ATTACHMENT G

Independent Statistics & Analysis
U.S. Energy Information Administration

Effect of Increased Levels of Liquefied Natural Gas Exports on U.S. Energy Markets

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Introduction

This report responds to a May 29, 2014 request from the U.S. Department of Energy's Office of Fossil Energy (DOE/FE) for an update of the Energy Information Administration's (EIA) January 2012 study of liquefied natural gas (LNG) export scenarios. This updated study, like the prior one, is intended to serve as an input to be considered in the evaluation of applications to export LNG from the United States under Section 3 of the Natural Gas Act, which requires DOE to grant a permit to export domestically produced natural gas unless it finds that such action is not consistent with the public interest. Appendix A provides a copy of the DOE/FE request letter.

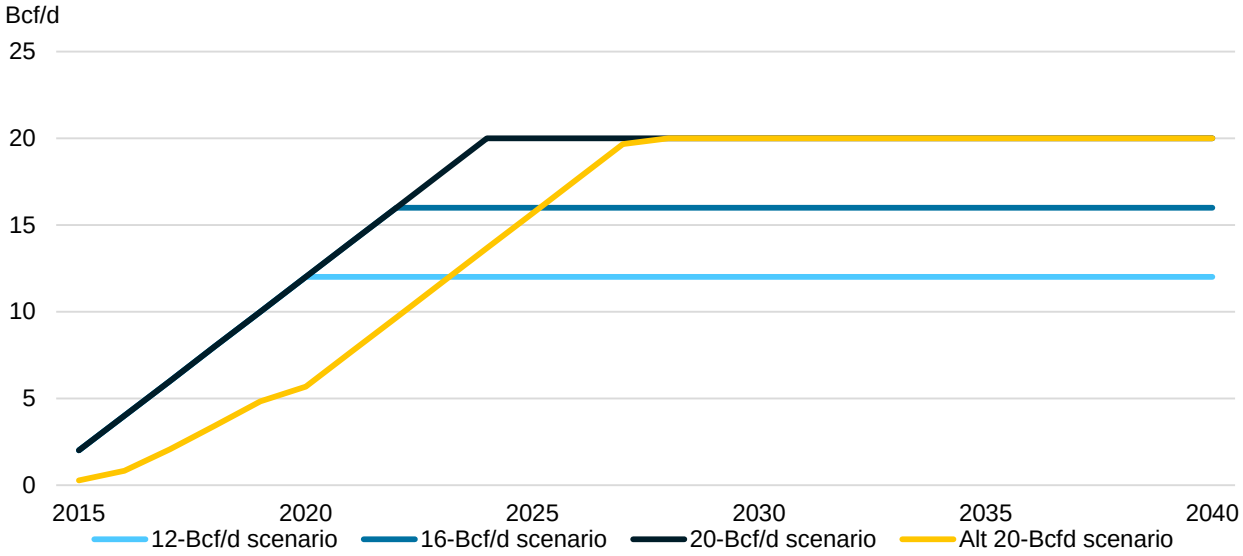
DOE/FE asked EIA to assess how specified scenarios of increased exports of LNG from the Lower 48 states could affect domestic energy markets, focusing on consumption, production, and prices. The DOE/FE scenarios posit total LNG exports sourced from the Lower 48 states of 12 billion standard cubic feet per day (Bcf/d), 16 Bcf/d, and 20 Bcf/d, with these exports phased in at a rate of 2 Bcf/d each year beginning in 2015.

DOE/FE requested that EIA consider the specified Lower 48 states LNG export scenarios in the context of baseline cases from EIA's 2014 Annual Energy Outlook (AEO2014) that reflect varying perspectives on the domestic natural gas supply situation, the growth rate of the U.S. economy, and natural gas use for electricity generation. The AEO2014 cases considered in this report include:

- The AEO2014 Reference case
- The High Oil and Gas Resource (HOGR) case, which reflects more optimistic assumptions about domestic natural gas supply prospects than the Reference case
- The Low Oil and Gas Resource (LOGR) case, which reflects less optimistic assumptions about domestic oil and natural gas supply prospects than the Reference case
- The High Economic Growth (HEG) case, in which the U.S. gross domestic product grows at an average annual rate 0.4 percentage points higher than in the Reference case, resulting in higher domestic energy demand
- The Accelerated Coal and Nuclear Retirements (ACNR) case, in which higher costs for running existing coal and nuclear plants result in accelerated capacity retirements, resulting in more reliance on natural gas to fuel electricity generation than in the Reference case

EIA recognizes that the ramp-up specified by DOE/FE for the scenarios analyzed in this report, under which total Lower 48 states LNG exports reach 12 Bcf/d in 2020, is extremely aggressive, indeed almost impossible, and that the ultimate LNG export levels specified by DOE/FE are also very unlikely for some of the baselines. EIA understood that the DOE/FE scenarios were intended to provide results that show an outer envelope of domestic production and consumption responses that might follow from the approval of export licenses beyond 12 Bcf/d. Accordingly, EIA also included a 20 Bcf/d export scenario, applied to the Reference case, with a delayed ramp-up to identify the impact of higher LNG exports implemented at a more credible pace. The DOE/FE scenarios, as well as the alternative 20 Bcf/d (Alt 20-Bcfd) scenario are shown in Figure 1.

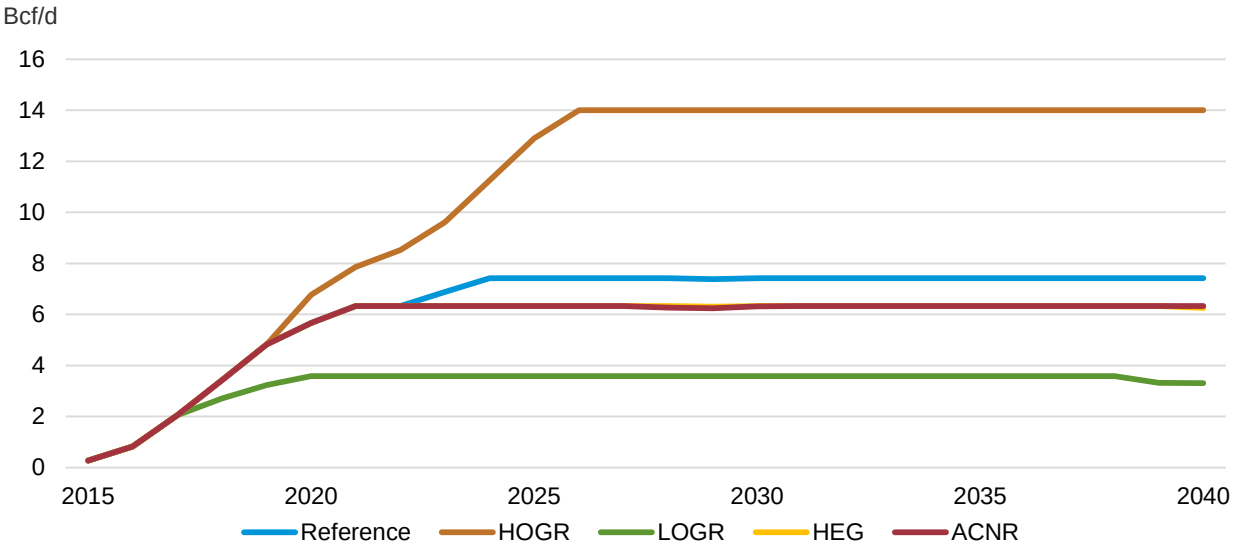
Figure 1. Lower 48 states LNG exports in scenarios specified by DOE/FE



Each of the five AEO2014 cases used as baselines in this study already includes some amount of LNG exports from the Lower 48 states. The LNG exports in the AEO2014 baseline cases, rather than the scenarios specified for this study, reflect EIA's own views on future LNG exports. As shown in Figure 2, LNG exports from the Lower 48 states in the baselines have projected 2040 levels ranging from 3.3 Bcf/d (LOGR case) to 14.0 Bcf/d (HOGR case). Projected exports are positively correlated with the abundance of the domestic resource base, and negatively correlated with the level of domestic natural gas demand.[1]

[1] In the HOGR baseline case, projected Lower 48 states LNG exports exceed 12 Bcf/d, one of the specified DOE/FE scenarios, by the mid-2020s. Although the 12-Bcf/d scenario with the HOGR case assumptions is included in the figures and tables of this report, it is excluded from the narrative of the discussion of the ranges of results due to LNG exports being less than the baseline.

Figure 2. Lower 48 states LNG exports in the five AEO2014 baseline cases

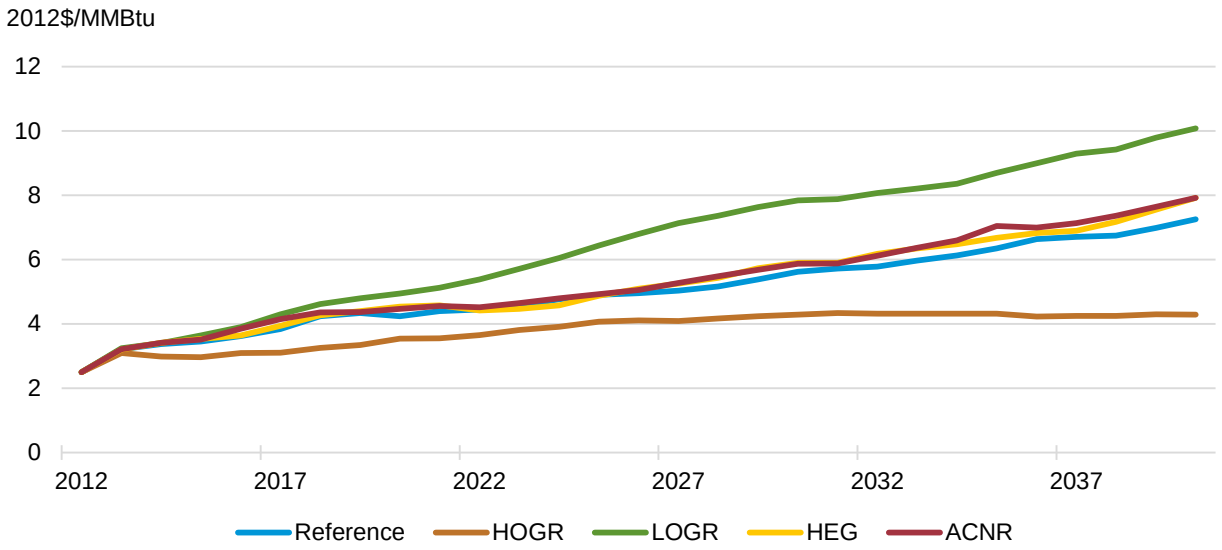


Note: The HEG and ACNR baselines have very similar LNG export paths that are indistinguishable in this figure.

As shown in Figure 3, projected U.S. natural gas prices increase in each of the five baseline cases. The price paths depend on the assumptions made regarding the resource base and advances in production technology, economic growth, and natural gas demand. In the Reference case, the average Lower 48 state supply price more than doubles between 2013 and 2040, ultimately reaching $7.25/Million British thermal units (MMBtu) in 2040.[2] In contrast, under the more optimistic resource assumptions of the HOGR case, prices increase by only 38% by 2040 and never rise above $4.34/MMBtu. Under the more pessimistic resource assumptions of the LOGR case, prices reach $10.08/MMBtu in 2040.

[2] All prices in this report are in 2012 dollars unless otherwise noted. To convert one thousand cubic feet (Mcf) to MMBtu, a ratio of 1 Mcf to 1.027 MMBtu was used.

Figure 3. Average Lower 48 states natural gas supply price in the five AEO2014 baseline cases used in this study



The different price paths in Figure 3 are key drivers of variation in the level of Lower 48 states LNG exports across the AEO2014 baseline cases. The amount of added Lower 48 LNG exports above the baseline projection required to fulfill each of the export scenarios specified by DOE/FE for this analysis, cumulative Lower 48 LNG exports at specified dates for each baseline, and additional Lower 48 states cumulative exports above baseline through those same specified dates for each of the DOE/FE scenarios are reported in Table 1. For example in the Reference case baseline, Lower 48 states exports are 5.7 Bcf/d in 2020 and cumulative exports through 2020 are 6.2 trillion cubic feet (Tcf). In the 12-, 16- and 20-Bcf/d export scenarios, cumulative exports through 2020 are 9.1 Tcf above those in the Reference case baseline (as shown in the lower panel of Table 1).

Estimated price and market responses to each pairing of a specified export scenario and a baseline will reflect the additional amount of LNG exports needed to reach the targeted export level starting from that baseline. For example, as shown in Table 1, the 20-Bcf/d export scenario starting from the HOGR baseline requires a smaller additional amount of cumulative exports relative to baseline (55.4 Tcf over the 2015-40 period) than the 12-Bcf/d export scenario starting from the LOGR baseline (72.3 Tcf over the same period).

Table 1. Added LNG exports needed in each pairing of DOE/FE export scenarios and baseline cases

	Reference						HOGR						LOGR					
	2015	2020	2025	2030	2035	2040	2015	2020	2025	2030	2035	2040	2015	2020	2025	2030	2035	2040
Export level (Bcf/d)	0.3	5.7	7.4	7.4	7.4	7.4	0.3	6.8	12.9	14.0	14.0	14.0	0.3	3.6	3.6	3.6	3.6	3.3
Cumulative exports since 2015 (Tcf)		6.2	18.8	32.3	45.9	59.4		6.6	24.9	50.5	76.0	101.6		4.6	11.2	17.7	24.3	30.6
Difference from baseline in cumulative LNG exports for each DOE/FE export scenario /baseline pairing (Tcf)																		
12-Bcf/d		9.1	18.5	26.8	35.2	43.5		8.7	12.3	8.6	5.0	1.3		10.7	26.1	41.4	56.8	72.3
16-Bcf/d		9.1	25.0	40.7	56.3	72.0		8.7	18.9	22.5	26.2	29.8		10.7	32.6	55.3	77.9	100.8
20-Bcf/d		9.1	28.7	51.6	74.6	97.5		8.7	22.5	33.5	44.4	55.4		10.7	36.3	66.2	96.2	126.3
Alt 20-Bcf/d*		0.0	8.8	30.7	53.7	76.6												

*Note: EIA included the Alt 20 Bcf/d scenario to reflect a more realistic ramp-up of near-term LNG exports

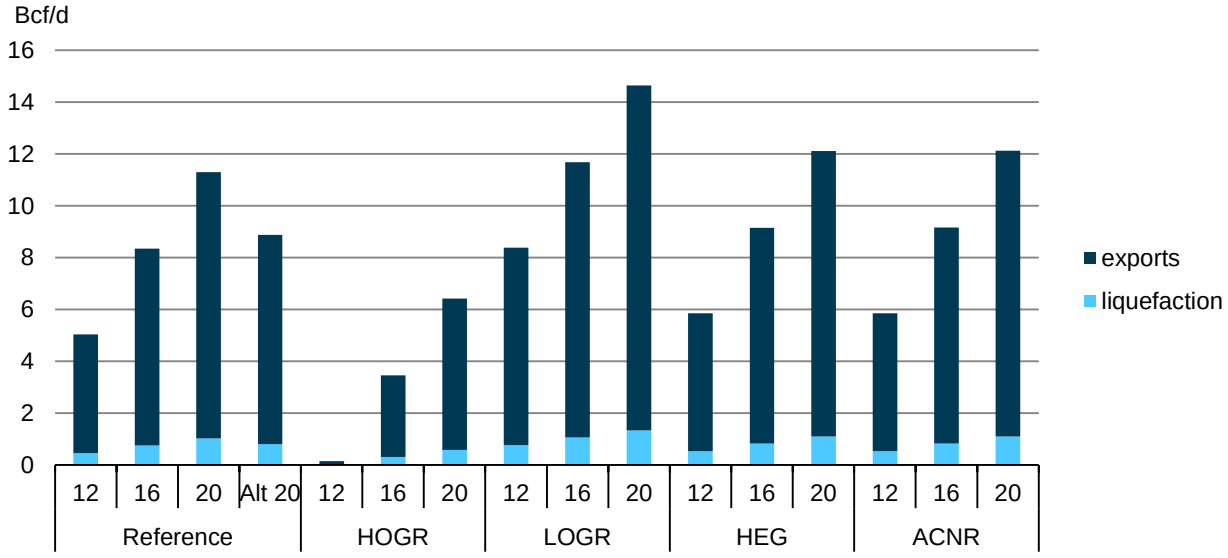
Although the study reports results for all pairings of export scenarios and baselines, some combinations are inherently less plausible than others. High additional levels of LNG exports are unlikely to occur under baseline conditions associated with high U.S. natural gas prices because high domestic prices and limited resources to grow supply would discourage investment in projects to liquefy and export domestic gas. The combination of the 20-Bcf/d export scenario with LOGR case baseline, which projects U.S. producer-level prices near $8/MMBtu by 2030 and above $10/MMBtu by 2040 even before consideration of added LNG exports, seems particularly implausible.

Analysis approach

EIA used the five AEO2014 cases described above as the starting point for its analysis and made several changes to represent the export scenarios specified in the study request. EIA exogenously added LNG exports from the Lower 48 states in its model runs, using the National Energy Modeling System (NEMS), to reach the targeted LNG export levels. The Mid-Atlantic and South Atlantic regions were each assumed to host 1 Bcf/d of LNG export capacity, the Pacific region was assumed to host 2 Bcf/d, with all of the remaining Lower 48 states' export capacity hosted along the Gulf Coast in the West South Central Census division.

In addition to the volume of natural gas needed to satisfy the levels of LNG exports defined in the scenarios, a supplemental volume of gas is required in order to liquefy natural gas for export as LNG. EIA assumed that this volume would equal 10% of the LNG export volume (Figure 4). The additional natural gas consumed during the liquefaction process is counted as fuel use within the U.S. region where liquefaction occurs.

Figure 4. Added average LNG export-related demand needed in each pairing of DOE/FE export scenarios and baseline cases (2015-40)



As in AEO2014, U.S. natural gas pipeline imports and exports and U.S. LNG imports are endogenously determined in the model. However, LNG exports out of Alaska were set exogenously to the projected level from the corresponding baseline cases.

One further modeling change was applied only in export scenario runs using the ACNR case. The ACNR case was included in the study to reflect a baseline with high use of natural gas and low use of coal for electricity generation that is driven by factors other than favorable natural gas supply conditions and low natural gas prices, which are considered in the HOGR case. In order to represent a situation in which increased coal generation is not an available response to higher domestic natural gas prices, coal-fired generation was not allowed to rise above the ACNR baseline level when the DOE/FE export scenarios were implemented. In effect, the model was forced to accommodate added LNG exports using a combination of responses other than a reversion to coal-fired generation.

Caveats regarding interpretation of the analysis results

EIA recognizes that projections of energy markets over a 25-year period are highly uncertain and subject to many events that cannot be foreseen, such as supply disruptions, policy changes, and technological breakthroughs. This uncertainty is particularly true in projecting the effects of exporting significant LNG volumes from the United States because of the following factors:

- NEMS is not a world energy model and does not address the interaction between the potential for additional U.S. natural gas exports and developments in world natural gas markets.
- Global natural gas markets are not fully integrated, and their nature could change substantially in response to significant changes in natural gas trading patterns. Future opportunities to profitably export natural gas from the United States depend on the future of global natural gas markets, the inclusion of relevant terms in specific contracts to export natural gas, as well as on the assumptions in the various cases analyzed.

- Given its focus on the domestic energy system, NEMS does not fully account for interactions between energy prices and the global economy that could benefit the U.S. economy. For example, while NEMS reflects both the positive effects of higher domestic production and the negative effects of higher domestic energy prices on the U.S. economy, it does not include a linkage between energy prices outside the United States and global economic performance. As in the United States, a reduction in the price of imported energy tends to support economic activity. Any reduction in global natural gas prices that might occur as a result of U.S. LNG exports would tend to stimulate the economies of countries that import gas, increasing their demand for both domestic goods and services and imports sourced from the United States and elsewhere. Because the NEMS model does not consider how LNG export might change natural gas pricing in overseas markets, or the implications of such changes for economic activity, this interaction is not reflected in this study. Capturing that linkage would require the use of a global economic model that explicitly includes the energy sector.
- Measures of domestic industrial activity in NEMS are sensitive to both the composition of final U.S. demand and changes in domestic energy prices. However, NEMS does not account for the impact of domestic and global energy price changes on the global utilization pattern for existing manufacturing capacity or the siting of new capacity inside or outside of the United States in energy-intensive industries. Assessment of these effects can be challenging and require careful attention to detail. For example, while the implementation of the export scenarios raises domestic natural gas prices relative to the baseline, increases in production from shale gas resources that provide most of the natural gas used to increase LNG exports also increase the projected domestic supply of natural gas liquids such as ethane and propane that are important feedstock for some energy-intensive industries.

EIA's January 2012 analysis of LNG exports, Effect of Increased Natural Gas Exports on Domestic Energy Markets, includes an extensive discussion of caveats and issues involving the representation of global natural gas markets and their interaction with the North American market. Much of that discussion also applies to the analysis contained in this updated report. Additional observations regarding issues surrounding the estimation of economic impacts of the export scenarios are provided in the economic results section of this report.

Summary of Results

- **Increased LNG exports lead to increased natural gas prices.** Starting from the AEO2014 Reference case baseline, projected average natural gas prices in the Lower 48 states received by producers in the export scenarios are 4% (12-Bcf/d scenario) to 11% (20-Bcf/d scenario) more than their base projection over the 2015-40 period. Percentage changes in delivered natural gas prices, which include charges for gas transportation and distribution, are lower than percentage changes in producer prices, particularly for residential and commercial customers. Starting from the AEO2014 Reference case baseline, projected average Lower 48 states residential natural gas prices in the export scenarios are 2% (12-Bcf/d scenario) to 5% (20-Bcf/d scenario) above their base projection over the 2015-40 period.
- **Natural gas markets in the United States balance in response to increased LNG exports mainly through increased natural gas production.** Across the different export scenarios and baselines, higher natural gas production satisfies about 61% to 84% of the increase in natural gas demand from LNG exports, with a minor additional contribution from increased imports from Canada. Across most cases, about three-quarters of this increased production is from shale sources.
- **Supply from higher domestic production is augmented by reductions in natural gas use by domestic end-users, who respond to higher domestic natural gas prices.** As a result of higher natural gas prices, the electric generation mix shifts towards other generation sources, including coal and renewables, with some decrease in total generation as electricity prices rise. The reduction in the average annual level of gas-fired generation over the 2015-40 period ranges from 30 to 146 billion kilowatthours (kWh), starting from levels that range from 1200 to 1782 billion kWh across the five baselines used in this study. There is also a small reduction in natural gas use in all sectors from efficiency improvements and conservation.
- **Increased LNG exports result in higher total primary energy use and energy-related CO_2 emissions in the United States**. The 0.1% to 0.6% increase in total primary energy use and a -0.1% to 0.6% change in CO_2 emissions relative to baseline over the 2015-40 period reflect both increased use of natural gas to fuel added liquefaction and fuel switching in the electric power sector that for some cases increases both fuel use and emissions intensity.
- **Consumer expenditures for natural gas and electricity increase modestly with added LNG exports**. On average, from 2015 to 2040, natural gas bills paid by end-use consumers in the residential, commercial, and industrial sectors combined increase 1% to 8% over a comparable baseline case, depending on the export scenario and case, while increases in electricity bills paid by end-use customers range from 0% to 3%. These estimates reflect the combined impact of higher prices and small reductions in natural gas and electricity use.
- **Added U.S. LNG exports result in higher levels of economic output, as measured by real gross domestic product as (GDP)**. Increased energy production spurs investment, which more than offsets the adverse impact of somewhat higher energy prices when the export scenarios are applied. Economic gains, measured as changes in the level of GDP relative to baseline, range from 0.05% to 0.17% and generally increase with the amount of added LNG exports required to fulfill an export scenario for the applicable baseline. As noted in the previous discussion of caveats, EIA's NEMS model is focused on the U.S. energy system and the domestic economy and does not address several key international linkages that may increase economic benefits.

- **Added U.S. LNG exports result in higher levels of domestic consumption expenditures for goods and services in most cases**. Domestic consumption is influenced more by movements in energy prices, than increased energy production. In most cases, U.S. consumers increase their consumption expenditures as the positive impacts of increased energy production outweigh energy price changes. As energy prices increase by more than 10% above baseline, then consumption changes become very small to negative in some instances. Consumption gains range from 0.0% to 0.08% and generally increase with the amount of added LNG exports required to fulfill an export scenario for the applicable baseline.
- **Results for export scenarios using baselines representing higher domestic demand for natural gas than in the Reference case both economy-wide (HEG case) and specifically for electric power generation (ACNR case) differ only slightly from those using the Reference case baseline.** Although domestic gas use is higher in the HEG and ACNR baselines than in the Reference baseline, the preponderance of the energy market response to added LNG exports occurs on the supply side, with similar price, expenditure, and economic effects across the three baselines.
- **Results for export scenarios using the HOGR and LOGR baselines that respectively make more optimistic and more pessimistic assumptions regarding natural gas resources and technology than the Reference case show some differences from those using the other baselines.** The amount of added LNG exports to fulfill the export scenarios is smaller for the HOGR baseline, which starts with relatively high LNG exports, than for other baselines. At the same time, the greater ability to increase production also holds down increases in natural gas prices. The LOGR case is the opposite, requiring the largest amount of added LNG exports to fulfill the export scenarios under supply conditions that make it more difficult and costly to raise production, leading to modeled outcomes with the highest impacts on natural gas prices and the largest diversions of natural gas from domestic end uses. As noted in the introduction, competition in global LNG markets is likely to prevent the realization of high LNG exports under the unfavorable domestic supply conditions of the LOGR case.
- **A slower, more realistic, ramp-up in LNG export capability results in slightly lower price impacts in the early years of the projection and delays increases in domestic natural gas production that support higher LNG exports.** In the scenarios specified by DOE/FE, LNG exports from the Lower 48 states start in 2015 and rise rapidly to reach 12 Bcf/d by 2020. EIA implemented the Alt 20-Bcf/d scenario, under Reference case conditions. In EIA's Alt 20-Bcf/d scenario, the ramp-up in Lower 48 states LNG exports is delayed but still quite aggressive, reaching 12 Bcf/d in 2023. Comparison of results for the "alt" and "standard" versions of the 20-Bcf/d scenario shows very modest differences in impacts over the entire projection period.
- **AEO2014, which includes the cases used as baselines in this study, best reflects EIA's view on LNG exports and U.S. natural gas markets more generally**. Consideration of the energy market and economic implications of export scenarios specified by DOE/FE in this analysis should not be construed as reflecting any change in EIA's own projections.

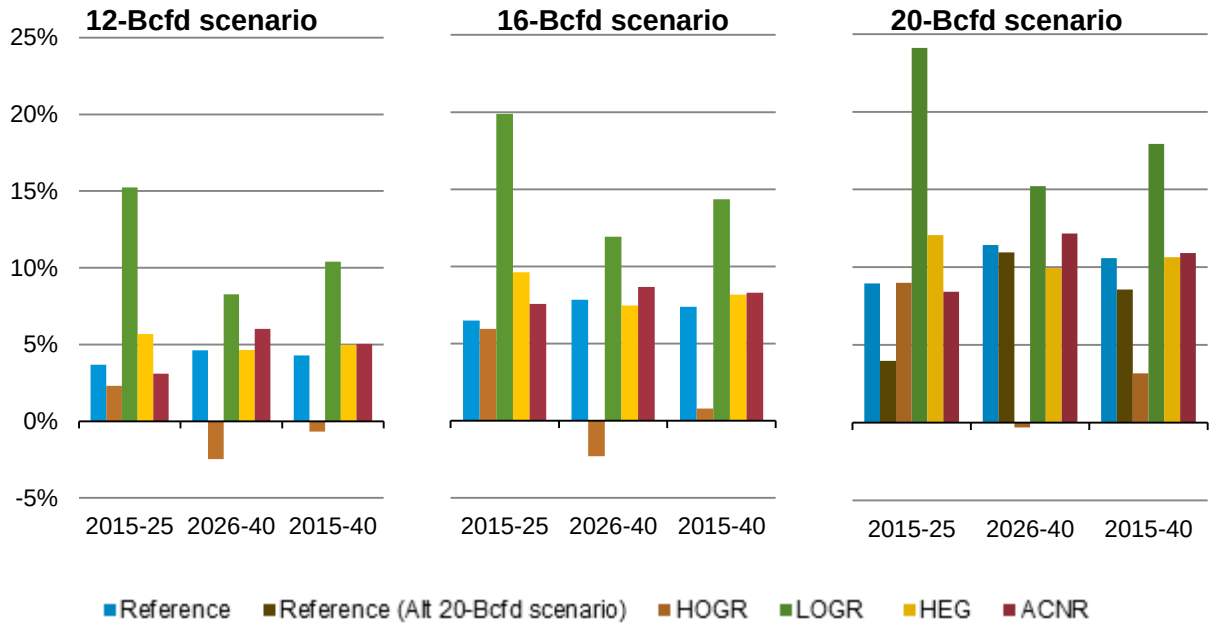
Energy Market Results

This section summarizes the analysis results for energy prices, demand, supply, the electricity mix, primary energy use, energy-related CO_2 emissions, and energy expenditures. Model results for each scenario/baseline combination are compared to baseline-only results to identify the impacts of the export scenarios.

Natural gas prices

Generally, natural gas prices increase relative to their respective base cases, with the greatest impact during the 2015-25 timeframe when LNG exports are ramping up (Figure 5). The least and greatest price changes occur when the export scenarios are considered using the HOGR and LOGR baselines, respectively, since, as shown in Table 1, implementing the export scenarios from these baselines requires the least and greatest change in export levels. Starting from the HOGR baseline, average Lower 48 states natural gas prices at the producer level decrease 1% in the 12-Bcf/d scenario for the 2015-40 period, reflecting a decline in LNG export volumes relative to baseline after 2024. Average Lower 48 states supply price increases range from 1% (16-Bcf/d scenario) to 3% (20-Bcf/d scenario) in the HOGR baseline. When the export scenarios are implemented in the context of the LOGR baseline, the impact of average Lower 48 states natural gas prices at the producer level ranges from 10% (12-Bcf/d scenario) to 18% (20-Bcf/d scenario) over the 2015-40 period.

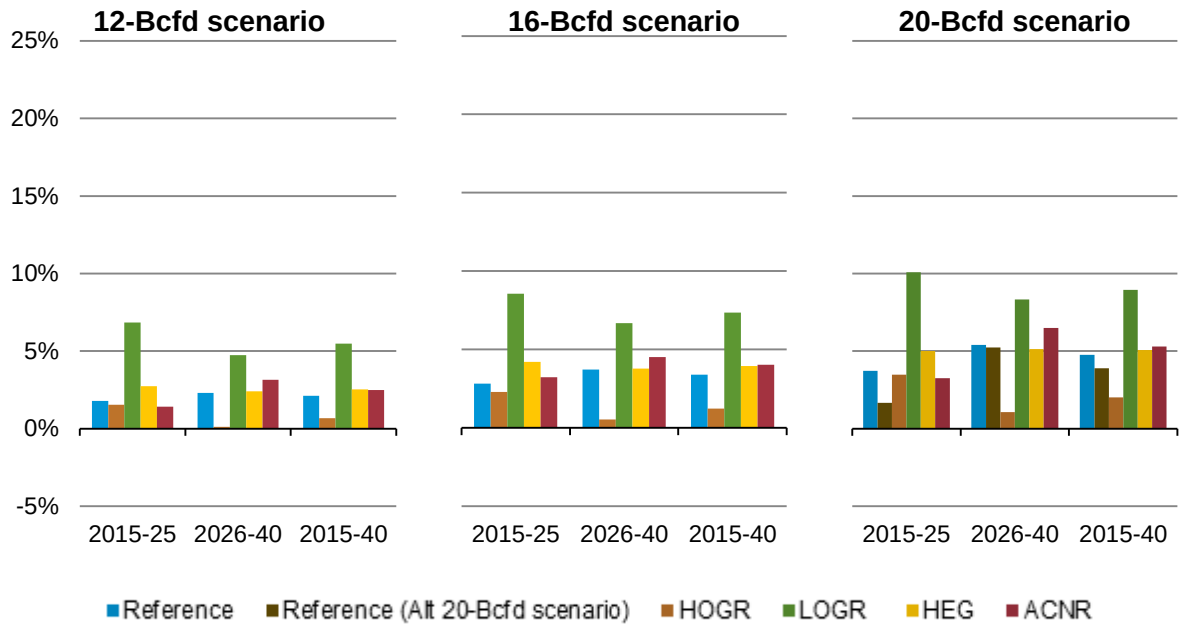
Figure 5. Percentage change in average Lower-48 states natural gas supply prices relative to baseline



Although the increases in natural gas prices at the producer level translate to similar absolute increases in delivered prices to customers, the percentage change in prices that industrial and electric customers pay tends to be somewhat lower than the change in the producer price. And the percentage change in

prices that residential and commercial customers pay is significantly lower. These lower values are because delivered prices include transportation charges (for most customers) and distribution charges (especially for residential and commercial customers) that do not vary significantly across export scenarios. For example, while the natural gas supply price increases across the three export scenarios range from 4% to 11% in the Reference case, the corresponding percentage increases in residential prices range from 2% to 5% (Figure 6).

Figure 6. Percentage change in average natural gas residential prices relative to baseline



Summary statistics on delivered prices are provided in Appendix B. More detailed results on delivered prices and other report results can be found in the standard National Energy Modeling System (NEMS) output tables posted online.

Natural gas supply and consumption

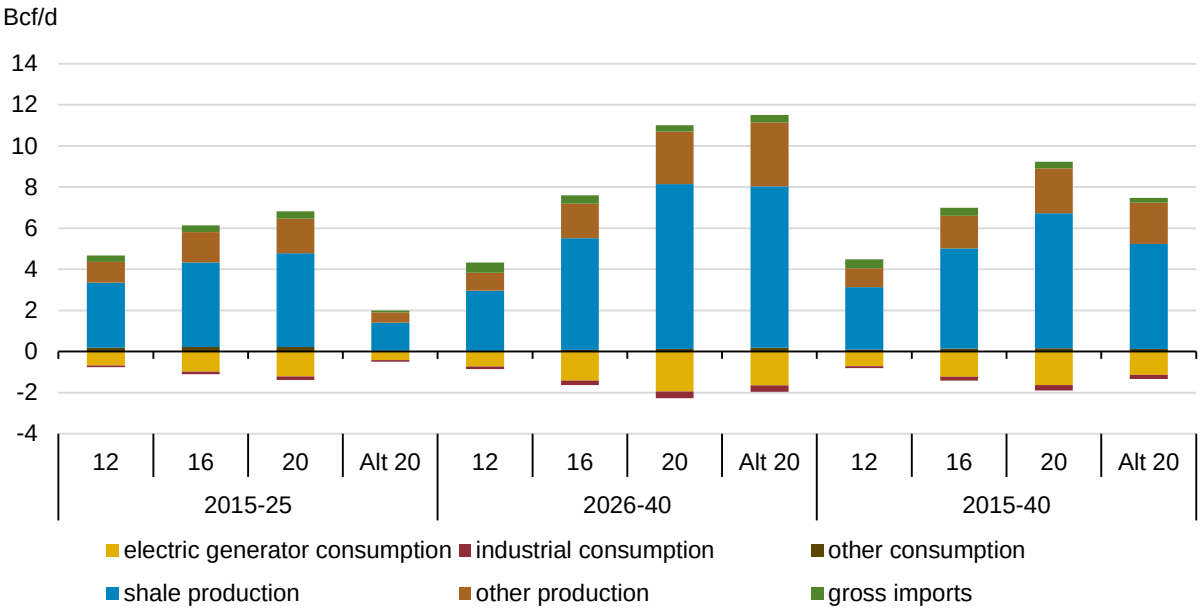
In the AEO2014 Reference case, total domestic natural gas production grows from 67.5 Bcf/d in 2015 to 102.6 Bcf/d in 2040, averaging 89.0 Bcf/d over the 2015-40 period. The United States becomes a net exporter of natural gas before 2020, due to declining net imports from Canada and increasing net exports of natural gas to Mexico via pipeline and to overseas markets as LNG.

U.S. natural gas consumption is projected to grow in all sectors other than the residential sector, where increased efficiencies and migration to warmer regions drive consumption down. Average annual natural gas consumption between 2015 and 2040 in the electric power sector is 26.7 Bcf/d, accounting for 38% of delivered natural gas end-use volumes. The industrial sector consumes an average of 22.9 Bcf/d over the same period, 33% of total delivered natural gas consumption. Average natural gas volumes projected to be consumed by the residential and commercial sectors between 2015 and 2040 are 11.9 Bcf/d and 9.0 Bcf/d, respectively. Consumption in the electric power sector, the largest consumer of natural gas during the projection period, is particularly responsive to the level of natural gas prices.

As discussed above, implementing the scenarios specified for this analysis results in added LNG exports and higher domestic natural gas prices. Higher prices lead to increases in domestic natural gas production and pipeline imports from Canada, and decreases in domestic natural gas consumption. In all pairings of the export scenarios and baselines, most of the additional natural gas needed for export is provided by increased domestic production, with a minor contribution from increased natural gas imports, largely from Canada.

For example, using the Reference case baseline, added LNG exports average 10.3 Bcf/d from 2015-40 in the 20-Bcf/d scenario. Total natural gas supply is up by 9.1 Bcf/d, and delivered domestic volumes of natural gas are down by 2.3 Bcf/d (Figure 7). Increased natural gas production from shale gas resources provides about 72% of the 9.1 Bcf/d supply increase, with other natural gas production providing roughly 24% and pipeline imports from Canada accounting for the remainder. About 71% of the 2.3 Bcf/d decrease to end-use consumption occurs in the electric power sector and 11% in the industrial sector, on average, from 2015-40. The projected consumption decrements are relatively small in the context of baseline levels and trends. For example, average natural gas use for electricity generation is 25.0 Bcf/d over 2015-40 in the 20-Bcf/d scenario, only 1.6 Bcf/d below the Reference case baseline level. For the industrial sector, average natural gas consumption of 22.7 Bcf/d over the 2015-40 period in the 20-Bcf/d scenario is just 0.3 Bcf/d below the Reference case baseline level.

Figure 7. Change in average natural gas supply and delivered end-use consumption in three export scenarios relative to the Reference case baseline (excludes natural gas liquefaction consumption)

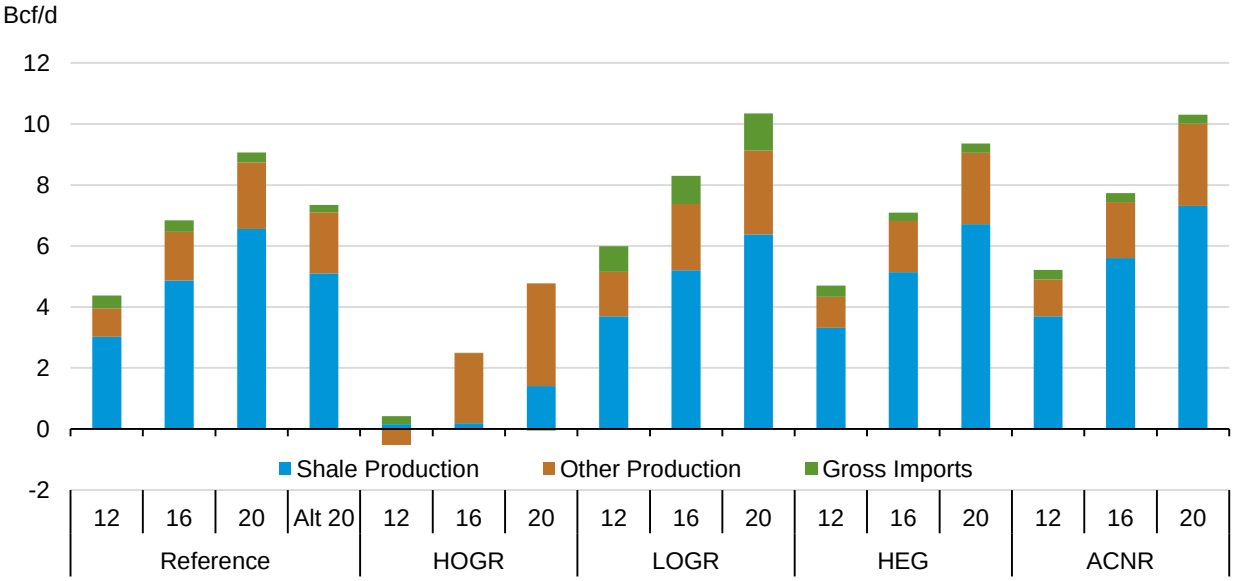


Natural gas supply response

Increased domestic production provides most of the additional natural gas needed to support added LNG exports across the cases and scenarios, as shown in Figure 8. In all cases, with the exception of the HOGR case, production from shale resources accounts for more than 70% of the increased production.

Projected production increases for the three export scenarios are smallest under the HOGR case baseline, which requires the lowest amount of added LNG exports given the high levels of production and LNG exports compared to the other baselines. Increased domestic gas production only contributes to around 60% of LNG export-related demand when the export scenarios are implemented using the LOGR case baseline, lower than the share when other baselines are used. This result reflects the relatively high prices placing greater downward pressure on demand and the relative lack of ability of supply to respond to the high prices under the low resource assumptions.

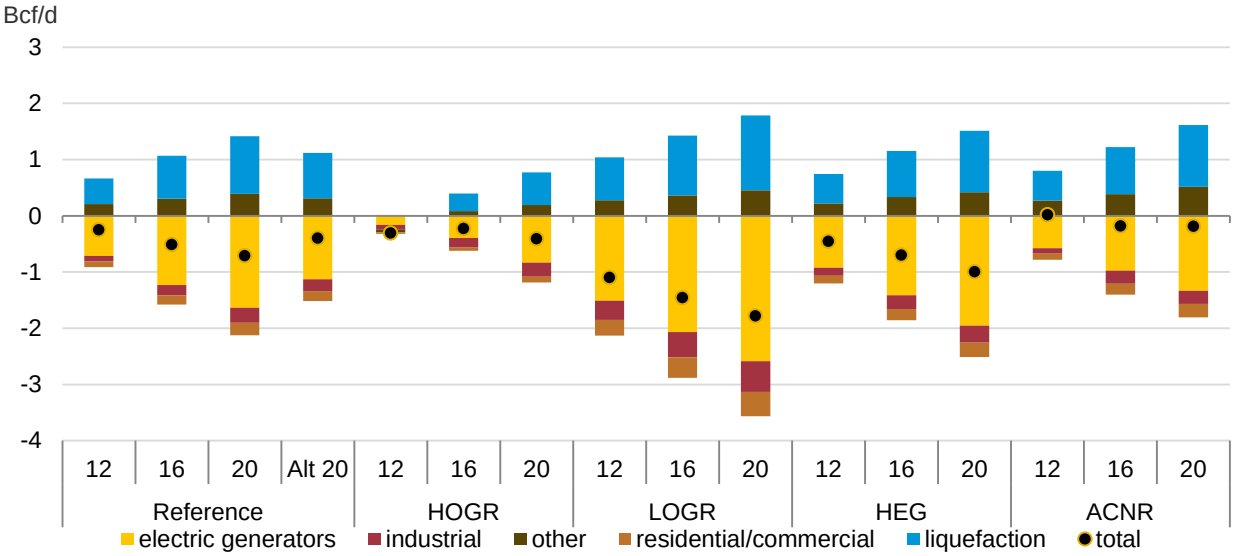
Figure 8. Change in average natural gas supply in the three export scenarios relative to five baseline cases (2015-40)



End-use natural gas consumption response

Across the full range of scenarios and baselines, the end-use consumption response to added LNG exports occurs largely within the electric power sector (Figure 9). Except for the HOGR case baseline, which requires very modest additions to LNG exports to implement the specified export scenarios, the role of demand response tends to rise in the later years of the projection period, particularly for electric generators and the transportation sector. These long-term responses reflect the impact of a sustained change in natural gas prices on investment decisions.

Figure 9. Change in average natural gas consumption in the three export scenarios relative to five baselines (2015-40)



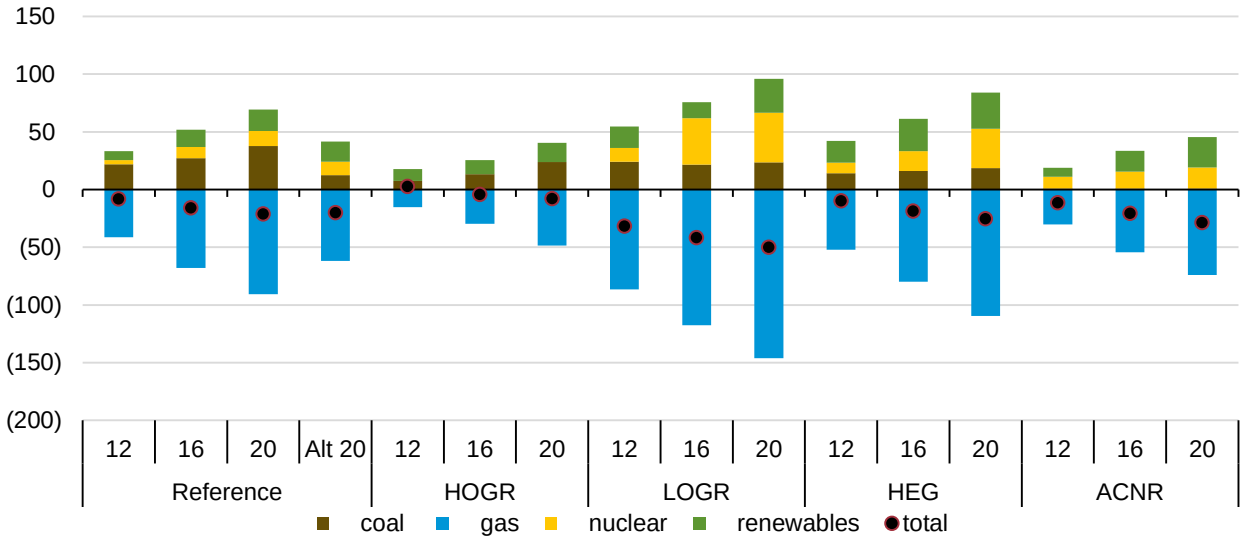
Note: "Other" includes lease and plant fuel, pipeline transportation, and vehicle transportation.

Over the 2015-40 period, the decline in natural gas consumption from electric power generators, on average, contributes from 10% to 18% to the levels of natural gas needed for the increased LNG export demands, across all cases and scenarios. In all the LNG export scenarios and cases, the average change from each respective base scenario in total electric generation over the 2015-40 period is 0% to -1%, responding to end-use electricity prices that increase 0% to 4%.

A combination of demand reduction and increased coal, nuclear, and renewable generation displaces natural gas generation (Figure 10). The tradeoff in natural gas-fired generation and generation from competing fuels varies depending on case, and generally depends on what the generation fuel mix is in the base scenarios. In all cases and scenarios, with the exception of the ACNR case, in the 2015-25 period, the increase in coal-fired generation contributes the largest share of the increase in generation from other sources. After 2025, increases in nuclear and renewable generation make up the largest share in the growth of generation from other fuel in the Reference, LOGR and HEG cases.

Figure 10. Change in average electric power generation in the three export scenarios relative to five baselines (2015-40)

billion kWh



Total energy use, energy-related carbon dioxide emissions, and end-use expenditures

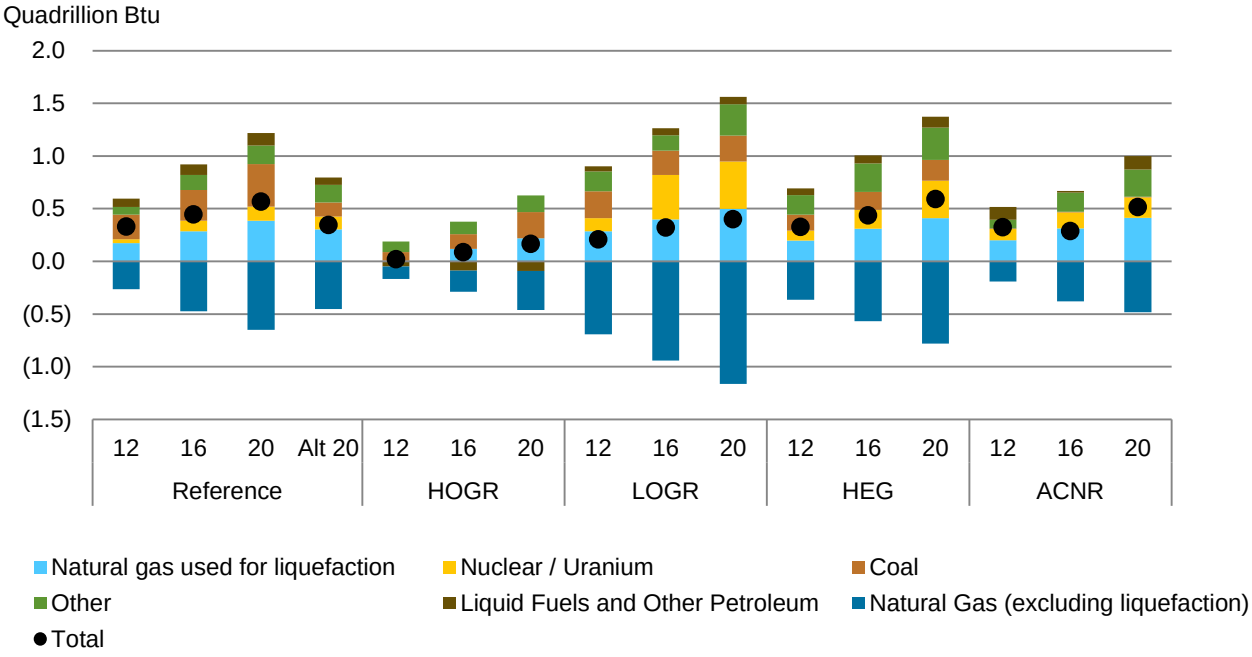
Annual primary energy consumption in the AEO2014 Reference case, measured in British thermal units (Btu), averages 103 quadrillion Btu over the 2015-40 period, with an annual average growth rate of 0.3%. Cumulative carbon dioxide (CO_2) emissions total 143,353 million metric tons over that period.

Primary energy use

Implementation of the specified LNG export scenarios starting from any of the five baselines used in this study raises projected primary energy consumption (Figure 11). The increase in primary energy use is generally on the order of 0.4%, but is lower under the HOGR baseline. This outcome is largely driven by the increased use of natural gas needed to liquefy natural gas for exports. As shown in Table 1, average added LNG exports over the 2015-40 period vary widely across pairings of scenarios and baselines, from 0.1 Bcf/d (HOGR case baseline, 12-Bcf/d scenario) to 13.3 Bcf/d (LOGR case baseline, 20-Bcf/d scenario). With gas consumed in liquefaction roughly 10% of the LNG export volume, in the LOGR case, 1.33 Bcf/d of natural gas, which is equal to 0.50 quadrillion Btu of primary energy consumption annually, is required to support added LNG exports at the high end of the added export range.

Because the heat rate (Btu per kWh) for coal generators generally exceeds that for natural gas generators by a significant margin, the displacement of some natural gas-fired generation by coal-fired generation, as discussed, also results in a net increase in primary energy use.

Figure 11. Change in average total domestic energy use in the three export scenarios relative to five baselines (2015-40)



Energy-related carbon dioxide (CO_2) emissions

The use of natural gas to provide energy for added liquefaction, combined with the displacement of natural gas by more carbon-intensive fuels in end-use sectors, causes an increase in CO_2 emissions over the analysis period in most pairings of export scenarios and baselines (Table 2). In particular, the increased use of coal in the electric power sector and the increased use of liquids in the industrial sector generally result in a net increase in CO_2 emissions. A lower natural gas price environment tends to favor increased coal use in response to higher LNG exports. Factors driving increased CO_2 emissions are dampened in pairings where the amount of added LNG exports is small and where there is limited opportunity or impetus to displace natural gas generation with coal-fired generation. The latter can occur in cases where natural gas prices are relatively high (e.g., the LOGR cases), increasing the viability of higher priced options such as nuclear and renewables, as well as coal. Higher LNG exports serve to exacerbate this response.

Cumulative CO_2 emissions are highest in the HEG baseline, which in support of increased economic activity has the highest electricity and primary energy consumption of all the baseline cases, and in particular has the highest use of liquid fuels and next to highest use of coal. Both the ACNR and LOGR cases have the lowest cumulative CO_2 emissions from 2015-40 and the lowest percent increases in CO_2 emissions from their respective baselines. In the ACNR case, assumptions limit the availability of coal-fired and nuclear electric power capacity, with generation from coal and nuclear in the ACNR baseline 21% and 8%, respectively, below the Reference baseline, on average from 2015-40. Although overall electric generation in the ANCR baseline is lower, the reduction in coal and nuclear generation is offset by increased natural gas-fired and renewable generation. The LOGR baseline has the lowest amount of electricity generation of all the cases, due to the high cost of electricity, driven by the high cost of natural gas. The LOGR baseline also has the highest shares of electric generation from nuclear and

renewable sources, which more than offsets the contribution of relatively higher levels of coal-fired generation to CO_2 emissions. Compared to all the cases, nuclear generation grows the highest amount, on average from 2015-40, in each of the LOGR LNG export scenarios.

Despite the CO_2 emission increases projected in the LNG export scenarios, energy-related CO_2 emissions remain below the 2005 level (5,999 million metric tons) in each year of the projection period across all pairings of scenarios and baselines.

Table 2. Cumulative energy-related CO_2 emissions over 2015-40 and difference from baseline for all pairings (million metric tons)

Case	Scenario	Cumulative CO_2 emissions (2015-40)	Difference from base	% Change from base
Reference	baseline	143,353		
	12-Bcf/d	143,901	548	0.4%
	16-Bcf/d	143,940	587	0.4%
	20-Bcf/d	144,157	803	0.6%
	Alt 20-Bcf/d	143,586	232	0.2%
HOGR	baseline	144,842		
	12-Bcf/d	144,836	-6	-0.0%
	16-Bcf/d	145,017	175	0.1%
	20-Bcf/d	145,213	372	0.3%
LOGR	baseline	140,838		
	12-Bcf/d	140,982	143	0.1%
	16-Bcf/d	140,779	-59	-0.0%
	20-Bcf/d	140,661	-177	-0.1%
HEG	baseline	149,362		
	12-Bcf/d	149,606	243	0.2%
	16-Bcf/d	149,536	173	0.1%
	20-Bcf/d	149,486	124	0.1%
ACNR	baseline	136,077		
	12-Bcf/d	136,226	149	0.1%
	16-Bcf/d	136,056	-21	-0.0%
	20-Bcf/d	136,151	73	0.1%

End-use energy expenditures

The AEO2014 Reference case projects annual average end-use energy expenditures of $1,409 billion over the 2015-40 period. Of that, $845 billion per year is spent on liquids, $415 billion on electricity, $140 billion on natural gas, and $9 billion on coal. Implementation of the 12-Bcf/d scenario under Reference case conditions is projected to increase total end-use energy expenditures by $9 billion per year, or 0.6% on average, from 2015-40. For the 20-Bcf/d scenario, total end-use energy expenditures

are projected to rise by $18 billion per year, or 1.3% on average, over the same period. Increased end-use expenditures on natural gas account for roughly one-third of additional expenditures.

Similar results apply across the full range of scenarios and baselines. Although implementation of the export scenarios specified by DOE/FE reduces projected natural gas and electricity consumption in domestic end-use sectors, higher prices increase average projected natural gas and electricity bills over the 2015-40 period (Tables 3 and 4).

Expenditures on liquid fuels also increase with added exports across the cases. However, with the exception of the HOGR case, the increase in expenditures on liquid fuels is largely due to an increase in liquid fuels consumption, which occurs primarily in the industrial sector. This reflects both the increasing availability of natural gas liquids as domestic natural gas production grows and higher economic growth.

Table 3. Average natural gas expenditures over 2015-40 and difference from baseline for all pairings (billion U.S. 2012$)

Case	Scenario	Average natural gas expenditures (2015-40)	Difference from base	% Change from base
Reference	baseline	140		
	12-Bcf/d	143	3	1.9%
	16-Bcf/d	145	4	3.2%
	20-Bcf/d	147	6	4.6%
	Alt 20-Bcf/d	145	5	3.7%
HOGR	baseline	123		
	12-Bcf/d	123	0	0.0%
	16-Bcf/d	123	1	0.5%
	20-Bcf/d	125	2	1.5%
LOGR	baseline	159		
	12-Bcf/d	167	8	5.0%
	16-Bcf/d	170	11	6.7%
	20-Bcf/d	172	13	8.4%
HEG	baseline	151		
	12-Bcf/d	154	3	2.3%
	16-Bcf/d	157	6	3.7%
	20-Bcf/d	158	7	4.8%
ACNR	baseline	143		
	12-Bcf/d	146	3	2.4%
	16-Bcf/d	148	5	3.7%
	20-Bcf/d	150	7	5.1%

Table 4. Average electricity expenditures over 2015-40 and difference from baseline for all pairings (billion U.S. 2012$)

Case	Scenario	Average electricity expenditures (2015-40)	Difference from base	% Change from base
Reference	baseline	415		
	12-Bcf/d	419	4	0.9%
	16-Bcf/d	421	6	1.3%
	20-Bcf/d	423	8	1.9%
	Alt 20-Bcf/d	422	6	1.6%
HOGR	baseline	399		
	12-Bcf/d	399	0	0.1%
	16-Bcf/d	399	1	0.2%
	20-Bcf/d	400	2	0.4%
LOGR	baseline	436		
	12-Bcf/d	444	8	1.8%
	16-Bcf/d	447	11	2.5%
	20-Bcf/d	449	13	3.0%
HEG	baseline	446		
	12-Bcf/d	450	4	0.9%
	16-Bcf/d	453	7	1.6%
	20-Bcf/d	455	9	2.0%
ACNR	baseline	435		
	12-Bcf/d	440	5	1.2%
	16-Bcf/d	442	7	1.6%
	20-Bcf/d	444	10	2.2%

Macroeconomic Effects

Macroeconomic considerations related to increased energy exports

U.S. economic output in NEMS represents all domestic goods and services, and net trade of global goods and services. Holding other factors constant, more robust growth in U.S. production of goods and services, including energy, adds to domestic output.

Changes in energy prices can also affect the economy. For example, a reduction in the price of imported energy tends to boost domestic economic activity. Any reduction in global natural gas prices that might occur due to exports of U.S. LNG would tend to stimulate the economies of countries that import gas, increasing their demand for both domestic goods and services and imports sourced from the United States and elsewhere. These effects generally apply across the full range of industries. However, to the extent that an increment to domestic production is concentrated in a particular sector, such as oil and natural gas production, industries that provide inputs to those activities, such as steel pipe and tube and drilling equipment, may realize a disproportionately large boost. Because NEMS does not consider how U.S. LNG exports might change natural gas pricing in overseas markets, or the implications of such changes for non-U.S. economic activity, economic impacts from international markets are not included in this study. Capturing that linkage would require the use of a global macroeconomic model that explicitly includes energy prices.

For energy-intensive industries, energy prices can also affect industrial activity directly through their influence on utilization decisions for existing plants and siting decisions for new ones. All else equal, lower U.S. energy prices and higher energy prices abroad tend to favor greater reliance on production facilities located in the United States. For example, recent success in developing domestic shale gas resources and the consequent availability of price-advantaged natural gas has encouraged both higher capacity utilization and plans for capacity expansion in gas-intensive sectors such as the production of bulk chemicals. To the extent that U.S. LNG exports result in raised domestic prices and reduced prices in other global regions, some of this advantage could be smaller.

Given its domestic focus, however, NEMS does not account for the impact of energy price changes outside of the United States on utilization patterns of existing capacity or the siting of new capacity inside or outside of the United States in energy-intensive industries. Capturing such linkages would likely require a global model of industrial competition in the specific sector(s) of interest.

Economic results from EIA modeling

Increasing LNG exports leads to higher economic output, as measured by real gross domestic product (GDP), as increased energy production spurs investment. This higher economic output is enough to overcome the negative impact of higher domestic energy prices over the projection period. Exchange rates and foreign GDP do not change from their respective baselines when the specified export scenarios are modeled in NEMS, which precludes adjustments that would in reality tend to offset the impact of a rise in overall U.S. prices relative to those trading partners compared to baseline conditions.

Implementing the export scenarios specified for this study increased domestic economic output, measured as GDP, by 0.05% to 0.2% over the 2015-40 period depending on the export scenario.

Investment and consumption lead the GDP gains. As energy prices begin to rise, these gains begin to taper off. Figures 12 and 13 show the GDP and consumption, respectively, for the four export scenarios implemented from a Reference case baseline. As shown in Figure 12, the GDP gains from increasing LNG exports are positive across all cases, although relatively modest.

Figure 12. Real GDP impacts of the export scenarios relative to the Reference baseline, undiscounted and discounted (4% discount rate), billion 2005 dollars

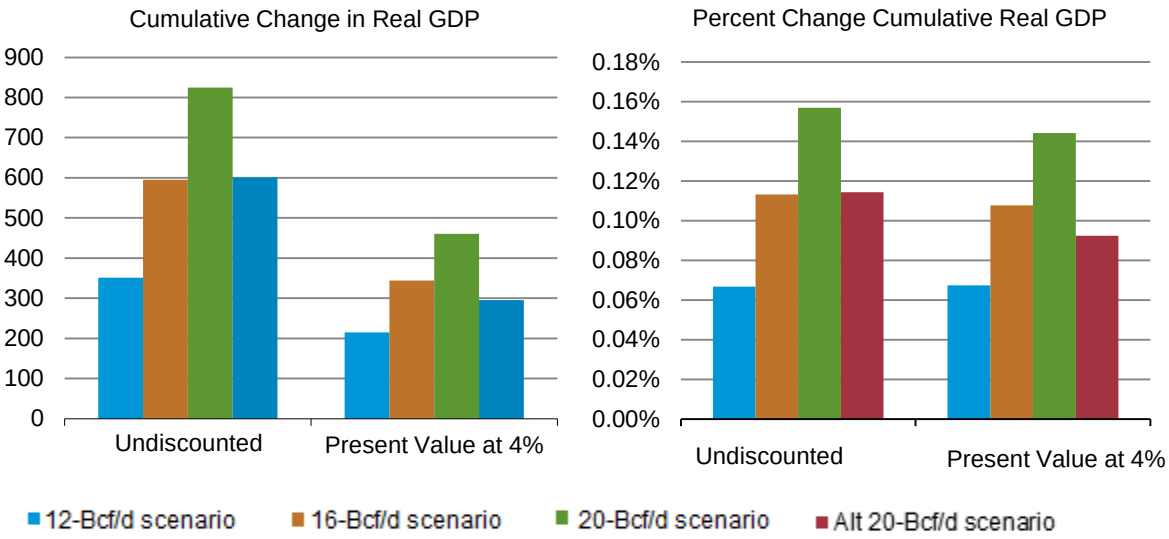
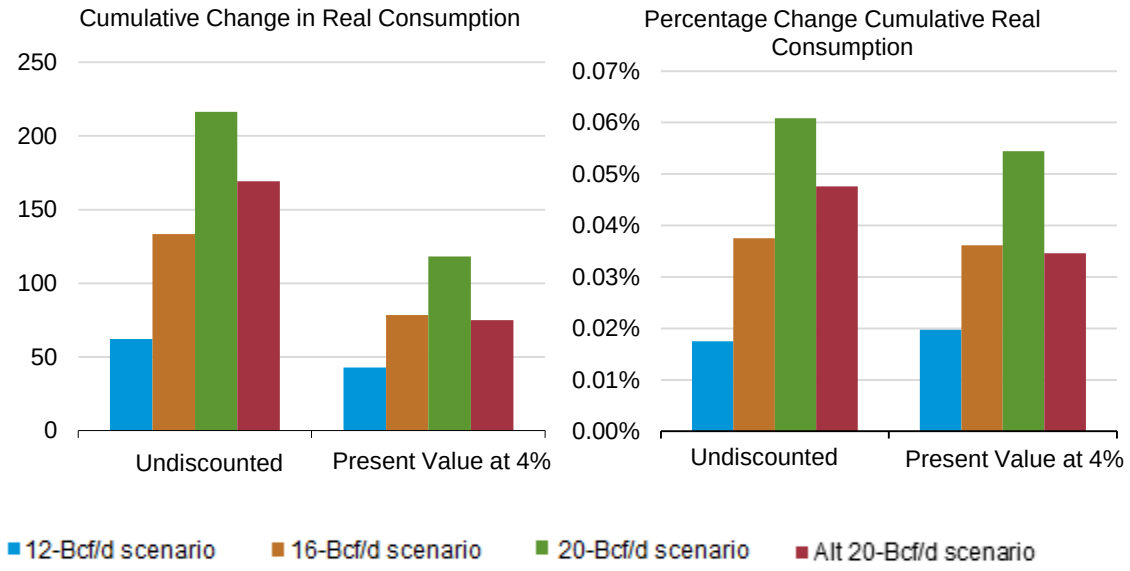


Figure 13. Change in real consumption in the export scenarios compared to the Reference baseline, undiscounted and discounted (4% discount rate), billion 2005 dollars



Industrial shipments generally mirror GDP changes. Energy-intensive industries are challenged by initial energy price increases, but adverse impacts are ameliorated as energy prices return to base levels and GDP begins to increase. Employment changes generally follow both industrial shipments and GDP, although the changes in employment are proportionately less as labor productivity improves.

Results for 12- and 20-Bcf/d scenarios using alternative baselines

Differences in the amount of added energy production explain most of the differences in economic results from implementing the export scenarios when alternative baselines are used. Using the HOGR case as a starting point, real GDP impacts are less as energy production increases to reach the targeted export level (Table 1). Even though energy prices are much higher in the LOGR case, the larger increase in energy production raises the productive capability of the economy enough to offset the negative impacts of higher energy prices.

As elsewhere in this report, the discussion of economic results focuses on changes from baseline when the export scenarios are implemented. This approach is appropriate given the study's aim of assessing the export scenarios rather than differences in the alternative baselines, but readers should always keep in mind that differences across the baselines generally play a much larger role than the export scenarios in driving overall energy market and economic outcomes. Thus, even though the export scenarios provide a bigger boost to economic output using the LOGR case baseline than using the HOGR case baseline, the level of economic output is always higher under the favorable resource and technology conditions of the HOGR case baseline than using the relatively pessimistic LOGR case baseline.

GDP impacts across export scenarios using alternative baselines are uniformly positive, although relatively modest (Figure 14). The average yearly GDP percentage change in the 12-Bcf/d export scenario using alternative base scenarios ranges from 0.01% using the High Resource case to 0.08% using the LOGR case (Figure 14). However, there is relatively little difference in aggregate GDP impacts

when comparing the cases other than the LOGR case, primarily because the proportionate differences in energy production and energy prices between those four cases are small. Increasing LNG exports to 20 Bcf/d shows higher GDP changes. However, the ACNR case generally shows slightly higher percentage-change impacts compared to the LOGR case, primarily because prices increase proportionately less in the ACNR 20-Bcf/d scenario compared to the LOGR 20-Bcf/d scenario (Figure 15). The increases in GDP across the export scenarios range from 0.08% to 0.14% using the LOGR case.

Consumption expenditures across export scenarios are generally positive, though smaller in percentage terms than real GDP impacts. Changing energy prices have more of an impact on consumption. For most cases, U.S. consumers increase their consumption expenditures as the positive impacts of increased energy production outweigh energy price changes. As energy prices increase by more than 10% above baseline, then consumption changes become very small to negative in some instances. Consumption gains range from 0.0% to 0.08% and generally increase with the amount of added LNG exports required to fulfill an export scenario for the applicable baseline.

Figure 14. Cumulative and percent change in real GDP in the 12-Bcf/d scenario relative to alternative baselines, billion 2005 dollars

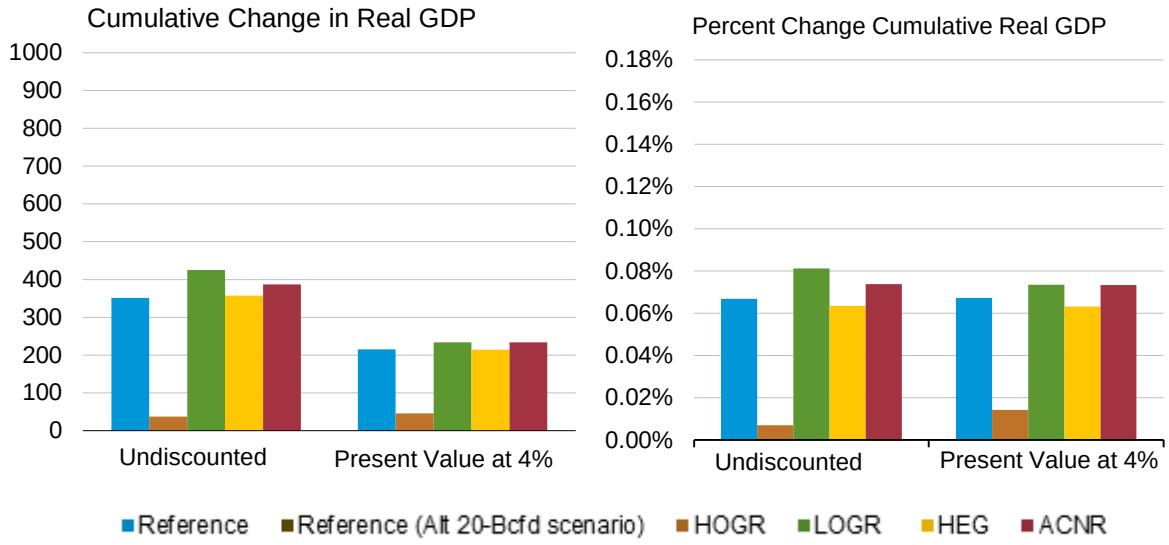
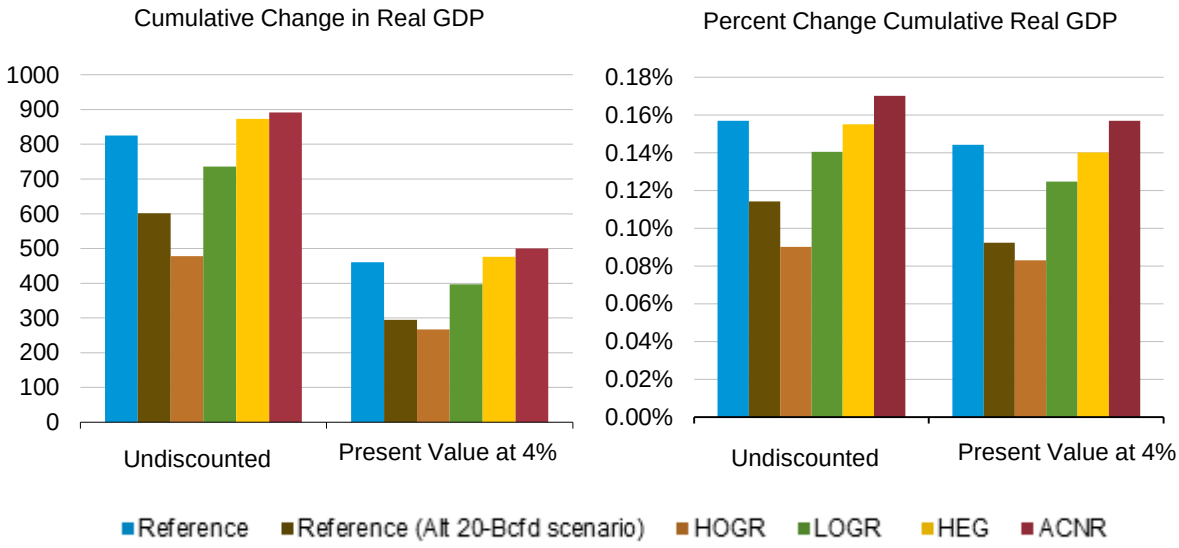


Figure 15. Cumulative and percent change in real GDP in the 20-Bcf/d scenario relative to alternative baselines, billion 2005 dollars



Appendix A. Request Letter

Department of Energy
Washington, DC 20585

May 29, 2014

MEMORANDUM

TO: ADAM SIEMINSKI
ADMINISTRATOR
ENERGY INFORMATION ADMINISTRATION

FROM: CHRISTOPHER SMITH
PRINCIPAL DEPUTY ASSISTANT SECRETARY
OFFICE OF FOSSIL ENERGY

SUBJECT: Request for an Update of EIA's January 2012 Study of Liquefied Natural Gas Export Scenarios

The Office of Fossil Energy (FE) requests the Energy Information Administration (EIA) to evaluate the impact of increased natural gas demand, reflecting possible exports of U.S. natural gas, on domestic energy markets using the modeling analysis presented in the *Annual Energy Outlook 2014 (AEO 2014)* as a starting point. The analysis should focus on the implications of additional natural gas demand on domestic energy consumption, production, and prices.

The updated study should address scenarios reflecting increases in export-related natural gas demand representing total lower-48 liquefied natural gas (LNG) exports of 12 billion standard cubic feet per day (Bcf/d), 16 Bcf/d, and 20 Bcf/d phased in at a rate of 2 Bcf/d per year starting in 2015. Understanding that the domestic natural gas market is sensitive to a number of factors, FE requests that EIA include sensitivity cases to explore some of these uncertainties. We are particularly interested in sensitivity cases relating to alternative recovery economics for shale gas resources, as in the *AEO2014 Low and High Resource* cases, a sensitivity case with additional natural gas use for electric generation, and a sensitivity case with increased baseline natural gas demand as in the *AEO2014 High Economic Growth* case.

The study report should review and synthesize the results obtained in the modeling work and include, as needed, discussions of context, caveats, issues and limitations that are relevant to the study. Please include tables or figures that summarize impacts on annual domestic natural gas prices, domestic natural gas production and consumption levels, domestic expenditures for natural gas and other relevant fuels, and revenues associated with the incremental export demand for natural gas. The standard *AEO 2014* reporting tables should also be provided, with the exception of tables reporting information that EIA considers to be spurious or misleading given the limitations of its modeling tools in

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addressing the study questions.

We would like to receive the completed analysis as soon as possible. We also recognize that EIA may post the study on its website after providing it to us.

Thank you for your attention to this request.

Appendix B. Summary Tables

Table B1. U.S. Annual Averages Values from 2015-40

	Reference					High Oil and Gas Resource				Low Oil and Gas Resource				High Macroeconomic Growth				Accelerated Coal and Nuclear Retirements			
	baseline	12 Bcf	16 Bcf	20 Bcf	Alt 20 Bcf	baseline	12 Bcf	16 Bcf	20 Bcf	baseline	12 Bcf	16 Bcf	20 Bcf	baseline	12 Bcf	16 Bcf	20 Bcf	baseline	12 Bcf	16 Bcf	20 Bcf
NATURAL GAS VOLUMES (Tcf)																					
Net Exports	3.6	5.1	6.1	7.0	6.3	4.9	4.9	5.9	6.8	1.8	4.1	5.0	5.8	3.3	5.0	6.0	7.0	3.2	5.0	6.0	7.0
gross imports	2.2	2.3	2.3	2.3	2.3	2.4	2.5	2.4	2.3	2.6	3.0	3.0	3.1	2.3	2.4	2.4	2.4	2.3	2.4	2.4	2.4
gross exports	5.8	7.5	8.5	9.3	8.6	7.3	7.4	8.3	9.2	4.4	7.0	8.0	8.9	5.6	7.4	8.4	9.3	5.5	7.4	8.4	9.3
Dry Production	32.5	33.9	34.8	35.7	35.1	36.6	36.5	37.5	38.4	27.8	29.7	30.5	31.1	33.8	35.3	36.2	37.1	34.0	35.7	36.7	37.6
shale gas	15.9	17.0	17.6	18.3	17.7	19.7	19.7	19.7	20.2	12.0	13.4	13.9	14.4	16.8	18.0	18.7	19.2	16.9	18.3	19.0	19.6
other	16.6	16.9	17.2	17.4	17.3	17.0	16.8	17.8	18.2	15.8	16.3	16.6	16.8	17.0	17.4	17.6	17.8	17.0	17.5	17.7	18.0
Consumed Volumes (1)	28.8	28.7	28.6	28.5	28.6	31.6	31.5	31.5	31.4	25.9	25.5	25.4	25.2	30.4	30.2	30.1	30.0	30.6	30.6	30.5	30.5
electric generators	9.7	9.5	9.3	9.1	9.3	11.8	11.7	11.6	11.5	7.9	7.3	7.1	6.9	10.5	10.2	10.0	9.8	11.6	11.4	11.3	11.1
industrial	8.4	8.3	8.3	8.3	8.3	8.6	8.6	8.5	8.5	8.1	8.0	7.9	7.9	8.8	8.8	8.7	8.7	8.3	8.3	8.2	8.2
liquefaction	0.3	0.4	0.5	0.6	0.6	0.4	0.4	0.5	0.6	0.2	0.4	0.6	0.7	0.2	0.4	0.5	0.6	0.2	0.4	0.5	0.6
residential	4.3	4.3	4.3	4.3	4.3	4.4	4.4	4.4	4.4	4.3	4.2	4.2	4.2	4.5	4.5	4.5	4.5	4.3	4.3	4.3	4.3
commercial	3.3	3.3	3.2	3.2	3.2	3.4	3.4	3.4	3.4	3.1	3.1	3.1	3.1	3.3	3.3	3.3	3.3	3.3	3.3	3.2	3.2
other	2.8	2.8	2.9	2.9	2.9	3.0	3.0	3.0	3.1	2.4	2.5	2.5	2.5	2.9	3.0	3.0	3.1	2.8	2.9	2.9	3.0
NATURAL GAS END-USE PRICES (2012$/Mcf)																					
residential	13.4	13.7	13.8	14.0	13.9	12.0	12.0	12.1	12.2	15.3	16.1	16.4	16.6	13.8	14.2	14.4	14.5	13.6	13.9	14.1	14.3
commercial	11.0	11.3	11.4	11.6	11.5	9.5	9.6	9.6	9.7	12.9	13.7	14.0	14.2	11.3	11.6	11.8	12.0	11.2	11.6	11.8	11.9
industrial	6.9	7.1	7.3	7.5	7.4	5.5	5.5	5.6	5.7	8.6	9.4	9.7	9.9	7.1	7.4	7.6	7.7	7.2	7.5	7.7	7.8
OTHER PRICES																					
Natural Gas Lower 48 Supply Price (2012$/Mcf)	5.4	5.7	5.8	5.99	5.9	4.0	4.0	4.1	4.2	7.1	7.9	8.2	8.4	5.6	5.9	6.1	6.2	5.7	6.0	6.2	6.3
Northeast (2012$/Mcf)	5.6	5.9	6.0	6.2	6.1	4.1	4.0	3.9	3.9	8.0	8.8	8.9	9.0	5.9	6.2	6.3	6.5	6.0	6.3	6.5	6.6
Gulf Coast (2012$/Mcf)	5.5	5.7	5.9	6.0	5.9	4.0	4.1	4.2	4.3	7.1	7.8	8.1	8.5	5.7	5.9	6.1	6.3	5.7	6.0	6.2	6.4
West Coast (2012$/Mcf)	5.6	5.9	6.0	6.2	6.1	4.4	4.5	4.6	4.7	7.1	7.7	8.0	8.2	5.8	6.1	6.3	6.4	5.9	6.2	6.4	6.4
Coal Minemouth Price (2012$/short-ton)	51.1	51.2	51.2	51.2	51.2	50.3	50.3	50.3	50.3	51.4	51.5	51.5	51.5	51.8	51.9	51.9	51.9	75.6	75.7	75.7	75.7
End-Use Electricity Price (2012 cents/Kwh)	10.4	10.5	10.5	10.6	10.6	9.8	9.8	9.8	9.8	11.1	11.4	11.4	11.5	10.5	10.7	10.8	10.8	11.1	11.2	11.3	11.4
END-USE ENERGY EXPENDITURES (B 2012$)	1,409.2	1,418.4	1,423.0	1,427.7	1,423.5	1,332.3	1,333.7	1,334.7	1,336.8	1,458.8	1,477.0	1,483.1	1,488.7	1,505.7	1,516.6	1,522.7	1,527.4	1,426.0	1,436.7	1,439.6	1,447.2
liquids	845.0	847.9	848.7	849.2	847.6	802.6	803.7	803.7	803.8	855.5	857.8	858.3	859.1	899.2	902.7	903.3	904.8	837.9	840.2	839.0	842.3
natural gas	140.3	143.0	144.8	146.7	145.5	122.7	122.8	123.4	124.5	159.1	166.9	169.7	172.4	151.0	154.4	156.6	158.3	142.8	146.2	148.2	150.1
electricity	415.4	419.0	421.0	423.3	421.8	398.5	398.8	399.2	400.1	435.8	443.8	446.6	448.8	445.7	449.7	453.0	454.5	434.7	439.7	441.8	444.2
coal	8.5	8.5	8.5	8.5	8.5	8.4	8.4	8.4	8.4	8.5	8.5	8.4	8.4	9.8	9.8	9.8	9.8	10.7	10.7	10.6	10.7
END-USE ENERGY CONSUMPTION (quadrillion Btu)	65.4	65.4	65.3	65.3	65.1	67.2	67.1	67.0	67.0	64.3	64.0	63.9	63.8	68.6	68.5	68.4	68.4	64.8	64.8	64.6	64.6
ELECTRIC GENERATION (billion kWh)	4,711.1	4,702.9	4,695.1	4,689.7	4,691.0	4,811.2	4,813.8	4,806.9	4,803.2	4,615.4	4,583.7	4,573.6	4,565.3	4,969.2	4,959.3	4,950.5	4,943.8	4,631.4	4,619.8	4,610.7	4,602.8
coal	1,668.2	1,690.1	1,695.3	1,705.9	1,680.6	1,526.1	1,533.7	1,539.4	1,550.0	1,737.4	1,761.6	1,759.1	1,761.0	1,711.2	1,725.3	1,727.3	1,729.8	1,314.8	1,315.6	1,315.6	1,315.6
gas	1,486.1	1,444.7	1,418.2	1,395.4	1,424.3	1,769.5	1,754.3	1,739.9	1,721.1	1,200.3	1,113.9	1,082.7	1,054.3	1,623.2	1,571.0	1,543.2	1,513.7	1,782.3	1,751.9	1,727.9	1,708.3
nuclear	785.6	789.2	795.4	798.5	797.2	781.0	781.0	781.0	781.0	838.1	850.0	878.4	881.1	808.9	818.0	826.1	842.9	721.9	732.1	736.5	740.4
renewables	728.8	736.5	743.7	747.3	746.4	692.5	702.8	704.6	709.1	797.0	815.6	810.8	826.3	782.9	802.0	811.0	814.4	771.4	779.2	789.6	797.5
other	42.4	42.5	42.5	42.6	42.5	42.1	42.1	42.0	42.1	42.6	42.6	42.6	42.6	42.9	43.0	43.0	43.0	41.1	41.0	41.0	41.0
PRIMARY ENERGY (quadrillion Btu)																					
Consumption	102.6	102.9	103.0	103.1	102.9	104.4	104.4	104.5	104.6	101.3	101.6	101.7	101.7	107.2	107.6	107.7	107.8	100.2	100.5	100.4	100.7
liquids	36.0	36.1	36.1	36.1	36.1	36.9	36.8	36.8	36.8	35.8	35.9	35.9	35.9	37.5	37.6	37.6	37.7	35.8	35.9	35.8	35.9
natural gas	29.4	29.3	29.2	29.1	29.2	32.3	32.2	32.2	32.1	26.5	26.1	25.9	25.8	31.0	30.8	30.8	30.6	31.3	31.3	31.2	31.2
coal	18.8	19.0	19.1	19.2	18.9	17.3	17.4	17.4	17.5	19.5	19.7	19.7	19.7	19.4	19.6	19.6	19.6	15.0	15.0	15.0	15.0
other	18.4	18.5	18.6	18.7	18.7	18.0	18.1	18.1	18.1	19.6	19.9	20.2	20.3	19.2	19.5	19.7	19.9	18.1	18.3	18.4	18.6
Production	97.1	99.1	100.2	101.3	100.3	108.4	108.4	109.4	110.5	91.7	94.3	95.4	96.3	100.1	102.3	103.4	104.5	93.9	96.2	97.2	98.4
ENERGY RELATED CO2 EMISSIONS (including liquefaction) (million metric tons)	5,514	5,535	5,536	5,544	5,523	5,571	5,571	5,578	5,585	5,417	5,422	5,415	5,410	5,745	5,754	5,751	5,749	5,234	5,239	5,233	5,237
ECONOMIC INDICATORS																					
Gross Domestic Product (B 2005 chain-weighted $)	20,223	20,236	20,246	20,254	20,246	20,386	20,388	20,396	20,404	20,144	20,160	20,167	20,172	21,646	21,660	21,670	21,680	20,163	20,177	20,188	20,197
Total industrial shipments (B 2005$)	9,118	9,133	9,135	9,136	9,125	9,399	9,401	9,398	9,396	8,967	8,966	8,964	8,962	10,190	10,204	10,204	10,209	9,063	9,082	9,077	9,091
Non-farm employment (millions)	156	156	156	156	156	156	156	156	157	155	155	155	155	162	163	163	163	155	156	156	156
Annual change in Consumer Price Index	2.1%	2.1%	2.1%	2.1%	2.1%	2.0%	2.0%	2.0%	2.0%	2.2%	2.2%	2.2%	2.2%	1.8%	1.8%	1.8%	1.8%	2.1%	2.1%	2.1%	2.1%

Table B2. Differential from Base in U.S. Annual Average Values from 2015-40 when Exports are Added

	Reference				High Oil and Gas Resource				Low Oil and Gas Resource				High Macroeconomic Growth				Accelerated Coal and Nuclear Retirements			
	baseline	12 Bcf	16 Bcf	20 Bcf	Alt 20 Bcf	baseline	12 Bcf	16 Bcf	20 Bcf	baseline	12 Bcf	16 Bcf	20 Bcf	baseline	12 Bcf	16 Bcf	20 Bcf	baseline	12 Bcf	16 Bcf	20 Bcf
NATURAL GAS VOLUMES (Tcf)																					
Net Exports		1.5	2.5	3.5	2.7		(0.0)	1.0	1.9		2.3	3.2	4.0		1.7	2.7	3.7		1.8	2.8	3.7
gross imports		0.2	0.1	0.1	0.1		0.1	0.0	(0.0)		0.3	0.3	0.4		0.1	0.1	0.1		0.1	0.1	0.1
gross exports		1.7	2.7	3.6	2.8		0.1	1.0	1.9		2.6	3.6	4.4		1.9	2.8	3.8		1.9	2.9	3.8
Dry Production		1.4	2.4	3.2	2.6		(0.1)	0.9	1.7		1.9	2.7	3.3		1.6	2.5	3.3		1.8	2.7	3.7
shale gas		1.1	1.8	2.4	1.9		0.1	0.1	0.5		1.3	1.9	2.3		1.2	1.9	2.5		1.3	2.0	2.7
other		0.3	0.6	0.8	0.7		(0.2)	0.8	1.2		0.5	0.8	1.0		0.4	0.6	0.9		0.4	0.7	1.0
Consumed Volumes (1)		(0.1)	(0.2)	(0.3)	(0.1)		(0.1)	(0.1)	(0.1)		(0.4)	(0.5)	(0.6)		(0.2)	(0.3)	(0.4)		0.0	(0.1)	(0.1)
electric generators		(0.3)	(0.4)	(0.6)	(0.4)		(0.1)	(0.1)	(0.3)		(0.6)	(0.8)	(0.9)		(0.3)	(0.5)	(0.7)		(0.2)	(0.4)	(0.5)
industrial		(0.0)	(0.1)	(0.1)	(0.1)		(0.0)	(0.1)	(0.1)		(0.1)	(0.2)	(0.2)		(0.1)	(0.1)	(0.1)		(0.0)	(0.1)	(0.1)
liquefaction		0.2	0.3	0.4	0.3		0.0	0.1	0.2		0.3	0.4	0.5		0.2	0.3	0.4		0.2	0.3	0.4
residential		(0.0)	(0.0)	(0.0)	(0.0)		(0.0)	(0.0)	(0.0)		(0.0)	(0.1)	(0.1)		(0.0)	(0.0)	(0.0)		(0.0)	(0.0)	(0.0)
commercial		(0.0)	(0.0)	(0.0)	(0.0)		(0.0)	(0.0)	(0.0)		(0.1)	(0.1)	(0.1)		(0.0)	(0.0)	(0.1)		(0.0)	(0.0)	(0.1)
other		0.1	0.1	0.1	0.1		(0.0)	0.0	0.1		0.1	0.1	0.2		0.1	0.1	0.2		0.1	0.1	0.2
NATURAL GAS END-USE PRICES (2012$/Mcf)																					
residential		0.3	0.5	0.6	0.5		0.1	0.1	0.2		0.8	1.1	1.4		0.3	0.5	0.7		0.3	0.5	0.7
commercial		0.3	0.4	0.6	0.5		0.0	0.1	0.2		0.8	1.1	1.3		0.3	0.5	0.7		0.3	0.5	0.7
industrial		0.2	0.4	0.6	0.5		0.0	0.1	0.2		0.8	1.0	1.3		0.3	0.5	0.6		0.3	0.5	0.6
OTHER PRICES																					
Natural Gas Lower 48 Supply Price (2012$/Mcf)		0.2	0.4	0.57	0.5		(0.0)	0.0	0.1		0.7	1.0	1.3		0.3	0.5	0.6		0.3	0.5	0.6
Northeast (2012$/Mcf)		0.3	0.4	0.5	0.4		(0.1)	(0.2)	(0.2)		0.8	1.0	1.0		0.3	0.4	0.6		0.3	0.5	0.7
Gulf Coast (2012$/Mcf)		0.2	0.4	0.6	0.5		0.0	0.1	0.3		0.7	1.0	1.4		0.3	0.5	0.6		0.3	0.5	0.6
West Coast (2012$/Mcf)		0.3	0.4	0.5	0.5		0.1	0.2	0.3		0.6	1.0	1.2		0.3	0.5	0.6		0.3	0.5	0.5
Coal Minemouth Price (2012$/short-ton)		0.1	0.1	0.1	0.1		(0.0)	0.0	(0.0)		0.1	0.1	0.0		0.1	0.1	0.1		0.1	0.1	0.1
End-Use Electricity Price (2012 cents/Kwh)		0.1	0.2	0.2	0.2		0.0	0.0	0.1		0.3	0.4	0.4		0.1	0.2	0.3		0.2	0.2	0.3
END-USE ENERGY EXPENDITURES (B 2012$)		9.1	13.8	18.5	14.2		1.5	2.4	4.5		18.2	24.3	29.9		11.0	17.0	21.7		10.7	13.6	21.2
liquids		2.9	3.7	4.2	2.6		1.1	1.1	1.1		2.3	2.9	3.6		3.5	4.1	5.6		2.3	1.1	4.4
natural gas		2.7	4.5	6.4	5.1		0.0	0.6	1.8		7.9	10.7	13.3		3.5	5.6	7.3		3.4	5.3	7.3
electricity		3.6	5.6	7.9	6.5		0.3	0.7	1.6		8.0	10.8	13.0		4.0	7.3	8.8		5.0	7.1	9.5
coal		0.0	0.0	0.0	0.0		0.0	0.0	0.0		(0.0)	(0.0)	(0.0)		0.0	0.0	0.0		0.0	(0.0)	(0.0)
END-USE ENERGY CONSUMPTION (quadrillion Btu)		(0.0)	(0.1)	(0.2)	(0.3)		(0.1)	(0.2)	(0.2)		(0.3)	(0.4)	(0.4)		(0.1)	(0.2)	(0.2)		(0.0)	(0.2)	(0.1)
ELECTRIC GENERATION (billion kWh)		(8.1)	(15.9)	(21.3)	(20.1)		2.6	(4.3)	(7.9)		(31.7)	(41.8)	(50.1)		(9.9)	(18.6)	(25.4)		(11.6)	(20.7)	(28.6)
coal		21.9	27.1	37.8	12.4		7.6	13.3	23.9		24.2	21.7	23.6		14.1	16.1	18.6		0.8	0.8	0.8
gas		(41.4)	(67.9)	(90.7)	(61.8)		(15.2)	(29.6)	(48.4)		(86.5)	(117.7)	(146.1)		(52.2)	(80.0)	(109.5)		(30.4)	(54.4)	(74.0)
nuclear		3.6	9.8	12.9	11.6		(0.0)	(0.0)	(0.0)		11.9	40.3	43.0		9.1	17.2	34.0		10.2	14.6	18.5
renewables		7.7	14.9	18.6	17.6		10.3	12.1	16.6		18.6	13.8	29.3		19.1	28.1	31.5		7.8	18.3	26.1
other		0.1	0.1	0.1	0.0		(0.0)	(0.1)	(0.0)		0.1	0.0	0.0		0.0	0.1	0.1		(0.0)	(0.0)	(0.0)
PRIMARY ENERGY (quadrillion Btu)																					
Consumption		0.3	0.4	0.6	0.3		0.0	0.1	0.2		0.2	0.3	0.4		0.3	0.4	0.6		0.3	0.3	0.5
liquids		0.1	0.1	0.1	0.1		(0.0)	(0.1)	(0.1)		0.0	0.1	0.1		0.1	0.1	0.1		0.1	0.0	0.1
natural gas		(0.1)	(0.2)	(0.3)	(0.1)		(0.1)	(0.1)	(0.2)		(0.4)	(0.5)	(0.7)		(0.2)	(0.3)	(0.4)		0.0	(0.1)	(0.1)
coal		0.2	0.3	0.4	0.1		0.1	0.1	0.3		0.3	0.2	0.2		0.2	0.2	0.2		0.0	0.0	0.0
other		0.1	0.2	0.3	0.3		0.1	0.1	0.2		0.3	0.6	0.7		0.3	0.5	0.7		0.2	0.3	0.5
Production		1.9	3.1	4.2	3.2		(0.0)	1.1	2.1		2.6	3.7	4.6		2.2	3.3	4.4		2.2	3.3	4.5
ENERGY RELATED CO2 EMISSIONS (including liquefaction) (million metric tons)		21	23	31	9		(0)	7	14		6	(2)	(7)		9	7	5		6	(1)	3
ECONOMIC INDICATORS																					
Gross Domestic Product (B 2005 chain-weighted $)		14	23	32	23		1	10	18		16	23	28		14	24	34		15	25	34
Total industrial shipments (B 2005$)		15	17	18	7		2	(1)	(3)		(1)	(2)	(5)		13	14	18		19	14	29
Non-farm employment (millions)		0.1	0.1	0.2	0.1		0	0	0		0	0	0		0	0	0		0	0	0
Annual change in Consumer Price Index		0.0%	0.0%	0.0%	0.0%		0.0%	0.0%	0.0%		0.0%	0.0%	0.0%		0.0%	0.0%	0.0%		0.0%	0.0%	0.0%

Table B3. Differential (%) from Base in U.S. Annual Average Values from 2015-40 when Exports are Added

	Reference				High Oil and Gas Resource				Low Oil and Gas Resource				High Macroeconomic Growth				Accelerated Coal and Nuclear Retirements			
	baseline	12 Bcf	16 Bcf	20 Bcf	Alt 20 Bcf	baseline	12 Bcf	16 Bcf	20 Bcf	baseline	12 Bcf	16 Bcf	20 Bcf	baseline	12 Bcf	16 Bcf	20 Bcf	baseline	12 Bcf	16 Bcf	20 Bcf
NATURAL GAS VOLUMES (Tcf)																					
Net Exports		42.4%	70.8%	96.1%	76.3%		-0.5%	20.0%	38.4%		126.9%	179.6%	221.7%		52.8%	83.2%	111.3%		54.9%	85.7%	114.7%
gross imports		7.1%	6.3%	5.4%	4.1%		4.0%	0.1%	-0.8%		11.6%	12.7%	16.8%		5.9%	4.5%	4.9%		5.1%	4.8%	4.7%
gross exports		29.1%	46.5%	61.8%	49.1%		0.9%	13.6%	25.7%		58.2%	80.2%	99.7%		33.8%	51.2%	68.1%		34.5%	52.6%	69.6%
Dry Production		4.4%	7.3%	9.8%	8.0%		-0.4%	2.5%	4.8%		6.8%	9.7%	12.0%		4.7%	7.4%	9.8%		5.3%	8.0%	10.8%
shale gas		7.0%	11.2%	15.1%	11.7%		0.3%	0.4%	2.6%		11.2%	15.8%	19.4%		7.2%	11.2%	14.6%		7.9%	12.1%	15.8%
other		2.0%	3.5%	4.8%	4.4%		-1.1%	4.9%	7.2%		3.4%	5.0%	6.4%		2.2%	3.6%	5.0%		2.6%	4.0%	5.8%
Consumed Volumes (1)		-0.3%	-0.6%	-0.9%	-0.5%		-0.4%	-0.3%	-0.5%		-1.5%	-2.1%	-2.5%		-0.5%	-0.8%	-1.2%		0.0%	-0.2%	-0.2%
electric generators		-2.7%	-4.6%	-6.1%	-4.2%		-0.5%	-1.2%	-2.6%		-7.0%	-9.6%	-12.0%		-3.2%	-4.9%	-6.8%		-1.8%	-3.1%	-4.2%
industrial		-0.4%	-0.8%	-1.1%	-0.9%		-0.3%	-0.7%	-1.1%		-1.6%	-2.0%	-2.5%		-0.6%	-1.0%	-1.3%		-0.4%	-1.0%	-1.0%
liquefaction		62.0%	102.5%	138.9%	109.2%		1.3%	29.3%	54.5%		168.0%	234.2%	293.5%		76.8%	120.7%	160.1%		79.0%	123.5%	163.5%
residential		-0.4%	-0.6%	-0.8%	-0.6%		-0.1%	-0.2%	-0.4%		-1.0%	-1.3%	-1.6%		-0.5%	-0.7%	-0.9%		-0.4%	-0.7%	-0.8%
commercial		-0.7%	-1.1%	-1.5%	-1.2%		-0.2%	-0.3%	-0.6%		-1.8%	-2.4%	-2.8%		-0.9%	-1.2%	-1.6%		-0.7%	-1.3%	-1.5%
other		2.7%	4.1%	5.1%	4.1%		-0.6%	1.0%	2.3%		4.3%	5.6%	7.0%		2.8%	4.2%	5.3%		3.5%	5.0%	6.7%
NATURAL GAS END-USE PRICES (2012$/Mcf)																					
residential		2.1%	3.4%	4.8%	3.9%		0.7%	1.2%	2.0%		5.5%	7.3%	8.9%		2.5%	3.9%	5.1%		2.5%	4.0%	5.3%
commercial		2.5%	4.0%	5.7%	4.6%		0.4%	0.9%	1.8%		6.3%	8.5%	10.2%		2.9%	4.6%	6.0%		2.9%	4.8%	6.2%
industrial		3.6%	6.2%	8.8%	7.1%		0.5%	2.1%	4.4%		8.9%	12.2%	15.3%		4.4%	7.0%	9.0%		4.2%	6.9%	9.1%
OTHER PRICES																					
Natural Gas Lower 48 Supply Price (2012$/Mcf)		4.3%	7.4%	10.6%	8.6%		-0.7%	0.8%	3.2%		10.4%	14.4%	17.9%		5.0%	8.2%	10.6%		5.0%	8.3%	10.9%
Northeast (2012$/Mcf)		4.5%	6.6%	9.2%	7.3%		-3.2%	-5.2%	-4.9%		10.2%	12.3%	13.1%		4.6%	7.4%	10.0%		5.9%	8.6%	11.6%
Gulf Coast (2012$/Mcf)		3.9%	7.1%	10.4%	8.7%		0.5%	3.4%	6.7%		10.2%	14.8%	19.0%		4.8%	8.2%	10.5%		5.0%	8.3%	11.0%
West Coast (2012$/Mcf)		4.7%	6.9%	9.7%	8.2%		2.5%	4.5%	6.5%		9.0%	13.6%	16.7%		5.6%	8.1%	9.9%		5.4%	7.8%	9.0%
Coal Minemouth Price (2012$/short-ton)		0.2%	0.2%	0.1%	0.1%		-0.1%	0.1%	0.0%		0.1%	0.1%	0.1%		0.1%	0.2%	0.3%		0.1%	0.2%	0.1%
End-Use Electricity Price (2012 cents/Kwh)		1.0%	1.6%	2.3%	1.9%		0.0%	0.2%	0.6%		2.4%	3.3%	3.9%		1.1%	2.1%	2.5%		1.4%	2.1%	2.7%
END-USE ENERGY EXPENDITURES (B 2012$)		0.6%	1.0%	1.3%	1.0%		0.1%	0.2%	0.3%		1.2%	1.7%	2.0%		0.7%	1.1%	1.4%		0.8%	1.0%	1.5%
liquids		0.3%	0.4%	0.5%	0.3%		0.1%	0.1%	0.1%		0.3%	0.3%	0.4%		0.4%	0.5%	0.6%		0.3%	0.1%	0.5%
natural gas		1.9%	3.2%	4.6%	3.7%		0.0%	0.5%	1.5%		5.0%	6.7%	8.4%		2.3%	3.7%	4.8%		2.4%	3.7%	5.1%
electricity		0.9%	1.3%	1.9%	1.6%		0.1%	0.2%	0.4%		1.8%	2.5%	3.0%		0.9%	1.6%	2.0%		1.2%	1.6%	2.2%
coal		0.4%	0.3%	0.3%	0.1%		0.2%	0.2%	0.2%		-0.3%	-0.4%	-0.6%		0.2%	0.1%	0.2%		0.1%	0.0%	0.0%
END-USE ENERGY CONSUMPTION (quadrillion Btu)		-0.1%	-0.2%	-0.3%	-0.5%		-0.1%	-0.2%	-0.4%		-0.4%	-0.6%	-0.7%		-0.1%	-0.3%	-0.3%		0.0%	-0.4%	-0.2%
ELECTRIC GENERATION (billion kWh)		-0.2%	-0.3%	-0.5%	-0.4%		0.1%	-0.1%	-0.2%		-0.7%	-0.9%	-1.1%		-0.2%	-0.4%	-0.5%		-0.3%	-0.4%	-0.6%
coal		1.3%	1.6%	2.3%	0.7%		0.5%	0.9%	1.6%		1.4%	1.2%	1.4%		0.8%	0.9%	1.1%		0.1%	0.1%	0.1%
gas		-2.8%	-4.6%	-6.1%	-4.2%		-0.9%	-1.7%	-2.7%		-7.2%	-9.8%	-12.2%		-3.2%	-4.9%	-6.7%		-1.7%	-3.1%	-4.1%
nuclear		0.5%	1.2%	1.6%	1.5%		0.0%	0.0%	0.0%		1.4%	4.8%	5.1%		1.1%	2.1%	4.2%		1.4%	2.0%	2.6%
renewables		1.1%	2.0%	2.5%	2.4%		1.5%	1.8%	2.4%		2.3%	1.7%	3.7%		2.4%	3.6%	4.0%		1.0%	2.4%	3.4%
other		0.2%	0.2%	0.3%	0.1%		-0.1%	-0.3%	-0.1%		0.1%	0.1%	0.1%		0.1%	0.2%	0.1%		0.0%	-0.1%	0.0%
PRIMARY ENERGY (quadrillion Btu)																					
Consumption		0.3%	0.4%	0.6%	0.3%		0.0%	0.1%	0.2%		0.2%	0.3%	0.4%		0.3%	0.4%	0.6%		0.3%	0.3%	0.5%
liquids		0.2%	0.3%	0.3%	0.2%		-0.1%	-0.2%	-0.2%		0.1%	0.2%	0.2%		0.2%	0.2%	0.3%		0.3%	0.0%	0.4%
natural gas		-0.3%	-0.6%	-0.9%	-0.5%		-0.4%	-0.3%	-0.5%		-1.5%	-2.1%	-2.5%		-0.5%	-0.8%	-1.2%		0.0%	-0.2%	-0.2%
coal		1.2%	1.5%	2.1%	0.7%		0.5%	0.8%	1.4%		1.3%	1.2%	1.3%		0.8%	0.9%	1.0%		0.0%	0.0%	0.0%
other		0.6%	1.3%	1.7%	1.6%		0.6%	0.7%	0.9%		1.6%	2.9%	3.8%		1.4%	2.3%	3.4%		1.0%	1.8%	2.5%
Production		2.0%	3.2%	4.3%	3.3%		0.0%	1.0%	1.9%		2.8%	4.1%	5.0%		2.1%	3.3%	4.4%		2.4%	3.5%	4.8%
ENERGY RELATED CO2 EMISSIONS (including liquefaction) (million metric tons)		0.4%	0.4%	0.6%	0.2%		0.0%	0.1%	0.3%		0.1%	0.0%	-0.1%		0.2%	0.1%	0.1%		0.1%	0.0%	0.1%
ECONOMIC INDICATORS																					
Gross Domestic Product (B 2005 chain-weighted $)		0.1%	0.1%	0.2%	0.1%		0.0%	0.0%	0.1%		0.1%	0.1%	0.1%		0.1%	0.1%	0.2%		0.1%	0.1%	0.2%
Total industrial shipments (B 2005$)		0.2%	0.2%	0.2%	0.1%		0.0%	0.0%	0.0%		0.0%	0.0%	-0.1%		0.1%	0.1%	0.2%		0.2%	0.2%	0.3%
Non-farm employment (millions)		0.1%	0.1%	0.1%	0.1%		0.0%	0.0%	0.1%		0.1%	0.1%	0.1%		0.1%	0.1%	0.1%		0.1%	0.1%	0.1%
Annual change in Consumer Price Index		0.0%	0.2%	0.4%	0.3%		0.0%	-0.4%	-0.6%		0.0%	0.3%	0.4%		0.2%	0.3%	0.6%		0.3%	0.1%	0.4%

Table B4. U.S. Annual Averages Values from 2015-25

	Reference					High Oil and Gas Resource				Low Oil and Gas Resource				High Macroeconomic Growth				Accelerated Coal and Nuclear Retirements			
	baseline	12 Bcf	16 Bcf	20 Bcf	Alt 20 Bcf	baseline	12 Bcf	16 Bcf	20 Bcf	baseline	12 Bcf	16 Bcf	20 Bcf	baseline	12 Bcf	16 Bcf	20 Bcf	baseline	12 Bcf	16 Bcf	20 Bcf
NATURAL GAS VOLUMES (Tcf)																					
Net Exports	1.5	3.0	3.6	3.9	2.2	1.9	2.9	3.4	3.7	0.7	2.7	3.3	3.6	1.4	3.0	3.6	3.9	1.3	3.0	3.6	3.9
gross imports	2.5	2.6	2.6	2.6	2.5	2.6	2.7	2.7	2.7	2.6	2.8	2.9	2.9	2.5	2.6	2.6	2.6	2.5	2.6	2.6	2.6
gross exports	3.9	5.6	6.2	6.5	4.7	4.5	5.6	6.1	6.5	3.3	5.6	6.2	6.5	3.9	5.6	6.2	6.5	3.9	5.6	6.2	6.5
Dry Production	28.6	30.2	30.7	30.9	29.3	30.9	31.8	32.3	32.5	26.5	28.3	28.8	29.1	29.5	31.1	31.6	31.8	29.7	31.6	32.1	32.4
shale gas	13.0	14.2	14.5	14.7	13.5	14.7	15.4	15.7	15.8	11.3	12.7	13.0	13.2	13.7	14.8	15.2	15.4	13.9	15.5	15.7	16.0
other	15.6	16.0	16.2	16.2	15.8	16.2	16.4	16.6	16.7	15.2	15.6	15.8	15.9	15.9	16.2	16.3	16.4	15.8	16.2	16.4	16.4
Consumed Volumes (1)	27.1	27.0	27.0	26.9	27.0	28.9	28.8	28.7	28.6	25.7	25.4	25.4	25.3	28.0	27.9	27.9	27.9	28.3	28.5	28.4	28.4
electric generators	8.8	8.6	8.5	8.4	8.7	10.3	10.0	9.9	9.8	7.9	7.5	7.4	7.4	9.4	9.1	9.1	9.0	10.1	10.0	9.9	9.9
industrial	8.1	8.1	8.0	8.0	8.1	8.2	8.2	8.1	8.1	8.0	7.9	7.8	7.8	8.3	8.3	8.3	8.2	8.0	8.0	8.0	8.0
liquefaction	0.2	0.3	0.4	0.4	0.3	0.2	0.3	0.4	0.4	0.1	0.3	0.4	0.4	0.2	0.3	0.4	0.4	0.2	0.3	0.4	0.4
residential	4.5	4.4	4.4	4.4	4.5	4.5	4.5	4.5	4.5	4.4	4.4	4.4	4.4	4.5	4.5	4.5	4.5	4.5	4.4	4.4	4.4
commercial	3.2	3.1	3.1	3.1	3.2	3.3	3.2	3.2	3.2	3.1	3.0	3.0	3.0	3.2	3.1	3.1	3.1	3.2	3.1	3.1	3.1
other	2.3	2.4	2.5	2.5	2.4	2.4	2.5	2.5	2.5	2.2	2.3	2.3	2.4	2.4	2.5	2.5	2.5	2.4	2.5	2.6	2.6
NATURAL GAS END-USE PRICES (2012$/Mcf)																					
residential	11.9	12.1	12.2	12.3	12.1	11.0	11.2	11.3	11.4	12.7	13.6	13.8	14.0	12.1	12.5	12.7	12.7	12.0	12.2	12.4	12.4
commercial	9.8	10.0	10.1	10.2	10.0	8.8	8.9	9.0	9.1	10.6	11.4	11.6	11.8	9.9	10.2	10.4	10.5	9.9	10.0	10.3	10.3
industrial	5.9	6.1	6.2	6.4	6.1	5.2	5.4	5.5	5.7	6.7	7.5	7.7	8.0	6.0	6.2	6.4	6.6	6.1	6.2	6.5	6.5
OTHER PRICES																					
Natural Gas Lower 48 Supply Price (2012$/Mcf)	4.4	4.5	4.7	4.8	4.5	3.6	3.7	3.8	3.9	5.1	5.9	6.1	6.4	4.4	4.7	4.8	4.9	4.5	4.6	4.8	4.9
Northeast (2012$/Mcf)	4.3	4.4	4.5	4.5	4.5	2.7	2.7	2.6	2.6	5.3	6.0	6.0	6.1	4.3	4.6	4.7	4.7	4.4	4.5	4.6	4.5
Gulf Coast (2012$/Mcf)	4.4	4.6	4.7	4.9	4.6	3.9	4.0	4.2	4.4	5.2	6.0	6.2	6.5	4.5	4.7	4.9	5.0	4.6	4.8	5.0	5.1
West Coast (2012$/Mcf)	4.7	4.8	4.9	5.0	4.8	4.2	4.4	4.5	4.6	5.3	6.0	6.3	6.5	4.7	5.0	5.2	5.2	4.8	4.9	5.1	5.2
Coal Minemouth Price (2012$/short-ton)	46.1	46.2	46.2	46.2	46.2	45.3	45.3	45.4	45.3	46.5	46.8	46.8	46.7	46.5	46.6	46.7	46.7	55.6	55.8	55.8	55.7
End-Use Electricity Price (2012 cents/Kwh)	10.0	10.1	10.1	10.2	10.1	9.8	9.8	9.8	9.8	10.3	10.6	10.7	10.8	10.1	10.2	10.3	10.3	10.4	10.5	10.5	10.6
END-USE ENERGY EXPENDITURES (B 2012$)	1,290.0	1,296.3	1,300.0	1,302.3	1,295.0	1,249.1	1,253.7	1,257.2	1,260.8	1,318.0	1,338.1	1,343.6	1,348.6	1,336.8	1,345.3	1,350.9	1,353.3	1,297.2	1,302.7	1,306.3	1,311.1
liquids	784.4	786.3	787.1	787.2	785.2	759.4	761.9	762.5	764.1	794.8	797.2	797.6	798.0	813.5	815.4	816.0	816.4	780.2	781.0	780.8	783.1
natural gas	119.2	121.4	122.9	124.2	121.4	110.2	111.5	113.1	114.3	128.1	137.4	139.9	142.3	122.4	125.9	128.1	129.4	120.5	122.3	124.8	125.2
electricity	378.2	380.2	381.6	382.6	380.0	371.2	372.0	373.3	374.1	386.7	395.2	397.7	400.0	391.8	395.0	397.7	398.3	387.2	390.1	391.5	393.6
coal	8.3	8.4	8.4	8.4	8.4	8.3	8.3	8.3	8.3	8.4	8.4	8.4	8.4	9.1	9.1	9.1	9.1	9.2	9.2	9.2	9.2
END-USE ENERGY CONSUMPTION (quadrillion Btu)	64.7	64.7	64.7	64.6	64.4	65.7	65.6	65.5	65.5	64.3	64.0	63.9	63.9	66.5	66.4	66.3	66.3	64.3	64.3	64.2	64.3
ELECTRIC GENERATION (billion kWh)	4,407.5	4,403.2	4,399.3	4,397.5	4,403.7	4,455.8	4,451.4	4,447.8	4,445.5	4,376.1	4,348.2	4,340.7	4,336.0	4,539.8	4,532.8	4,526.7	4,523.7	4,370.9	4,368.7	4,360.6	4,352.9
coal	1,643.4	1,671.7	1,677.7	1,688.3	1,655.0	1,515.5	1,536.1	1,544.5	1,552.1	1,712.0	1,740.3	1,740.2	1,741.5	1,676.6	1,698.1	1,699.4	1,701.5	1,403.1	1,403.8	1,403.8	1,403.8
gas	1,274.3	1,238.5	1,223.6	1,211.2	1,253.4	1,473.0	1,436.0	1,421.8	1,408.7	1,146.2	1,083.5	1,071.4	1,063.1	1,363.9	1,327.2	1,317.2	1,308.0	1,456.7	1,448.2	1,435.3	1,426.4
nuclear	783.3	783.3	783.3	783.3	783.3	783.3	783.3	783.3	783.3	793.2	793.3	796.7	796.8	783.5	783.5	783.3	786.4	783.3	783.3	783.3	783.3
renewables	664.0	667.1	672.3	672.1	669.5	641.7	653.5	655.9	659.1	682.1	688.3	689.7	691.8	673.0	681.1	683.9	684.9	686.3	691.8	696.7	697.9
other	42.5	42.6	42.6	42.6	42.5	42.4	42.5	42.3	42.3	42.7	42.8	42.8	42.8	42.8	42.9	42.9	42.9	41.5	41.6	41.5	41.5
PRIMARY ENERGY (quadrillion Btu)																					
Consumption	100.5	100.9	100.9	101.0	100.6	101.3	101.5	101.5	101.5	100.1	100.2	100.2	100.2	103.0	103.3	103.3	103.3	99.2	99.6	99.5	99.6
liquids	36.7	36.7	36.7	36.7	36.7	37.0	37.0	37.0	37.0	36.6	36.6	36.6	36.6	37.5	37.6	37.6	37.6	36.5	36.5	36.5	36.6
natural gas	27.6	27.6	27.5	27.5	27.6	29.6	29.4	29.4	29.2	26.3	26.0	25.9	25.9	28.6	28.5	28.5	28.5	28.9	29.1	29.0	29.0
coal	18.6	18.9	18.9	19.0	18.7	17.2	17.4	17.5	17.6	19.3	19.6	19.6	19.6	19.0	19.3	19.3	19.3	16.0	16.0	16.0	16.0
other	17.7	17.7	17.7	17.7	17.7	17.4	17.6	17.6	17.6	17.9	18.0	18.1	18.1	17.8	17.9	17.9	18.0	17.9	17.9	18.0	18.0
Production	93.3	95.3	96.0	96.4	94.2	98.9	100.1	100.7	101.0	90.6	92.8	93.4	93.7	95.0	97.0	97.6	97.9	92.0	94.3	94.7	95.2
ENERGY RELATED CO2 EMISSIONS (including liquefaction) (million metric tons)	5,469	5,497	5,501	5,508	5,477	5,464	5,477	5,483	5,485	5,462	5,477	5,474	5,473	5,614	5,634	5,635	5,634	5,276	5,290	5,285	5,289
ECONOMIC INDICATORS																					
Gross Domestic Product (B 2005 chain-weighted $)	16,739	16,751	16,754	16,756	16,742	16,831	16,839	16,842	16,844	16,699	16,705	16,707	16,709	17,517	17,528	17,529	17,532	16,708	16,720	16,721	16,726
Total industrial shipments (B 2005$)	7,960	7,971	7,972	7,969	7,961	8,117	8,118	8,117	8,117	7,900	7,891	7,889	7,889	8,557	8,564	8,560	8,561	7,926	7,937	7,930	7,946
Non-farm employment (millions)	148	148	148	148	148	148	148	148	148	147	147	147	147	152	152	152	152	147	147	147	148
Annual change in Consumer Price Index	1.8%	1.8%	1.9%	1.9%	1.9%	1.8%	1.8%	1.8%	1.8%	1.9%	2.0%	2.0%	2.0%	1.5%	1.5%	1.5%	1.5%	1.8%	1.8%	1.9%	1.9%

Table B5. Differential from Base in U.S. Annual Average Values from 2015-25 when Exports are Added

	Reference				High Oil and Gas Resource				Low Oil and Gas Resource				High Macroeconomic Growth				Accelerated Coal and Nuclear Retirements			
	baseline	12 Bcf	16 Bcf	20 Bcf	Alt 20 Bcf	baseline	12 Bcf	16 Bcf	20 Bcf	baseline	12 Bcf	16 Bcf	20 Bcf	baseline	12 Bcf	16 Bcf	20 Bcf	baseline	12 Bcf	16 Bcf	20 Bcf
NATURAL GAS VOLUMES (Tcf)																					
Net Exports		1.6	2.1	2.4	0.8		1.0	1.5	1.9		2.1	2.7	3.0		1.6	2.1	2.5		1.7	2.2	2.6
gross imports		0.1	0.1	0.1	0.0		0.1	0.1	0.1		0.2	0.2	0.2		0.1	0.1	0.2		0.1	0.1	0.1
gross exports		1.7	2.3	2.6	0.8		1.1	1.7	2.0		2.3	2.9	3.2		1.7	2.3	2.6		1.8	2.3	2.7
Dry Production		1.5	2.0	2.3	0.7		0.8	1.3	1.5		1.8	2.3	2.6		1.5	2.1	2.3		1.9	2.3	2.7
shale gas		1.2	1.5	1.7	0.5		0.7	1.0	1.0		1.4	1.8	1.9		1.2	1.6	1.8		1.6	1.8	2.1
other		0.4	0.5	0.6	0.2		0.2	0.4	0.5		0.4	0.5	0.6		0.4	0.5	0.6		0.3	0.6	0.6
Consumed Volumes (1)		(0.0)	(0.1)	(0.2)	(0.1)		(0.1)	(0.2)	(0.3)		(0.3)	(0.4)	(0.4)		(0.1)	(0.1)	(0.1)		0.2	0.1	0.2
electric generators		(0.2)	(0.4)	(0.4)	(0.2)		(0.3)	(0.3)	(0.5)		(0.4)	(0.5)	(0.6)		(0.2)	(0.3)	(0.4)		(0.1)	(0.1)	(0.2)
industrial		(0.0)	(0.0)	(0.1)	(0.0)		(0.0)	(0.1)	(0.1)		(0.1)	(0.2)	(0.2)		(0.0)	(0.1)	(0.1)		(0.0)	(0.1)	(0.0)
liquefaction		0.2	0.2	0.3	0.1		0.1	0.2	0.2		0.2	0.3	0.3		0.2	0.2	0.3		0.2	0.2	0.3
residential		(0.0)	(0.0)	(0.0)	(0.0)		(0.0)	(0.0)	(0.0)		(0.0)	(0.1)	(0.1)		(0.0)	(0.0)	(0.0)		(0.0)	(0.0)	(0.0)
commercial		(0.0)	(0.0)	(0.0)	(0.0)		(0.0)	(0.0)	(0.0)		(0.1)	(0.1)	(0.1)		(0.0)	(0.0)	(0.0)		(0.0)	(0.0)	(0.0)
other		0.1	0.1	0.1	0.0		0.0	0.1	0.1		0.1	0.1	0.2		0.1	0.1	0.1		0.1	0.2	0.2
NATURAL GAS END-USE PRICES (2012$/Mcf)																					
residential		0.2	0.3	0.4	0.2		0.2	0.3	0.4		0.9	1.1	1.3		0.3	0.5	0.6		0.2	0.4	0.4
commercial		0.2	0.3	0.4	0.2		0.1	0.2	0.3		0.8	1.1	1.2		0.3	0.5	0.6		0.2	0.4	0.4
industrial		0.2	0.3	0.4	0.2		0.1	0.3	0.4		0.8	1.1	1.3		0.3	0.5	0.6		0.2	0.4	0.4
OTHER PRICES																					
Natural Gas Lower 48 Supply Price (2012$/Mcf)		0.2	0.3	0.4	0.2		0.1	0.2	0.3		0.8	1.0	1.2		0.3	0.4	0.5		0.1	0.3	0.4
Northeast (2012$/Mcf)		0.2	0.2	0.2	0.2		(0.1)	(0.2)	(0.2)		0.7	0.8	0.9		0.2	0.3	0.4		0.2	0.3	0.2
Gulf Coast (2012$/Mcf)		0.2	0.3	0.5	0.2		0.1	0.3	0.5		0.8	1.0	1.3		0.2	0.4	0.6		0.2	0.4	0.5
West Coast (2012$/Mcf)		0.1	0.2	0.3	0.1		0.2	0.4	0.4		0.8	1.1	1.2		0.3	0.5	0.6		0.1	0.3	0.3
Coal Minemouth Price (2012$/short-ton)		0.1	0.1	0.1	0.0		(0.0)	0.0	(0.0)		0.2	0.2	0.2		0.1	0.2	0.2		0.2	0.1	0.1
End-Use Electricity Price (2012 cents/Kwh)		0.1	0.1	0.1	0.1		0.0	0.1	0.1		0.3	0.4	0.4		0.1	0.2	0.2		0.1	0.1	0.2
END-USE ENERGY EXPENDITURES (B 2012$)		6.3	9.9	12.3	4.9		4.6	8.1	11.7		20.1	25.6	30.6		8.6	14.2	16.5		5.6	9.2	13.9
liquids		2.0	2.7	2.8	0.8		2.5	3.1	4.7		2.4	2.8	3.2		1.9	2.6	3.0		0.8	0.6	2.8
natural gas		2.3	3.8	5.1	2.3		1.3	2.9	4.1		9.3	11.8	14.2		3.5	5.7	7.0		1.8	4.3	4.7
electricity		2.0	3.4	4.4	1.9		0.8	2.2	2.9		8.4	11.0	13.2		3.2	5.9	6.6		2.9	4.3	6.4
coal		0.0	0.0	0.0	0.0		0.0	0.0	0.0		(0.0)	(0.0)	(0.0)		0.0	0.0	0.0		(0.0)	(0.0)	(0.0)
END-USE ENERGY CONSUMPTION (quadrillion Btu)		(0.0)	(0.1)	(0.1)	(0.3)		(0.1)	(0.1)	(0.1)		(0.3)	(0.4)	(0.4)		(0.1)	(0.2)	(0.2)		(0.0)	(0.2)	(0.0)
ELECTRIC GENERATION (billion kWh)		(4.3)	(8.2)	(10.0)	(3.8)		(4.5)	(8.0)	(10.3)		(27.8)	(35.4)	(40.0)		(7.0)	(13.1)	(16.1)		(2.2)	(10.3)	(18.0)
coal		28.3	34.3	44.9	11.6		20.6	29.0	36.6		28.3	28.2	29.5		21.5	22.9	25.0		0.7	0.7	0.7
gas		(35.8)	(50.8)	(63.2)	(20.9)		(37.0)	(51.2)	(64.3)		(62.6)	(74.7)	(83.0)		(36.7)	(46.7)	(56.0)		(8.4)	(21.4)	(30.2)
nuclear		0.0	0.0	0.0	0.1		(0.0)	(0.0)	(0.0)		0.2	3.5	3.7		(0.0)	(0.2)	2.9		0.0	0.0	0.0
renewables		3.0	8.2	8.1	5.4		11.8	14.3	17.4		6.2	7.6	9.7		8.1	10.9	11.9		5.5	10.4	11.6
other		0.1	0.1	0.1	0.0		0.1	(0.1)	(0.1)		0.1	0.1	0.1		0.1	0.1	0.1		0.0	(0.0)	0.0
PRIMARY ENERGY (quadrillion Btu)																					
Consumption		0.3	0.4	0.4	0.1		0.2	0.3	0.2		0.1	0.1	0.1		0.3	0.3	0.3		0.3	0.3	0.4
liquids		0.1	0.1	0.1	0.0		0.0	0.0	0.0		0.0	0.0	0.0		0.0	0.0	0.0		0.1	0.0	0.1
natural gas		(0.0)	(0.1)	(0.2)	(0.1)		(0.2)	(0.2)	(0.3)		(0.3)	(0.4)	(0.4)		(0.1)	(0.1)	(0.1)		0.2	0.1	0.2
coal		0.3	0.4	0.5	0.1		0.2	0.3	0.4		0.3	0.3	0.3		0.2	0.2	0.3		0.0	0.0	0.0
other		0.0	0.1	0.1	0.1		0.1	0.1	0.2		0.1	0.1	0.1		0.1	0.1	0.1		0.1	0.1	0.1
Production		2.0	2.7	3.0	0.9		1.2	1.8	2.1		2.3	2.8	3.1		2.0	2.6	2.9		2.3	2.7	3.2
ENERGY RELATED CO2 EMISSIONS (including liquefaction) (million metric tons)		29	32	40	8		14	20	21		15	12	11		20	21	20		14	9	12
ECONOMIC INDICATORS																					
Gross Domestic Product (B 2005 chain-weighted $)		12	15	17	3		7	10	13		6	8	10		11	12	14		12	13	17
Total industrial shipments (B 2005$)		11	11	9	0		1	0	(0)		(9)	(11)	(11)		7	3	4		11	4	20
Non-farm employment (millions)		0	0	0	0		0	0	0		0	0	0		0	0	0		0	0	0
Annual change in Consumer Price Index		0.0%	0.0%	0.0%	0.0%		0.0%	0.0%	0.0%		0.1%	0.1%	0.1%		0.0%	0.0%	0.0%		0.0%	0.0%	0.0%

Table B6. Differential (%) from Base in U.S. Annual Average Values from 2015-25 when Exports are Added

	Reference				High Oil and Gas Resource				Low Oil and Gas Resource				High Macroeconomic Growth				Accelerated Coal and Nuclear Retirements			
	baseline	12 Bcf	16 Bcf	20 Bcf	Alt 20 Bcf	baseline	12 Bcf	16 Bcf	20 Bcf	baseline	12 Bcf	16 Bcf	20 Bcf	baseline	12 Bcf	16 Bcf	20 Bcf	baseline	12 Bcf	16 Bcf	20 Bcf
NATURAL GAS VOLUMES (Tcf)																					
Net Exports		105.7%	144.2%	165.2%	51.1%		52.0%	81.1%	97.6%		321.7%	407.6%	453.6%		113.0%	152.0%	174.5%		123.8%	164.0%	189.7%
gross imports		4.7%	5.0%	5.1%	1.6%		4.9%	5.4%	5.6%		7.9%	8.6%	9.2%		4.9%	5.6%	6.1%		3.8%	4.6%	4.5%
gross exports		42.6%	57.2%	65.2%	20.2%		24.9%	37.6%	44.7%		70.2%	87.8%	97.4%		44.1%	58.7%	67.1%		45.7%	60.3%	69.2%
Dry Production		5.3%	7.1%	8.0%	2.3%		2.7%	4.3%	5.0%		6.8%	8.7%	9.6%		5.2%	7.0%	7.9%		6.3%	7.9%	9.1%
shale gas		8.9%	11.5%	12.8%	3.8%		4.5%	6.7%	7.1%		12.3%	15.5%	17.1%		8.5%	11.5%	12.8%		11.3%	12.9%	15.5%
other		2.4%	3.4%	3.9%	1.1%		1.1%	2.2%	3.1%		2.7%	3.6%	4.1%		2.3%	3.1%	3.6%		1.9%	3.5%	3.5%
Consumed Volumes (1)		-0.2%	-0.4%	-0.6%	-0.3%		-0.5%	-0.7%	-1.1%		-1.2%	-1.4%	-1.6%		-0.2%	-0.3%	-0.5%		0.7%	0.5%	0.5%
electric generators		-2.8%	-4.0%	-5.0%	-1.8%		-2.5%	-3.4%	-4.6%		-5.3%	-6.4%	-7.2%		-2.7%	-3.3%	-4.1%		-0.6%	-1.3%	-2.0%
industrial		-0.4%	-0.6%	-0.8%	-0.3%		-0.3%	-0.6%	-0.9%		-1.5%	-1.9%	-2.2%		-0.5%	-0.9%	-1.1%		-0.3%	-0.8%	-0.6%
liquefaction		98.2%	133.2%	152.7%	46.6%		49.3%	75.6%	90.3%		221.1%	276.9%	307.9%		103.6%	139.4%	159.2%		108.2%	144.7%	165.0%
residential		-0.3%	-0.5%	-0.6%	-0.2%		-0.3%	-0.4%	-0.5%		-1.1%	-1.3%	-1.4%		-0.4%	-0.7%	-0.7%		-0.2%	-0.5%	-0.5%
commercial		-0.6%	-0.9%	-1.1%	-0.4%		-0.5%	-0.7%	-1.0%		-2.0%	-2.5%	-2.8%		-0.9%	-1.3%	-1.5%		-0.4%	-1.0%	-0.9%
other		4.4%	5.6%	6.1%	1.8%		2.0%	3.1%	3.5%		5.3%	6.5%	7.2%		4.3%	5.4%	6.0%		5.5%	6.3%	7.4%
NATURAL GAS END-USE PRICES (2012$/Mcf)																					
residential		1.8%	2.8%	3.7%	1.7%		1.5%	2.3%	3.5%		6.8%	8.6%	10.1%		2.7%	4.2%	5.0%		1.4%	3.2%	3.2%
commercial		2.1%	3.3%	4.4%	2.0%		1.5%	2.3%	3.6%		8.0%	9.9%	11.7%		3.2%	4.9%	5.8%		1.7%	3.8%	3.8%
industrial		3.2%	5.5%	7.5%	3.1%		2.6%	5.7%	8.0%		12.4%	16.1%	19.4%		4.8%	7.9%	9.9%		2.5%	6.3%	6.9%
OTHER PRICES																					
Natural Gas Lower 48 Supply Price (2012$/Mcf)		3.7%	6.5%	8.9%	4.0%		2.3%	6.0%	9.0%		15.2%	19.9%	24.1%		5.7%	9.6%	12.1%		3.1%	7.6%	8.4%
Northeast (2012$/Mcf)		3.6%	4.5%	5.6%	3.8%		-2.7%	-5.7%	-5.9%		13.9%	14.9%	16.4%		5.7%	8.0%	8.6%		3.9%	6.0%	4.3%
Gulf Coast (2012$/Mcf)		4.2%	7.7%	10.6%	4.5%		2.1%	7.7%	12.3%		15.0%	20.1%	25.1%		5.2%	9.7%	12.8%		4.5%	9.5%	11.5%
West Coast (2012$/Mcf)		3.1%	5.2%	6.6%	2.7%		4.8%	8.6%	10.4%		14.6%	20.7%	23.6%		6.8%	10.1%	12.2%		2.1%	5.9%	6.8%
Coal Minemouth Price (2012$/short-ton)		0.2%	0.2%	0.2%	0.1%		0.0%	0.1%	0.0%		0.5%	0.5%	0.5%		0.3%	0.4%	0.4%		0.3%	0.3%	0.2%
End-Use Electricity Price (2012 cents/Kwh)		0.6%	1.1%	1.4%	0.6%		0.3%	0.7%	1.0%		2.8%	3.6%	4.3%		1.0%	1.9%	2.0%		0.9%	1.4%	1.9%
END-USE ENERGY EXPENDITURES (B 2012$)		0.5%	0.8%	1.0%	0.4%		0.4%	0.7%	0.9%		1.5%	1.9%	2.3%		0.6%	1.1%	1.2%		0.4%	0.7%	1.1%
liquids		0.3%	0.4%	0.4%	0.1%		0.3%	0.4%	0.6%		0.3%	0.3%	0.4%		0.2%	0.3%	0.4%		0.1%	0.1%	0.4%
natural gas		1.9%	3.2%	4.2%	1.9%		1.2%	2.6%	3.7%		7.3%	9.2%	11.1%		2.9%	4.6%	5.7%		1.5%	3.6%	3.9%
electricity		0.5%	0.9%	1.2%	0.5%		0.2%	0.6%	0.8%		2.2%	2.8%	3.4%		0.8%	1.5%	1.7%		0.8%	1.1%	1.6%
coal		0.3%	0.3%	0.3%	0.1%		0.2%	0.2%	0.2%		-0.1%	-0.2%	-0.3%		0.1%	0.0%	0.1%		0.0%	-0.2%	0.0%
END-USE ENERGY CONSUMPTION (quadrillion Btu)		0.0%	-0.1%	-0.2%	-0.5%		-0.1%	-0.2%	-0.2%		-0.5%	-0.6%	-0.6%		-0.1%	-0.2%	-0.3%		0.0%	-0.2%	-0.1%
ELECTRIC GENERATION (billion kWh)		-0.1%	-0.2%	-0.2%	-0.1%		-0.1%	-0.2%	-0.2%		-0.6%	-0.8%	-0.9%		-0.2%	-0.3%	-0.4%		-0.1%	-0.2%	-0.4%
coal		1.7%	2.1%	2.7%	0.7%		1.4%	1.9%	2.4%		1.7%	1.6%	1.7%		1.3%	1.4%	1.5%		0.0%	0.0%	0.0%
gas		-2.8%	-4.0%	-5.0%	-1.6%		-2.5%	-3.5%	-4.4%		-5.5%	-6.5%	-7.2%		-2.7%	-3.4%	-4.1%		-0.6%	-1.5%	-2.1%
nuclear		0.0%	0.0%	0.0%	0.0%		0.0%	0.0%	0.0%		0.0%	0.4%	0.5%		0.0%	0.0%	0.4%		0.0%	0.0%	0.0%
renewables		0.5%	1.2%	1.2%	0.8%		1.8%	2.2%	2.7%		0.9%	1.1%	1.4%		1.2%	1.6%	1.8%		0.8%	1.5%	1.7%
other		0.2%	0.3%	0.3%	0.1%		0.2%	-0.3%	-0.2%		0.2%	0.2%	0.2%		0.2%	0.3%	0.2%		0.0%	0.0%	0.0%
PRIMARY ENERGY (quadrillion Btu)																					
Consumption		0.3%	0.4%	0.4%	0.1%		0.2%	0.2%	0.2%		0.1%	0.1%	0.1%		0.3%	0.3%	0.3%		0.3%	0.3%	0.4%
liquids		0.1%	0.2%	0.2%	0.0%		0.0%	0.0%	0.0%		0.1%	0.1%	0.1%		0.1%	0.1%	0.1%		0.2%	0.0%	0.3%
natural gas		-0.2%	-0.4%	-0.6%	-0.3%		-0.5%	-0.7%	-1.1%		-1.2%	-1.4%	-1.6%		-0.2%	-0.3%	-0.5%		0.7%	0.5%	0.5%
coal		1.6%	2.0%	2.6%	0.7%		1.3%	1.8%	2.2%		1.6%	1.6%	1.7%		1.2%	1.3%	1.4%		0.0%	0.0%	0.0%
other		0.2%	0.5%	0.4%	0.3%		0.7%	0.8%	1.0%		0.4%	0.6%	0.8%		0.4%	0.6%	0.8%		0.3%	0.6%	0.6%
Production		2.2%	2.9%	3.2%	1.0%		1.2%	1.8%	2.1%		2.5%	3.1%	3.4%		2.1%	2.7%	3.1%		2.5%	2.9%	3.5%
ENERGY RELATED CO2 EMISSIONS (including liquefaction) (million metric tons)		0.5%	0.6%	0.7%	0.2%		0.3%	0.4%	0.4%		0.3%	0.2%	0.2%		0.4%	0.4%	0.4%		0.3%	0.2%	0.2%
ECONOMIC INDICATORS																					
Gross Domestic Product (B 2005 chain-weighted $)		0.1%	0.1%	0.1%	0.0%		0.0%	0.1%	0.1%		0.0%	0.1%	0.1%		0.1%	0.1%	0.1%		0.1%	0.1%	0.1%
Total industrial shipments (B 2005$)		0.1%	0.1%	0.1%	0.0%		0.0%	0.0%	0.0%		-0.1%	-0.1%	-0.1%		0.1%	0.0%	0.0%		0.1%	0.1%	0.3%
Non-farm employment (millions)		0.1%	0.1%	0.1%	0.0%		0.0%	0.1%	0.1%		0.0%	0.1%	0.1%		0.1%	0.1%	0.1%		0.1%	0.1%	0.1%
Annual change in Consumer Price Index		-0.2%	0.4%	1.3%	1.2%		0.3%	0.2%	1.4%		2.6%	3.6%	4.9%		0.0%	1.1%	1.8%		-0.4%	0.2%	0.6%

Table B7. U.S. Annual Averages Values from 2026-40

	Reference					High Oil and Gas Resource				Low Oil and Gas Resource				High Macroeconomic Growth				Accelerated Coal and Nuclear Retirements			
	baseline	12 Bcf	16 Bcf	20 Bcf	Alt 20 Bcf	baseline	12 Bcf	16 Bcf	20 Bcf	baseline	12 Bcf	16 Bcf	20 Bcf	baseline	12 Bcf	16 Bcf	20 Bcf	baseline	12 Bcf	16 Bcf	20 Bcf
NATURAL GAS VOLUMES (Tcf)																					
Net Exports	5.1	6.6	8.0	9.3	9.3	7.2	6.4	7.7	9.1	2.6	5.1	6.3	7.4	4.7	6.5	7.9	9.2	4.6	6.5	7.8	9.2
gross imports	2.0	2.2	2.1	2.1	2.1	2.2	2.3	2.1	2.1	2.7	3.0	3.1	3.2	2.1	2.2	2.2	2.2	2.1	2.2	2.2	2.2
gross exports	7.1	8.8	10.1	11.4	11.4	9.4	8.7	9.9	11.2	5.3	8.1	9.4	10.6	6.8	8.8	10.0	11.4	6.7	8.7	10.0	11.4
Dry Production	35.3	36.7	37.9	39.1	39.3	40.8	40.0	41.4	42.7	28.7	30.7	31.7	32.6	36.9	38.5	39.7	40.9	37.0	38.8	40.0	41.4
shale gas	18.0	19.0	19.9	20.9	20.8	23.3	22.9	22.7	23.4	12.6	13.9	14.6	15.2	19.1	20.3	21.2	22.0	19.2	20.4	21.4	22.2
other	17.3	17.6	17.9	18.3	18.5	17.5	17.1	18.7	19.3	16.2	16.8	17.1	17.4	17.8	18.2	18.5	18.9	17.9	18.4	18.6	19.2
Consumed Volumes (1)	30.0	29.9	29.8	29.7	29.8	33.5	33.4	33.5	33.5	26.0	25.5	25.3	25.2	32.1	31.8	31.7	31.6	32.3	32.2	32.1	32.1
electric generators	10.4	10.1	9.9	9.7	9.8	12.8	12.9	12.8	12.6	7.8	7.2	6.9	6.6	11.4	11.0	10.7	10.4	12.8	12.4	12.2	12.1
industrial	8.6	8.5	8.5	8.5	8.5	8.9	8.9	8.8	8.8	8.2	8.0	8.0	8.0	9.2	9.1	9.1	9.1	8.5	8.5	8.4	8.4
liquefaction	0.3	0.5	0.7	0.8	0.8	0.5	0.4	0.6	0.7	0.2	0.5	0.7	0.8	0.3	0.5	0.7	0.8	0.3	0.5	0.7	0.8
residential	4.3	4.2	4.2	4.2	4.2	4.4	4.4	4.4	4.4	4.1	4.1	4.1	4.1	4.5	4.5	4.5	4.5	4.3	4.2	4.2	4.2
commercial	3.4	3.3	3.3	3.3	3.3	3.5	3.5	3.5	3.5	3.2	3.1	3.1	3.1	3.4	3.4	3.4	3.4	3.4	3.3	3.3	3.3
other	3.1	3.1	3.2	3.2	3.2	3.4	3.3	3.4	3.5	2.5	2.6	2.6	2.7	3.3	3.3	3.4	3.4	3.1	3.2	3.2	3.3
NATURAL GAS END-USE PRICES (2012$/Mcf)																					
residential	14.5	14.8	15.0	15.3	15.2	12.7	12.7	12.7	12.8	17.1	17.9	18.3	18.5	15.1	15.4	15.6	15.8	14.8	15.2	15.4	15.7
commercial	11.9	12.2	12.4	12.7	12.6	10.1	10.0	10.1	10.1	14.6	15.4	15.7	16.0	12.3	12.7	12.9	13.1	12.2	12.7	12.9	13.2
industrial	7.6	7.9	8.1	8.3	8.3	5.7	5.6	5.7	5.8	10.0	10.7	11.1	11.4	7.9	8.3	8.4	8.6	8.0	8.4	8.5	8.8
OTHER PRICES																					
Natural Gas Lower 48 Supply Price (2012$/Mcf)	6.2	6.5	6.7	6.9	6.9	4.4	4.3	4.3	4.4	8.6	9.3	9.6	9.9	6.5	6.8	7.0	7.2	6.6	7.0	7.1	7.4
Northeast (2012$/Mcf)	6.6	7.0	7.1	7.4	7.2	5.1	5.0	4.9	4.9	9.9	10.8	11.1	11.1	7.1	7.4	7.6	7.8	7.1	7.6	7.8	8.2
Gulf Coast (2012$/Mcf)	6.3	6.5	6.7	6.9	6.9	4.2	4.1	4.2	4.3	8.5	9.2	9.6	9.9	6.6	6.9	7.0	7.2	6.6	7.0	7.1	7.3
West Coast (2012$/Mcf)	6.3	6.7	6.8	7.0	7.0	4.6	4.6	4.6	4.7	8.4	8.9	9.2	9.5	6.6	6.9	7.1	7.2	6.7	7.2	7.3	7.4
Coal Minemouth Price (2012$/short-ton)	54.8	54.9	54.9	54.8	54.9	53.9	53.9	54.0	53.9	55.1	55.0	55.0	55.0	55.7	55.7	55.7	55.7	90.2	90.2	90.3	90.3
End-Use Electricity Price (2012 cents/Kwh)	10.6	10.8	10.8	10.9	10.9	9.8	9.8	9.8	9.8	11.6	11.9	12.0	12.1	10.9	11.0	11.1	11.2	11.6	11.8	11.9	11.9
END-USE ENERGY EXPENDITURES (B 2012$)	1,496.6	1,507.9	1,513.2	1,519.6	1,517.7	1,393.3	1,392.4	1,391.5	1,392.6	1,562.0	1,578.9	1,585.5	1,591.4	1,629.5	1,642.2	1,648.7	1,655.1	1,520.5	1,535.0	1,537.4	1,547.1
liquids	889.5	893.0	893.8	894.6	893.5	834.3	834.4	834.0	832.8	899.9	902.2	902.9	903.9	962.1	966.7	967.3	969.6	880.2	883.6	881.7	885.8
natural gas	155.9	158.8	160.9	163.3	163.1	131.9	131.0	130.8	132.0	181.7	188.6	191.6	194.4	171.9	175.4	177.4	179.5	159.2	163.7	165.3	168.3
electricity	442.7	447.4	449.8	453.1	452.5	418.6	418.5	418.1	419.2	471.8	479.5	482.5	484.7	485.2	489.8	493.5	495.7	469.5	476.1	478.7	481.3
coal	8.6	8.7	8.7	8.7	8.6	8.5	8.5	8.5	8.5	8.6	8.5	8.5	8.5	10.3	10.4	10.3	10.4	11.7	11.7	11.7	11.7
END-USE ENERGY CONSUMPTION (quadrillion Btu)	66.0	65.9	65.8	65.7	65.6	68.3	68.2	68.1	68.0	64.3	64.0	63.9	63.8	70.2	70.1	70.0	69.9	65.1	65.1	64.8	64.9
ELECTRIC GENERATION (billion kWh)	4,933.7	4,922.8	4,912.1	4,904.0	4,901.6	5,071.8	5,079.6	5,070.2	5,065.6	4,790.9	4,756.4	4,744.4	4,733.5	5,284.0	5,272.0	5,261.3	5,251.9	4,822.4	4,804.0	4,794.1	4,786.1
coal	1,686.4	1,703.5	1,708.3	1,718.9	1,699.4	1,533.9	1,531.9	1,535.7	1,548.5	1,756.0	1,777.2	1,772.9	1,775.4	1,736.7	1,745.3	1,747.7	1,750.6	1,250.0	1,250.9	1,250.9	1,250.9
gas	1,641.4	1,595.8	1,561.0	1,530.5	1,549.7	1,986.9	1,987.6	1,973.1	1,950.1	1,240.1	1,136.1	1,090.9	1,047.7	1,813.3	1,749.8	1,709.0	1,664.6	2,021.1	1,974.6	1,942.5	1,915.1
nuclear	787.3	793.6	804.3	809.6	807.4	779.3	779.3	779.3	779.3	871.1	891.5	938.3	942.9	827.5	843.3	857.4	884.3	676.9	694.6	702.3	708.9
renewables	776.2	787.4	796.0	802.5	802.7	729.7	738.9	740.3	745.8	881.2	909.0	899.7	925.0	863.5	890.6	904.2	909.4	833.7	843.2	857.8	870.5
other	42.4	42.5	42.5	42.5	42.4	41.9	41.8	41.8	41.9	42.5	42.6	42.5	42.5	43.1	43.1	43.1	43.1	40.7	40.7	40.7	40.7
PRIMARY ENERGY (quadrillion Btu)																					
Consumption	104.1	104.4	104.5	104.7	104.6	101.3	101.5	101.5	101.5	100.1	100.2	100.2	100.2	103.0	103.3	103.3	103.3	99.2	99.6	99.5	99.6
liquids	35.6	35.7	35.7	35.7	35.7	37.0	37.0	37.0	37.0	36.6	36.6	36.6	36.6	37.5	37.6	37.6	37.6	36.5	36.5	36.5	36.6
natural gas	30.7	30.5	30.4	30.3	30.5	29.6	29.4	29.4	29.2	26.3	26.0	25.9	25.9	28.6	28.5	28.5	28.5	28.9	29.1	29.0	29.0
coal	18.9	19.1	19.2	19.3	19.1	17.2	17.4	17.5	17.6	19.3	19.6	19.6	19.6	19.0	19.3	19.3	19.3	16.0	16.0	16.0	16.0
other	18.9	19.1	19.3	19.4	19.4	17.4	17.6	17.6	17.6	17.9	18.0	18.1	18.1	17.8	17.9	17.9	18.0	17.9	17.9	18.0	18.0
Production	99.9	101.8	103.4	104.9	104.8	98.9	100.1	100.7	101.0	90.6	92.8	93.4	93.7	95.0	97.0	97.6	97.9	92.0	94.3	94.7	95.2
ENERGY RELATED CO2 EMISSIONS (including liquefaction) (million metric tons)	5,547	5,562	5,562	5,571	5,556	5,464	5,477	5,483	5,485	5,462	5,477	5,474	5,473	5,614	5,634	5,635	5,634	5,276	5,290	5,285	5,289
ECONOMIC INDICATORS																					
Gross Domestic Product (B 2005 chain-weighted $)	22,778	22,792	22,806	22,820	22,815	22,993	22,990	23,003	23,016	22,670	22,694	22,704	22,711	24,674	24,690	24,707	24,722	22,696	22,713	22,730	22,742
Total industrial shipments (B 2005$)	9,967	9,984	9,989	9,991	9,979	10,339	10,342	10,338	10,334	9,749	9,754	9,753	9,749	11,388	11,406	11,409	11,417	9,896	9,921	9,918	9,931
Non-farm employment (millions)	162	162	162	162	162	162	162	162	163	161	161	161	161	170	170	170	170	161	161	162	162
Annual change in Consumer Price Index	2.3%	2.3%	2.3%	2.3%	2.3%	2.2%	2.2%	2.2%	2.1%	2.3%	2.3%	2.3%	2.3%	2.0%	2.0%	2.0%	2.0%	2.3%	2.3%	2.3%	2.3%

Table B8. Differential from Base in U.S. Annual Average Values from 2026-40 when Exports are Added

	Reference				High Oil and Gas Resource				Low Oil and Gas Resource				High Macroeconomic Growth				Accelerated Coal and Nuclear Retirements			
	baseline	12 Bcf	16 Bcf	20 Bcf	Alt 20 Bcf	baseline	12 Bcf	16 Bcf	20 Bcf	baseline	12 Bcf	16 Bcf	20 Bcf	baseline	12 Bcf	16 Bcf	20 Bcf	baseline	12 Bcf	16 Bcf	20 Bcf
NATURAL GAS VOLUMES (Tcf)																					
Net Exports		1.5	2.8	4.2	4.2		(0.8)	0.6	1.9		2.4	3.6	4.7		1.8	3.2	4.6		1.9	3.2	4.6
gross imports		0.2	0.1	0.1	0.1		0.1	(0.1)	(0.1)		0.4	0.4	0.6		0.1	0.1	0.1		0.1	0.1	0.1
gross exports		1.7	3.0	4.3	4.3		(0.7)	0.5	1.8		2.8	4.1	5.3		2.0	3.3	4.6		2.0	3.3	4.7
Dry Production		1.4	2.6	3.9	4.0		(0.8)	0.6	1.9		1.9	3.0	3.9		1.6	2.8	4.0		1.7	3.0	4.3
shale gas		1.1	2.0	2.9	2.9		(0.4)	(0.6)	0.1		1.3	2.0	2.6		1.2	2.1	3.0		1.2	2.2	3.1
other		0.3	0.6	0.9	1.1		(0.5)	1.2	1.8		0.6	1.0	1.3		0.4	0.7	1.1		0.5	0.8	1.3
Consumed Volumes (1)		(0.1)	(0.3)	(0.3)	(0.2)		(0.1)	0.0	(0.0)		(0.5)	(0.7)	(0.8)		(0.2)	(0.4)	(0.5)		(0.1)	(0.2)	(0.2)
electric generators		(0.3)	(0.5)	(0.7)	(0.6)		0.1	0.0	(0.2)		(0.6)	(0.9)	(1.2)		(0.4)	(0.7)	(1.0)		(0.3)	(0.5)	(0.7)
industrial		(0.0)	(0.1)	(0.1)	(0.1)		(0.0)	(0.1)	(0.1)		(0.1)	(0.2)	(0.2)		(0.1)	(0.1)	(0.1)		(0.0)	(0.1)	(0.1)
liquefaction		0.2	0.3	0.5	0.5		(0.1)	0.1	0.2		0.3	0.5	0.6		0.2	0.4	0.5		0.2	0.4	0.5
residential		(0.0)	(0.0)	(0.0)	(0.0)		(0.0)	(0.0)	(0.0)		(0.0)	(0.1)	(0.1)		(0.0)	(0.0)	(0.0)		(0.0)	(0.0)	(0.0)
commercial		(0.0)	(0.0)	(0.1)	(0.1)		0.0	(0.0)	(0.0)		(0.1)	(0.1)	(0.1)		(0.0)	(0.0)	(0.1)		(0.0)	(0.0)	(0.1)
other		0.1	0.1	0.1	0.2		(0.1)	(0.0)	0.1		0.1	0.1	0.2		0.1	0.1	0.2		0.1	0.1	0.2
NATURAL GAS END-USE PRICES (2012$/Mcf)																					
residential		0.3	0.5	0.8	0.8		0.0	0.1	0.1		0.8	1.1	1.4		0.4	0.6	0.8		0.5	0.7	1.0
commercial		0.3	0.5	0.8	0.7		(0.0)	(0.0)	0.1		0.8	1.1	1.4		0.3	0.5	0.8		0.4	0.7	0.9
industrial		0.3	0.5	0.7	0.7		(0.0)	(0.0)	0.1		0.7	1.0	1.3		0.3	0.5	0.7		0.4	0.6	0.8
OTHER PRICES																					
Natural Gas Lower 48 Supply Price (2012$/Mcf)		0.3	0.5	0.7	0.7		(0.1)	(0.1)	(0.0)		0.7	1.0	1.3		0.3	0.5	0.6		0.4	0.6	0.8
Northeast (2012$/Mcf)		0.3	0.5	0.7	0.6		(0.2)	(0.3)	(0.2)		0.9	1.1	1.2		0.3	0.5	0.7		0.5	0.7	1.1
Gulf Coast (2012$/Mcf)		0.2	0.4	0.6	0.7		(0.0)	0.0	0.1		0.7	1.1	1.4		0.3	0.5	0.6		0.3	0.5	0.7
West Coast (2012$/Mcf)		0.4	0.5	0.7	0.7		0.0	0.1	0.2		0.5	0.9	1.1		0.3	0.5	0.6		0.5	0.6	0.7
Coal Minemouth Price (2012$/short-ton)		0.1	0.1	0.0	0.1		(0.1)	0.0	0.0		(0.1)	(0.0)	(0.1)		0.0	0.0	0.1		0.1	0.1	0.1
End-Use Electricity Price (2012 cents/Kwh)		0.1	0.2	0.3	0.3		(0.0)	(0.0)	0.0		0.3	0.4	0.4		0.1	0.2	0.3		0.2	0.3	0.4
END-USE ENERGY EXPENDITURES (B 2012$)		11.3	16.6	23.0	21.1		(0.9)	(1.8)	(0.7)		16.8	23.4	29.4		12.7	19.1	25.6		14.5	16.9	26.6
liquids		3.5	4.3	5.1	4.0		0.1	(0.4)	(1.5)		2.3	2.9	3.9		4.7	5.3	7.5		3.4	1.5	5.6
natural gas		3.0	5.0	7.4	7.2		(0.9)	(1.0)	0.1		6.9	9.9	12.6		3.4	5.5	7.6		4.5	6.1	9.2
electricity		4.7	7.2	10.4	9.8		(0.1)	(0.4)	0.7		7.7	10.7	12.9		4.6	8.3	10.5		6.6	9.2	11.8
coal		0.0	0.0	0.0	0.0		0.0	0.0	0.0		(0.0)	(0.0)	(0.1)		0.0	0.0	0.0		0.0	0.0	0.0
END-USE ENERGY CONSUMPTION (quadrillion Btu)		(0.1)	(0.1)	(0.2)	(0.4)		(0.1)	(0.2)	(0.3)		(0.3)	(0.4)	(0.5)		(0.1)	(0.2)	(0.2)		(0.0)	(0.3)	(0.2)
ELECTRIC GENERATION (billion kWh)		(10.9)	(21.6)	(29.7)	(32.1)		7.8	(1.6)	(6.2)		(34.5)	(46.6)	(57.5)		(12.0)	(22.7)	(32.1)		(18.4)	(28.4)	(36.4)
coal		17.1	21.9	32.5	13.0		(1.9)	1.8	14.6		21.2	16.9	19.3		8.6	11.1	13.9		0.9	0.9	0.9
gas		(45.5)	(80.4)	(110.9)	(91.7)		0.7	(13.8)	(36.8)		(104.0)	(149.2)	(192.3)		(63.5)	(104.4)	(148.8)		(46.5)	(78.6)	(106.0)
nuclear		6.3	17.0	22.3	20.1		(0.0)	0.0	0.0		20.5	67.2	71.8		15.8	29.9	56.8		17.7	25.3	32.0
renewables		11.1	19.8	26.3	26.5		9.1	10.6	16.0		27.8	18.4	43.8		27.2	40.7	46.0		9.4	24.0	36.8
other		0.1	0.1	0.1	0.0		(0.1)	(0.1)	0.0		0.0	(0.0)	(0.0)		0.0	0.0	0.0		(0.0)	(0.0)	(0.0)
PRIMARY ENERGY (quadrillion Btu)																					
Consumption		0.3	0.5	0.7	0.5		0.2	0.3	0.2		0.1	0.1	0.1		0.3	0.3	0.3		0.3	0.3	0.4
liquids		0.1	0.1	0.2	0.1		0.0	0.0	0.0		0.0	0.0	0.0		0.0	0.0	0.0		0.1	0.0	0.1
natural gas		(0.1)	(0.3)	(0.3)	(0.2)		(0.2)	(0.2)	(0.3)		(0.3)	(0.4)	(0.4)		(0.1)	(0.1)	(0.1)		0.2	0.1	0.2
coal		0.2	0.2	0.3	0.1		0.2	0.3	0.4		0.3	0.3	0.3		0.2	0.2	0.3		0.0	0.0	0.0
other		0.2	0.4	0.5	0.5		0.1	0.1	0.2		0.1	0.1	0.1		0.1	0.1	0.1		0.1	0.1	0.1
Production		1.9	3.4	5.0	4.9		1.2	1.8	2.1		2.3	2.8	3.1		2.0	2.6	2.9		2.3	2.7	3.2
ENERGY RELATED CO2 EMISSIONS (including liquefaction) (million metric tons)		15	15	24	9		14	20	21		15	12	11		20	21	20		14	9	12
ECONOMIC INDICATORS																					
Gross Domestic Product (B 2005 chain-weighted $)		15	29	42	38		(3)	10	23		24	34	42		16	32	48		17	34	47
Total industrial shipments (B 2005$)		17	22	24	12		3	(1)	(5)		5	4	0		18	22	29		24	21	35
Non-farm employment (millions)		0	0	0	0		(0)	0	0		0	0	0		0	0	0		0	0	0
Annual change in Consumer Price Index		0.0%	0.0%	0.0%	0.0%		0.0%	0.0%	0.0%		0.0%	0.0%	-0.1%		0.0%	0.0%	0.0%		0.0%	0.0%	0.0%

Table B9. Differential (%) from Base in U.S. Annual Average Values from 2026-40 when Exports are Added

	Reference					High Oil and Gas Resource				Low Oil and Gas Resource				High Macroeconomic Growth				Accelerated Coal and Nuclear Retirements			
	baseline	12 Bcf	16 Bcf	20 Bcf	Alt 20 Bcf	baseline	12 Bcf	16 Bcf	20 Bcf	baseline	12 Bcf	16 Bcf	20 Bcf	baseline	12 Bcf	16 Bcf	20 Bcf	baseline	12 Bcf	16 Bcf	20 Bcf
NATURAL GAS VOLUMES (Tcf)																					
Net Exports		29.1%	55.4%	81.5%	81.6%		-10.7%	8.2%	26.9%		91.6%	138.2%	179.7%		39.5%	67.9%	97.3%		40.3%	69.0%	98.8%
gross imports		9.3%	7.6%	5.6%	6.4%		3.2%	-4.4%	-6.3%		14.3%	15.7%	22.3%		6.8%	3.5%	3.9%		6.2%	5.0%	4.9%
gross exports		23.6%	42.1%	60.5%	60.8%		-7.4%	5.2%	19.1%		52.8%	76.7%	100.7%		29.4%	48.1%	68.5%		29.8%	49.3%	69.8%
Dry Production		3.9%	7.4%	10.9%	11.3%		-2.1%	1.4%	4.6%		6.8%	10.4%	13.6%		4.4%	7.6%	10.9%		4.7%	8.1%	11.7%
shale gas		5.9%	11.0%	16.3%	15.9%		-1.7%	-2.6%	0.5%		10.5%	16.0%	20.8%		6.5%	11.0%	15.6%		6.2%	11.6%	15.9%
other		1.8%	3.5%	5.4%	6.6%		-2.6%	6.8%	10.1%		3.8%	6.0%	7.9%		2.1%	3.9%	5.9%		3.0%	4.2%	7.3%
Consumed Volumes (1)		-0.4%	-0.8%	-1.1%	-0.6%		-0.2%	0.0%	-0.1%		-1.8%	-2.5%	-3.2%		-0.7%	-1.2%	-1.6%		-0.4%	-0.7%	-0.7%
electric generators		-2.6%	-5.0%	-6.8%	-5.8%		0.7%	0.0%	-1.4%		-8.2%	-11.9%	-15.6%		-3.5%	-5.9%	-8.4%		-2.5%	-4.0%	-5.4%
industrial		-0.5%	-0.9%	-1.4%	-1.3%		-0.4%	-0.8%	-1.1%		-1.6%	-2.1%	-2.7%		-0.6%	-1.1%	-1.4%		-0.5%	-1.2%	-1.4%
liquefaction		48.7%	91.3%	133.9%	132.0%		-14.3%	14.3%	42.9%		148.0%	218.0%	288.1%		66.1%	113.3%	160.5%		67.6%	115.2%	162.9%
residential		-0.4%	-0.6%	-0.9%	-0.9%		0.0%	-0.1%	-0.2%		-1.0%	-1.4%	-1.7%		-0.5%	-0.7%	-0.9%		-0.5%	-0.8%	-1.1%
commercial		-0.7%	-1.2%	-1.7%	-1.7%		0.1%	-0.1%	-0.4%		-1.7%	-2.3%	-2.9%		-0.9%	-1.2%	-1.7%		-0.9%	-1.4%	-2.0%
other		1.8%	3.2%	4.6%	5.4%		-2.0%	-0.1%	1.7%		3.6%	5.0%	6.8%		2.0%	3.5%	4.9%		2.4%	4.3%	6.3%
NATURAL GAS END-USE PRICES (2012$/Mcf)																					
residential		2.3%	3.7%	5.4%	5.2%		0.1%	0.5%	1.1%		4.7%	6.7%	8.3%		2.4%	3.8%	5.1%		3.1%	4.5%	6.5%
commercial		2.7%	4.4%	6.4%	6.2%		-0.3%	0.0%	0.7%		5.5%	7.7%	9.4%		2.8%	4.5%	6.1%		3.7%	5.3%	7.7%
industrial		3.9%	6.5%	9.5%	9.3%		-0.9%	-0.3%	1.9%		7.1%	10.3%	13.3%		4.1%	6.4%	8.6%		5.1%	7.2%	10.3%
OTHER PRICES																					
Natural Gas Lower 48 Supply Price (2012$/Mcf)		4.6%	7.9%	11.4%	10.9%		-2.5%	-2.3%	-0.3%		8.3%	11.9%	15.2%		4.6%	7.5%	9.9%		6.0%	8.7%	12.2%
Northeast (2012$/Mcf)		4.8%	7.6%	10.9%	9.0%		-3.3%	-5.0%	-4.5%		8.8%	11.3%	11.8%		4.1%	7.2%	10.5%		6.8%	9.8%	14.8%
Gulf Coast (2012$/Mcf)		3.7%	6.8%	10.2%	10.8%		-0.6%	0.5%	2.9%		8.1%	12.4%	16.3%		4.6%	7.4%	9.3%		5.2%	7.7%	10.7%
West Coast (2012$/Mcf)		5.6%	7.9%	11.4%	11.2%		1.0%	1.7%	3.9%		6.4%	10.3%	13.6%		4.9%	7.0%	8.8%		7.2%	8.8%	10.2%
Coal Minemouth Price (2012$/short-ton)		0.2%	0.2%	0.1%	0.2%		-0.1%	0.1%	0.0%		-0.1%	-0.1%	-0.1%		0.0%	0.0%	0.2%		0.1%	0.1%	0.1%
End-Use Electricity Price (2012 cents/Kwh)		1.3%	2.0%	2.9%	2.8%		-0.1%	-0.2%	0.3%		2.2%	3.0%	3.7%		1.1%	2.2%	2.7%		1.7%	2.5%	3.2%
END-USE ENERGY EXPENDITURES (B 2012$)		0.8%	1.1%	1.5%	1.4%		-0.1%	-0.1%	-0.1%		1.1%	1.5%	1.9%		0.8%	1.2%	1.6%		1.0%	1.1%	1.7%
liquids		0.4%	0.5%	0.6%	0.4%		0.0%	0.0%	-0.2%		0.3%	0.3%	0.4%		0.5%	0.5%	0.8%		0.4%	0.2%	0.6%
natural gas		1.9%	3.2%	4.7%	4.6%		-0.7%	-0.8%	0.1%		3.8%	5.4%	7.0%		2.0%	3.2%	4.4%		2.9%	3.8%	5.8%
electricity		1.1%	1.6%	2.4%	2.2%		0.0%	-0.1%	0.2%		1.6%	2.3%	2.7%		0.9%	1.7%	2.2%		1.4%	2.0%	2.5%
coal		0.5%	0.4%	0.3%	0.0%		0.2%	0.2%	0.1%		-0.4%	-0.5%	-0.7%		0.3%	0.1%	0.2%		0.1%	0.1%	0.0%
END-USE ENERGY CONSUMPTION (quadrillion Btu)		-0.1%	-0.2%	-0.3%	-0.5%		-0.1%	-0.3%	-0.4%		-0.4%	-0.6%	-0.7%		-0.1%	-0.3%	-0.3%		0.0%	-0.4%	-0.4%
ELECTRIC GENERATION (billion kWh)		-0.2%	-0.4%	-0.6%	-0.7%		0.2%	0.0%	-0.1%		-0.7%	-1.0%	-1.2%		-0.2%	-0.4%	-0.6%		-0.4%	-0.6%	-0.8%
coal		1.0%	1.3%	1.9%	0.8%		-0.1%	0.1%	0.9%		1.2%	1.0%	1.1%		0.5%	0.6%	0.8%		0.1%	0.1%	0.1%
gas		-2.8%	-4.9%	-6.8%	-5.6%		0.0%	-0.7%	-1.9%		-8.4%	-12.0%	-15.5%		-3.5%	-5.8%	-8.2%		-2.3%	-3.9%	-5.2%
nuclear		0.8%	2.2%	2.8%	2.5%		0.0%	0.0%	0.0%		2.3%	7.7%	8.2%		1.9%	3.6%	6.9%		2.6%	3.7%	4.7%
renewables		1.4%	2.5%	3.4%	3.4%		1.3%	1.4%	2.2%		3.2%	2.1%	5.0%		3.1%	4.7%	5.3%		1.1%	2.9%	4.4%
other		0.2%	0.2%	0.3%	0.1%		-0.2%	-0.3%	0.0%		0.1%	0.0%	0.0%		0.0%	0.1%	0.1%		0.0%	-0.1%	0.0%
PRIMARY ENERGY (quadrillion Btu)																					
Consumption		0.3%	0.5%	0.6%	0.5%		0.2%	0.2%	0.2%		0.1%	0.1%	0.1%		0.3%	0.3%	0.3%		0.3%	0.3%	0.4%
liquids		0.3%	0.4%	0.5%	0.3%		0.0%	0.0%	0.0%		0.1%	0.1%	0.1%		0.1%	0.1%	0.1%		0.2%	0.0%	0.3%
natural gas		-0.4%	-0.8%	-1.1%	-0.6%		-0.5%	-0.7%	-1.1%		-1.2%	-1.4%	-1.6%		-0.2%	-0.3%	-0.5%		0.7%	0.5%	0.5%
coal		1.0%	1.2%	1.8%	0.7%		1.3%	1.8%	2.2%		1.6%	1.6%	1.7%		1.2%	1.3%	1.4%		0.0%	0.0%	0.0%
other		0.9%	1.9%	2.6%	2.5%		0.7%	0.8%	1.0%		0.4%	0.6%	0.8%		0.4%	0.6%	0.8%		0.3%	0.6%	0.6%
Production		1.9%	3.4%	5.0%	4.9%		1.2%	1.8%	2.1%		2.5%	3.1%	3.4%		2.1%	2.7%	3.1%		2.5%	2.9%	3.5%
ENERGY RELATED CO2 EMISSIONS (including liquefaction) (million metric tons)		0.3%	0.3%	0.4%	0.2%		0.3%	0.4%	0.4%		0.3%	0.2%	0.2%		0.4%	0.4%	0.4%		0.3%	0.2%	0.2%
ECONOMIC INDICATORS																					
Gross Domestic Product (B 2005 chain-weighted $)		0.1%	0.1%	0.2%	0.2%		0.0%	0.0%	0.1%		0.1%	0.1%	0.2%		0.1%	0.1%	0.2%		0.1%	0.2%	0.2%
Total industrial shipments (B 2005$)		0.2%	0.2%	0.2%	0.1%		0.0%	0.0%	-0.1%		0.1%	0.0%	0.0%		0.2%	0.2%	0.3%		0.2%	0.2%	0.4%
Non-farm employment (millions)		0.1%	0.1%	0.2%	0.1%		0.0%	0.0%	0.1%		0.1%	0.1%	0.1%		0.1%	0.1%	0.2%		0.1%	0.1%	0.2%
Annual change in Consumer Price Index		0.2%	0.1%	-0.1%	-0.2%		-0.2%	-0.8%	-1.8%		-1.7%	-1.8%	-2.4%		0.3%	-0.1%	0.0%		0.7%	0.1%	0.3%

FOOTNOTE

(1) Total natural gas consumption. Liquefaction includes natural gas consumed in the export liquefaction facility. Other includes natural gas used in the transportation sector, for pipeline fuel, and for lease and plant fuel.

Projections: EIA, Annual Energy Outlook 2014 National Energy Modeling System runs refaeo.d062614a, ref12.d080214a, ref16.d080214a, ref20.d080214a, ref20p.d100614a, hmacaeo.d072014a, hmac12.d080214a, hmac16.d080214a, hmac20.d080614a, rclncaeonclgn.d090914a, rclnc12nclgn.d090914a, rclnc16nclgn.d090914a, rclnc20nclgn.d090914a, lresaeo.d071414a, lres12.d073114a, lres16.d080614a, lres20.d080214a, hresaeo.d062614a, hres12.d073114a, hres16.d080614a, hres20.d080614a