



### RECOMMENDATIONS

- South Africa must re-commit itself to a low carbon economy by locating and sourcing energy resources (such as gas) with the potential to lower the country's carbon footprint.
- The increased importance of gas as a power source must be realised either by up-scaling the capacity of gas-to-power plants planned or under construction, or by developing strategies towards increasing the number of such facilities. This must be done within the context of the IRP, currently under review.
- The South African government must encourage companies to investigate opportunities in Mozambique's gas sector. This could be done by forming consortiums for upstream exploration, production and development activities, or through downstream activities such as GTL plants, transportation or storage facilities and gas-to-power plants. It is important that South African companies position themselves in such a way that they form strategic partnerships with Mozambican companies in the energy sector.
- Hydrocarbons companies such as PetroSA need to consider a strategic investment in the construction of an LNG terminal, in order to enable the country to receive exports from the Rovuma Basin. This gas could feed into both power generation and GTL production. If this is not done, this massive resource will bypass South Africa and be exported, to Asia and probably Europe.

## Mozambique's Gas: An Opportunity for South Africa?

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### EXECUTIVE SUMMARY

In the past two years companies in Mozambique have announced major gas discoveries off the Rovuma Basin in the northern province of Cabo Delgado. Since the power crisis of 2007–2008 the energy industry in South Africa has been in a precarious state. South Africa's 2011 Integrated Resource Plan for Electricity 2010–2030 identifies two urgent priorities for the country's energy sector: to ensure a secure energy sector through obtaining resources for power generation, and to curb carbon emissions by including cleaner sources such as gas in the energy mix. Against the background of the recent discoveries in Mozambique, the value of natural gas resources to South Africa's energy industry cannot be ignored. South African companies, alone or in consortium, are already active in Mozambique's energy sector and sound diplomatic relations between the two countries favour further entry into the sector. Investment in Mozambique's newly discovered resources would do much to alleviate South Africa's energy insecurity. To do so, however, demands an appropriate level of commitment from South Africa at political, financial and economic levels. Whether South Africa's energy industry will seize the opportunities depends on the adaptability and responsiveness of the institutions and strategies that govern the sector. The paper concludes with four policy recommendations.

### ENERGY IN MOZAMBIQUE

Mozambique has a diversity of energy sources, including coal, gas, hydro, wind, solar and geothermal power. As a result, it has potential to generate more than 15 000MW of electricity.<sup>2</sup>

To date, however, only 2 300MW has been installed, most of it in the form of hydropower from the Cahora Bassa hydroelectric plant on the Zambezi River. Mirroring the country's economic development, demand for electricity is increasing at an annual average rate of 7%, but it is clear that for the foreseeable future Mozambique will continue to export the bulk of its energy. This is certainly true for the gas sector, which has recently emerged as a new frontier for development in the country. In the past two years there have been major gas discoveries off the Rovuma Basin in Cabo Delgado province: exploration in only two of Rovuma's five concession areas has led to estimates of the total resource in place as possibly 100 trillion cubic feet (tcfs) This extremely high potential yield, coupled with projections from the other blocks, places these gas discoveries among the highest in the world over the past decade.

Discoveries by two consortiums, led respectively by US company Anadarko Petroleum Corporation and the Italian oil 'supermajor' ENI spa, have catapulted the country into becoming potentially one of the world's main liquefied natural gas (LNG) exporters. The remaining consortiums are expected to start exploration in the Rovuma Basin area within the coming months, and a second round of bidding for hydrocarbon exploration licences will open in the latter part of 2012. The sheer scale of the resource is likely to bring with it increased access to energy for the population at large and the economy in general; depending on how it is managed, it will increase export revenues; encourage foreign direct investment (FDI) and contribute to the development of domestic energy industries. For South Africa, the gas has the potential to help address the urgent issue of energy security and more specifically, power generation.

#### ENERGY (IN)SECURITY IN SOUTH AFRICA

South Africa's main sources of primary energy are coal, imported crude oil, natural gas, hydro and nuclear power, and biomass.<sup>3</sup> Various conversion methods are used to process this energy into either liquid fuels or electricity, for domestic and export markets. In particular, gas may be used to generate

power and produce liquid fuels, and as a feedstock for production of chemicals.

South Africa's petroleum industry is relatively stable. Four main energy sources are used to meet the country's liquid fuels requirements. Respectively they are crude oil imports (mainly from Saudi Arabia, Nigeria, Iran and Angola) which are refined locally; imported refined fuels such as diesel, petrol and liquefied petroleum gas (LPG); and locally produced coal-to-liquids (CTL) and gas-to-liquids (GTL) petrochemical products. In total, however, 65% of South Africa's energy is derived from coal, which is plentiful and relatively cheap, with current reserves estimated at over 30 billion tonnes – 100 years of consumption at current rates. Unfortunately, conversion of coal to energy is also the highest single contributor to South Africa's carbon footprint. It is this factor that necessitates a reassessment of the energy mix in favour of cleaner sources, such as gas.

Compared with the electricity sector, South Africa's petroleum industry is relatively stable. In 2007–2008 South Africa experienced a shortage of electricity generating capacity that had a major impact on industrial, mining, commercial and domestic consumers. It also negatively affected confidence in the country's ability to meet its present and future energy needs. In order to address this shortfall, the country's over-reliance on coal as a 'dirty' energy input and a need to diversify electricity sources, the South African government used its 2003 Integrated Energy Plan as a framework for developing the Integrated Resource Plan for Electricity 2010–2030 (IRP). This document serves as a 20-year road-map for future security in the electricity sector. Proposing new-build capacity in excess of 42 000MW by 2030, as well as stipulating the precise inputs required to meet this objective, the IRP makes for a flexible plan that can be updated continually in accordance with developments in the sector.<sup>4</sup>

According to the IRP, which was drafted at a time when Mozambique's gas industry had not yet emerged as the energy powerhouse that it promises to be, gas-to-power plants will contribute 6 280MW, nearly 14% of South Africa's new-build power capacity.<sup>5</sup> This is particularly noteworthy given the present marginal contribution of gas to electricity generation but the sheer scale of Mozambique's

gas resources suggests that this projection should be revisited, with the aim of increasing imports so as to raise the contribution of this resource. This is especially important given that with the same generation capacity, gas emits about half the pollution of coal.<sup>6</sup>

Increasing the contribution of gas to the country's energy mix will go some way to securing power generation capacity through open- and closed-cycle gas turbines. It will also reduce imports of refined fuels by making gas available for local GTL refineries. It is crucial that the South African government commits itself to this goal by ensuring the flexibility of instruments and institutions that will permit the energy sector to adapt to changing circumstances.

## SOUTH AFRICA IN MOZAMBIQUE

South Africa and Mozambique have enjoyed strong diplomatic ties for many years. Cross-sectoral relations go back almost a century, and economic investment in, and collaboration with post-war Mozambique dates back more than a decade, to the establishment of the Maputo Development Corridor in the early 1990s. This was followed in 2000 by the development of the Mozal aluminium smelter in Maputo through a partnership between South Africa's Industrial Development Corporation, the Anglo-Australian multinational BHP Billiton, Japan's Mitsubishi Corporation and the government of Mozambique. Four years later the South African petrochemicals company Sasol began exports through an 865km pipeline from its Pande and Temane gas fields in Inhambane Province to Secunda in South Africa. Currently, all economic collaboration between South Africa and Mozambique takes place in the context of the 1997 Heads of State Economic Bilateral Forum, chaired by the respective presidents.<sup>7</sup> In December 2011 South African president Jacob Zuma and President Armando Guebuza of Mozambique committed themselves to up scaling co-operation through the establishment of a Bi-National Commission (BNC), a move that will see elevated levels of engagement between the two countries.<sup>8</sup>

Mozambique's relatively young hydrocarbons sector has been dominated by Sasol since 2004. The

company's gas fields produce 183 gigajoules of gas annually. Most of this is exported to South Africa and used by Sasol for the production of liquid fuels and chemicals: the Mozambican domestic market has access to 27 million gigajoules annually through a sales agreement with the company; nine million gigajoules a year remain in the country as royalty payments.<sup>9</sup> There are plans under way to utilise this resource as a feedstock for a gas-fuelled power plant and for gas piped directly to households and businesses in Maputo.

As the first company to successfully produce hydrocarbons in Mozambique, Sasol has paved the way for the Petroleum, Oil and Gas Corporation of South Africa (PetroSA), South Africa's national oil company, and other South African firms operating in the energy sector. There is a strong commitment from South Africa and Mozambique to further collaboration and partnership in economic investment, development and co-operation, which should provide a favourable environment for South African companies entering Mozambique. Given South Africa's substantial energy requirements and the multiple uses of gas as an energy source, there is scope for a number of South African initiatives in Mozambique's gas sector.

## OPPORTUNITIES IN MOZAMBIQUE'S GAS SECTOR

In December 2011 PetroSA signed a 'strategic partnership agreement' with its Mozambican counterpart Petr6leos de Moçambique (Petromoc), in the area of downstream industries in the hydrocarbons sector.<sup>10</sup> A joint study into the possibility of developing a GTL facility in Mozambique is already under way, a move indicative of a firm commitment to collaboration between the two national oil companies. Sasol is also currently investigating the feasibility of developing gas fields near the Beira coast in Sofala Province.<sup>11</sup> There are further opportunities for South African companies to enter the Mozambique hydrocarbons sector in ways beneficial to both countries.

With Mozambique's next hydrocarbons bidding round soon to be opened and gas production set to begin in 2018, these opportunities exist in both upstream and downstream activities. Given the

costs and risks inherent in upstream hydrocarbons activities the best route for South African companies is likely to be through partnerships or consortiums with bigger multinationals. In Mozambique, the government has established an interdepartmental task team to assess the scenarios that exist for future utilisation of the resource within the country. This process will culminate in the release of 'The Gas Masterplan', a document that will set out scenarios for how the gas is to be utilised.

Initial indications are that although most of the gas produced from 2018 will be used to generate export revenues, the government also supports development of beneficiation industries. These will take the form of converting gas to electricity and fuel, and using it as a feedstock in chemicals production. The vision is that these energy products will be used locally and exported to neighbouring countries, thereby contributing to job creation, export revenue and economic growth in Mozambique. South Africa is the more technologically advanced of the two countries, which points to further potential for South African companies to ally with their Mozambican counterparts in developing the requisite processes. Given that the quantity and commercial viability of South Africa's west coast gas reserves has yet to be proven, there is also scope for PetroSA to import LNG to be used in GTL production and power generation. For this to happen, however, South Africa must invest in an LNG receiver terminal that will ensure that the country can take advantage of Mozambique's LNG exports while also creating an access point to the global LNG industry.

## CONCLUSION

South Africa's energy sector has been in a state of insecurity for several years, a situation set to continue in the foreseeable future, and its carbon emissions are high due to over-reliance on coal as an energy input. If the country is to benefit from Mozambique's major gas resources and diversify its energy mix by including a greater proportion of low-carbon sources, decisions must be made

now. This is an urgent priority, not only because implementing decisions and putting infrastructure in place will take years, but also because the window of opportunity will not remain open indefinitely. The importance of maintaining and further strengthening diplomatic and economic ties with Mozambique cannot be overstated.

## ENDNOTES

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- 10 PetroSA statement, 'PetroSA signs a strategic partnership agreement with Mozambique's Petromoc', Maputo, Mozambique, 14 December 2011.
- 11 Personal interview, senior manager of Sasol Mozambique, Maputo, 17 February 2012.

The Governance of Africa's Resources Programme is funded by the Norwegian Ministry of Foreign Affairs. SAIIA gratefully acknowledges this support.

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