Correspondence: Emission effects of the Chinese-Russian gas deal

In May 2014, Russia and China signed an agreement according to which Russia will supply approximately 38 billion cubic meters of gas to China annually over 30 years via the 'Power of Siberia' pipeline [1]. This additional gas could support the Chinese government's plan to reduce local air pollution and CO_2 emissions by reducing coal consumption.

Dong *et al.* [2] argued that this gas deal between Russia and China would lead to an annual reduction in Chinese CO_2 emissions of 41.7 million tonnes (or 46 million short tons). But this relies on a number of optimistic assumptions about fuel displacement. We show that the impact of the gas deal on Chinese CO_2 emissions could be less optimistic as expected when potential market responses are considered.

Dong *et al*'s estimate relies on the assumption that all the additionally imported gas from Russia is used to substitute coal. Indeed, this might be the case if additional gas is used by state run companies, which are not necessarily exposed to market incentives in the same way as private companies are. In free markets, however, this estimate might be too optimistic as potential market effects are not taken into consideration. This is of particular importance since recent price reforms by the Chinese government aim to liberalise the energy sector in the long-term (Chen, 2014) and market effects resulting from the implementation of the gas deal become crucial.

While domestic and imported gas is easily substitutable, energy inputs such as gas, coal, and oil tend to be imperfect substitutes in consumption. In addition, China does not face a shortage of gas supplies as the portfolio of gas imports is quite diversified. Thus, more gas from Russia in China's energy market could crowd out more expensive gas imported from other countries and make the overall increase in demand for gas in China less pronounced. Furthermore, the additional gas supply may lower the average energy price in China, inducing additional consumption of energy and related CO_2 emissions.

Our model shows that total consumption of gas in China could increase by approximately 20 million tonnes of oil equivalent annually and that CO_2 emissions are only moderately reduced by 6 million tonnes annually, on average (see Figure 1 and Supplementary Information for details). This suggest that to exploit the full potential of CO_2 emission mitigation, the Chinese-Russian gas deal needs to be complemented by policy measures encouraging substitution from coal towards gas.

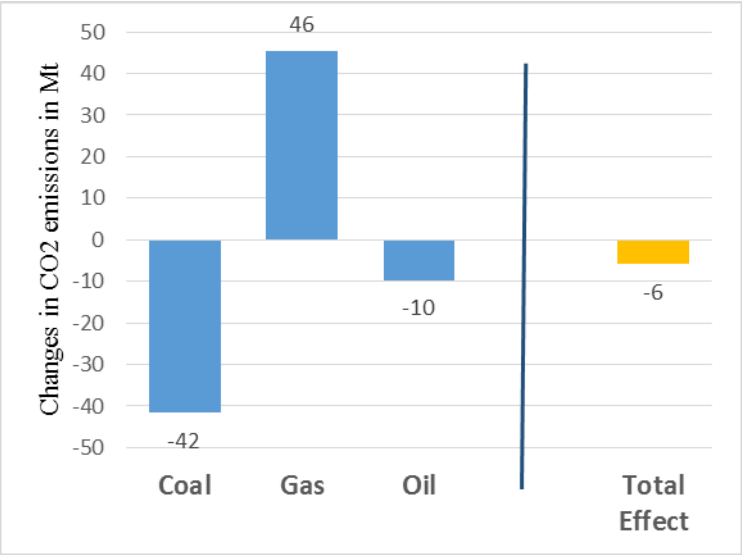

Figure 1: Average yearly changes of CO_2 emissions in China by energy carrier in Mt, induced by the Chinese-Russian gas deal. Calculated in comparison to a Business-as-usual-scenario.

References

1. Reuters, 2014. Available at: http://www.reuters.com/article/2014/05/21/us-china-russia-gas-idUSBREA4K07K20140521

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