

Carpe Diem: LNG Exports Are America's Once-in-a-Generation Opportunity

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White Paper By
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America's
Natural Gas
Alliance

Introduction

The United States can be a global energy leader by exporting a share of our abundant natural gas supplies without sacrificing the competitive advantage enjoyed by domestic manufacturers. But we need to act soon.

The enormous reserves of natural gas in the United States have dramatically changed the global energy equation. The Potential Gas Committee's¹ (PGC) freshly issued biennial report has yielded for the sixth time in a row a record natural gas resource assessment. The bottom line: U.S. natural gas consumption in 2014 totaled 27 trillion cubic feet (Tcf), yet the total volume of U.S. natural gas recoverable with existing technology is 2,853 Tcf — more than 100 times greater.

In addition, the U.S. Energy Information Administration's (EIA) 2015 Annual Energy Outlook projects increased domestic natural gas production and stable prices for decades to come. While some continue to call for restrictions on liquefied natural gas (LNG) exports, these latest figures provide more evidence that we have an opportunity to reap all of the economic, geopolitical and environmental benefits of LNG exports, while continuing to fuel a manufacturing renaissance at home.

The markets are giving us the same message. Royal Dutch Shell announced its intention to acquire BG Group for \$70 billion, with analysts calling the move primarily a bet on robust global trade in LNG. Further, even in an environment of soft global oil prices, companies have maintained their efforts to gain approval from the Federal Energy Regulatory Commission (FERC) for LNG export facilities. But the **global demand for LNG is not infinite. Many countries are making plans to compete. The time for the U.S. to act is now.**

ANGA urges the Department of Energy (DOE) to move forward as quickly as possible to approve all terminals now in its queue, and we ask Congress to enact legislation that enjoys strong bipartisan support to help expedite and provide certainty to the permitting process.

This paper details the many advantages of exporting LNG and addresses the overheated rhetoric by some opponents. It also outlines the domestic manufacturing opportunities, the energy security benefits for America and its allies, and the environmental improvements that can be made by exporting natural gas.

Thanks to the shale revolution, America faces a future of energy abundance. It should share this bounty with the world. The United States can be a global energy leader without sacrificing its domestic advantage. **For its citizens and its allies, the United States should seize the day.**

¹ A group of highly knowledgeable and experienced geologists, engineers and others who, since 1964, have assessed the technically recoverable natural gas resource base in the United States on a biennial basis. The Colorado School of Mines (CSM) leads the work of the PGC.

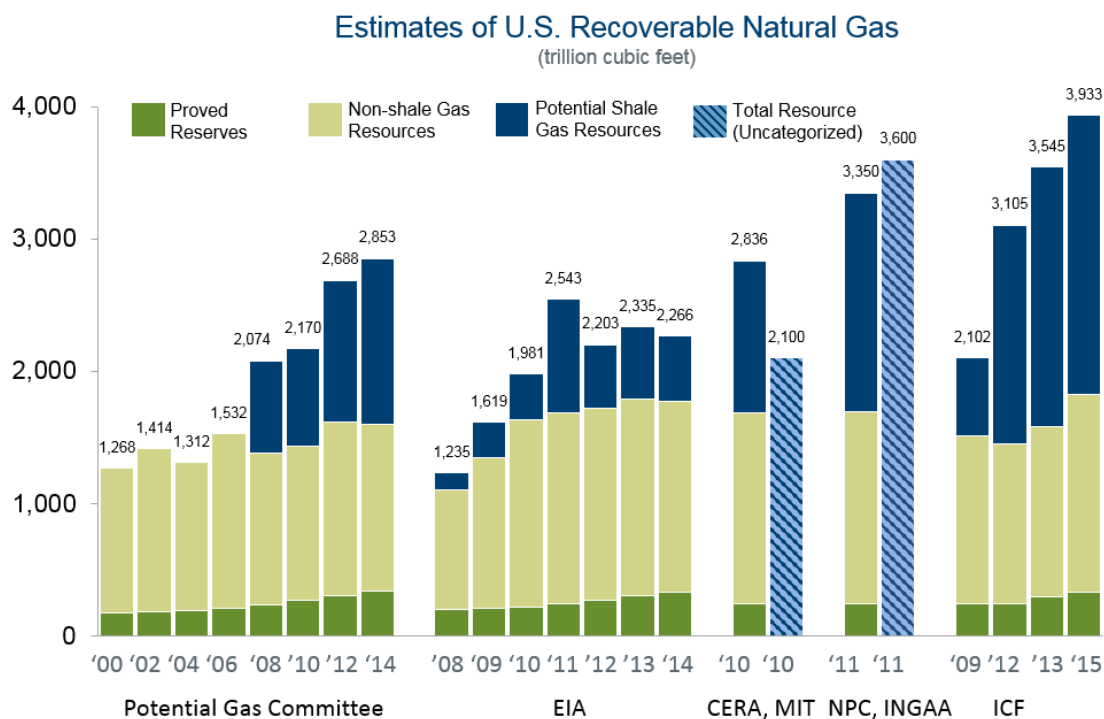
Supply: Does the U.S. Have Enough Natural Gas to Use at Home and to Export?

Can the U.S. export natural gas without “giving away our domestic advantage”? The simple answer is yes. U.S. natural gas supply is vast and recoverable enough to support significant market growth across the economy, including power generation, manufacturing, transportation and exports.

The most recent PGC projections join a host of credible assessments from industry, academia and government showing a range of technically recoverable gas from 2,266 to 3,933 Tcf (Figure 1). Of these reserves, **ICF International estimates that more than 1,500 Tcf of natural gas is available at \$5/MMBTU or less.**²

The long-term advantage our nation enjoys as a result of this abundance was confirmed by PGC’s most recent findings. “Our present assessment, strengthened by robust domestic production levels and reserves bookings, demonstrates an exceptionally strong and optimistic gas supply picture for the nation,” said Dr. John B. Curtis, the committee’s top geologist and Professor Emeritus of Geology and Geological Engineering at the Colorado School of Mines.

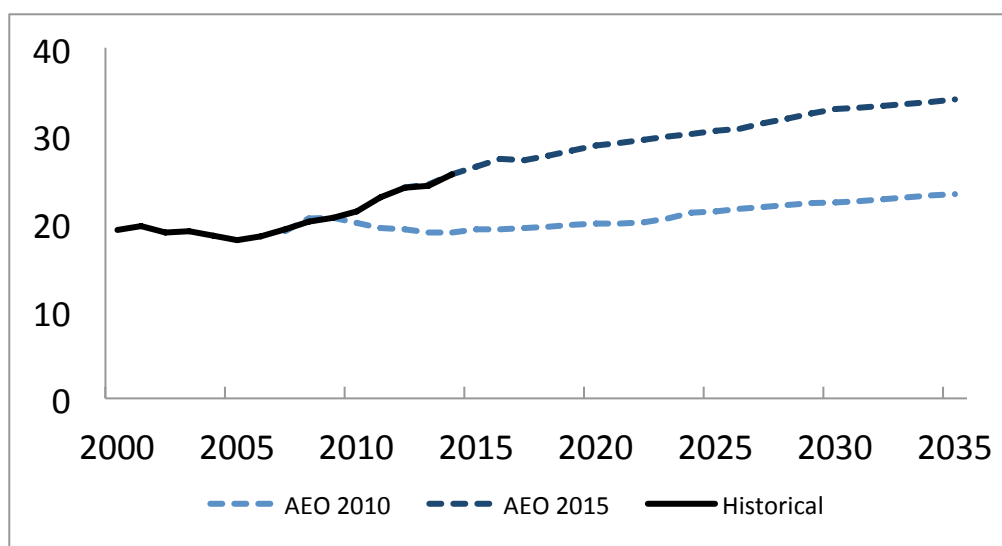
Figure 1: Technically Recoverable Reserves



² ICF International, “U.S. LNG Exports: Impacts on Energy Markets and the Economy,” May 2013, 45.

Since 2005, U.S. natural gas production has increased 41 percent. The EIA 2015 Annual Energy Outlook projects a further 48 percent increase in production from 2010 to 2035 (Figure 2).³ EIA confirms in its report that increased natural gas production will support growing demand from LNG exports.⁴

Figure 2: U.S. Natural Gas Production
Natural Gas Production (TCF): Reference



Given the broad and data-driven consensus affirming our nation’s enormous natural gas supplies, suggestions by some opponents of LNG exports — groups like America’s Energy Advantage and the Industrial Energy Consumers of America (IECA) — **that the resource is inadequate to support both domestic needs and LNG exports simply have no basis in fact.**

Just a few years ago, energy experts expected the U.S. to become a major importer of natural gas. The shale revolution has virtually eliminated the need for imports and EIA now projects America will instead be a net natural gas exporter by 2017.⁵

³ EIA, “Annual Energy Outlook 2015: Total Energy Supply, Disposition, and Price Summary, Reference Case Table,” May, 2015, accessed April 15, 2015.

⁴ U.S. Energy Information Administration, “Effect of Increased Levels of Liquefied Natural Gas Exports on U.S. Energy Markets,” October 2014, 12, <http://www.eia.gov/analysis/requests/fe/pdf/lng.pdf>.

⁵ EIA, “Annual Energy Outlook 2015,” April, 2015, ES-1.

The Need for Action

The LNG export licensing and permitting process involves both FERC and DOE. The FERC process is extensive, predictable, requires significant investment from the applicant and provides meaningful opportunity for public comment and input.

While DOE made improvements to its permitting procedures in August 2014, the need for certainty and quicker action remains. Applications continue to languish far too long and the U.S. stands to gain immensely from expediting these processes. Applicants will be better able to estimate their costs, construction timelines and labor needs if they can more accurately estimate the time these licensing processes will take. Figure 3 shows that those terminals that have received FERC approval all applied to DOE three to five years ago. More than half of the dozens of applications awaiting approval were sent to the federal government in 2012 or earlier.

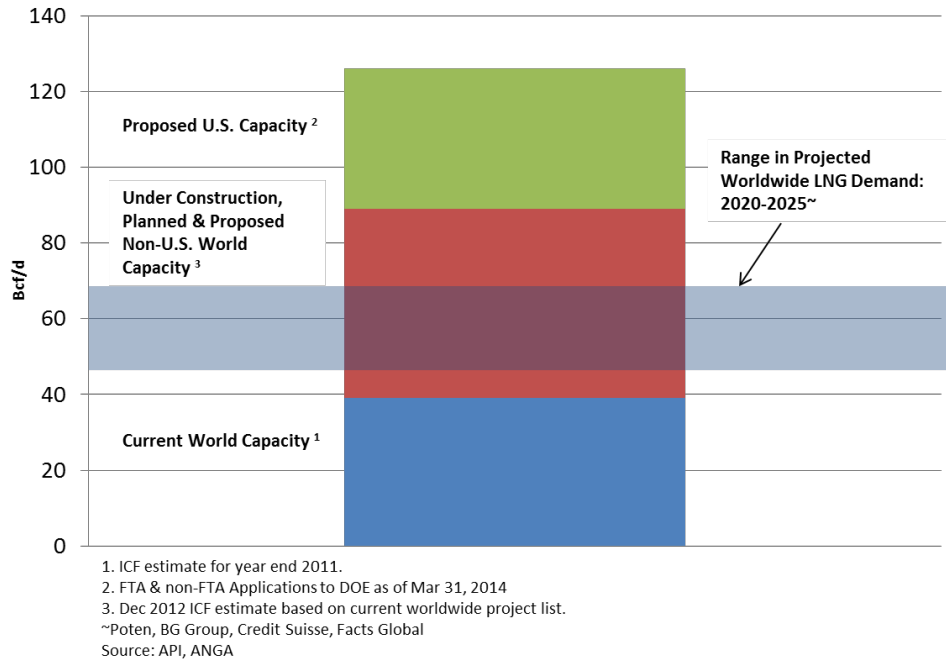
Figure 3: DOE Approval Timeline

Terminal	Applied to DOE	Final Approval at FERC	Final Approval at DOE	Days between FERC and DOE Approvals
Sabine Pass	7-Sep-10	16-Apr-12	7-Aug-12	113
Freeport LNG	17-Dec-10	30-Jul-14	20-Nov-14	113
Carib Energy	20-Oct-11	N/A	20-Sep-14	N/A
Cameron LNG	21-Dec-11	19-Jun-14	16-Sep-14	89
Cove Point	3-Oct-11	30-Sep-14	Still waiting	
Corpus Christi	31-Aug-12	20-Dec-14	Still waiting	

Source: DOE & FERC

An unpredictable licensing process could keep U.S. LNG exports from entering the global market. Proposed global LNG capacity outside the United States is approximately 50 billion cubic feet per day (Bcf/d). However, recent studies project global demand for natural gas to increase between 18 and 38 Bcf/d by 2025. Given the disparity between projected demand and the number of facilities proposed worldwide, the window of opportunity for the U.S. to capture some of this global demand is narrow (Figure 4). Further, LNG export facilities cost billions of dollars and take several years to build.

Figure 4: Global LNG Export Capacity and Demand



We urge the administration to continue finding ways to move applications more quickly. We also believe it is important for Congress to enact legislation to expedite and provide certainty to the approval process. The House has passed a bill (HR 351) that would require DOE to process permits within 30 days of FERC approval, while Senate legislation (S 33) sets a 45-day approval window for DOE.

Both measures enjoy strong bipartisan support. And, **Energy Secretary Ernest Moniz has stated that DOE will be able to comply with this legislation if enacted.** ANGA urges Congress to move these important measures forward as soon as possible.

These are logical, prudent steps to provide certainty to markets, investors and the entire natural gas supply chain. As a result, they boost the competitiveness of the U.S. in this growing market, increasing the likelihood our nation will reap significant domestic economic benefits while advancing both clean energy and global energy security throughout the world.

Price Impacts and Economic Opportunities Associated With LNG Exports

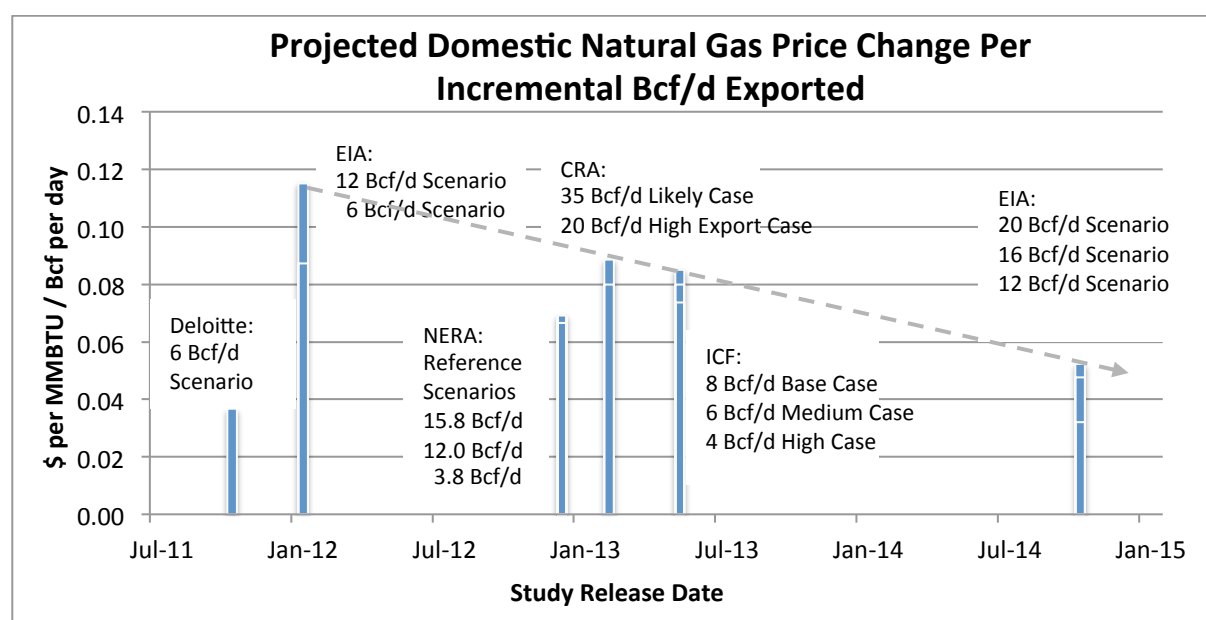
Opponents of natural gas exports frequently cite implausible export scenarios in claiming that shipping gas overseas will increase domestic prices. Fortunately, the facts tell a different story.

DOE has conducted multiple, comprehensive analyses — both internally through EIA and with outside consultants — concluding there are significant domestic economic benefits at all levels of exports considered, with very modest price impacts (Figure 5).

In January 2012, EIA published a study examining the impacts of LNG exports at both 6 Bcf/d and 12 Bcf/d levels. The analysis found at the 6 Bcf/d level, every incremental Bcf/d would increase prices just 9 cents per MMBtu; for the 12 Bcf/d level, the projected domestic price impact would be about 11 cents per incremental Bcf/d.

Just two years later in 2014, with the true scale of the U.S. shale gas revolution more apparent, price impact estimates fell dramatically. In EIA's subsequent study analyzing LNG export levels at high scenarios of 12 Bcf/d, 16 Bcf/d and 20 Bcf/d, price impacts per incremental Bcf/d were just a quarter of EIA's 2012 estimates. At the 12 Bcf/d level, an incremental Bcf/d added just 3 cents to the domestic price of natural gas.⁶

Figure 5: Projected Natural Gas Price Change Per Incremental Bcf/d Exported



Opponents point to price increases they claim would result from implausibly high export volumes as a reason not to export at all. What they don't tell you is that the most plausible export scenarios would be well under those evaluated by EIA, accounting for less than 10 percent of total U.S. gas production, and are projected to have a *de minimis* impact on price.

Some point to Australia as a "cautionary tale" for price increases caused by exports, but again they're not telling the whole story. In 2013, Australia's production was nearly 2.2 Tcf, while U.S. production was 25.1 Tcf. Australia exported 47 percent of what it produced in 2013, and EIA projects the U.S. will export under 10 percent of its production in 2030. Australia lacks the extensive pipeline and production infrastructure we enjoy in the U.S. and its cost of production is consistently higher than here. So this cautionary tale is more of a red herring.

⁶ U.S. Energy Information Administration, "Effect of Increased Levels of Liquefied Natural Gas Exports on U.S. Energy Markets," October 2014, 12, <http://www.eia.gov/analysis/requests/fe/pdf/lng.pdf>.

So where is the true urgency? In addition to Australia, countries such as Qatar (the world's largest exporter of LNG), Russia, Oman and others are looking to enter the global LNG market. The U.S., therefore, needs to act quickly to take advantage of this opportunity.

Exporting U.S. natural gas is a win-win proposition that will strengthen the economy, improve our trade balance and allow us to be a global energy leader. An ICF International study found that LNG exports will contribute up to 665,000 net jobs nationwide and add up to \$115 billion to U.S. gross domestic product (GDP) by 2035.⁷ NERA Economic Consulting, which conducted a study on the macroeconomic impacts of LNG exports at the request of DOE, found that "LNG exports provide net economic benefits in all the scenarios investigated, and the greater the level of exports, the greater the benefits."⁸

Contrary to the arguments of critics, a robust export market will boost the competitiveness of many U.S.-based manufacturing interests. By encouraging more natural gas production, exports will incentivize greater production of the associated natural gas liquids, which are essential building blocks for a strong and globally competitive U.S. petrochemical industry. Reliable, affordable supplies of natural gas and natural gas liquids will continue to fuel the growth of the U.S. manufacturing. ICF International examined the impacts of LNG exports and found that natural gas liquid volumes would increase between 138,000 and 555,000 barrels per day (bbl/d) by 2035 due to LNG exports.⁹

By attempting to curb LNG exports, opponents are essentially advocating for suppressing domestic energy production and limiting overall economic benefits. It is exactly the abundant, reliable and sustainable supply of U.S. natural gas that is driving both demand for LNG exports and a manufacturing renaissance in this country. Rather than being at odds, LNG exports offer an opportunity to stoke U.S. economic growth on both fronts.

The Energy Security Equation

Just as the trade of any commodity promotes domestic jobs and economic growth, so too will the export of natural gas. Expanding demand for U.S. natural gas in international markets will result in increased investment, enhanced GDP growth, rising incomes and more jobs. Moreover, U.S. LNG exports will expand global gas markets, enhancing U.S. influence around the world.

"From a geopolitical perspective, increased LNG exports from the U.S. and its allies would shift rents away from traditional, autocratic suppliers, including Russia, that have used the proceeds to finance policies at odds with U.S. national security interests," said David Goldwyn, a senior fellow with the Energy Security & Climate Initiative at the Brookings Institution, in testimony before the Senate Committee on Foreign Relations.

⁷ ICF International, "U.S. LNG Exports: State-Level Impacts on Energy Markets and the Economy," Nov. 13, 2013, Key Findings.

⁸ NERA Economic Consulting, "Macroeconomic Impacts of LNG Exports from the United States," Dec. 2012, 1.

⁹ ICF International, "U.S. LNG Exports: Impacts on Energy Markets and the Economy." May 2013, 7.

Natural gas exports can support our allies around the world by helping them diversify their energy sources. While Asia is considered a primary, early market, European customers are also lining up options to receive LNG from U.S. facilities.

Earlier this year, Lithuanian Energy Minister Rokas Masiulis said a speedy U.S. response to world export markets could reduce what he called “monopoly conditions” in Russia. “Lithuania and the rest of Europe are steadily building the infrastructure necessary to provide greater energy diversification and thus to enhance regional security,” Energy Minister Masiulis stated. “What we need now is for the United States to play its part, demonstrating its commitment to free trade by allowing its allies in Europe and the rest of the world to quickly benefit from the surplus natural gas it does not need.”

Clearly, the U.S. has a national security interest in providing natural gas to the global market.

Benefits to the Environment

Domestic industrial growth will strengthen the U.S. economy and provide an opportunity to reduce CO₂ globally. This reduction is possible partly because U.S. energy consumers are less carbon intensive than other parts of the world.

For example, while the U.S. electric sector had an average carbon intensity of 1,109 lb CO₂/MWh in 2011, the electric sectors in China, India and the Middle East had much higher average carbon intensities of 1,684 lb CO₂/MWh, 1,887 lb CO₂/MWh and 1,493 lb CO₂/MWh, respectively.¹⁰ LNG exports allow the U.S. to both reduce emissions globally and continue to support our domestic manufacturing renaissance.

Energy Secretary Moniz notes that “natural gas will play a crucial role in enabling very substantial reductions in carbon emissions.”¹¹ Just as essential as its role in reducing carbon emissions, greater natural gas production and use lowers emissions of pollutants, such as mercury, sulfur dioxide, nitrogen oxide and particulate matter.¹² According to Environmental Protection Agency (EPA) Administrator Gina McCarthy, “natural gas in the U.S. has been a game changer... [i]t’s been a significant benefit to the United States. It’s been a significant benefit to air quality.”¹³

Exporting U.S. LNG will reduce a broad spectrum of global greenhouse gas (GHG) emissions. DOE’s study entitled “Life Cycle Greenhouse Gas Perspective on Exporting Liquefied Natural Gas

¹⁰ International Energy Agency, “CO₂ Emissions from Fuel Combustion,” 2013, accessed March 5, 2015, <http://www.iea.org/publications/freepublications/publication/co2emissionsfromfuelcombustionhighlights2013.pdf>.

¹¹ Steven Mufson, “Ernest Moniz, MIT physicist, nominated as energy secretary,” *Washington Post*, March 4, 2013, accessed January 26, 2015, http://www.washingtonpost.com/business/economy/ernest-moniz-mit-physicist-is-to-be-nominated-as-energy-secretary/2013/03/04/e3fe68aa-808c-11e2-a350-49866afab584_story.html.

¹² EPA, “Air Markets Program Data,” accessed January 22, 2014, <http://ampd.epa.gov/ampd/>.

¹³ Jeff McMahon, “EPA Administrator Gina McCarthy Defends Natural Gas,” *Forbes*, September 25, 2014, accessed January 26, 2015, <http://www.forbes.com/sites/jeffmcmahon/2014/09/25/mccarthy-defends-natural-gas/>.

from the United States” found that U.S. natural gas consumed in Europe or Asia has lower life cycle GHG emissions than power generation from locally sourced fossil fuels.¹⁴

Conclusion

Thanks to the shale energy revolution, America has moved from a posture of energy scarcity to one of energy abundance. The U.S. can harness clean, abundant and affordable natural gas for both domestic consumption and exports to become a global energy leader.

This paradigm shift is driving economic growth, environmental improvements and enhanced energy security. However, to fully realize the potential presented by our natural gas abundance, it is imperative that we advance policies that allow America to sell its product overseas, just like producers of other American products.

To do that, we must have a more predictable and timely approval process that provides the certainty companies need to compete in global LNG markets and to improve economic conditions both here in America and for our strategic allies overseas who are eagerly awaiting access to America’s natural gas abundance. We encourage the administration and Congress to make this a priority, so our nation can seize this exceptional opportunity.

About ANGA

Representing North America’s leading independent natural gas exploration and production companies, America’s Natural Gas Alliance (ANGA) works with industry, government and customer stakeholders to promote increased demand for and continued availability of our nation’s abundant natural gas resource for a cleaner and more secure energy future. Learn more about ANGA at www.anga.us

¹⁴ U.S. Department of Energy, “Life Cycle Greenhouse Gas perspective on Exporting Liquefied Natural Gas from the United States,” May 29, 2014, 9.