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Vice President  
Washington Office

February 11, 2016

U.S. Department of Energy  
Office of Regulation and International Engagement  
Office of Fossil Energy  
Forrestal Building, Room 3E-042  
1000 Independence Ave, SW  
Washington, DC 20585

To Whom It May Concern,

Enclosed please find Exxon Mobil Corporation's comments in response to the "Notice of Availability of the 2014 EIA LNG Export Study and the 2015 LNG Export Study, and Request for Comments" issued by the Office of Fossil Energy, Department of Energy.

Sincerely,

A handwritten signature in black ink, appearing to read "Theresa Fariello". The signature is fluid and cursive, with a large initial "T" and a long, sweeping underline.

Attachment

## COMMENTS OF EXXON MOBIL CORPORATION REGARDING 2015 LNG EXPORT STUDY

Exxon Mobil Corporation (ExxonMobil) offers the following comments in response to the “Notice of Availability of the 2014 EIA LNG Export Study and the 2015 LNG Export Study, and Request for Comments” issued by the Office of Fossil Energy, Department of Energy (DOE).

### Summary

DOE commissioned Oxford Economics and the Center for Energy Studies at Rice University’s Baker Institute to undertake a study on the macroeconomic effects of U.S. LNG exports ranging from 12 Bcf/d to 20 Bcf/d. The study confirms that natural gas exports beyond 12 Bcf/d will result in overall economic benefits for consumers and the economy of the United States. This latest comprehensive study included a wide range of assumptions about the size of U.S. natural gas resources, U.S. gas demand, and the international gas marketplace in its analysis and evaluated multiple scenarios to assess the economic impacts of U.S. LNG exports. Analysis from the study concluded that:

- **The results of the study show that U.S. LNG exports will result in positive economic benefits for the country.** In fact, economic benefits increase with greater LNG export volumes.
- **Economic growth is long-term and sustainable.** The incremental gain to the U.S. economy and consumers when exports increase above 12 Bcf/d amounts to between \$7.7 billion and \$20.5 billion in average annual GDP growth over the period of 2026 – 2040.
- **Job creation is substantial.** Increasing LNG exports above 12 Bcf/d would create an average annual employment benefit of between 9,600 and 35,200 jobs over the period of 2026 – 2040.
- **LNG exports stimulate additional U.S. natural gas production.** New natural gas production generates economic activity and jobs. Greater LNG exports effectively add demand for U.S. natural gas, which facilitates expansion in the gas-producing domestic upstream sector.

The results of the 2015 LNG export study combined with the 2012 DOE-commissioned study (developed by NERA Consulting) reinforce the broad agreement that free trade increases economic growth and raises living standards at all levels of market exports. In recent years, this conclusion has been reconfirmed by multiple studies and economic models analyzing U.S. LNG exports. Unsurprisingly, DOE has yet to receive a credible argument that LNG exports are not in the public interest.

Tremendous growth in the availability of domestic natural gas supply has given the U.S. a competitive advantage and an opportunity to capture economic benefits through exports. Technological innovation contributed to this advantage, unlocking an abundance of natural

gas in the United States. Given gas abundance, increasing LNG exports will help to expand the American economy, create jobs domestically, and provide a cleaner-burning resource for power generation to international consumers. The DOE has overwhelming evidence to support expeditious approval of pending LNG export applications.

**Consistent with free trade principles, increases in U.S. LNG exports will result in positive net economic benefits for the country and consumers**

The 2015 LNG export study was prepared using the Global Economic Model of Oxford Economics. This leading and globally-integrated model is relied upon by finance ministries, major banks and blue chip companies for macroeconomic data. In addition, Oxford's Global Industry Model covers 100 sectors of the economy and enabled detailed study of key manufacturing sectors such as chemicals and metals. These tools and their application across a wide range of scenarios provide sound economic analysis of the effects of U.S. LNG exports. The results of the analysis point to similar conclusions as previous studies: that the overall economic impacts of LNG exports are positive at any export volume, and more exports generate greater benefits for the U.S., even when LNG exports rise above 20 Bcf/d.<sup>1</sup> The study finds in particular that, "greater LNG exports effectively serve as additional demand for U.S. natural gas, which facilitates expansion in the domestic upstream sector."<sup>2</sup> The expansion of natural gas production created by LNG exports will attract significant capital investments, which will support jobs and economic activity across the U.S. economy.

The study authors acknowledge that the economic benefits of producing natural gas liquids (NGLs) associated with natural gas (such as ethane, propane, and butane) were not included in their macroeconomic analysis, an issue which likely led to underestimation of economic benefits. The production of NGLs associated with natural gas provides a significant area of related economic activity, since NGLs are processed and flow heavily into the chemical sector.

By focusing only on the incremental effects of increasing LNG exports from 12 Bcf/d to higher levels, instead of comparing against the current level of zero exports, the study may obscure the real benefits. Because LNG exports today are effectively zero, the total benefit to consumers and the economy relative to current conditions would actually be much larger than what is reported in the study. In addition, the focus on incremental impacts for LNG exports between 12 Bcf/d and higher levels also obscures the total benefits and growth trend that occur across sectors of the economy, including in energy-intensive and general manufacturing areas.

The findings of this 2015 LNG export study echo repeated economic studies over recent

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<sup>1</sup> *The Macroeconomic Impact of Increasing U.S. LNG Exports*, Center for Energy Studies at Rice University's Baker Institute and Oxford Economics, October 29, 2015 pg. 15

<sup>2</sup> Center for Energy Studies at Rice University's Baker Institute and Oxford Economics, *Id.* pg. 12

years including the DOE-commissioned 2012 NERA report, a 2014 NERA update, analysis by ICF International, and other reports by Brookings Institution, Rice University, and Deloitte.<sup>3</sup> The conclusions of these studies are clear: that the benefits of trade are substantial; all levels of market-determined exports yield positive net benefits; and more exports generate larger benefits for the U.S. economy and consumers.

For economists, the benefits of trade are not controversial. According to Harvard University's economist Greg Mankiw, "Few propositions command as much consensus among professional economists as that open world trade increases economic growth and raises living standards".<sup>4</sup> Importantly, expanding trade encourages more investment and leads to mutual benefits and progress, both domestically and internationally.

The U.S. also has a long-standing commitment to free trade. The U.S. played a central role during the post-World War II era, working as a leader in establishing the General Agreement on Tariffs and Trade, the development of the World Trade Organization, and in pursuing groundbreaking trade agreements like NAFTA. As the world's leading producer of natural gas, the U.S. should unequivocally support the free trade of LNG.

According to DOE, this 2015 study was conducted to help the agency make an LNG export-related public interest determination for exports of natural gas to nations with which the U.S. does not have a free trade agreement. Section 3 of the Natural Gas Act mandates that DOE "shall issue" an order approving an application to import or export natural gas "unless, after opportunity for hearing, it finds that the proposed exportation or importation will not be consistent with the public interest."<sup>5</sup> Under the Natural Gas Act, the DOE must grant an

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<sup>3</sup> Source 2012 NERA report: <http://energy.gov/fe/services/natural-gas-regulation/lng-export-study>  
-2014 NERA report: <http://www.nera.com/publications/archive/2014/updated-macroeconomic-impacts-of-lng-exports-from-the-united-sta.html>  
-ICF International: <http://www.api.org/Policy-and-Issues/Policy-Items/LNG-Exports/US-LNG-Exports-Impacts-on-Energy-Markets-and-Economy>  
-Brookings Institution: [http://www.brookings.edu/~media/research/files/reports/2012/5/02%20lng%20exports%20ebinger/0502\\_lng\\_exports\\_ebinger.pdf](http://www.brookings.edu/~media/research/files/reports/2012/5/02%20lng%20exports%20ebinger/0502_lng_exports_ebinger.pdf)  
-Rice University: [http://bakerinstitute.org/media/files/Research/da5493d4/US\\_LNG\\_Exports\\_-\\_Truth\\_and\\_Consequence\\_Final\\_Aug12-1.pdf](http://bakerinstitute.org/media/files/Research/da5493d4/US_LNG_Exports_-_Truth_and_Consequence_Final_Aug12-1.pdf)  
-Deloitte: <http://www2.deloitte.com/content/dam/Deloitte/us/Documents/energy-resources/us-er-made-in-america.pdf>

<sup>4</sup> Source: <http://gregmankiw.blogspot.com/2006/05/outsourcing-redux.html>

<sup>5</sup> Section 3(a) provides as follows:

[N]o person shall export any natural gas from the United States to a foreign country or import any natural gas from a foreign country without first having secured an order of the [Secretary of Energy] authorizing it to do so. The [Secretary] shall issue such order upon application, unless after opportunity for hearing, [he] finds that the proposed exportation or importation will **not** be consistent with the public interest. The [Secretary] may by . . . order grant such application, in whole or part, with such modification and upon such terms and conditions as the [Secretary] may find necessary or appropriate.

application to export natural gas to nations with which the U.S. has a free trade agreement, as such exports are deemed to be consistent with the public interest. By contrast, the Natural Gas Act establishes a rebuttable presumption in favor of applications to export natural gas to countries with which the U.S. does not have a free trade agreement, and DOE must grant such an application unless an argument is presented to overcome that presumption. The 2015 study supports and further reinforces the evidence that U.S. LNG exports are in the public interest, and will lead to macroeconomic benefits for the country and consumers.

### **Vast U.S. unconventional gas resources unlocked by technologies create the case for exports**

The leading driver behind the opportunity for LNG exports is the tremendous increase in natural gas production and technically recoverable reserves unlocked by new technologies. Resources previously labeled as “uneconomical” or “inaccessible” can now be viably produced, leading to excess supply of natural gas in the U.S.

The U.S. is the world’s fastest growing region for hydrocarbon production in the world, outpacing Russia and Saudi Arabia as the world’s top producer of petroleum and natural gas since 2012. Growth in dry natural gas production to meet demand continues with the first 10 months of 2015 setting a new record despite low Henry Hub natural gas spot prices.<sup>6</sup> The Energy Information Administration (EIA) reported “In September [2015], total marketed production hit a record high of 81.1 Bcf/d”.<sup>7</sup>

According to EIA, the U.S. consumes about 26 trillion cubic feet (Tcf) of natural gas per year, while technically recoverable resources and reserves have grown more than 84 percent, reaching 2,276 Tcf from an estimate of 1,235 Tcf in 2008.<sup>8</sup> And EIA reserve estimates continue to grow. EIA’s *U.S. Crude Oil and Natural Gas Proved Reserves* report published in November 2015 indicates that U.S. proved natural gas reserves grew ten percent in 2014 to a record 389 Tcf.<sup>9</sup>

Other estimates of natural gas resources are much higher, including the biannual estimate of the Potential Gas Committee and estimates by consultant ICF International. Using its lower resource estimate, EIA in recent years has substantially under-estimated near term production in the agency’s *Annual Energy Outlook*. Even when EIA used its higher resource scenario, gas production was still under-estimated, although by a smaller margin.<sup>10</sup> The 2015

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15 U.S.C. § 717b(a)

<sup>6</sup> EIA data for dry gas production and Henry Hub prices; Henry Hub spot prices have not sustained a level above \$3 per mmBtu since the beginning of 2015.

<sup>7</sup> EIA, *Short-Term Energy Outlook*, Dec. 2015

<sup>8</sup> Source: <http://www.eia.gov/forecasts/aeo/assumptions/>

<sup>9</sup> Source: <http://www.eia.gov/todayinenergy/detail.cfm?id=23932>

<sup>10</sup> Source: potentialgas.org and <http://anga.us/media-room/testimony-and-filings/2015/12/8/anga-submits-comments-to-pennsylvania-dep-on-clean-power-plan-compliance>

LNG export study examines both EIA resource scenarios, but given EIA's recent underestimates of production, the high resource case may arguably be more realistic, and the benefits of exports may be understated in the cases with lower resource assumptions. Notably, the study found that the "overall gain for the U.S. economy is greatest in the High Resource scenario."<sup>11</sup>

### **America's vast natural gas resources enable benefits for both producers and manufacturers**

The abundance of U.S. natural gas resources supports multiple investment opportunities, including the expansion of manufacturing and the increased use of natural gas in power generation, in addition to LNG exports. As America's largest natural gas producer and a large consumer of gas for both energy and manufacturing, ExxonMobil is investing in both the expansion of manufacturing and in exporting LNG. The investments of the company reflect the feasibility of doing both.

In June 2014, ExxonMobil started construction on a multi-billion dollar ethane cracker at the Baytown, Texas chemical and refinery complex and also began construction on associated premium product facilities in Mont Belvieu, Texas. This expansion would make ExxonMobil one of the largest chemical manufacturers in the U.S.

ExxonMobil is also an equity partner in the LNG export project, Golden Pass Products. Golden Pass Products is currently seeking FERC authorization to construct facilities in Southeast Texas as part of an approximately \$10-billion investment. The project has received DOE authorization for exports to free trade agreement countries and is awaiting DOE approval to export to non-free trade agreement countries.

### **Environmental benefits of natural gas**

Natural gas is the cleanest burning fossil fuel and is being used throughout the world to reduce carbon dioxide emissions. Compared to coal, the use of natural gas for power generation emits far fewer emissions of carbon dioxide, particulates and sulfur oxides. As the world demand for electricity continues to grow, the long-term outlook for natural gas remains strong.

Trading in natural gas is expected to expand rapidly, mostly due to projected growth in LNG. ExxonMobil's *Outlook for Energy* estimates that global LNG trading is expected to almost triple, rising to about 100 Bcf/d in 2040.<sup>12</sup> ExxonMobil estimates that by 2040, about 25 percent of the world's natural gas demand will be met by LNG shipments or interregional

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<sup>11</sup> *The Macroeconomic Impact of Increasing U.S. LNG Exports*, Center for Energy Studies at Rice University's Baker Institute and Oxford Economics, October 29, 2015 pg.15

<sup>12</sup> *The Outlook for Energy: A View to 2040*, <http://corporate.exxonmobil.com/en/energy/energy-outlook>

pipeline trade, compared to about 15 percent in 2014. LNG will be essential to meeting the world's growing need for natural gas – particularly in the fast-growing economies of the Asia-Pacific region, where LNG demand is expected to grow by about 60 percent over the next decade, accounting for about two-thirds of global LNG demand growth.<sup>13</sup>

Much of the LNG demand growth will serve rapidly expanding markets including demand for power in Asia. In parallel with the expanding role for natural gas, global energy-related carbon dioxide emissions likely will peak around 2030 and then decline. In addition, carbon intensity of the global economy is likely to be reduced by half through 2040, reflecting significant gains in the energy efficiency of economies worldwide and a gradual transition to lower carbon-intensive energy sources.

Participating in the international market for clean-burning natural gas helps countries around the world meet air quality and emissions standards. A 2014 report by the United Nations Intergovernmental Panel on Climate Change promotes natural gas as an important tool in reducing global GHG emissions.<sup>14</sup>

A recent study commissioned by the Center for LNG and completed by PACE Global measured emissions from every part of the LNG process – from wellhead, to liquefaction plant, to export by tanker, to the LNG receiving terminal, and finally to the end-user for power generation. This comprehensive study of the lifecycle of greenhouse gas emissions from LNG concluded that “in every scenario considered, exporting U.S. – produced natural gas creates significantly less emissions than continued use of coal”.<sup>15</sup> The PACE study found that compared to LNG, a coal-fired power plant will emit between 92 and 194 percent more greenhouse gas emissions on a life-cycle basis.<sup>16</sup>

Furthermore, in the U.S., data from the Environmental Protection Agency (EPA) show that methane emissions have fallen over the past decade while the number of new U.S. wells has greatly increased. From 2005 to 2012, EPA data show that the number of oil and natural gas wells increased by 7.5 percent, while methane emissions decreased by about 11 percent.<sup>17</sup>

Harvard Professor Lawrence Summers, a former U.S. Treasury Secretary and former director of the National Economic Council, stated in 2014 that allowing the export of natural gas should be an obvious choice: “The question is whether we are going to organize our public policies in a way that enables that natural gas to be shared with the rest of the world so that it can do there what it has done here, permit the displacement of coal, or whether we are going to seek to horde that natural gas here and allow coal exports to continue on a

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<sup>13</sup> The Outlook for Energy, *Id.*

<sup>14</sup> Source: [http://report.mitigation2014.org/drafts/final-draft-postplenary/ipcc\\_wg3\\_ar5\\_final-draft\\_postplenary\\_chapter7.pdf](http://report.mitigation2014.org/drafts/final-draft-postplenary/ipcc_wg3_ar5_final-draft_postplenary_chapter7.pdf)

<sup>15</sup> Source: <http://www.paceglobal.com/pace-global-report-commissioned-by-the-center-for-lng/>

<sup>16</sup> Pace Global, *Id.*

<sup>17</sup> EPA *Greenhouse Gas Inventory Report* April 2015

substantial scale. I cannot see a rational argument for the latter course.”<sup>18</sup>

U.S. LNG exports can provide a pathway to a cleaner energy future in fast-growing economies around the world. Exporting LNG would help efforts to reduce global greenhouse gas emissions as existing coal-fired electricity generation and new capacity needs are supplied with natural gas. This is particularly beneficial in countries where access to lower emission energy sources is otherwise limited.

### **Abundant evidence to support U.S. LNG exports**

DOE’s 2012 and 2015 studies both provide strong economic support for the statutory presumption in favor of the approval of all qualified LNG export applications. No credible argument has been made to the DOE showing that LNG exports are not in the public interest.

DOE’s latest study confirms that U.S. LNG exports beyond 12 Bcf/d will lead to net economic benefits for the U.S. economy. The vast natural gas resource base in the U.S. allows for both domestic consumption as well as exports. The 2015 study reinforces that LNG exports are in the public interest, and it provides a clear basis for DOE to expeditiously approve LNG exports.

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<sup>18</sup> September 9, 2014, Larry Summers at Brookings Institution, “Changing Markets: The Future of U.S. Energy Security and Oil Export Policy,” per transcript posted at larrysummers.com, [http://larrysummers.com/wp-content/uploads/2014/09/140910\\_Brookings\\_Energy\\_Transcript\\_jd.pdf](http://larrysummers.com/wp-content/uploads/2014/09/140910_Brookings_Energy_Transcript_jd.pdf)