



OIES-Renmin Roundtable Conference on Implications for China of North American Energy Independence, 27 March 2013, Beijing:

Summary of Discussions

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The US has substantially reduced its reliance on imported fossil fuel energy. This trend towards “energy independence” has important implications for the world and specifically for China. International and Chinese experts debated North American - especial US - energy developments and their implications at a recent round table conference in Beijing. The Oxford Institute for Energy Studies (OIES) and the Centre for International Energy and Environment Strategy Studies of Renmin University (CIEESS) organized the conference, with support from the British Embassy in Beijing.

1. North American Energy Independence and International Implications

a. US Energy Policies

In December last year, President Obama said: “The United States is going to be a net exporter of energy because of new technologies and what we are doing with natural gas and oil”. In a nutshell, he was saying the US would become energy independent. Although he did not place a timescale on this, his comments reflect a fundamental shift in US energy policy making.

At its simplest, energy independence could be said to exist when a country produces more energy than it consumes. Taking oil, natural gas and coal together, US production rose from 70% of combined domestic consumption in 2010 to 79% in 2012. That is quite a remarkable cut in net imports, but it does not constitute energy independence as defined above. Barring some major surprises, the US will not be energy independent with respect to fossil fuels for some time, but it is moving in that direction.

What should we expect from the US Administration over the next four years? Most of what happens on the oil and gas supply side is related to markets, but policy will also influence the outcome. In most cases, federal and state policies will try to find a

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balance between more hydrocarbon supply and environmental protection: (a) whether to permit the construction of the Keystone XL pipeline bringing “oil sands” crude from Canada to the US; (b) what environmental and safety regulations to impose on fracking; (c) whether and on what basis to lease acreage in publicly held lands for exploration; and (d) whether to permit the building of infrastructure for coal exports to Asia. However, probably the most controversial debate will be over the export of natural gas, with opponents (led by Dow Chemical) opposing exports on the grounds that exports will raise natural gas prices in the US and thereby damage industries that rely on cheap natural gas.

Beyond boosting hydrocarbon supply, the President recently identified four specific policy initiatives in the State of the Union Address, including doubling of renewable power by 2020; establishing an Energy Security Trust to shift cars/trucks off oil; promoting energy “productivity” (i.e. efficiency); and addressing the challenges of climate change. The last of these is the most controversial of all. President Obama has called for comprehensive federal legislation that would set national targets and price CO₂ emissions - through cap and trade or a carbon tax. However, there is strong opposition in Congress, especially from the Tea Party members of the Republican Party. So it is likely that we will not see federal legislation on climate change, but rather a number of industry specific regulations - such as emission limits for coal power stations. This type of regulation has proven to be very problematic in the US, leading to litigation, uncertainty and to investment delays. The absence of federal legislation is likely to weaken the ability of the US to take the lead in international negotiations on climate change.

b. Natural Gas

The advent of US shale gas has created a glut of North American supply, depressing gas prices and helping natural gas to replace coal in the power sector. Indeed, in 2012 gas prices fell so much (\$2/Mbtu) that dry shale gas drilling declined as the industry focused its attention on more profitable ‘wet’ gas shale plays and shale oil. More recently, natural gas prices have been rising (now \$4/Mbtu). The sustainable gas price is approximately \$5-7/Mbtu, but at these prices, coal will replace natural gas in some areas. Exports of natural gas are the light at the end of the tunnel for the shale gas producers.

The Administration is preparing to approve the first few of a long list of prospective LNG export projects. Elsewhere in the gas world, the future impact of this new and largely unforeseen supply source on the European gas and Asian LNG markets is a cause of much speculation in academic and corporate circles.

The post 2015 gas world has other major uncertainties. In the shorter term the re-start of Japan’s nuclear generation would ease the current LNG market tightness but in the longer term the pace of China’s future gas and LNG demand growth is a key ‘known unknown’. With Australian (and later in the decade East African) LNG poised to add to supply, there is the obvious question of how much of this will flow to Asia and what is the scale of the residual supply for Europe? With Europe’s transition away from oil-indexation to hub pricing in its pipeline gas contracts, this creates a dilemma for Russia in terms of its future price-volume strategy. If it holds out for high prices it will encourage the development of further US LNG exports and face a loss of market share, especially in Europe.

Russia will be competing with the US in all of its major markets. While US LNG exports will primarily target the Asian markets, this will tend to divert cargoes from Middle East and African suppliers towards Europe. If US LNG exports grow to become very

significant volumes they would also target Europe. Russia will not be a low cost supplier in the Asia market. Furthermore, most Russian supplies will be for coastal areas, which is precisely where they will compete with US and other LNG supplies. It is very likely that US exports will cap the prices that Russia can obtain in Asian markets and that US Henry Hub indexation will take over from oil-based indexation. A central issue for Russia is whether they can lock in Asia markets before the US LNG infrastructure has been built.

In Asia prospective buyers of US LNG are anticipating savings relative to traditional JCC-linked prices². While there is much discussion of a future Asian LNG hub, the practicalities and impact on current midstream incumbents are as yet little appreciated. Establishing an LNG pricing mechanism responsive to Asian gas and LNG fundamentals and LNG prices at a more competitive level compared to JCC are both desirable and enduring goals from a policy perspective. The challenges to creating an LNG hub price for Asia will have to be faced at some point in the medium term but, based on experience in North America and Europe; such a price formation transition will not be smooth or painless.

c. Oil

The increase in US oil production has been very impressive, mainly thanks to the “shale oil revolution”. In 2012, US and Saudi liquids production (crude oil and products) are similar at over 11 mbd. The expectation is that US production will continue to rise, but there is a wide range of forecasts concerning shale oil production. Meanwhile, US oil demand is falling, partly as a result of more demanding fuel economy standards and improved efficiency. The combination of rising liquids production and falling consumption is reducing oil imports.

Some people think that these US oil developments are revolutionary and that they are ushering in a period of oil plenty, but this is not obvious. The impact on world prices has yet to be seen, with prices pretty stable near \$100/bbl. In part, this is because the increase in US oil production masks the decline in other non-OPEC countries. One might ask what the world oil prices would be if the US had not increased its production.

Furthermore, the size of shale oil resources in global terms is much less significant than in the case of gas. It is also worth remembering that US shale resources have a relatively high cost base. When world oil prices fall below the incremental cost of developing the US resources, US producers will shut wells and slow or stop the development of the more expensive fields.

As a result of declining US imports of crude oil, the Middle East will be selling an increasing share of its crude oil to Asian markets. It is not evident that this will change the relative importance of Middle East crude oil in world markets since Asian markets are growing faster than any others. The Middle East region will continue to be the main supplier of crude oil to world markets. Political or military instability there could introduce an unwelcome element of additional volatility in global oil prices, with potentially serious negative effects for the world economy.

It is important to remember that the Middle East is where the lowest cost crude oil is, and also that this is where spare capacity exists. If Middle East oil producing countries, and particularly Saudi Arabia, expect markets to diminish as a result of a trend towards “energy independence”, they would likely reduce their investment in E&P, which in turn

² The Japan Customs-cleared Crude (JCC) is the average price of customs-cleared crude oil imports into Japan. Nicknamed the “Japanese Crude Cocktail”, it is often used as an index for LNG contracts.

would lead to tighter markets, to the disappearance of spare capacity and to greater potential volatility.

The first conclusion is that we are probably not entering into a period of oil abundance that will lead to a period of lower prices. The second conclusion is that there is significant uncertainty about the likely level of US oil production and its implications.

d. Industrial Competitiveness

The rapid growth of shale gas has depressed natural gas prices, improving the competitiveness of industrial consumers that are intensive users of natural gas, notably in the petrochemical industry. This has created significant investment and employment in this sector and made US producers relatively more competitive than European and Asian competitors, including China, where petrochemicals are usually produced with more expensive energy derivatives like naphtha. Second, natural gas in the US is significantly cheaper than oil on a calorific basis. Although gasoline will continue to dominate the car transport market for many years to come, there is a noticeable shift towards natural gas in many other activities, for instance as the energy used in the oil and shale gas business itself, and as a source of fuel for the refining and trucking industries.

e. Coal and Power

The significant decline in natural gas prices has also enabled gas to compete more effectively with coal in the US. In the power sector, generation has shifted from coal to natural gas; with coal now (2012) accounting for only 37% of generation, compared to 50% in 2005. However, this shift from coal to gas could well reverse as the price of natural gas rises. There is sufficient excess generation capacity (coal and gas) to allow for this sort of reversal in the short term. Nevertheless, for other reasons - especially public opposition to coal power, regulatory limits on various coal-based emissions and financial market reluctance to invest in coal based generation - the future prospects for natural gas are much better than for coal in the US power sector.

This shift towards natural gas has helped to reduce US emissions of CO₂ since coal has higher carbon intensity than natural gas. As a result, the US has exported an increasing volume of coal, mainly to Europe. This has put downward on international coal prices, another reason - along with high European natural gas prices and low CO₂ prices in the EU ETS - why coal has replaced natural gas in European power markets. At the same time, if prices were to change and coal once again replaces gas in the US power system, this "export" effect would become less significant, and we could also expect US CO₂ emissions to rise.

f. Geopolitics

As a result of its greater energy independence, the US will be less reliant on imports from unstable parts of the world, in particular the Middle East. The US will continue to have an interest in the stability of that region, not only because oil prices are set in global markets, but also because of the US's close ties to Israel. The US will no doubt maintain a strong military presence in the area, providing protection for friendly regimes and helping to act as policeman. Nevertheless, the US will rely less on the physical delivery of oil and natural gas from the region than China and other energy importing regions like the EU, Japan and India. The move towards US energy independence will give that country additional freedom to focus attention, and its diplomatic, military and other resources, on the Asia-Pacific region. This leaves China in the awkward position

of needing to work with the US to ensure stability in the Middle East, but in so doing enabling the US to become more active in Asia.

US geo-strategy has involved two transformations: diminishing reliance on international energy supplies; and a strategic shift away from the Middle East towards Asia.

2. Implications for China's Policies

China depends on imports for 57.8% of its oil consumption, 29% of its natural gas consumption and 7.6% of its coal consumption. In other words, China is heavily dependent on imported fuels and this dependence is growing. Furthermore, the very heavy reliance on coal makes China a heavy polluter compared to countries that rely more on cleaner sources of energy. Trying to replace coal is difficult because it would involve increasing the reliance on imported oil and gas and would substantially increase the cost of energy. On the other hand, a shift towards less energy-intensive economic activity could reduce overall energy demand.

Overall, the development of shale resources is good news for China. First, North American shale gas adds to world supply, reducing international gas prices and weakening the dominance of traditional gas suppliers, in particular Russia. This has been particularly evident in Europe, but is also becoming obvious in Asia. The imminence of LNG exports from the US explains President Putin's anxiousness to reach an agreement with China; there are many challenges remaining in dealing with Russia, but the momentum is going in a positive direction. Second, North American shale oil resources help to limit world oil prices. Third, China is exploring for its own shale resources, helping to reduce imports and generally to diversify supplies.

a. Domestic Policies

China is trying to reduce its own reliance on oil and gas imports through a combination of supply side and demand side policies.

China is interested in developing carbon capture and storage or use (CCS/CCU) technologies to enable it to continue using its domestic coal resources, at the same time as limiting CO₂ emissions. However, the costs of CCS/CCU are very substantial and require global collaboration in order to drive down costs. There may be technological breakthroughs, but there are no guarantees; the prospects are for continued and growing use of coal, with negative environmental consequences, unless alternative energies can be developed at prices that make them competitive.

One initiative is to develop domestic shale gas, with strong government support due to its strategic importance for China. However, this is likely to be a slow process. The US has been studying its own oil and gas resources for significantly longer than China and has a better idea of their potential. Furthermore, although there are significant shale resources in China, a large share of these resources is in areas that do not have sufficient water to allow their exploitation. Infrastructure - for instance pipelines - is also lacking, which will slow the development of the resources and impose environmental costs. The local population will become increasingly vocal if there is any evidence that shale gas development creates health or safety issues; the implication is that China needs to inform and win the support of the local populations and not keep them in the dark about what is going on. It is worth remembering that one of the reasons for US success in developing shale oil and gas is that, uniquely in the US, private landowners own the mineral rights (e.g. oil and gas) below the surface; this gives them an incentive to support exploration and development. Finally, China lacks the institutions and the thousands of nimble, small drilling and service companies that make shale gas a

success in the US and Canada. No doubt, China will develop these resources and overcome these challenges, but this will take time and require public support, as well as significant investment and reforms.

The Government also has a range of policies designed to limit the growth of demand for imported fossil fuels. These policies include the goal of reducing energy and carbon intensity, limiting emissions for particular industries, promoting the use of renewable energies, distributed generation and nuclear power, at the same time as planning for the phase-out of coal.

One very important and difficult reform will be to ensure that the prices of all energy sources reflect the full economic cost of those resources, including the cost of “negative externalities”, such as the emissions of sulphur, mercury, CO₂, ash and other particulates. By pricing energy at its true costs, China’s economy will be better able to rebalance away from energy-intensive products and towards services that have lower energy-intensity and higher value added. Pricing in this way is also likely to lead to reduced reliance on hydrocarbons, especially coal.

b. China’s International Policies

With growing supply of oil and gas from North America, there is a need to rethink the global governance of the energy system. In the 1970’s, the US promoted the creation of the International Energy Agency (IEA), to represent the interest of the major oil importing countries. The US is now less interested in the IEA’s emergency response mechanism. However, China will probably soon depend on imports for 70% of its oil and will be increasingly interested in coordinating with existing international organizations, such as the IEA, or in creating new organizations and fora for global energy governance.

China should also be rethinking its policies on climate change. Due to the growth of shale gas, the US is lowering its CO₂ emissions (so far without comprehensive climate change legislation) and may be more sympathetic to an international agreement. China needs to be rethinking its own position in the international negotiations and be aiming to lower its own emission intensity, beyond its current plans.

China should be thinking how to take advantage of the fact that some international companies (e.g. Marathon) are refocusing their efforts on North America. To the extent that they leave traditional producing areas (e.g. Russia, the Middle East, Africa, Latin America), this may open up opportunities for Chinese companies. On the other hand, US and Canadian companies will continue to be active outside North America and all companies will need to consider the risks and rewards in the countries where they invest.

Sino-Russian oil cooperation is set to expand significantly. Rosneft CEO Igor Sechin is indicating an increase of crude supply from the current 15 mt/y up to 50 mt/y by 2018. A key question is whether Russia can develop its production base in time. In any case, the Sino-Russian cooperation in the oil sector will be strengthened continuously. In 2012, Sino-Russian trade was US\$ 88 billion, and both sides aim to increase the figure to US\$ 100 billion by 2015 and US\$ 200 billion by 2020. The target could be easily achieved once the Sino-Russian gas cooperation gets on the right track.

Gazprom announced that both Gazprom and CNPC aim to finalise the gas price deal by the end of 2013. As President Putin has given instructions to construct the 3,200 km gas pipeline named "Power of Siberia" without further delay, the project development has no other choice but to promote a hybrid scheme, that is, one pipeline to Vladivostok

for Vladivostok LNG and another pipeline to Heilongjiang province to satisfy the gas demand in the north eastern provinces of China. This is the best way to make this expensive pipeline development economically viable.

Gazprom and CNPC have discussed the options for gas cooperation in upstream and midstream sectors for the massive east Siberian gas resources development, but down-stream sector cooperation has not begun yet. It is not certain whether the consensus on the value chain business comprising upstream, midstream and downstream sectors can be reached by the end of 2013, but the breakthrough on the Sino-Russian gas price deal based on the upfront payment could be achieved by the end of 2013 due to the rapidly changing environment in the global gas business. Without the breakthrough, the biggest beneficiaries in Asian markets will be the new LNG suppliers from North America and East Africa, together with the main LNG suppliers from Qatar and Australia.

3. Implications for the World of China's Policies

China and other emerging powers have a growing interest in actively participating in the global governance of energy markets, trade, finance, economics and climate change, among other major issues. China is focusing its attention on energy governance mainly through the G-20 forum. It seeks to: work with developed and developing countries; transition into new growth models that involve less carbon and energy intensity, where the costs of the transition are taken into account; keep world energy markets open in spite of regional conflicts; provide sufficient access to resources for all; and find new mechanisms for cooperation.

The US has a clear policy of becoming energy independent, but China does not appear to have a long-term energy strategy, at least not one that meets the objectives of environmental sustainability and self-reliance at the same time. The continued reliance on domestic coal is environmentally unsustainable, and there is currently no alternative source of cleaner, domestic energy to replace it.

As the US shifts its strategic attention to Asia, China will find itself increasingly engaging with the US. This may appear as growing source of tension, but it is also a natural process of "cooperative competition". There will be contested issues, but overall there is potential for collaboration.

While China, like the US, has an interest in becoming less dependent on imported fossil fuels, the two countries share with most if not all countries an interest in stable world energy markets, a more sustainable environment and climate, a prosperous and growing world economy, and peaceful relations with their neighbours. In a word, we are all "interdependent", however much any country decides that it would like to be more independent. Policies must therefore strike the right balance between self-reliance and creating the governance arrangements that allow for a stable global economy, energy market and environment.