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Prior to joining JANA in 1998, Jim worked at the Victorian Department of Treasury and Finance, starting in 1975. He was primarily involved in budget operations and was an Assistant Director in the Budget Strategy and Management Branch. In his later years at the Department, Jim was also responsible for the preparation, implementation and supervision of the Victorian Government's guidelines for the funding of non-government organisations.

Jim holds a Bachelor of Commerce (Honours) Degree from the University of Melbourne.



The US Shale Gas Revolution – An Infrastructure and Political Opportunity

It is almost impossible today to open a newspaper or access any media outlet without finding a reference to “infrastructure”. Whether it be Budget announcements, toll road openings, complaints about utility services or any of a myriad of other topics; infrastructure has become a regular talking point.

While society has been building, operating, upgrading or dismantling infrastructure for thousands of years, it is really only since the mid-nineties that infrastructure has, as an investment alternative, been accepted as part of the institutional investment framework.

This history, while relatively short in timeframe, has been an intriguing story, with many failures and successes along the journey. Today, we are witnessing a rapidly growing focus across the world on the need for nation building and the massive gap between the infrastructure we have and the infrastructure that we need. Estimates of the spending that is required vary widely, however a recent report prepared by McKinsey stated that \$57 trillion of worldwide infrastructure spending was required through to 2030.

Governments obviously have a huge role in meeting this shortfall. However, institutional investors are a rapidly growing source of funding and the demand for quality assets, yielding solid long term returns is burgeoning. One particular opportunity however, as we discuss below, is generating significant interest both in Australia and abroad.

The shale gas revolution

The current crisis in the Ukraine has exposed a number of fragilities in the European equilibrium and the inherent difficulties in achieving cultural hegemony between the east and the west. Not the least of the issues that the crisis has highlighted is the dependence of Russia's immediate neighbours, and Western Europe in general, on the supply of piped natural gas



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imports from Russia. Russia currently supplies about one third on the natural gas consumed in Europe.

It is not the intention here to address the geo-political risks currently in play in the Ukraine and surrounding countries, although it is worth observing that members of JANA's Infrastructure Research Team were recently in Poland, and the developments in their next door neighbour are a matter of national interest. The impending crisis has led to a swift response in the United States, with the US House of Representatives Energy and Commerce Committee Chairman Fred Upton calling for swift action on liquefied natural gas (LNG) exports.

Mr Upton recently stated;

Responding to Russian President Vladimir Putin's threat to turn off gas supplies to Ukraine unless it receives pre-payments for the fossil fuel, Fred Upton said the ultimatum showed the need for the US to ramp up LNG exports.

(http://www.pv-magazine.com/news/details/beitrag/us-congressman-says-natural-gas-is-the-solution-to-eu-russia-energy-crisis_100015127/#ixzz365yTsA00)

The American shale gas boom has been well documented. It will have significant impacts in a number of areas, not the least for infrastructure investors. This article will review some recent developments and the possibilities that lie ahead.

The shale gas revolution has transformed the US energy supply market. Production of natural gas from shale formations is not new, but for many

years was considered uneconomic. However, breakthroughs in the techniques of hydraulic fracturing (fracking) and horizontal drilling have directly made production from shale and indirectly other natural gas intensive industries such as LNG exports financially attractive. We will not specifically address the environmental issues often raised with regard to fracking, as that is an entire paper in itself.

Between 2006 and 2010, the amount of natural gas produced from shale formations in the United States increased over four times, from 1 trillion cubic feet to 4.8 trillion cubic feet. UBS GIS has commented that over the last five years, the culmination of innovation and public will in the United States has facilitated further significant increases in natural gas production, such that its market share has increased markedly.

Shale gas production has also had a significant impact on the United States' entire energy supply balance. The Energy Information Administration has recently commented that the impact on gas supply from the shale revolution will be a 20 percent decline in the real cost of natural gas, and a five times increase in incremental natural gas consumption by 2025.

The impact on the US industrial environment is also expected to be significant, with cheaper energy being a substantial positive for energy intensive manufacturing companies. A more competitive manufacturing sector has obvious flow-on benefits to employment and export growth, and subsequently US GDP growth.

There is also a general consensus in the market that based on current estimates, the US will be able to "land" LNG in Asian markets, primarily Japan, at a very competitive price compared to that currently being paid. This will place pressure on current suppliers, including Australian companies, and possibly impact the long term profitability of planned LNG expansion projects in Western Australia and Queensland.

While there are a number of obstacles to overcome before shale gas becomes mainstream, the United States has generally embraced the development. However, the successful exploitation of this opportunity will also require a significant investment in storage terminals, gas transportation (i.e. pipelines), export facilities and other midstream infrastructure.

The growth in North American crude oil production ignited by the technological developments behind the shale gas revolution has also been significant. The U.S. will remain the world's biggest oil producer this year after overtaking Saudi Arabia and Russia as extraction

of energy from shale rock spurs the nation's economic recovery. There is every possibility that the United States could well become an oil exporter in the near future, particularly as supplies of quality crude continue to be discovered in the Gulf with the use of better technology.

In terms of geo-political risk, this could be an even far more strategic development than current events in the Ukraine and Iraq. But that is in the future. A more immediate interest is the impact that we are already seeing in the infrastructure sector from the project stream generated by the LNG opportunity.

A specific example that we will focus on is the LNG facility at Freeport in Texas. In 2005, a consortium commenced construction of a world class LNG receiving (import) and regasification terminal. At that time, consensus forecasts envisioned a major increase in US LNG imports. Since 2008, when the terminal commenced commercial operations, the shale gas revolution has evolved, and the increase in domestic natural gas resources has resulted in a drop in prices to the point at which US natural gas prices are now amongst the lowest in the world.

As a result, Freeport resolved that the abundance of domestic reserves and low prices presented a compelling case that the facility should become a point of origin for the export of LNG. It launched a LNG export project in 2012, with a proposition to add approximately 13.2 million metric tons of nominal liquefaction capability to its Quintana Island Terminal facility.

In December 2013, Freeport LNG and IFM Investors announced that IFM had entered into an agreement to invest approximately \$US1.3 billion of equity funding in this redevelopment project. The investment by IFM will provide the equity required for the development of one of the three trains (a LNG train is a liquefaction and purification facility) at the facility, and will be drawn down over the construction period which will be around five years.

Crucially, Freeport LNG has received authorisation from the US Department of Energy (DOE) to export the entire LNG production volume of the initial three trains to any country that has, or in the future, develops the capacity to import LNG and with which trade is permissible.

While there has been some political resistance, the DOE has now approved five projects to construct LNG export facilities, although environmental permits are still required. Freeport LNG, along with these other facilities, also requires the approval of the Federal



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Energy Regulatory Commission (FERC) before exports can occur. The FERC is responsible for authorising the siting and construction of onshore and near-shore LNG import and export facilities.

FERC approval can be a drawn out process, and management at Freeport LNG do not expect approval before year end. On a positive note, FERC announced in mid-June that it had authorised Cameron LNG, LLC to site, construct, and operate facilities to liquefy and export domestically produced natural gas from its existing LNG import terminal in Cameron Parish, Louisiana. This marks the second time FERC has approved an LNG export project. DOE has also conditionally approved Cameron LNG's export of gas to both Free Trade Agreement and non-Free Trade Agreement countries.

Interestingly, a manager that JANA recently visited in its US offices observed that FERC may at some stage consider placing a cap on the number of permits granted to export LNG. Recent changes to the conditional process for issuing export licences to LNG exports destined for non-Free Trade Agreement countries will also represent challenges to export projects with the DOE announcing that it will now only issue export approvals when FERC has provided its final environmental assessments. This represents a significant advantage for a project such as Freeport, where the FERC approval process is well underway.

Mention was made earlier that successful exploitation of the shale gas opportunity/revolution will require major capex commitments which extend over a long period of time, and will involve significant construction risk. In the case of Freeport LNG, the construction risk is further heightened given it is located in a major hurricane risk geography, and this provides a challenging scenario for a five year greenfield construction project. This could well be another factor in "capping" the number of LNG export projects both in the US



and around the world, as companies review their capex programs and determine that the degree of risk in this sector may be too high. But in general terms, the market outlook for LNG remains positive, with strong demand growth forecast.

Conclusion

The United States is moving towards a scenario where it will no longer require imports of oil and gas to satisfy its energy requirements. In fact within a relatively short time frame, it will have the potential to be an exporter of both LNG and oil. This will have significant economic and geopolitical impacts.

But it will also create a significant opportunity for the infrastructure asset class, reflecting the enormous capital expenditure that will be required to facilitate these advancements in the energy sector. In a country where infrastructure investment opportunities are limited, this is an extremely welcome development.

As a postscript, on 25 June;

"The House of Representatives today approved H.R. 6, the Domestic Prosperity and Global Freedom Act, by a bipartisan vote of 266 to 150. The legislation will help speed up the Department of Energy's approval of U.S. liquefied natural gas (LNG) exports. Increasing U.S. LNG exports will create American jobs while offering our global allies access to a source of secure and affordable energy. House Energy and Commerce Committee Chairman Fred Upton said, "With today's vote, the House sent a strong signal to Russia and the world that the U.S. is serious about entering the global gas market."

(<http://energycommerce.house.gov/press-release/house-approves-bill-boost-gas-exports-create-jobs#sthash.nbFO7Cxd.dpuf>)

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