

## Cyprus LNG: optimizing the export options

CHARLES ELLINAS

The advantageous geographic location of Cyprus – at the crossroads of major international energy routes to Europe and the Far East through the Suez Canal – makes the island a natural regional energy hub in the Eastern Mediterranean and the natural location to develop a liquefied natural gas (LNG) plant.

### The Growing Importance of Gas

The new Eastern Mediterranean gas discoveries have happened in a period when global demand for gas is increasing. ExxonMobil's *The Outlook for Energy 2013* predicts that global energy demand will grow by 35 per cent, even with significant efficiency gains, as the world's population expands from 7 billion today to nearly 9 billion by 2040, led by growth in Africa and India. Energy demand in developing nations (non-OECD countries) will rise 65 per cent by 2040 compared to 2010. The fuels used to meet the world's growing demand for energy are changing. Oil will remain the number one global fuel, while natural gas will overtake coal for the number two spot. Also, over the same period, global gas demand is expected to grow at about 1.6 per cent per year – more than twice the rate of oil. Within that, LNG demand growth is expected to be even stronger. Between now and 2020, average annual growth is expected to be

5 per cent, decreasing to about 2 per cent per year after that as demand shifts to the more price-sensitive markets of China and India who have other energy sources of their own.

Gas will see strong growth and will constitute nearly a third of fuel inputs for electricity generation by 2040. In OECD countries, ExxonMobil sees an ongoing transition from coal to gas in the following 15 years. Today, coal is a very competitive economic option for generating electricity. However, as costs arising from greenhouse gas policies are considered, natural gas becomes increasingly competitive, due to the fact that it emits 60 per cent less carbon dioxide than coal in electricity generation. Thus, gas demand will grow faster than any other major fuel source, rising 65 per cent by 2040. In Europe, despite the effects of the economic crisis, gas demand will remain fairly stable or slightly increase in the coming years, to reach 550–600 bcm/year by 2020.

For the next 10 to 20 years, Europe will require substantial growth in both oil and gas imports, because indigenous production of gas in the EU is decreasing rapidly. As a result, by 2025 the EU will require an increase of about 100 bcm in gas imports per year, in comparison to 2010. Over the same period China will need another 140 bcm/year of new gas, despite increasing production of

shale gas. China is actively securing long-term gas supplies, both by pipeline from central Asia and as LNG imports. However, shale gas is expected to change China's energy landscape significantly after 2020. Driven by China and India, global gas imports are expected to increase by 450 bcm/year by 2025.

### Eastern Mediterranean Gas and Energy Security in Europe

Europe is heavily dependent on Russia for its energy supplies and is currently the largest market for Russian energy exports, with about 35 per cent of the EU's gas coming from Russia. The EU has made it clear that in order to satisfy current and future demands, it wants to diversify its imports away from Russia and inflexible long-term contracts indexed to oil, towards alternative reliable gas suppliers. This diversification is also supported by the USA. A report by the US Congressional Research Service on Europe's energy security in 2012 states that successive US administrations and Congresses have viewed European energy security as a US national interest. This has included promoting diversification of Europe's natural gas supplies, especially in recent years, through the development of a Southern European Corridor, as an alternative to Russian natural gas.

For Europe, Eastern Mediterranean gas has a strategic value as an alternative to Russian and North African imports. But Russia's ability to adapt and protect its markets, even by reconsidering the pricing of gas if required, should not be underestimated.

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With potential gas reserves exceeding 1.1 tcm in the six leased blocks and a very small domestic gas demand (of the order of 1 bcm/year), Cyprus is developing an export strategy. Of the possible export options, LNG provides the flexibility to serve several markets and customers, providing the strategic advantages that Cyprus needs. Pipelines do not offer flexibility in the selection of markets. Also, the water depth in the eastern Mediterranean (2000 m+) limits the size of pipeline, and thus throughput. Given the amount of gas that Cyprus expects to be exporting by 2025, pipelines do not offer a practical solution. The decision to build an LNG plant in the south of the island at Vasilikos was reconfirmed by the President of the government of Cyprus, Mr Anastasiades, in April 2013. The land has been secured initially for three trains with 15 mtpa of LNG export capacity, possibly expanding up to a total of eight trains in the future.

**Cyprus as Regional LNG Hub**

With the timely establishment of an LNG plant, Israel and Lebanon should also be able to bring their gas to Cyprus for liquefaction, making it possible to create a world class LNG hub at Vasilikos. However, Israel still has other options, which include Floating Liquefied Natural Gas (FLNG); geopolitics, cost, and time will be key factors in the final choice. By 2025 Cyprus could be in a position to export 25 million tonnes LNG (35 bcm) per year, starting with 5 million tonnes (7 bcm) by 2020. This could rise to 35 million tonnes (50 bcm) per year if

Vasilikos becomes an LNG hub for the region.

Even with only 50 per cent of this gas going to Europe, by 2025 Cyprus and the Levantine Basin could supply 25 per cent of the additional gas needs of the EU, which is far more than the 10 bcm of gas currently planned for the Trans Anatolian Natural Gas Pipeline Project (TANAP) per year, making the Eastern Mediterranean a much larger potential gas supply source. Cyprus's membership of the EU also offers the added incentive of fiscal and regulatory oversight. It also satisfies the EU Commission's intent to promote development of new onshore and offshore indigenous sources of energy.

The East Med Gas Corridor could form a new independent and secure supply of LNG which could contribute substantially to the EU's future energy security. This is in line with the European Council's May decision to intensify the diversification of Europe's energy supply and develop indigenous energy resources to ensure security of supply, reduce the EU's external energy dependency, and stimulate economic growth. Furthermore, a Cyprus-based LNG plant would give access to the attractive markets of Asia, especially those of the Far East, where demand for gas supplies keeps growing and LNG prices are particularly high – and are expected to remain so in the 2020s.

**Alternative Global Supplies and Risks**

Over the long term, Cyprus offshore gas will have to compete with production from lower-cost supplies from East Africa and unconventional gas sources such as shale gas from North America. In addition to the above, there is a wave of large projects coming to fruition from 2014 onwards in Australia. These will expand LNG supply from 25 mtpa to 88 mtpa and Australia is expected to become the largest LNG supplier in the world by 2018.

Global LNG demand is expected to continue increasing and by 2025 an additional 160 mtpa will be needed. Even allowing for new projects currently under planning, the LNG supply gap is expected to be about 70 mtpa. However, over 25 countries are proposing a number of new projects

which, by 2020, could amount to about a third of world LNG demand. A key factor in their realization will be their ability to attract investment in what are currently uncertain times, which will limit the number reaching a Final Investment Decision (FID). This may also lead to shortages of skilled contractors and labour, which may lead to higher project costs.

New pipelines and interconnectors, both to Europe and the Far East, will compete with LNG. Examples are the TANAP pipeline – expected to transport 10 bcm/year to Europe – and Turkmenistan to China pipelines which will carry up to 60 bcm/year.

New unconventional gas developments are also having an impact on global energy prospects. Currently, only the USA, Canada, and Australia are exploiting their unconventional gas (particularly shale gas) resources. In Europe, shale gas development may take much longer and is unlikely to become a game changer. The same applies to India. However, China is making progress with its own developments and should benefit from these increasingly from 2020 onwards. Unconventional recoverable gas resources (mostly shale gas) have now grown to over 44 per cent of the 752 tcm world total and are bound to capture some of the world's gas demand, in competition with LNG. When shale gas is included in the global total reserve base Cyprus's estimated 1.1 tcm recoverable reserves are put into context – at only 0.16 per cent of the world total.

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Another major risk for LNG demand is the erratic state of the world economy. Economic growth is uneven and uncertain – particularly in the developed world – impacting other world markets, with concomitant effects and uncertainties on future energy demand growth. Ineffective fiscal, legal, and regulatory systems may also slow LNG project development.

## Gas Pricing Structures

In the recent *EIA Outlook*, the USA is seen as being a net gas exporter by 2020. Even though actual US net export volumes, even by 2025, are expected to be relatively low (around 40 bcm), Henry Hub pricing is influencing other gas markets and, especially in the Far East, is contributing to the pressure on gas pricing to move away from oil price indexation. For example, a recent LNG supply contract between BG and CNOOC is based on a blending of oil-linkage and gas-on-gas market pricing. Going forward, LNG sellers will eventually have to face pricing reality to remain competitive, but equally, LNG prices will have to reflect construction costs. However, with the number and volume of projects proposed post-2020, buyers will have more choice and sellers will need to be competitive.

Many of the currently planned LNG projects would find it difficult to achieve FID if they are forced to sell at hub pricing. Even though such a shift is a few years away, LNG buyers, especially those in Europe (which has to compete with very low US gas prices), will focus on cost-competitive supplies with as low a level of oil price indexation as possible. This may be assisted by future US hub-priced LNG exports to Europe, as part of its policy to play a bigger role in European energy security and global natural gas markets.

A number of Japanese, Chinese, and Korean companies have already signed

contracts to purchase LNG from the USA and Canada at gas market-related prices. They have also begun to invest in upstream and midstream assets to enable their LNG supply, something which is of interest to Cyprus given the need for investment in its LNG plant.

Another major factor is that pricing in Asia and the Far East is expected to be influenced by the upcoming cost-competitive North American and East African LNG projects, especially for post-2020 LNG supplies. An ever-increasing number of projects is targeting this market, seeking long-term sales contracts post-2020. In addition to Australia, North America and East Africa may be supplying an additional 60 mmtpa to the Asian LNG markets by 2025. As a result, those projects which are delayed, or are unable to find buyers soon, may face increasing pricing risks with time. Cost-competitiveness is the other major factor.

As a result, it is expected that Henry Hub, shale gas in China, and East African LNG project economics will set pricing levels both in Europe and in Asia for post-2020 LNG supplies. Bearing in mind the above developments, competition, and global demand in the years to come, the World Bank expects gas prices in Europe and the Far East to drop by more than 10 per cent by 2020, in comparison to current prices. Predictions for 2020 are: \$13.7/mmBtu for Japan, \$10.5 for the EU, and \$5.7 for Henry Hub.

## Potential for LNG from Cyprus

Thus, with Cyprus planning to start exporting in 2020 the Far East, as well as the EU, remains an attractive market. The main competition will be projects in North America and East Africa, which are expected to start exporting LNG at about the same time, but they could have an advantage cost-wise. As a result, controlling costs and completing the Vasilikos LNG plant as early as possible will be key factors in its success. There have been many unsettling announcements of cost escalations and project development delays over the last few years.

With the large capital investment required to support new liquefaction projects, it is important to secure attractive long-term commercial arrangements to underpin project returns and financing sooner in the planning process rather than later. LNG projects can also be selective – by selling to those who can assist in securing finance to underpin project development. This also applies to Cyprus.

In view of the above, the key driver for Cyprus should be the acceleration of the LNG project in order to be in a position to start construction as early as possible – hopefully early in 2016 – and to begin exports by early 2020. This should then enable Cyprus to benefit from the window of opportunity it now has to negotiate long-term LNG sales contracts at favourable prices to underpin its project development. ■