Statement before the

Senate Energy and Natural Resources Committee

"The Important Role of U.S. LNG in Evolving Global Markets"

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Chairman Murkowski, Ranking Member Manchin and Members of the Senate Committee on Energy and Natural Resources, thank you for the opportunity to appear before you today to discuss the evolving global market for natural gas and the role that U.S. liquefied natural gas (LNG) plays in that market.

There is a profound transformation underway in global gas—with the United States at the center, as the world's largest producer, consumer, and source of incremental LNG supply. This new era offers enormous opportunities for the United States to create prosperity at home, enhance ties with friends and challenge foes, and support a fuel that can make a material contribution to our fight against climate change—especially if the environmental side-effects from the natural gas value chain are limited. Leadership in Washington has played a major role in this success story; my goal today is to highlight some areas where further focus could yield additional results. I have four takeaways for the Committee:

The United States is entering a global market that is changing, and its entry will accelerate that change. But change is evolutionary and multi-layered—thus, broad generalizations can mislead rather than illuminate. There are new players, new business models, and new trade routes, but these exist alongside business practices and patterns that have persisted for decades. More than ever, it is important to understand each region and market on its own terms, with due regard to the idiosyncrasies that make it special.

We are, in mid-2019, at a unique moment in the business cycle. There is an oversupply of LNG on the market, leading to historically low prices in Europe and Asia; at the same time, there is record-level investment and interest in new LNG supply; and, meanwhile, LNG is becoming part of several high-level geopolitical disputes affecting U.S. relations with both China and Europe. The LNG market is thus becoming much more competitive and somewhat more politicized—it is in this ultra-competitive market that existing U.S. LNG projects will need to survive, and new projects find a way to succeed.

We need a new institutional focus on gas and LNG. Multilateral organizations have played a central role in governing markets like crude oil or civilian nuclear energy; the institutional arrangements for gas are far less developed. Information transparency and data availability are poor—at least compared to oil markets. Concepts of energy security and resilience vary, even among advanced economies, and there are few shared metrics on how to measure energy security, much less enhance it. This new gas market needs new instruments.

LNG could use more help, especially in emerging economies. Gas demand is rising sharply, and LNG demand is rising even faster. But gas is also struggling in some regions, especially emerging Asia outside China, which is relying on coal to meet its energy needs, with serious repercussions for human health and the environment. The United States has existing policy and financing tools that could be sharpened to facilitate gas use in that part of the world.

Transformation in Global Gas and LNG Markets

There are several concurrent transformations taking place in gas markets, but the most important change is that the global energy system is relying increasingly on natural gas to meet its energy

needs; that this gas is being transported more and more via LNG; and that the United States is becoming a major player in that LNG market.

In 2018, 24 percent of the world's energy came from gas in 2018, the highest value ever.[1] Since 2000, LNG has grown more than twice as fast as total gas demand—as a result, LNG accounted for 11 percent of total gas consumption in 2018, up from 6 percent in 2000. In five years, from 2013 to 2018, LNG has registered an unprecedented surge in supply, growing by about a third—and that is even before all U.S. projects have reached their full production potential. By 2024, the International Energy Agency (IEA) forecasts that the United States will overtake Australia and Qatar as the largest LNG exporter in the world.[2]

The growth in volume has been accompanied by several other shifts. The first is complexity.[3] In the early 2000s, there were around ten countries that exported LNG and around ten countries that imported it. Trade routes were simple and routine: most LNG flowed either within the Atlantic and Pacific basins, or from the Middle East to the Pacific. By 2018, there were 19 exporters and 37 importers—with the latter, in particular, having grown sharply in recent years (10 countries started to import LNG from 2013 to 2018). And while intra-regional trade continues to dominate, there are new trade routes that have been created—and continue to be created with the rise of U.S. LNG exports as well as LNG shipped from the Arctic.

The structure of the LNG market is shifting too. In the early 2000s, most LNG was traded via long-term contracts, and the short-term market accounted for a mere 5 percent of all volumes. Over time, the short-term market has taken a bigger role, accounting for almost a third of the LNG trade since 2011 (the share has fluctuated between 27 and 31 percent).[4] This shift has had profound implications for gas pricing and energy security. At the same time, the short-term market for LNG made up less than 4 percent of the world's gas consumption—as such, the dynamics in that market should not be assumed to represent the gas market more broadly.

The pricing of gas is changing as well. In its latest survey of global gas prices, the International Gas Union noted that less than half of the gas consumed in the world was priced based on gas-on-gas competition in 2018; ~20 percent was priced in some relation to oil, and regulated pricing accounted for ~30 percent (the balance, below 5 percent, is priced in others ways).[5] And the big change is from regulated to gas-on-gas pricing (not away from oil indexation). In Asia, long-term LNG prices still track oil very closely.[6] Nor is there evidence that prices in different parts of the world move together.[7] As ever, gas pricing remains driven by micro, not macro factors.

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[1] Data in this paragraph from BP, Statistical Review of World Energy, June 2019, https://www.bp.com/en/global/corporate/energy-economics/statistical-review-of-world-energy.html.
[2] International Energy Agency (IEA), Gas 2019: Analysis and forecasts to 2024, https://www.iea.org/gas2019/.
[3] International Gas Union (IGU), World LNG Report 2019, https://www.igu.org/publications-page.
[4] IGU, World LNG Report 2019, https://www.igu.org/publications-page.
[5] IGU, Wholesale Gas Price Survey 2019, https://www.igu.org/publications-page.
[6] Nikos Tsafos, "Oil Still Drives Asian LNG Prices," Center for Strategic and International Studies (CSIS) Blog Post, June 19, 2019, https://www.csis.org/blogs/energy-headlines-versus-trendlines/oil-still-drives-asian-lng-prices.
[7] Nikos Tsafos, "Is Gas Global Yet?," CSIS Commentary, March 23, 2018, https://www.csis.org/analysis/gas-global-yet. There is, however, evidence that spot prices in Asia and European hub prices are, at times, highly correlated.

The final major shift is in geography. For two decades, Indonesia was the world's largest LNG supplier, a position it lost to Qatar in 2006. Now Australia has overtaken Qatar, and the United States might soon overtake Australia. Russia will be fourth, driven by the Arctic,[8] and having started LNG exports only a decade ago. These shifts are unprecedented. A similar transition is clear on the demand side. Japan has been the world's largest LNG importer since the early 1970s; South Korea has been second since the mid-1990s. Now China has overtaken South Korea and it might soon surpass Japan. China accounted for half the growth in LNG demand since 2012—and so China's strategy now has a disproportionate impact on LNG markets.[9] The geography of both supply and demand are changing dramatically.

My first important takeaway for the Committee is to appreciate the changes in the global gas market and understand how the United States is interacting or accelerating those changes; and to do so without resorting to broad strokes or the caricatures that often dominate the public discourse but to pay due attention to complexity, nuance and circumstance.

Unique Moment in the Business Cycle—Interacting with Geopolitics

Today's LNG market is dominated by two stories.[10] First, due to a surge in supply, there is a surplus of LNG looking for a destination—much of it is landing in Europe, leading to an above-average build-up in stocks. Hub prices in Europe, and prices for spot LNG in Asia have both fallen to their lowest point in a decade. At these price levels, there are serious questions about whether supply might be shut in; whether demand will respond; and whether the gap between long-term, oil-linked prices and spot prices will trigger a demand for contract renegotiations.

The second story is the unprecedented number of proposed LNG supply projects that might reasonably start construction over the next two years. Already, we have seen major projects take a final investment decision (FID) in Western Canada, the United States and Mozambique; and many projects are progressing towards FID. The geography of new supply will be dispersed, and the United States is unlikely to dominate it as much as it did the last wave. Instead, we will see supply growth from United States, Qatar, Russia, East Africa and Southeast Asia. The landscape is as competitive as ever—and several projects, including U.S. projects, are unlikely to make it to the finish line any time soon.

In this environment, we can expect to see companies tinkering with the business model in order to succeed.[11] We might see states step in and offer explicit or implicit support to their own projects. We might see countries that have stood on the sidelines, like Qatar, step in with big plans to recapture market share. We might also see a clearer interlinkage between LNG and broader geopolitical issues—like trade and sanctions, although how these will affect project

[8] Nikos Tsafos, "Is Russia Winning the Race to Develop Arctic Energy?," CSIS commentary, March 22, 2019, https://www.csis.org/analysis/russia-winning-race-develop-arctic-energy.
[9] Nikos Tsafos, "How Is China Securing Its LNG Needs?," CSIS commentary, January 9, 2019, https://www.csis.org/analysis/how-china-securing-its-lng-needs.
[10] Nikos Tsafos, "Gas Line, Q1 2019," CSIS, April 3, 2019, https://www.csis.org/analysis/gas-line-q1-2019; and Nikos Tsafos, "Gas Line Q2, 2019, CSIS, July 1, 2019, https://www.csis.org/analysis/gas-line-q2-2019.
[11] Nikos Tsafos, "U.S. LNG 2.0 Takes Shape," CSIS Commentary, May 2, 2019, https://www.csis.org/analysis/us-lng-20-takes-shape.

development is far from clear.[12] In short, this new wave is not going be merely driven by who can provide gas at the lowest cost—it will be a far more complex equation.

My second takeaway for the Committee is that despite historically low prices today, companies are betting billions to enable the next wave of LNG supply—and this wave will be far bigger, more diverse, and perhaps more politically complicated than earlier waves. The United States is still competitive in this expansion phase, but it will not dominate it. Instead, we can expect, over time, a market dominated by the United States, Qatar and Australia—with Russia in fourth place.

Renewed Multilateral Focus on Gas

Gas is often compared to oil, and one perennial question is when the global gas market will look more like oil. That conversation usually focuses on gas prices and when they might converge across regions; or when the spot market for LNG will become big enough to allow new projects to be built without having secured long-term contracts. Yet there is one area where gas lags far behind oil, but which gets far less attention: institutions. As gas becomes more global, driven by LNG, we will need to refresh and upgrade those institutions. I want to highlight two areas in particular.[13]

The first is data and information. We have a lot of data on gas and LNG, but it often comes with a time lag, it is dispersed, it resides behind paywalls, and is rendered inaccessible by differences in language, formats, and so on. In oil, everyone reads the monthly Oil Market Report from the IEA—that's a baseline that everyone starts from. Other organizations—the Energy Information Administration (EIA), the Organization of Petroleum Exporting Countries (OPEC)—release their own views as well, which give readers a range of possible assessments. We have specific metrics that we focus on—supply and demand growth, the level of storage in advanced economies, the shape of the forward curve, and so on.

In gas, that advanced information infrastructure mostly exists by private providers, which means it is often unavailable to policymakers and the public at large. Very simple tasks—comparing gas prices in the United States with Japan and the Netherlands—require relative sophistication by the reader to track down the information and convert the raw data to an understandable format. In some areas, the improvements in data have been significant; but often, these give us pieces of the puzzle, and thus we tend to over-focus on those pieces. Let me give one example.

The U.S. Department of Energy (DOE) and the EIA provide excellent information on U.S. LNG exports—we have good data on where U.S. LNG is going, and we have good data on the project pipeline (what project is online, what is under construction, etc.). But if you try to place those data points in context; for instance, if you ask, is more U.S. LNG going to Europe because it is displacing Russian gas right now, that's a difficult question to answer without proprietary data or without going through a very elaborate process of collecting data from open sources. Or, if you ask, these projects from the United States are just starting to export, what other projects in the

[12] Nikos Tsafos, "Will Chinese Tariffs Hurt U.S. LNG?," CSIS commentary, May 14, 2019, https://www.csis.org/analysis/will-chinese-tariffs-hurt-us-lng.
[13] This section draws from Nikos Tsafos, "A Global Gas Strategy for the United States," CSIS commentary, May 9, 2019, https://www.csis.org/analysis/global-gas-strategy-united-states.

world are doing the same—again, that's an answerable question but not something you can answer very quickly without third-party resources.

The second area I want to highlight is governance. The IEA was founded to promote the energy security of its members, and each member has made a commitment to hold stocks equivalent of 90 days of net oil imports. That measure may not be easily translatable to gas, but it is clear that we need to develop a more shared understanding of how to measure energy security. More importantly, we need a shared view on how to assess quantitatively the impact of possible shocks to the system. Let me give one example again.

In the world today, we are confronted with two possible physical shocks to the system: there is some turmoil in the Straits of Hormuz which could, in theory, disrupt LNG exports from the Gulf, as well as LNG inflows into the region; and there is a possible disruption to gas flows through Ukraine if there is no concrete agreement on transit of Russian gas once the existing contract expires on December 31, 2019.

On the former risk—a disruption from Hormuz—if you wanted a quick, publicly available assessment of what it might do to LNG markets, that's not easy to find. If you look, for instance, at the latest IEA Gas Security Review, the word "Hormuz" does not appear at all.[14] Of course, this is because the publication has a different purpose—to review the system's ability to manage security dimensions. But it is perhaps something worth doing.

The contrast with Ukraine is noticeable. Here too, we have a lot of speculation about how Europe would be impacted by a disruption. But we have something more in this case. A few years ago, Europe ran some stress tests on different disruption scenarios—including a cut of gas flows through Ukraine.[15] So we have a baseline for discussion, that one can update with more recent information. It is not perfect, but it is an important start.

My third takeaway for the Committee is that the United States will lead the world in LNG supply, and with that new position comes an opportunity to shape the conversation for a shared understanding of energy security, of what information needs to be collected and assessed, and on how energy security might be best pursued in a collective, multilateral framework. Creating this infrastructure is not about copying and pasting what works for oil. It will be different. But this conversation is still nascent, and the United States can help elevate it.

Supporting Gas Overseas

The U.S. government has a clear focus on supporting U.S. LNG exports.[16] So far, this focus has come mostly through advocacy—encouraging countries to look to the United States for their needs. After all, LNG is a private-sector driven business, and this will not change. However, the U.S. government has supported many LNG export projects around the world. The Export-Import Bank of the United States has been involved with projects in Brunei, Malaysia, Trinidad, Qatar,

[14] IEA, Global Gas Security Review 2018, October 2018, https://webstore.iea.org/global-gas-security-review-2018.
[15] ENTSOG, Security of Supply Simulation, 2017, https://www.entsog.eu/security-of-supply-simulation.
[16] This section draws from Nikos Tsafos, "A Global Gas Strategy for the United States," CSIS commentary, May 9, 2019, https://www.csis.org/analysis/global-gas-strategy-united-states.

Oman, Nigeria, Peru, Papua New Guinea and Australia.[17] It is hard to imagine the LNG map looking like it does today without the support of the U.S. government.

But if a country wants to import U.S. LNG, and perhaps build some related infrastructure to regasify that LNG and burn it in a power plant—the U.S. government has a far less developed toolkit to help with that. In part, this is because import projects have not traditionally relied on external finance to begin with—although this is changing.[18] In part this is because gas itself is often less competitive—which explains the lagging market share for gas in Asia outside China and the advanced economies.[19] But this also a matter of emphasis; as I explained in a recent publication:

> Ensuring that there are adequate financing or insurance products to meet the need for LNG imports should be a chief priority for the United States, especially allowing for equity participation as well as the financing of projects without major U.S. participation (both of which are allowed under the Better Utilization of Investment Leading to Development Act or the BUILD Act). Another possibility is to insure the sale of U.S. LNG. Earlier in 2019, OPIC provided insurance for a cross-border pipeline and gas sales from Israel to Egypt. The amounts are still small relative to what a long-term LNG contract might entail—but they show the growing ability to tailor products that respond to market needs. Often, when U.S. officials go overseas to promote U.S. LNG, the first question they encounter is: "where is the money?" The United States needs a better answer to that question to what it has offered so far (which is: "there is no money").[20]

My final takeaway for the Committee is that gas is often struggling to compete, and prospective importers of U.S. LNG are interested in tools that the U.S. government can bring to help them. The United States has some of these tools already, and it is important to ask how they might be repurposed to support the strategic goal of boosting gas consumption and, thus, also U.S. LNG exports.

[17] See Congressional Research Service, "Export-Import Bank Financing of Liquefied Natural Gas-Related Transactions," Memorandum to the Senate Energy and Natural Resources Committee, March 23, 2013, https://www.energy.senate.gov/public/index.cfm/files/serve?File_id=5CBE3406-2426-4615-83ED-9E2DDD71DCF2.

[18] For examples: Nikos Tsafos, "A Global Gas Strategy for the United States," CSIS commentary, May 9, 2019, https://www.csis.org/analysis/global-gas-strategy-united-states.

[19] Nikos Tsafos, "The Center of Coal Demand Keeps Shifting," CSIS commentary, October 15, 2018, https://www.csis.org/analysis/center-coal-demand-keeps-shifting; and Nikos Tsafos, "Is Gas Winning? It Depends," CSIS commentary, June 25, 2018, https://www.csis.org/analysis/gas-winning-it-depends.

[20] Nikos Tsafos, "A Global Gas Strategy for the United States," CSIS commentary, May 9, 2019, https://www.csis.org/analysis/global-gas-strategy-united-states.