



UPDATE ON SOUTH AFRICA'S GAS-TO-POWER PROGRAM: RECENT DEVELOPMENTS

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After years of underinvestment and poor maintenance of its power plants while demand has grown, South Africa continues to struggle to meet the electricity needs of its people and industries. The vast majority of South Africa's electricity comes from coal-fired power plants, infrastructure that is 30-35 years old and has become insufficient and unreliable. The economic consequences of insufficient power generation are real: "Regular load shedding by Eskom is hurting South Africa's economy to the tune of 0.5-1.8% of GDP per month, depending on the blackouts' severity," according to 2015 investment analysis by Edison Investment Research. Despite some recent improvement, still today most South Africans are in the dark some of the time, and perhaps ten million of them are in the dark all the time.

For the most part, Eskom has maintained its focus on coal as the primary solution to South Africa's power problems. In April 2007 it began construction on the coal-fired Medupi power plant, a facility with six 800MW units that overcame years of delay due to labor unrest and finally became operational in August 2015. Its sister plant,

the Kusile coal-fired power plant, will have the same capacity once complete, likely in 2017. Despite the additional completed and planned generation capacity, more power is still needed. Brian Molefe, Group Chief Executive of Eskom, has publicly acknowledged the severity of the problem and has blamed it primarily on the lack of capital or tariff increases the company needed to keep up with surging demand. Lack of proper maintenance coupled with rapid demand growth has caused Eskom to "run its plants into the ground", according to Bloomberg.

South Africa's government and citizens clearly recognize the urgent need to improve its power generation and distribution. The Integrated Resource Plan 2010-2030 (IRP) from March 2011 describes a comprehensive plan for developing South Africa's energy resources, from fossil fuels to renewables and nuclear power. Under the IRP, South Africa has begun developing 4,000 MW of renewable energy projects and attracted \$10 billion in foreign investment through four competitive bidding rounds in three years. Building on the success of renewables, officials have now turned to gas-fired power generation as an additional solution.

South Africa's government released a draft of the Gas Utilization Master Plan (GUMP) in May 2016, which aims to provide a long-term evolutionary roadmap for energy security and create a framework for the development of a robust gas industry. The GUMP states that there is no clear basis for

planning an in-country gas industry based purely on domestic gas sources, whether that is syn-gas, coal bed methane, shale gas, or offshore gas, and such a basis will not exist without significant successful development of indigenous gas. But while the draft GUMP is tentative on domestic gas exploration and development, the South African Minister of Rural Development and Land Reform, Minister Gugile Nkwinti, is notably optimistic. In a statement in March, he said that shale gas represents an area of "real opportunity for South Africa" and could lead to "excellent prospects for beneficiation and add value to [South Africa's] mineral wealth." According to Minister Nkwinti, exploration activities will begin in late 2016 or early 2017. Several international exploration and production companies including Shell have already expressed interest in participating in the exploration phase.

The GUMP is similarly tentative about building a gas industry around imported gas through regional pipelines, due to various unknowns including the fact that the gas supply would be subject to both commercial and inter-governmental negotiation and agreement. In contrast, the GUMP views imported liquefied natural gas (LNG) as the most attractive current option, though not to the exclusion of the other sources.

Gas power plants require gas feedstock to operate, and plans for transporting the gas to power generation facilities in South Africa are in the early stages. South Africa has limited domestic production capacity and insufficient



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transportation infrastructure, and for this reason in 2015 South Africa imported 77% of its natural gas by pipeline from Mozambique. Feedstock gas could be transported by pipeline, including from Mozambique, or through various other methods such as compressed natural gas (CNG), or gas cooled into a liquid (LNG).

Each of these methods will require South Africa to invest in building new infrastructure, a fact understood by investors and government officials alike. Delivering gas to power plants by pipeline will require new pipelines. Enabling vehicles to run on gas requires either CNG, and thus compression and refueling stations as well as vehicles equipped to run on CNG, or LNG with its refueling stations and so equipped vehicles. LNG could be made either by liquefying imported pipeline gas with liquefaction facilities, or by importing LNG from abroad via LNG tankers. Turning LNG back to a gas form for use by power plants and for heating and cooking requires onshore or floating regasification facilities, with the associated storage tanks, ports, jetties and pipelines. Power plants themselves require generating facilities and the associated transmission and distribution networks.

A request for information for South Africa's

new gas-to-power program was issued by the Department of Energy (DoE) in late 2015. The DoE's RFI provided for the possibility of developing South African gas resources, but also recognized that LNG imports will be essential to the viability of the gas-to-power program in the near term. An assessment is underway to consider potential sites for an LNG import terminal at Saldanha Bay, Coega or Richards Bay.

Last year the DoE also solicited market information to help in the design of the 3,126 MW gas-to-power program and in the development required to procure the gas to generate electricity. According to Energy Minister Tina Joemat-Pettersson, there was enormous interest in the program, including during an international options conference at the end of September 2015 at which the DoE sought input from potential market participants. Eskom Holdings (SOC) is anticipated to be the sole offtaker of electricity generated under the program. The DoE will be the governmental body responsible for regulating the program and preparing the procurement documentation. Crucially, the regulations relating to oil and gas will be split from the Department of Mineral Resources and instead will be governed by the DoE. This means that the proposed Minerals and Petroleum Resources

Development Act Amendment Bill, which would give a 20% stake of all new energy ventures to the state and enable the state to buy an unspecified additional share, would no longer apply to the oil and gas sector. This is an important consideration for potential IPPs and investors.

Supporters contend that the gas-to-power program will offer a demand-side "anchor" to stimulate sufficient investment in the required import capacity. The DoE intends to make a preliminary information memorandum regarding this gas-to-power program this summer, and then will begin the formal procurement process once the submission window closes. The DoE has also confirmed that it has plans to procure a new 600 MW gas-fired power generation plant, which will be developed as a public-private partnership. The plan is for a private "strategic partner" to collaborate with South Africa's state owned companies on the project, with the private sector leading the development, financing, operation and maintenance of the facility.

Minister Joemat-Pettersson has directed the DoE to begin the work of procuring imported gas to ensure "bankability of the gas-to-power program for investors, affordability for consumers and minimal fiscal exposure for

the government," according to Engineering News. Under the GUMP, the South African government recognizes that "[t]o encourage the development of the gas market in South Africa the market (including regulatory) arrangements must offer to international investors at least the potential for value that they see in other commodities, other markets and other geographies." This proactive approach to attracting investment and encouraging public-private cooperation is a welcome change for what has been an inefficient and sometimes mismanaged power industry in one of Africa's biggest economies.

South Africa is exploring all options in its efforts to improve power supply reliability. It has abundant coal, it continues developing its renewable program and considering nuclear, and its new gas-to-power program is up and running. Achieving a diversity of energy sources will serve South Africa well. If planned and implemented correctly, the gas-to-power program and other efforts could have beneficial effects on the development of new local industries and ultimately increase economic prosperity of South Africa.