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Subject:	NRDC Comments on DOE LNG Export Study
Date:	Thursday, January 24, 2013 4:26:52 PM
Attachments:	NRDC Comments on DOE LNG Export Study 1.14.13.pdf

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NRDC respectfully submits the attached comments on the DOE LNG Export Study.

Sincerely,

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The Natural Resources Defense Council (NRDC) respectfully submits these comments on the 2012 Liquified Natural Gas Export Study (LNG Export Study) commissioned by the U.S. Department of Energy. 77 Fed. Reg. 73627 (Dec. 11, 2012).

I. Introduction

NRDC is an international non-profit environmental advocacy organization with 1.3 million members and supporters and with offices in New York, Washington D.C., Chicago, San Francisco, Los Angeles, and Beijing. Curbing global warming pollution and building the clean energy future are NRDC's top institutional priorities. The devastating impacts of climate change are becoming clearer every year, confirmed by a draft report issued by the Global Climate Research Program (January 2013) which stated that there is "unambiguous evidence" that the earth is warming. "Certain types of weather events," the panel concluded, "have become more frequent and/or intense, including heat waves, heavy downpours, and, in some regions, floods and droughts. Sea level is rising, oceans are becoming more acidic, and glaciers and arctic sea ice are melting." National Climate Assessment Draft Report (Jan. 11, 2013) at 1.

NRDC works to build a healthier energy future -- one that is centered on clean, safe, renewable sources of power, used efficiently. Energy efficiency and renewable energy must be our country's top energy priorities because they are the quickest, cleanest and cheapest solutions to global warming and other pollution problems.

While natural gas has many important uses in the United States, the recent rapid expansion of hydraulic fracturing ("fracking") to produce natural gas in the United States has taken place against a backdrop of inadequate federal and state regulation and enforcement. Fracking run amuck has harmed communities and produced an array of environmental and public health impacts and risks. Whether natural gas produced in the United States is used for domestic power generation, heating, manufacturing or any other purpose, or whether it is exported and used internationally, NRDC opposes expanded fracking in the United States until effective safeguards are in place. See http://www.nrdc.org/energy/gasdrilling/.

The use of fracking in the United States has resulted in a glut of natural gas and in record low natural gas prices. Whereas just five years ago, the United States was considering a host of applications for facilities to import natural gas from other countries in liquefied form, the United States today is in the opposite situation. Although the United States has long engaged in a low-level of natural gas exports to other countries, it is now considering almost two dozen applications to export high volumes of Liquified Natural Gas ("LNG") to countries across the world. Under federal law, the U.S. Department of Energy ("DOE") must review these applications under a "public interest" standard, but this review is effectively limited to applications that seek to export LNG to countries with which the United States does not have a free trade agreement, including China, India and Japan.

Although the definition and scope of the applicable "public interest" standard is not defined by statute or regulation, DOE states that the focus of its "public interest" review is its "continuing duty to monitor supply and demand conditions in the United States in order to ensure that

authorizations to export LNG do not subsequently lead to a reduction in the supply of natural gas needed to meet essential domestic needs." 77 Fed. Reg. at 73628.

NRDC submits that this is far too narrow an interpretation of the public interest. Instead, DOE should undertake a careful and considered examination of the economic and environmental impacts of U.S. LNG exports both in the United States and internationally. [1] DOE's inquiry should include, at minimum, the following key questions.

First, DOE should undertake a more searching review of two of the potential impacts of LNG exports in the United States: 1) the risk that increased natural gas prices due to exports might lead to renewed growth in coal-fired electricity, with associated environmental and economic impacts; and 2) the risk that a higher level of exports might cause expanded fracking that federal and state governments and communities are still unprepared to address, including the environmental and economic costs of such an expansion.

Second, DOE should also consider the economic and environmental impacts of LNG exports on the non-free trade agreement countries that might receive these exports, such as China and India, including the extent to which LNG exports might help to displace the dominant role of coal-fired power generation in these countries and the public health, environmental and economic benefits of such displacement, as well as any impact of LNG exports on these countries' investments in clean energy. The climate and energy options and choices of other countries, particularly India and China, will have reverberations in the United States and across the globe. Many developing economies, like India and China, are at a cross roads in determining their energy future. For example, India currently has 210 gigawatts of installed capacity, currently dominated by coal-based production. India's current energy demand outstrips its supply as demonstrated by India's historic blackout this summer. As these economies continue to grow, their energy needs and related-emissions will also grow. Thoroughly considering the economic and environment impact in developing economies as part of the public interest inquiry is critical to determining global economic, health and climate impacts on LNG exports.[2]

To date, DOE has not sufficiently tackled these questions. The LNG Export Study that DOE has commissioned and offered for public comment is flawed and either skirts these questions entirely or answers them incompletely. NRDC urges DOE to address the flaws identified below in the LNG Export Study. We also urge DOE to engage in a rulemaking or other process to

[1] While the Supreme Court has noted that the public interest under the Natural Gas Act is primarily advanced through "the orderly development of plentiful supplies of…natural gas at reasonable prices," Nat'l Ass'n for Advancement of Colored People v. Fed. Power Comm'n, 425 U.S. 662, 670 (1976), the Court has specifically recognized that consideration of "conservation [and] environmental" questions is also appropriate. Id. at 670 n. 6.

[2] In undertaking this inquiry, DOE should examine the lifecycle energy usage and environmental impacts associated with the use by recipient countries of LNG exported from the United States, including the energy and emissions association with compression and transportation of LNG, and should also conduct a comparable lifecycle analysis of coal extraction, transportation and combustion.

develop criteria and standards to define the "public interest" standard, consistent with these comments.

Natural gas prices have long been volatile and subject to price spikes over time, and this trend will no doubt continue into the future regardless of the ultimate policy that the United States adopts on LNG exports. Energy prices, including natural gas prices, will increase or decrease over time in reaction to an array of factors, including variations in demand and supply and changes in federal and state energy and environmental policies. To reduce price volatility, keep energy bills as low as possible over the long-term, and to protect the environment and public health, the United States must promote all cost effective energy efficiency for natural gas and electricity end uses and reduce our country's reliance on fossil fuels by building a more diverse, sustainable and low-carbon set of energy resources.

II. Flaws in the LNG Export Study

A. Overview

As DOE describes, the Natural Gas Act requires that DOE review export applications for natural gas, including LNG, under a "public interest" standard. 77 Fed. Reg. at 73627-28; 15 U.S.C. § 717b. LNG export applications submitted by companies that seek authority to export natural gas to countries with which the United States has entered into a free trade agreement requiring national treatment for trade in natural gas ("free trade agreement countries") are deemed by the Natural Gas Act to be in the public interest. However, applications to export LNG to countries with which the United States has not entered into a free trade agreement (non-free trade agreement countries) must be reviewed by DOE under a "public interest" standard and may not be granted if DOE finds that they would not be consistent with the public interest. 15 U.S.C. § 717b(a).

As part of its "public interest" review, DOE is now considering 15 applications seeking authorization to export LNG from the lower-48 states to non-free trade agreement countries.[3] As part of its review of these applications, DOE commissioned two studies: an analysis performed by the Energy Information Administration (EIA), published in January 2012 (EIA Report") and an evaluation performed by NERA Economic Consulting, entitled Macroeconomic Impacts of Increased LNG Exports from the United States ("NERA Report"). NRDC's comments focus on the NERA Report.

There are a number of flaws in the NERA Report, as discussed below, which DOE should address. Overall, NERA's analysis: 1) underestimates demand for natural gas in the United

[3] As of January 11, 2013, DOE had received 17 applications to export LNG to non-free trade agreement countries. This proceeding includes 15 of 16 pending applications; the 16th application was submitted by Pangea LNG (North America) Holdings, LLC on December 19, 2012, after notice of this proceeding was published. See "Applications Received by DOE/FE to Export Domestically Produced LNG from the Lower-48 States (as of January 11, 2013)," http://www.fossil.energy.gov/programs/gasregulation/reports/summary_lng_applications.pdf, in which DOE lists 16 pending non-FTA applications and the approved export application for Sabine Pass Liquefaction, LLC (dated August 7, 2012).

States; 2) underestimates the potential impacts of LNG exports on natural gas prices in the United States; and 3) wholly neglects to estimate public health and environmental damages that are routinely estimated in regulatory impact analyses using widely accepted measures.

The NERA Report purports to assess the economic welfare effects of natural gas exports, and consistent with traditional economic theory it concludes that reducing constraints on exports always increases economic welfare. However, it makes no attempt to include environmental impacts in its measure of welfare. The EIA Report upon which the NERA report builds shows that there are modest increases in CO2 emissions in the U.S. with higher exports due to: 1) greater use of coal-fired electricity due to higher natural gas prices attributable to these exports; and 2) increased carbon emissions from the LNG liquefaction process. EIA Report at 19. There is a slight increase in renewable energy as well, but EIA's model indicates that the reduction in gas generation is replaced mostly by coal. There is also a modest reduction in total energy demand; the increase in renewable energy is smaller than the demand reduction. Id. at 17.

NRDC has three high level critiques of the NERA study, in addition to the detailed comments in the next section.

First, the NERA report does not provide a meaningful measure of the "public welfare" impact of LNG exports because it ignores environmental externalities, including global warming, air pollution, water pollution and other pollution impacts. To address this omission, DOE should examine the impact of life cycle LNG exports on air pollution emissions and the resulting negative welfare effects of such emissions increases. This appears to be within the capabilities of its modeling tool (that National Energy Modeling System, or "NEMS"). DOE could also used EPA's standard approaches for valuing the welfare impacts of changes in CO2, NOx, and SO2 emissions and ozone levels. Other forms of air pollution such as air toxics and hazardous air pollutants should also be accounted for. As discussed below, DOE should also consider more appropriate (higher) estimates of the welfare impacts of carbon emissions (i.e. the social cost of carbon emissions as calculated by Johnson and Hope). Finally, DOE should examine the impact of LNG gas exports on the welfare of communities affected by natural gas production and the costs borne by these communities.

Second, a number of the environmental impacts associated with expanded LNG exports could be mitigated or reduced by the enactment of stronger federal and state laws and regulations. But the NERA report does not examine the effects of stronger environmental safeguards on natural gas production in conjunction with gas exports. Nor does the NERA report examine the potential for natural gas efficiency in the United States in all sectors and the impact of reduced demand due to enhanced efficiency on natural gas prices.

Third, consistent with its limited assignment, the NERA Report also fails to examine any economic and environmental impacts, either positive or negative, in countries outside of the United States

B. Specific Comments

1. The NERA Report's measure of GDP assumes perfect markets with prices that reflect all costs of production; negative environmental externalities are ignored.

The NERA Report makes no attempt to estimate changes in pollution levels from traditional fossil fuel pollutants or carbon pollution, or their associated economic damages. For example, carbon emissions increase both as coal use increases in response to natural gas price increases, and from carbon emissions that occur as a result of the liquefaction process. Moreover, expanded natural gas production will be accompanied by expanded leakage of methane, a potent greenhouse gas, from the natural gas production, transmission and distribution system. The economic damages associated with these and traditional pollutants can be quantified with readily available and widely used measures. For example, the Environmental Protection Agency has a central estimate of $21 in economic damages per ton of CO2, and an upper estimate of $65 per ton. EIA's High Shale scenario could increase CO2 emissions by as much as 79 million tons per year on average between 2015 and 2035 (Table 2, EIA report, high/rapid case). At EPA's central estimate, that amounts to $1.67 billion in economic damages from carbon pollution, and at its high estimate $5 billion. Moreover, Johnson and Hope (2012) [4]show that had EPA incorporated into its model an intergenerational discount rate of 1 percent (as estimated in the economics literature), damages would be at $266 per ton, putting total carbon economic impacts from this EIA scenario at $21 billion. For comparison, NERA's net gains in GDP range from roughly $8 billion to $20 billion (NERA Report at 8, Figure 3). Note that these are only carbon damages and do not include other traditional fossil fuel emission damages, and other damages that have not yet been quantified—such as impacts to water, local air, land, habitat and public health.

2. An increase in income to resources owners that is greater than costs to manufacturers and consumers is not necessarily an increase in U.S. social welfare.

The NERA Report asserts that the net increase it projects in U.S. income represents an increase in social welfare. NERA Report at 6-7. This conclusion is based upon one, very narrow, criterion for an improvement in social welfare -- namely a Pareto improvement. A Pareto improvement is one in which gains to winners exceed those of losses to losers, so that there is a net gain to society regardless of whether such compensation actually occurs. To its credit, NERA notes that benefits of LNG exports will go to owners of natural gas assets, while costs will be borne by manufacturers and consumers. Id. at 8, 9 and 13. But this does not mean social welfare has improved: NERA skirts the fact that the number of losers will far outweigh the number of winners, due to the fact that a very large majority of assets are owned by a very small minority of Americans. NERA also ignores the potential losses to residents of communities where natural gas is produced and processed, including real economic losses in the form of decreased property values, increased health care costs, and more. These losses have been quantified by

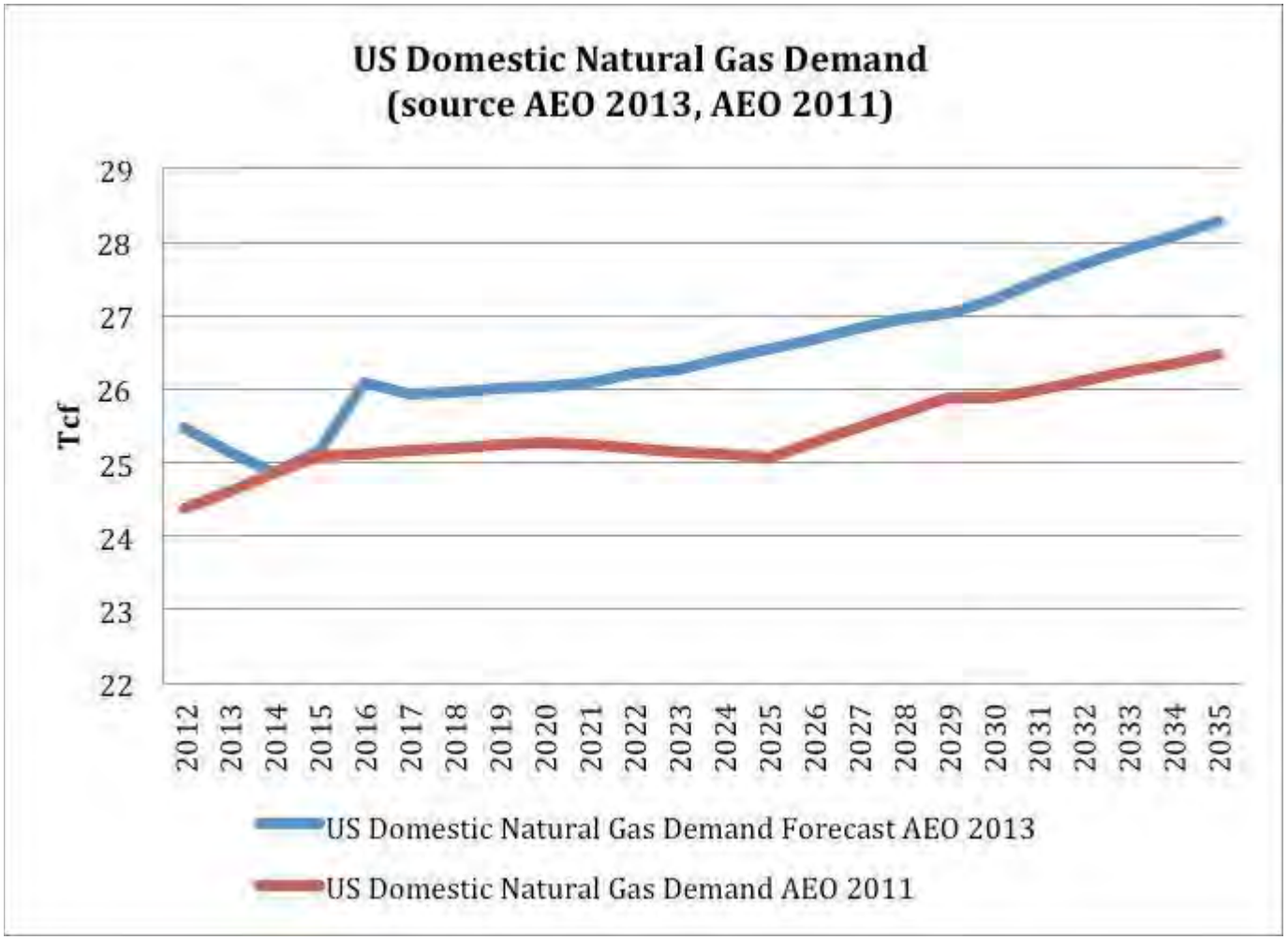
[4] Johnson, LT, and Hope, C (September 2012). The social cost of carbon in U.S. regulatory impact analyses: An introduction and critique. Journal of Environmental Studies and Sciences 2(3). http://www.springerlink.com/content/863287021p06m441.

economists. See
http://switchboard.nrdc.org/blogs/amall/new_economic_study_fracking_ri.html)

3. The NERA Report assumes higher prices / lower demand for natural gas than current EIA estimates

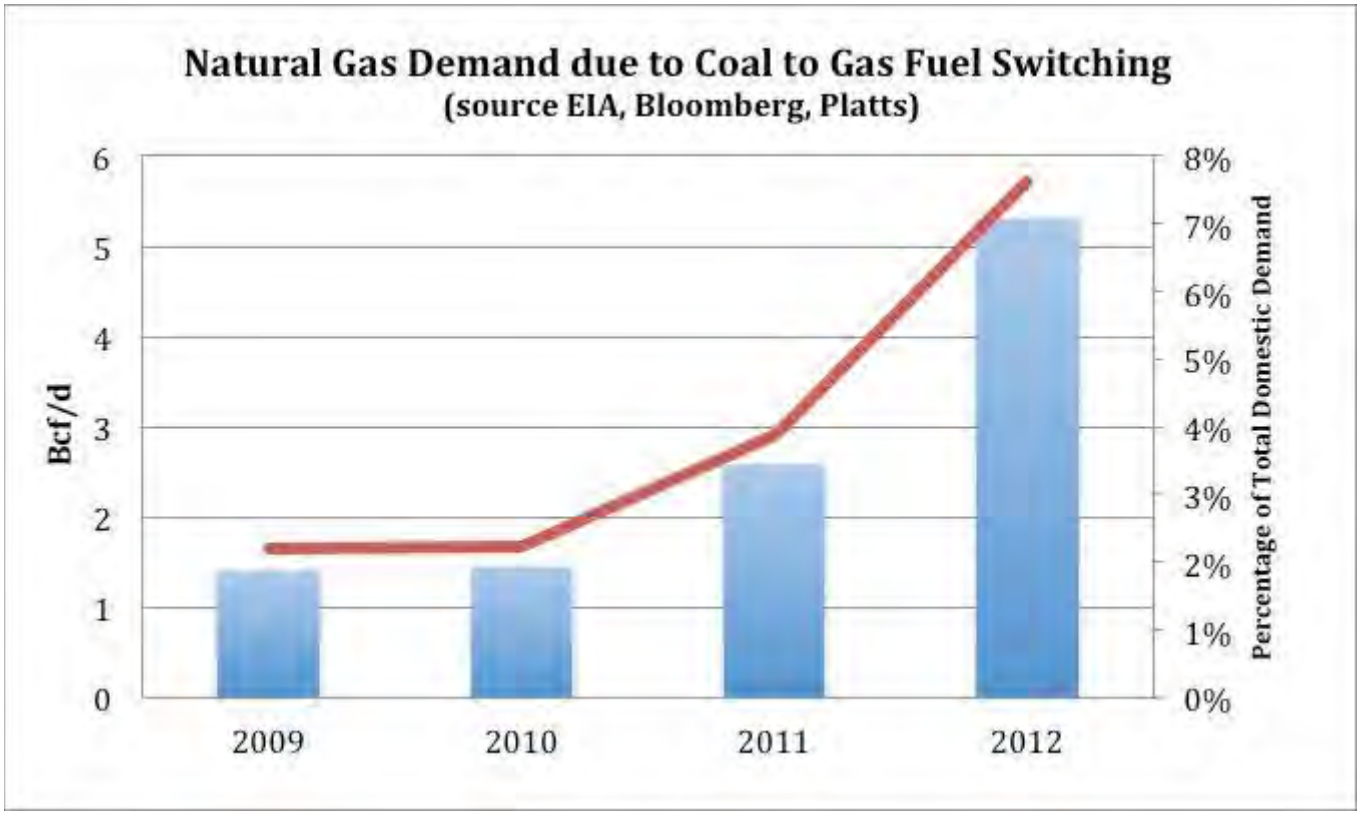
The EIA's current estimates for natural gas prices are significantly lower than those used in the NERA report. When these lower natural gas prices are included in the EIA analysis, the United States' demand for natural gas rises by roughly 4.6% over the next 20 years led by more aggressive fuel switching by industrial and utility customers. See Figure One below. Indeed, fuel switching away from coal to natural gas has already increased dramatically over the past several years with coal to gas switching accounting for 7.6% of total domestic demand in 2012. See Figure Two below. This recent significant increase in domestic demand for natural gas is not factored into the NERA Report and as a result significantly underestimates the potential impact of LNG exports on domestic natural gas prices.

FIGURE ONE



Sources:
AEO 2011 http://www.eia.gov/oiaf/aeo/aeoref_tab.html
AEO 2013 http://www.eia.gov/forecasts/aeo/er/index.cfm

FIGURE TWO



Sources:

EIA – Natural Gas Consumption - AEO 2013 http://www.eia.gov/forecasts/aeo/er/index.cfm
America's Energy: Coal (Jan. 25,2013); Goldman Sachs Research, Brian Singer CFA

4. The absence of either a positive supply, or negative demand, shock scenario.

NERA's report built upon and assessment done by EIA, in which EIA did a hypothetical analysis looking at the effect of export levels on domestic natural gas prices. EIA did not examine whether the export levels it specified could in fact be sold at high enough world prices to support the calculated domestic prices. NERA therefore had to estimate the world prices at which EIA's export levels could be sold on the world market. NERA Report at 3. Interestingly, the NERA report projected zero exports for the three EIA scenarios that it used for its baseline scenarios. Id. at Figures 144-46. NERA therefore constructed two scenarios to force positive exports: one in which there was a positive shock (i.e. increase) in world demand for natural gas (which would increase world prices) and another which added to that demand shock a negative

shock (i.e. decrease) in world supply (which would also increase world prices). Id. at 4 and Figures 147-164. However, it did not do the reverse. Opposite scenarios could occur: countries might reduce their demand for LNG imports (a negative demand shock, for example if they pull back supply from the world market to use their gas for domestic purposes), or increase their supply of LNG exports (a positive supply shock, for example, from a price-setting monopolistic producer like Qatar increasing output; importantly, NERA assumes Qatar does not change its output in response to world market conditions). Since NERA's forecast of global LNG exports is 50% below market estimates, an external supply shock that would benefit US LNG exports is highly unlikely. A more likely scenario is a negative domestic supply shock resulting from long-term commitments to provide US domestic natural gas supplies for export.

5. Other Flaws in the NERA Report

Although not core to NRDC's analysis or perspective, NRDC notes a number of other flaws in NERA's economic analysis that further demonstrate the skewed nature of its conclusions. These include the following:

Financing by non-US firms. NERA makes a simplifying assumption that all investment would come from U.S. firms. NERA Report at 5. While foreign funding of natural gas development would not affect the domestic employment created from such activity, it will affect the extent to which profits from that investment remain in the US, and in turn NERA's profits and GDP growth estimates. A proper analysis would assess what percentage of new investment is likely to come from foreign investors, and what portion of profits from these investments will count toward other countries' GDP rather than that of the U.S. Yet NERA does not provide any such assessment, so we do not know to what extent its simplifying assumption would affect its results.

Impact of Long-Term Contracts. NERA should assume that long-term export contracts are associated with every LNG terminal that its model predicts will be built because such contracts would be needed to secure financing for the construction of the facility. The study fails to examine the implication of locking up a significant portion of U.S. natural gas production in such long term contracts on the flexibility of U.S. energy markets and natural gas price volatility.

Conclusion

For the reasons discussed above, the flawed LNG Export Study that DOE has commissioned and offered for public comment provides an inadequate basis for DOE's public interest review of the pending LNG export applications to non-Free Trade agreement countries. NRDC urges DOE to address the flaws in the LNG Export Study identified in these comments. We also urge DOE to engage in a rulemaking or other process to develop criteria and standards to define the "public interest" standard, consistent with these comments. Thank you for considering these comments and please feel free to contact us if would you like further information.

Respectfully Submitted,

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