

# Gas in the tank!

## New discoveries to drive Mozambique's growth

*North and West Africa have dominated gas exports to western markets. But East Africa could now become a significant gas player as Anadarko Petroleum of the United States and Italy's Eni have discovered huge gas fields offshore Mozambique. In continuing our Focus on Africa, Daniel Brett reports for the OPEC Bulletin on what these new resources could mean for Mozambique's economic and industrial growth.*

Mozambique's rapid economic growth, shored up by a strong business environment and prudent government policy, is set to be further boosted by the country's prolific offshore gas deposits.

At present, Mozambique's exports are dominated by aluminium produced by the Mozal smelter near the capital Maputo, which lies in the south, although the income of much of the population is still derived from agriculture.

As a result, export-oriented growth is concentrated in the south of the country. The emerging gas industry in the north could bring another income flow to the economy.

The Rovuma Basin, which spans southern Tanzania and northern Mozambique, is attracting strong interest for development over the long term.

Discoveries over the past year or so have marked Mozambique as one of the most exciting prospects outside the Middle East, promising to catapult it from a country devastated by civil war to a middle-income economy, possibly within the space of one generation.

US independent, Anadarko Petroleum, and Italian major, Eni, have discovered estimated combined resources of over 900 billion cubic metres, according to *Oil and Gas Insight*.

If confirmed, Mozambique would have the second-largest gas reserves in sub-Saharan Africa behind Nigeria and there is a possibility that this could rise further as exploration continues.

Norway's Statoil holds a 90 per cent stake in offshore Areas 2 and 5 with imminent plans for drilling. Malaysia's

Petronas also holds significant offshore acreage, although the company has so far not disclosed its plans.

Eni has described the deepwater Mamba South discovery as the largest in the company's exploration history and confirming that the Rovuma Basin is a "world-class natural gas province".

Drilled to a total depth of 5,000 metres, 40 km off the Cabo Delgado coast, the exploration well on Area 4 has exceeded pre-drill expectations.

Eni estimates that there could be at least 15 trillion cu feet of gas in place in the Mamba South Area. A second commitment well, Mamba North 1, will be drilled after tests are finished on the first one.

The potential scale of Mozambique's burgeoning gas sector is shown in the investment proposals set out by various prospectors.

In November, Paulo Scaroni, Chief Executive Officer of Eni, indicated that the company will spend \$50bn on its massive offshore Mamba gas discovery, developing it as an LNG export plant to capitalize on soaring Asian demand.

This level of investment is the equivalent of around five times Mozambique's total GDP in 2010 and is many times greater than the \$2.2bn invested in Mozal.

## Liquefaction plans

Currently, Eni owns a 70 per cent operating stake in the gas discovery with the rest shared equally amongst Portugal's Galp Energia, South Korea's state-run Kogas, which is the world's largest corporate buyer of LNG, and state-run Empresa Nacional de Hidrocarbonetos (ENH).

Eni has said that it could build a two or three-train LNG plant on the country's northern coast with first exports launched as soon as 2016. This would imply export capacity of up to 18 million tonnes per annum, the equivalent of 25bn cu m, based on a 25-year project lifespan.

To put that into context, this is about the same level as Australia's total gas exports for 2010 and would cover around a quarter of Japan's total consumption, according to latest data from the International Energy Agency.

Eni's proposals follow similar plans by Anadarko, with a similar cost estimate of \$2,800/t of LNG export capacity and on a par with new projects being developed in Australia, a major target for global investment in gas liquefaction.

Anadarko had several successful strikes in 2010 and 2011 on its Area 1 offshore permit, east of Eni's block. It

holds a 36.5 per cent stake in the block with the rest held by Japanese trading house, Mitsui, Indian companies, Videocon and BPCL subsidiary Bharat Petro Resources Ltd, and London-based Cove Energy. ENH holds a 15 per cent interest carried through the exploration phase.

Anadarko also wishes to serve Asian markets and has submitted a \$15bn project proposal that, if approved, should see the scheme come onstream by 2018, according to Mozambican newspaper *Notícias*.

KBR has secured the contract for the pre-front-end-engineering and design study for the LNG plant with two trains totaling a 10m t/yr capacity. However, unlike Eni, Anadarko lacks experience and expertise in the LNG sector.



Cove Energy has mulled selling its interest in Mozambique so it can concentrate on exploring newly awarded licenses offshore Kenya.

As Eni's discovery is close to that of Anadarko, it is likely that they are the same reservoir and could present joint development opportunities if the parties decided to unitize their interests.

This approach would enable Anadarko to learn from Eni's LNG experience, while providing Eni with a partner to share the risks and financing of their deepwater discoveries.

Mozambique already exports gas to a gas-to-liquids plant in South Africa. However, this is via the

*Paulo Scaroni, Chief Executive Officer of Eni, which will invest \$50bn in Mozambique's Mamba gas discovery.*



An LNG vessel.

Temane-Secunda pipeline, which is almost 3,000 km from the Rovuma Basin.

The governments of both countries wish to intensify their cooperation and are discussing other opportunities on exploration and production. Sasol owns the GTL plant and wants Mozambicans to benefit from their gas riches through power generation, which would start earlier in 2013.

Gas consumption in the country was 14bn cu ft in 2006 but petered out to 3.5bn cu ft in 2009, according to the US Energy Information Administration.

The 140 megawatt gas-to-power plant, which is expected to cost \$220.6m, will be built under a joint venture with local power utility, EDM, taking a 51 per cent stake in the project. The partners will make a final investment decision in the first half of 2012.

### Major risks of megaprojects

Prudent management of the sector, along with maintaining an investor-friendly business environment, will be vital to continue progress in the gas industry and ensure that such progress delivers positive results for Mozambique's economy.

The Mozambican government has encouraged investment in mega-projects through the provision of free industrial zone status, reduced corporate tax obligations, various tax deductions linked to infrastructure development and tariff exemptions.

The key risk will be the possibility of escalating construction costs in a country that lacks energy infrastructure and local expertise. The north of the country, which is traditionally agricultural, has a poor level of infrastructure and has yet to recover fully from the civil war that ended nearly 20 years ago.

It remains the poorest area in one of the world's poorest countries. And, as stated, the Rovuma Basin gas fields are also remote from existing pipeline infrastructure.

If infrastructure needs lead to Mozambican costs rising to \$3,300/t of export capacity, as seen in some recent projects in Australia, investment requirements for Eni's plans could rise to \$60bn.

This may prompt a postponement of investment and it is likely that the

company will seek out another industry major, or Asian state-run company, such as Sinopec, to help fund the project.

### Markets ready for Mozambique

So, will the liquefaction plant in Mozambique be ready to meet market demand? Indeed, the economic downturn is unlikely to dent the anticipated surge in gas use in Japan and India.

By 2020, India's gas demand is set to more than double the 61.9bn cu m consumed in 2010, requiring significant gas import growth. Area 1 stakeholder, BPCL, is already considering building an LNG regasification terminal to import gas from Mozambique.

Anadarko is so confident about the gas demand outlook and exploration success, it is determined to increase the liquefaction complex as appropriate.

Chuck Meloy, Anadarko Senior's Vice President, Worldwide Operations, said: "Our base case development plans have now been expanded to a minimum of two 5m t/yr trains with the flexibility to develop additional trains based upon continued exploration and appraisal success."

He stated that once the first two trains were constructed, this infrastructure was expected to provide economies of scale that could reduce expansion costs for any additional trains.

Japan, the world's largest LNG importer, is also likely to feature strongly as a potential export market for Mozambique. Gas is likely to dominate in its power generation mix because of the fallout of nuclear power, following the Fukushima nuclear incident in March.

It is unsurprising then that Mitsui, the second-largest stakeholder in Offshore Area 1, along with Anadarko, is involved in gas exploration to secure supplies.

China's position, however, as a key customer is questionable considering it has massive technically recoverable shale gas resources — meaning it will need only half as much more LNG from 2020 onwards than it will require in the next decade.

Neither will China need additional gas transported by pipeline after 2020. Gas deliveries from Russia and Central Asia could also undermine the growth in the LNG market in China.

### Competing for the trickle-down

While majors and Asian economies would no doubt

## Rovuma basin gas field operators

Block	Operator
Area 1	Anadarko
Area 2	Statoil (Hydro)
Area 3	Petronas
Area 4	Eni
Area 5	Statoil (Hydro)
Area 6	Petronas

Source: Author's research.

benefit from the exploitation of the Rovuma Basin, the impact on Mozambique could be limited.

There are doubts about the extent to which liquefaction facilities will stimulate the development of the littoral northern provinces of Cabo Delgado, Nampula and Zambezia, where nearly half the country's poor reside.

Nigeria's LNG facilities at Bonny Island, which contribute around ten per cent of the world's total LNG supply, have had limited impact on economic development in the region.

The problems that have afflicted many impoverished countries lacking strong institutions could well play out in Mozambique.

Although the country has been at peace for two decades, recent riots over the surging price of bread suggest that there are significant tensions within Mozambican society over the country's economic direction.

Indeed, gas development is likely to contribute less to development than the Mozal smelter, which is criticized for its lack of contribution to government finances and the wider economy.

The export-oriented nature of proposed LNG megaprojects means that job opportunities in utilities, services and downstream industries are limited and most wealth creation will flow out of the country.

Moreover, the tax incentives in place to stimulate investment, such as one per cent VAT on total sales by megaprojects, also limit the amount of money flowing to government coffers for expenditure on development and public services.

Revenue will primarily come from the ten per cent stakes ENH holds in the offshore blocks. As such, while GDP growth figures will be boosted by gas production, as far as most Mozambicans are concerned, the gas boom may well pass them by.

NB: As we went to press, Anadarko was quoted by the *Financial Times* newspaper as announcing that it had just more than doubled the estimated size of its biggest natural gas discovery, offshore Mozambique, making it potentially "one of the most important natural gas fields discovered in the last ten years." ■■



A BG gas installation.