, it will possibly become less willing to openly challenge Russia. Should tensions rise between Europe and Russia, particularly on NATO's eastern border, U.S. forces would likely be involved, for both political and practical reasons.

Shale gas and tight oil are also changing the economic calculations of future oil and gas exploration in the Arctic, particularly for Russia. Of the 61 major oil and gas reserves found in the Arctic Circle, 43 are in Russia.[23] For Russia the Arctic is home to Russia's strategic nuclear fleet, 14 percent of Russia's GDP, 25 percent of its exports, and 50 percent of the total Arctic coastline. While the rapidly melting ice cap and Western technological advances have increased accessibility to energy sources in the Arctic, better-supplied energy markets have decreased economic pressures to exploit discoveries in this high-risk and fragile environment. Russia's interest, however, remains strong. It is focused on creating a major shipping transit route through the Northern Sea Route and reconfiguring its military

22. Obviously, capacity is not the only variable that affects whether and how many forces are committed to a given operation, nor do contributions directly reflect capability. For the purposes of comparison, however, other nations' contributions to U.S.-led operations in Iraq totaled 12 percent at their largest point; in Afghanistan, others' contributions peaked at 31 percent of the total force. Matt Kelley, "U.S. Partners Dwindling in Numbers, Size," *USA Today*, December 28, 2005,http://usatoday30.usatoday.com/news/nation/2005-12-28-iraq-coalition_x.htm; NATO, "International Security Assistance Force (ISAF): Key Facts and Figures," January 6, 2012, http://www.isaf.nato.int/images/stories/File/2012-01-06percent20ISAFpercent20Placemat.pdf.

23. EY, *Arctic Oil and Gas* (London: EY, 2013), 2, http://www.ey.com/Publication/vwLUAssets/Arctic_oil_and_gas/$FILE/Arctic_oil_and_gas.pdf.

structure in the Arctic.[24] In February 2014, Russia announced plans for "Northern Fleet–Joint Strategic Command," a new HQ for armed forces to defend Russia's strategic interests in the Arctic, composed of the Northern Fleet Navy as well as other existing Arctic-based military units and new formations.[25] Because four of the five Arctic coastal nations are NATO members (the United States, Canada, Norway, and Denmark via Greenland), any catastrophic environmental or mass casualty event as well as instability in the Arctic region would likely involve both Russian and NATO forces. The United States and its European allies, among others, are committed to ensuring freedom of navigation to newly accessible international passages such as the Northern Sea Route, not least because of the potential economic benefit. On net, the shale gas and tight oil revolution has likely diminished pressing interest in oil and gas exploration in the Arctic, thought interest in a new strategic transit route remains strong.

In Asia, the impact of shale gas and tight oil on the security environment has also, in broad terms, been limited. Energy competition plays some role in the multiparty conflict in the South China Sea, to include the potential for unconventional plays. That said, shale gas and tight oil's contributions to better-supplied energy markets alleviate some of the immediacy of (and change the cost calculations for) developing those resources. Further, while energy scarcity, particularly in the region where demand is growing most dramatically, is clearly an element of the South China Sea disputes, there are numerous other factors contributing to the tensions. Because of its relationships with all of the interested parties (Brunei, China, Malaysia, the Philippines, Taiwan, and Vietnam), the United States remains strongly interested in a diplomatic resolution to the conflict, but the impact of shale gas and tight oil on bringing about that end is far outweighed by the other factors at play.

Further, the promise of greater oil and gas supplies, while good news in the abstract for Asia as a whole, is also viewed in the context of intraregional competition. Just as Japan fears that supplies will be absorbed by China or Korea, to its disadvantage, many Southeast Asian leaders worry that Northeast Asia will reap the benefits first, putting their economies behind. Still others worry that the United States will reserve its increased production for domestic use, leaving Asia at the mercy of high prices and uncertain sources of supply. Some Association of Southeast Asian Nations (ASEAN) countries are concerned that U.S. exports of energy will go first to countries with which the United States has free-trade agreements. Currently this applies only to Singapore, but ongoing TPP negotiations include Brunei, Malaysia, and Vietnam as well.

The shifting energy and trade routes spurred, at least partially, by North America's changing demands, have increased the importance of the Indian Ocean to Pacific nations, and to China, India, and Australia in particular. Evidence of this shift is apparent both in Chinese and Indian naval strategy and investment. This too plays a role in the U.S.

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24. Michael Byers, "The (Russian) Arctic Is Open for Business," *The Globe and Mail* (Toronto), August 12, 2013, http://www.theglobeandmail.com/globe-debate/the-russian-arctic-is-open-for-business/article13696054/.

25. "Russian Military to Have Special Command for Arctic Operations," RT.com, February 17, 2014, http://rt.com/politics/russian-arctic-military-command-397/.

rebalancing strategy, which includes an effort to increase U.S. military access and relationships in Southeast Asia in particular.

As a general proposition, the abiding U.S. interest in maintaining stability in the Pacific is the overarching objective of its policies toward all in the region. Thus far, the shale gas and tight oil revolution has raised many questions but has seldom directly influenced the many sources of tension within and among the nations in the region. These tensions are reflected in growing levels of defense investment, not just by larger nations, but across most of Southeast Asia, and an emerging willingness in Japan to reverse its largely pacifist policies. While the United States hopes to shape this growing defense investment into broader regional cooperative efforts, both for its practical benefits and for the potential it might offer for "balancing" growing Chinese military power, its ability to achieve these ends remains to be seen.

On net, therefore, the national security impact of the shale gas and tight oil revolution on the United States' main allies and partners has been disruptive, but it has done little to modify preexisting trends. It has contributed to and alleviated tensions in some areas of regional dispute, such as the South China Sea, as well as contributed to a reduced level of commercial interest in natural resource development in some portions of the Arctic region. The shale gas and tight oil revolution has hindered European economic competitiveness, but it has done little to change the broader economic environment in Asia. Although Europe reduced its military spending well before the 2008–2009 global recession and the shale gas and tight oil revolution, Europe's continued economic challenges will strain defense spending at a time when increased instability in Africa, Russia, and the Middle East will demand a greater European security response. Given the close ties, both political and practical, between the United States and its friends in both Europe and Asia, stability in regions that supply energy it its allies will continue to be a major factor in American national security calculations.

THE SHALE GAS AND TIGHT OIL REVOLUTION HAS INCREASED THE POTENTIAL FOR MARKET INSTABILITY, STRAINED GOVERNANCE, AND UNREST FOR ENERGY IMPORT OR EXPORT DEPENDENT STATES.

As the world's only global power, the United States has a strong interest in preserving stability and enhancing good governance. Chapter 2 described some of the multiple ways in which energy-driven shifts might have an impact on governance, and thus stability. Most obviously, there are the possible ramifications of significant economic disruptions (positive or negative) in countries heavily reliant on oil and gas imports or export revenues.[26] While overall stability involves numerous factors, major swings in an economy can be a significant contributor. Various attempts to measure stability capture this reality: an examination of major indices that assess state fragility finds that seven of eight include one or more economic measures (e.g., GDP growth, GDP per capita, unemployment, or

26. Disruptions are not limited to price shocks. Shale gas and tight oil have already drawn investment to the United States and away from other less stable and now less competitive projects. Such restructuring benefits the U.S. economy at the expense, at least in the short term, of others.

trade).[27] In each index, economic factors account for 25 to 50 percent of a given country's fragility score, alongside other metrics assessing governance, conflict, development, and social factors.

The United States' interests in state stability can be direct (e.g., if allies, partners, or nations where significant numbers of American citizens live are threatened) or indirect. Indirect concerns include the possibility of a single state's disruptions spreading to its neighbors and causing broader regional conflagrations (large-scale ethnic or sectarian clashes, major refugee flows that strain regional capacity, and so forth). Other "indirect" concerns can be raised if a government is unable to control its own territory, particularly if that weakness is exploited either by terrorist organizations or those that support them or by those who spread knowledge or technologies associated with weapons of mass destruction.

To augment the analysis, Figure 5 offers a broad overview of the current nexus between energy security and instability, derived from a combination of various indices. It shows countries heavily reliant on energy imports, those with a large dependence on oil and gas revenues, and those that rank highly in one or more indicators of instability (terrorist safe havens, locations of terrorist attacks, and high ratings on the Fund for Peace's "failed states index").[28]

Although overly simplified, Figure 5 offers a basic sense of which countries are currently plagued by both instability and energy insecurity (which are often closely interrelated). Much of North and Central Africa rate high on various barometers that reflect governance challenges. Many countries in the Middle East do as well, along with Indonesia and the Philippines. Those indicators of instability coexist with high reliance on energy imports or exports in multiple African nations, as well as in Yemen, Turkey, and Venezuela. And much of central, southern, and to some degree eastern Europe, as well as most of the Middle East and parts of southern Africa, are vulnerable to energy price shocks, even if they are not currently among those states facing the largest challenges to governance.

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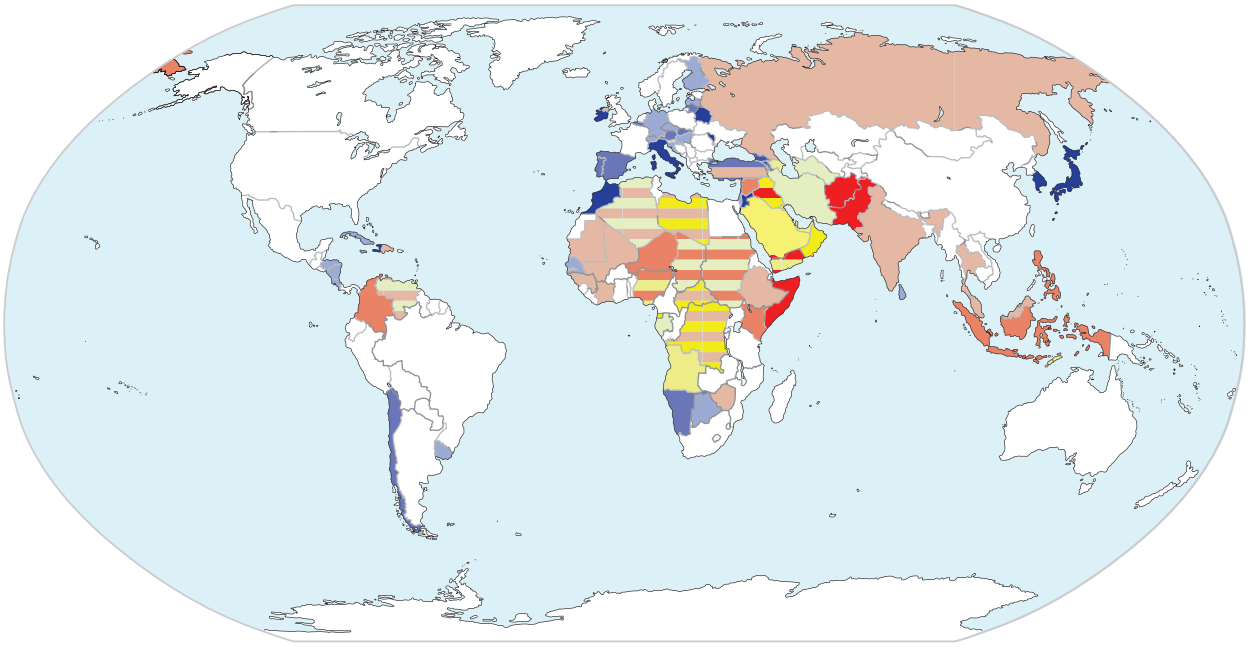
27. David Carment and Yiagadeesen Samy, "Assessing State Fragility: A Country Indicators for Foreign Policy Report," Canadian International Development Agency, June 15, 2012, http://www4.carleton.ca/cifp/app/serve.php/1407.pdf; Nate Haken et al., "Failed State Index: 2013," Fund for Peace, 2013, http://ffp.statesindex.org/rankings-2013-sortable; J. Joseph Hewitt et al., *Peace and Conflict 2012: Executive Summary* (College Park: Center for International Development and Conflict Management, University of Maryland, 2012) http://www.cidcm.umd.edu/pc/executive_summary/exec_sum_2012.pdf; Economist Intelligence Unit, *Political Instability Index*, 2009, http://viewswire.eiu.com/site_info.asp?info_name=social_unrest_table &page=noads; Monty G. Marshall and Benjamin R. Cole, *Global Report 2011: Conflict, Governance, and State Fragility* (Vienna, VA: Center for Systemic Peace, George Mason University, 2011), www.systemicpeace.org/GlobalReport2011.pdf; Susan E. Rice and Stewart Patrick, *Index of State Weakness in the Developing World* (Washington, DC: Brookings Institution, 2008), http://www.brookings.edu/~/media/research/files/reports/2008/2/weak%20states%20index/02_weak_states_index.pdf; Institute for Economics & Peace, *Global Peace Index: 2013: Measuring the State of Global Peace* (New York: Institute for Economics & Peace, 2013), http://www.visionofhumanity.org/sites/default/files/2013_Global_Peace_Index_Report_0.pdf.

28. For import dependence, darker shades of blue indicate a higher percentage of net energy imports as a percentage of energy use. For energy exporters, darker shades of yellow indicate higher percentages of natural resources as a percentage of the overall economy. For instability, darker shades of red mean a higher number of appearances on lists of the top 20 highest number of incidents of terrorism in 2011, the top 18 terrorist safe havens in 2012, and the top 20 highest ranking on the Failed States Index.

Figure 5: Energy Security and Instability



Blue = Net energy imports as percent of energy use (2011)
Yellow = Resource revenue as a percent of total fiscal revenue (2006-10)
Red = one or more negative factors: Top 20 highest incidents of terrorism (2011), Top 18 terrorist havens (2012), and Top 20 highest failed states index (2013)
Darker blue indicates greater foreign energy dependence. Darker yellow indicates greater dependence on energy revenue Darker red indicates greater numbers of factors.
Note: All data is for most recent available yeartv

Source: Based on data from Office of the Coordinator for Counterterrorism, *Country Reports on Terrorism 2012: Chapter 5: Terrorist Safe Havens* (Washington, DC: U.S. Department of State, May 2013), http://www.state.gov/j/ct/rls/crt/2012/209987.htm; Failed States Index 2013, The Fund for Peace, http://ffp.statesindex.org/rankings-2013-sortable; START Dataset, National Consortium for the Study of Terrorism and Responses to Terrorism, University of Maryland, http://www.start.umd.edu/data-and-tools/start-datasets; World Bank, "The Data Catalog: Energy Imports, Net (% of Energy Use)," http://data.worldbank.org/indicator/EG.IMP.CONS.ZS; International Monetary Fund, "Macroeconomic Policy Frameworks for Resource-Rich Developing Countries," August 24, 2012, http://www.imf.org/external/np/pp/eng/2012/082412.pdf.

The degree to which shale gas and tight oil energy markets exacerbate or alleviate underlying instability varies greatly, but views of energy insecurity do provide some insight into states that might face the greatest potential for disruption. The degree to which unconventional futures might prove economically disruptive depends on the scale, speed, and duration of potential price shocks. In the short term, the nations that are most vulnerable to shocks are those with the highest break-even prices. In 2013 these included Yemen ($214 per barrel), Iran ($126 per barrel), and Bahrain ($118 per barrel).[29]

Shifting markets are also affecting investment patterns in ways that influence the viability of states that are heavily reliant on future energy-derived revenue streams. As

29. IMF, *Regional Economic Outlook: Middle East and Central Asia* (Washington, DC: IMF, November 2013), 106, http://www.imf.org/external/pubs/ft/reo/2013/mcd/eng/pdf/mreo1113.pdf.

just one small example, between 2010 and 2012 one company sold over $2 billion in overseas assets (primarily in Africa and South America) to reinvest in lower-risk shale ventures in Texas.[30] Similar reallocations have led to speculation about a slowdown of planned LNG projects in particular, especially in East Africa, the full economic and political implications of which are not yet clear.[31]

Redirection of capital does not necessarily mean its absence. Indeed, projections of rising energy demand suggest that at some point different investors will come in behind those moving elsewhere. However, those investors will likely have higher risk premiums and must therefore extract higher profits from successful projects, potentially decreasing the return to local leaders and/or populations. Practically, these shifts have meant that many Western oil companies have been able to lower their financial risk, but also the physical risk to their employees operating in unstable areas. This decreased exposure may not always be a positive, however. Some have argued that the relationships between energy companies and exporting governments have created channels for influencing those governments' behaviors and thus serve as a "track 2" method of communication and stability.[32] In broad terms, the rapid rise of shale gas and tight oil has clearly prompted key energy exporters to take stock of the need for economic reforms. Even if the alarm bells are sounding, however, other factors are complicating progress. The most recent projections from the IMF for the Middle East, North Africa, Pakistan, and Afghanistan, for example, note that "complex political transitions and intensifying social tensions" in the region are slowing progress on energy reforms.[33]

THE SHALE GAS AND TIGHT OIL REVOLUTION EXACERBATES THE GAP BETWEEN U.S. NATIONAL AND POPULAR INTERESTS.

From a national security policy perspective, the shale gas and tight oil revolution has had few decisive impacts thus far. On the positive side, it has largely offset other disruptions to energy supplies, and it has improved the U.S. economic position relative to what it would otherwise likely have been. In some camps, the latter has resulted in the perception of greater U.S. leverage to exercise global leadership.

But shale gas and tight oil have not yet delivered a real boon, at least with respect to national security. Indeed, they have led to a variety of challenges that may ultimately prove manageable but are in some ways complicating the achievement of broader policy objectives. Perceptions of weakening ties with the rest of the world (particularly with

30. Clifford Krauss and Eric Lipton, "U.S. Inches toward Goal of Energy Independence," *New York Times*, March 22, 2012, http://www.nytimes.com/2012/03/23/business/energy-environment/inching-toward-energy-independence-in-america.html?pagewanted=4&adxnnl=1&adxnnlx=1388437905-5p/RwQgvzYwjdA4olefYfA&_r=0.

31. Guy Chazan and Ajay Makan, "U.S. Shale Boom Causing Slowdown in LNG Industry," *FT.com*, November 24, 2014, http://www.ft.com/cms/s/0/ae32d7b6-51ff-11e3-8c42-00144feabdc0.html#slide0.

32. Private communications. Examples of such "track 2" methods being used include Persian Gulf in the 1950s and 1960s; same in Southeast Asia and Venezuela during same periods, even through the 1970s, and in Angola in the 1990s.

33. IMF, *Regional Economic Outlook: Middle East and Central Asia*, 33.

energy-producing states) have complicated international relationships and placed demands on U.S. leaders and resources. Those same perceptions, at times fed by U.S. political leaders themselves, have made it more difficult to tell a compelling story about how the United States can and should play a global leadership role. As one part of a broader breakdown in U.S. domestic politics, this challenge has in turn raised questions in the eyes of others around the world about the degree to which U.S. political leaders can actually deliver on national security commitments or act in accordance with stated interests.

This particular difficulty is salient because of the scope and potential scale of the disruption to energy markets that shale gas and tight oil offer. That disruption has been significant thus far, but could become much more so in the future. Alternatively, though many people prefer not to acknowledge it, the promise of unconventional oil and gas could fade, leaving the world to adjust once again to a different version of an unexpected future. Such questions are explored more deeply in the "Scenarios, Strategies, and Pathways" background report written to further elucidate on topics discussed in *New Energy, New Geopolitics: Balancing Stability and Leverage.*

About the Authors

Principal Authors

Sarah O. Ladislaw is director and senior fellow in the CSIS Energy and National Security Program, where she concentrates on the geopolitics of energy, energy security, energy technology, and climate change. She has been involved with CSIS's work on the geopolitics portion of the 2007 National Petroleum Council study and the CSIS Smart Power Commission, focusing particularly on energy security and climate issues. She has published papers on U.S. energy policy, global and regional climate policy, clean energy technology, as well as European and Chinese energy issues. She teaches a graduate-level course on energy security at the George Washington University.

Ms. Ladislaw joined the Department of Energy (DOE) in 2003 as a presidential management fellow, and from 2003 to 2006 worked in the Office of the Americas in DOE's Office of Policy and International Affairs, where she covered a range of economic, political, and energy issues in North America, the Andean region, and Brazil. While at the department, she also worked on comparative investment frameworks and trade issues, as well as biofuels development and use both in the Western Hemisphere and around the world. She also briefly worked for Statoil as its senior director for international affairs in the Washington office. Ms. Ladislaw received her bachelor's degree in international affairs/East Asian studies and Japanese from the George Washington University in 2001 and her master's degree in international affairs/international security from the George Washington University in 2003 as part of the Presidential Administrative Fellows Program.

Maren Leed is senior adviser with the Harold Brown Chair in Defense Policy Studies at CSIS, where she works on defense-related issues. From 2011 to 2012, she served as senior adviser to the chief of staff of the U.S. Army. From 2009 to 2011, she was a senior fellow and director of the New Defense Approaches Project at CSIS, where she led projects on topics as diverse as military personnel costs, the future of ground forces, reforming the military personnel system, strategic forecasting, organizing for electromagnetic spectrum control, amphibious capabilities' contributions to deterrence and shaping missions, and service cultures. She also supported the U.S. Department of Defense (DoD) inquiry into the shootings at Fort Hood. She previously served as an analyst at the RAND Corporation, where she led projects relating to intelligence, surveillance, and reconnaissance (ISR) and countering improvised explosive devices (IEDs).

From 2005 to 2008, Dr. Leed was assigned as a special assistant to the vice chairman of the Joint Chiefs of Staff and was responsible for a range of issues including IEDs, ISR, cyber operations, biometrics, rapid acquisition, and Iraq policy. From 2001 to 2005, she was a professional staff member on the Senate Armed Services Committee, where she handled the operation and maintenance accounts and conducted oversight of military readiness, training, logistics, and maintenance for committee members. She was an analyst in the Economic and Manpower Analysis Division of the Office of Program Analysis and Evaluation in the Office of the Secretary of Defense from 2000 to 2001, where she conducted macroeconomic analyses relating to military manpower and coordinated DOD performance contracts with defense agencies. She was a doctoral fellow at RAND from 1995 to 1999, analyzing military manpower issues, training for operations other than war, and leader development, and providing strategic planning support for the military and private-sector organizations. Dr. Leed received her A.B. in political science from Occidental College and her Ph.D. in quantitative policy analysis from the RAND Graduate School.

Molly A. Walton is a research associate with the CSIS Energy and National Security Program, where she provides research and analysis on a wide range of projects associated with domestic and global energy trends. Her current work focuses on the energy-water nexus, unconventional oil and gas, environmental risk mitigation and industry best practices, clean energy, and global climate change. She also serves as editor in chief of *New Perspectives in Foreign Policy*, a CSIS journal written by and for the enrichment of young professionals. Prior to joining CSIS, Ms. Walton was a research analyst for Circle of Blue, an affiliate of the Pacific Institute, where she focused on the intersection of U.S. water and energy issues. Ms. Walton received her M.A. in international relations and environmental policy from Boston University and holds a B.A. in international relations and communications from Wheaton College (IL).

Contributing Authors

Michelle Melton is a research associate with the Energy and National Security Program at CSIS. She provides research and analysis on a wide range of projects associated with domestic and global energy trends, including the global oil market, unconventional fuels, U.S. energy policy, Iraq, U.S. electricity markets, and global climate change. Prior to joining CSIS, Ms. Melton held positions in the nonprofit, private, and public sectors, including with Statoil, the Government Accountability Office (GAO), and the Georgetown University Center on Education and the Workforce. She was also a Peace Corps volunteer in Zambia. Ms. Melton received an M.S. in foreign service and an M.A. in international history from Georgetown University and a B.A. from Johns Hopkins University.

Andrew Metrick is a research assistant and program coordinator with the Harold Brown Chair in Defense Policy Studies at CSIS. His work covers a broad range of issues, including U.S. ground forces, rotary-wing aviation, and unmanned systems. Prior to CSIS he was the team lead for the 2012–2013 Global Go To Think Tank Report responsible for a global survey process and the production of the final report. Additionally, he served as a teaching

assistant for a capstone writing and research class at the George Washington University. He holds a B.A. in international affairs from the George Washington University with concentrations in conflict and security and international politics.

Jane Nakano is a fellow in the Energy and National Security Program at CSIS. Her research focus includes nuclear energy policy and technology trends globally, energy security issues in Asia, and shale gas development in the United States.

Prior to joining CSIS in 2010, Ms. Nakano was with the U.S. Department of Energy (DOE) and served as the lead staff on U.S. energy engagements with China and Japan. She was responsible for coordinating DOE engagements in the U.S.-China Strategic Economic Dialogue, U.S.-China Energy Policy Dialogue, and U.S.-Japan Energy Dialogue. She also worked on U.S. energy engagements with Indonesia, North Korea, and the Asia-Pacific Economic Cooperation. From 2001 to 2002, she served at the U.S. embassy in Tokyo as special assistant to the energy attaché. Her recent publications include *Prospects for Shale Gas Development in Asia* (CSIS, August 2012); *Civil Nuclear Energy Cooperation between the United States and Japan* (Stimson Center, February 2012); *Rare Earth Trade Challenges and Sino-Japanese Relations* (National Bureau of Asia Research, September 2011); and *China: Leader or Laggard on the Path to a Secure, Low-Carbon Energy Future?* (CSIS, September 2011). Ms. Nakano holds a bachelor's degree from Georgetown University's School of Foreign Service and a master's degree from Columbia University's School of International and Public Affairs. She is fluent in English and Japanese.

Frank A. Verrastro is senior vice president and the James R. Schlesinger Chair for Energy and Geopolitics at CSIS. From 2003 to 2012, he served as director of the Energy and National Security Program at CSIS. He has extensive energy experience, having spent over 30 years in energy policy and project management positions in the U.S. government and the private sector. His government service included staff positions in the White House and the Departments of Interior and Energy, including serving as deputy assistant secretary for international energy resources. In the private sector, he has served as director of refinery policy and crude oil planning for TOSCO (formerly the nation's largest independent refiner) and more recently as senior vice president for Pennzoil.

Mr. Verrastro holds a B.S. in biology/chemistry from Fairfield University, a master's degree from Harvard University, and he completed the executive management program at the Yale University Graduate School of Business and Management. He served as a member of the Coordinating Committee for the 2011 National Petroleum Council (NPC) study on the *Prudent Development of North American Energy Resources*, as chair for the Geopolitics and Policy Task Groups for the 2007 NPC report, *Hard Truths: Facing the Hard Truths about Energy*, and as a Task Force member for the Council on Foreign Relations report, *National Security Consequences of U.S. Oil Dependency*. He has authored papers on energy and security topics and currently serves on the Advisory Board for the National Renewable Fuels Laboratory (NREL) in Golden, Colorado, and as a member of the Council on Foreign Relations.

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