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Economic and Environmental Impacts of Increased U.S. Natural Gas Exports


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Shale Gas Benefits



- Shale gas is a game changer.
- It is part of the reason behind the manufacturing resurgence in the U.S.
- It will stimulate much more conversion of old coal fired electric power plants in the U. S. to natural gas, thereby providing environmental benefits.
- The IEA estimates that shale gas done right is only 7% more expensive than business as usual, so it can be done with minimal adverse environmental

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Impacts of Increased Natural Gas Exports

- Free trade is beneficial in almost all cases from a global perspective.
- However, that does not mean that free trade in all cases is good for every country. In fact, there are many examples of countries or regions losing from trade liberalization.
- The question, then, is what are the impacts on the U.S. economy and environment of permitting increased natural gas exports.

Impacts of Increased Natural Gas Exports

- We use a model called MARKAL-Macro to evaluate the impacts of increased natural gas exports.
 - MARKAL is a bottom-up energy model that solves for the lowest cost mix of meeting energy service demands over the specified time horizon.
 - MARKAL-Macro adds a macroeconomic sector to provide two way feedback on energy service costs and demands.

Impacts of Increased Natural Gas Exports

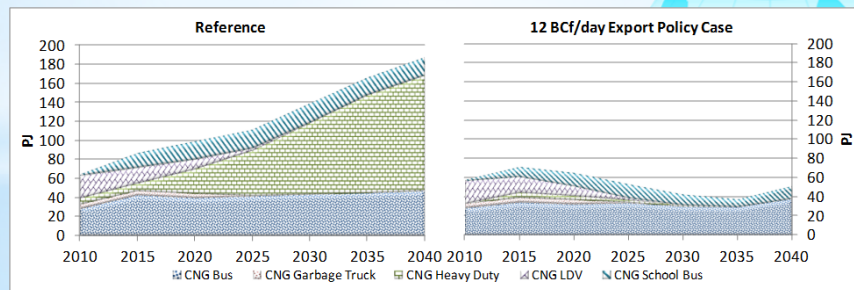
- We conducted our analysis for three cases: export increases of 6, 12, and 18 BCF/day.
- Our results suggest that all of these levels of increased export actually reduce GDP by a small amount - 0.04%, 0.11%, and 0.17% for the year 2035 for the three cases respectively.
- Natural gas prices increase 16%, 41%, and 47% for the three cases.
- The biggest change in the energy resource mix is less domestic use of gas and more use of coal.

Electricity Sector Impacts of Increased LNG Exports

- The main impacts are higher electricity prices and higher GHG emissions with higher exports.
 - Electricity prices are 1.1%, 4.3%, and 7.2% higher than in the reference case for the three export levels.
 - The change in GHG emissions varies over the time period and by level of exports, but ranges between +2% and +12%.

Transportation Impacts of Increased LNG Exports

- Transport use of CNG rises substantially in the reference case, is flat in the 6 BCF export case, and declines in the 12 and 18 BCF/day cases.
- The main impact is on LNG use for trucks

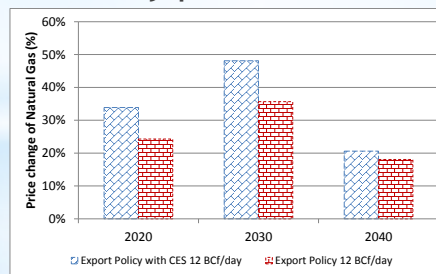


Energy Intensive Sector Impacts of Increased LNG Exports

- Energy use in the manufacturing sectors is a proxy for level of economic activity.
- Energy use declines in primary metal, non-metals manufacturing, paper, and chemicals
- For the 12 BCF/day case, the declines range from 2 to 3.1%.

Combination of Clean Energy Standard and Increased LNG Exports

- Imposition of the CES by itself leads to increased natural gas prices because of the greater use of gas for electricity.
- The combination of CES and increased exports causes the electricity price increase to be greater



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DOE-NERA Study

- This study concluded that there is a net economic gain from LNG exports, about \$12 billion.
- For 2030, labor and capital income and indirect taxes fall about \$45 billion, and natural gas resource income and net transfers increase about \$57 billion.
- Wage income falls in agriculture, energy intensive sectors, and the electricity sector. The % wage declines are greater than the increase in net national income.
- Natural gas price increases always < 20%.

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Comparison of NERA and Purdue Analyses

- Different models, different data sets, and different model parameters.
- Many differences, but some similarities. Income change in both is small - positive in NERA and negative in Purdue MARKAL-Macro.
- Purdue MARKAL-Macro gets much larger natural gas price increases than NERA.
- Trade policy changes are as much about who wins and who loses as about the net change.

Comparison of NERA and Purdue Analyses

- We agree that the global net impact is positive from larger US exports, but differ in the direction of impact on the US - driven mainly by the size of natural gas price increases.
- Within the US, there is also the distributional question. Winners are natural resource owners, and losers are labor and capital in other sectors.
- NERA does not estimate changes in GHG emissions, but US emissions clearly increase with higher LNG exports.

Conclusions

- Whether the net gains are positive or negative, they are quite small.
- Decisions must turn at least partly on distributional issues.
 - With such a large drop in labor income (NERA), and the high unemployment rate in the US, this is an important issue.
- For low levels of LNG exports, impacts are minor.
- Policy makers need to be cautious in approving higher LNG exports.

Thanks!
Questions and Comments