

# Analyses of World Supply of Natural Gas with DNE21+ Model

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One of global warming mitigation options is the shift to natural gas from coal or oil. This gas shift will, however, require a significant development of international gas infrastructure and adjustments in the international gas flows.

In order to evaluate the role of natural gas in the world energy systems up to the middle of this century, perspectives of natural gas are analyzed using the DNE21+ model<sup>[1]</sup>. The model is a world energy systems model of intertemporal optimization type, where the world energy systems cost between 2000 and 2050 is minimized. It has 77 world divided regions and the interregional transportation for natural gas, oil, coal, etc. are taken into account. The fossil and non-fossil fuel resources are assumed based on GIS data, such as, USGS<sup>[2,3]</sup>, and therefore, the regional distributions are well represented. The transportation infrastructures, such as pipelines and tankers, for natural gas and other energy carriers are explicitly modeled, and the cost-effective construction of the transportation infrastructures among the divided world regions can be also evaluated.

The optimal natural gas supplies of the regions for Reference Case and a CO<sub>2</sub> emission reduction case for 550 ppmv stabilization, are evaluated. According to the model analysis, global natural gas productions expand in both of the cases. In the 550 ppmv stabilization case, the cumulative production of natural gas in the United States, Russia and Iran between 2000 and 2020, for example, is about 18, 14 and 4% of the world total production, respectively; the cumulative production between 2000 and 2050 is about 8, 25 and 10% of the total, respectively.

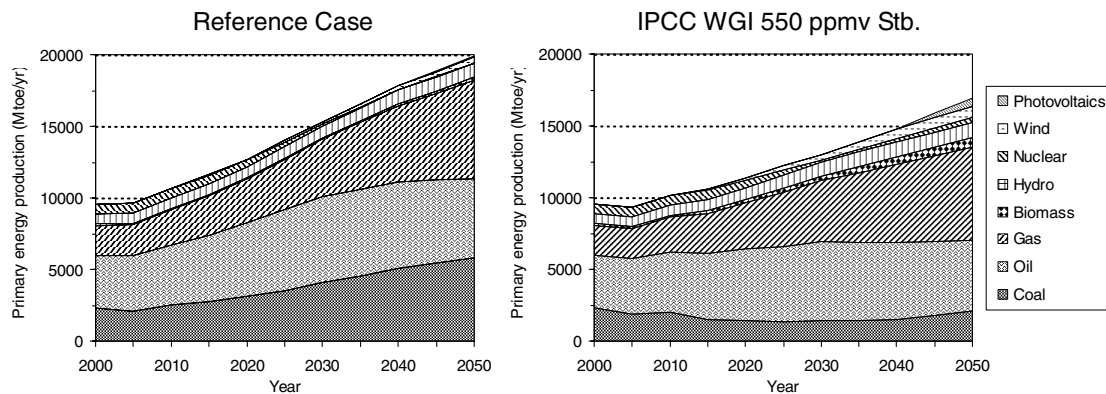


Figure 1: World primary energy production in Reference Case and the 550 ppmv Stabilization

**Keywords:** natural gas, energy supply, world gas market, energy systems model

## References

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