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# Introduction

*Keeping America competitive requires affordable energy. And here we have a serious problem: America is addicted to oil, which is often imported from unstable parts of the world.... By applying the talent and technology of America, this country can dramatically improve our environment, move beyond a petroleum-based economy, and make our dependence on Middle Eastern oil a thing of the past.*

—President George W. Bush

When President George W. Bush called for an end to US oil dependence in his 2006 State of the Union address, American businesses and consumers were experiencing a surge in petroleum prices not witnessed since the late 1970s. The cost of crude oil had doubled since President Bush took office and gasoline prices were up by nearly 40 percent. Domestic oil production had been declining for decades while demand continued to grow, leaving the United States dependent on imports for 60 percent of its oil supply. In the wake of the September 11 terrorist attacks, Americans had grown increasingly anxious about their country's reliance on foreign oil and its implications for US foreign policy, national security, and economic vitality. And there was no relief in sight.

The Energy Information Administration (EIA 2006) projected a continued decline in US crude oil production, from 5.8 million barrels per day (bbl/d) in 2000 to 4.6 million bbl/d by 2030, and a 40 percent increase in demand over the same period. US oil imports would exceed 17 million bbl/d by 2030, more than total US oil demand during the 1980s and early 1990s. Moreover, it looked like those imports would be coming from increasingly unstable parts of the world. Sixty-two percent of the world's proven oil reserves were in the Middle East and 75 percent of global reserves were controlled by the Organization of Petroleum Exporting Countries (OPEC) (BP 2006). Against this backdrop, President Bush, himself a former oil man from Texas, called for the United States to start abandoning oil as an energy source, stressing that the only way to safeguard the US economy and American national security was to reduce demand through efficiency and develop alternative sources of supply. He called for increased funding for electric vehicle research and greater use of ethanol as a transportation fuel. In 2007 he worked with a Democratic Congress to pass the Energy Independence and Security Act, which raised vehicle efficiency standards and established a biofuels mandate.

While oil received the most attention, high natural gas costs were exacting a significant toll on the US economy as well. Natural gas prices rose alongside crude oil prices, from less than \$3 per cubic foot during the 1990s (in 2012 dollars) to \$8 per cubic foot by July 2005. Hurricanes Katrina and Rita took out significant quantities of natural gas production in the Gulf of Mexico in August and September, and prices spiked above \$15. Businesses and households saw an increase not only in natural gas costs but also in their electricity bills, as natural gas sets the marginal power price in many parts of the country. With natural gas production expected to remain flat through 2030, most analysts expected the United States would increasingly rely on imported and relatively expensive liquefied natural gas (LNG) to meet growing demand.

What a difference six years made. Through technological advances such as horizontal drilling and hydraulic fracturing (fracking), the oil and gas industry began to extract large quantities of natural gas from previously inaccessible shale formations. The rise in natural gas prices between 2000 and 2006 attracted the investment required to deploy these technologies at scale. When President Barack Obama gave his State of the Union address in January 2012, US natural gas production was 30 percent higher than it was during President Bush's speech in 2006. Thanks to this abundant supply, prices were nearly 70 percent lower. LNG terminals built to import natural gas began to be overhauled to export gas instead. The US chemicals industry was increasingly profitable and competitive thanks to low-cost feedstock. Though Obama had come into office pledging to move the country away from fossil fuels, he extolled the economic benefits of natural gas in his 2012 and 2013 State of the Union speeches.

The fracking process used to extract natural gas from shale can be used to produce oil as well. As natural gas prices have fallen thanks to new unconventional supply and oil prices have risen due to robust demand in Asia and instability in the Middle East and North Africa, US oil and gas companies have shifted focus to tight oil—the crude produced from unconventional reservoirs in North Dakota, Texas, and other parts of the country. American tight oil output has grown by 1.5 million barrels per day since 2006, reversing a quarter-century decline in US oil production (EIA 2013a). High oil prices also have made deepwater exploration in the Gulf of Mexico more economically attractive. US offshore production rose by 400,000 barrels per day between 2006 and the beginning of 2010. While the Deepwater Horizon oil spill reversed most of those gains, the prospects for continued growth in offshore production in the years ahead are bright if high oil prices persist. Oil companies are even exploring other previously inaccessible or uneconomic resources, such as offshore production in the Arctic and oil shale deposits in the Rocky Mountains.

By the end of 2012, net imports as a share of US oil consumption had fallen below 40 percent—levels not seen since the early 1990s. This growth in production has led many observers to proclaim the dawn of a US oil and gas renaissance.

sance (Morse et al. 2012, Adkins and Molchanov 2012, Verleger 2012).<sup>1</sup> In this view of the future, reduced oil imports and cheap natural gas will revolutionize US foreign policy and revitalize domestic manufacturing. The United States could even become energy independent within a decade, a goal most analysts and policymakers long considered impossible. More skeptical observers question the ability of the oil and gas industry to keep production growing at its current pace or warn that even if the optimists' supply outlook is correct, it will not have as great an effect on US national security or the economy as they think (Brackett 2012, Securing America's Future Energy 2012, Trivedi et al. 2012).<sup>2,3</sup>

Producers and consumers have already begun battling over the emerging energy future. Faced with historically low domestic natural prices and historically high prices in other parts of the world, US companies are looking to export low-cost US supply. Gas-dependent residential and industrial consumers are concerned that linking the United States to international markets could erase nascent shale-driven energy savings.<sup>4</sup> The recent fight over whether the government should approve LNG export terminals could be the first act in a new trade policy drama. With net US oil imports rapidly declining, a battle over America's prohibition on crude oil exports is next in line.

Environmental groups are growing increasingly wary of the US oil and gas boom and many are actively working to stop it.<sup>5</sup> The impact of shale gas and tight oil production on local air and water quality is their primary concern. Fracking involves injecting water and chemicals into a well to coax oil or natural gas out of reservoirs with low permeability. Opponents worry that the fluids from fracking could leak into ground water supplies or be improperly disposed of once recovered from the well. Emissions from trucks and drilling

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1. See also John Deutch, "The US Natural-Gas Boom Will Transform the World," *Wall Street Journal*, August 14, 2012, [http://professional.wsj.com/article/SB10001424052702303343404577514622469426012.html?mod=rss\\_opinion\\_main&wpisrc=nl\\_wonk&mg=reno64-wsj](http://professional.wsj.com/article/SB10001424052702303343404577514622469426012.html?mod=rss_opinion_main&wpisrc=nl_wonk&mg=reno64-wsj) (accessed on September 8, 2013); David Ignatius, "An Economic Boom Ahead?" *Washington Post*, May 6, 2012, [www.washingtonpost.com/opinions/an-economic-boom-ahead/2012/05/04/gIQAj5K2T\\_story.html](http://www.washingtonpost.com/opinions/an-economic-boom-ahead/2012/05/04/gIQAj5K2T_story.html) (accessed on September 8, 2013).

2. See also Kate Mackenzie, "Shale Oil Everywhere... for a While," *Financial Times*, August 13, 2012, <http://ftalphaville.ft.com/2012/08/13/1101721/shale-oil-everywhere-for-a-while> (accessed on September 8, 2013); Ian Urbina, "Insiders Sound an Alarm Amid a Natural Gas Rush," *New York Times*, June 25, 2011, [www.nytimes.com/2011/06/26/us/26gas.html?\\_r=1](http://www.nytimes.com/2011/06/26/us/26gas.html?_r=1) (accessed on September 8, 2013); and Chris Nelder, "The Murky Future of U.S. Shale Gas," *SmartPlanet*, October 17, 2012, [www.smartplanet.com/blog/take/the-murky-future-of-us-shale-gas/157](http://www.smartplanet.com/blog/take/the-murky-future-of-us-shale-gas/157) (accessed on September 8, 2013).

3. For excellent and independent discussions of the competing visions of America's energy futures, see Levi (2013), Ladislav et al. (2013), and Bordoff (2013).

4. Amy Harder, "Democratic Gas Blockade," *National Journal*, July 18, 2012.

5. Amy Harder, "Chamber, Sierra Club Wage Dueling Shale-Gas Campaigns," *National Journal*, July 26, 2012.

rigs used in shale development can also adversely affect air quality and respiratory health. Fracking has even been linked to increased earthquake activity. Following the Deepwater Horizon spill, the environmental community is likewise skeptical of the industry's ability to produce challenging offshore oil and gas resources safely, whether in the Gulf of Mexico or the Alaskan Arctic. There is a broad sense of unease that emerging oil and gas resources will lower fossil fuel prices, making it harder for renewables to compete and complicating efforts to reduce US carbon dioxide emissions to combat climate change. Reports that shale gas wells leak large quantities of methane, another greenhouse gas, make environmental groups that much more worried.

Government and private sector forecasters have started to assess the effect of a US oil and gas renaissance on the country's energy future. But analysis of the economic and environmental consequences has been more limited, either driven by interest groups or focusing on a particular industry or issue. This book attempts to assess the situation more comprehensively to help readers navigate the debate. In chapter 2 we discuss the economic cost of rising oil and gas prices between 2002 and 2008 and the fears of energy shortage it created. Chapter 3 describes the emerging energy renaissance that proponents argue will provide much-needed economic relief and evaluates the range of current oil and gas supply projections. We model the economic and employment effects of these projections and discuss our findings in chapter 4. In chapter 5 we turn to the demand side of the energy equation, where efficiency improvements are working alongside the growth in supply to reduce US dependence on imported energy. Chapter 6 analyzes the distributional effects of America's changing energy landscape—which states and industries have the most to gain, and to lose. In chapter 7 we assess the environmental costs and benefits of increased US oil and gas supply. Chapter 8 discusses trade policy implications. We conclude with recommendations for policymakers on how to respond to America's rapidly changing energy future.