



## Natural Gas in Southern Africa, Part 1: Current supply and demand

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This is the first part of a 2-part series of articles covering the natural gas industry in southern Africa. For these articles, we view southern Africa as comprising South Africa, Namibia, Botswana, Lesotho, Swaziland, Zimbabwe and Mozambique. The two parts focus on different aspects of the natural gas industry, as follows:

- Part 1: Current natural gas supply and demand; and
- Part 2: Available gas resources and future development.

Part 2 will be issued directly to our subscribers and published to our website on the 3<sup>rd</sup> of December 2018.

### Introduction

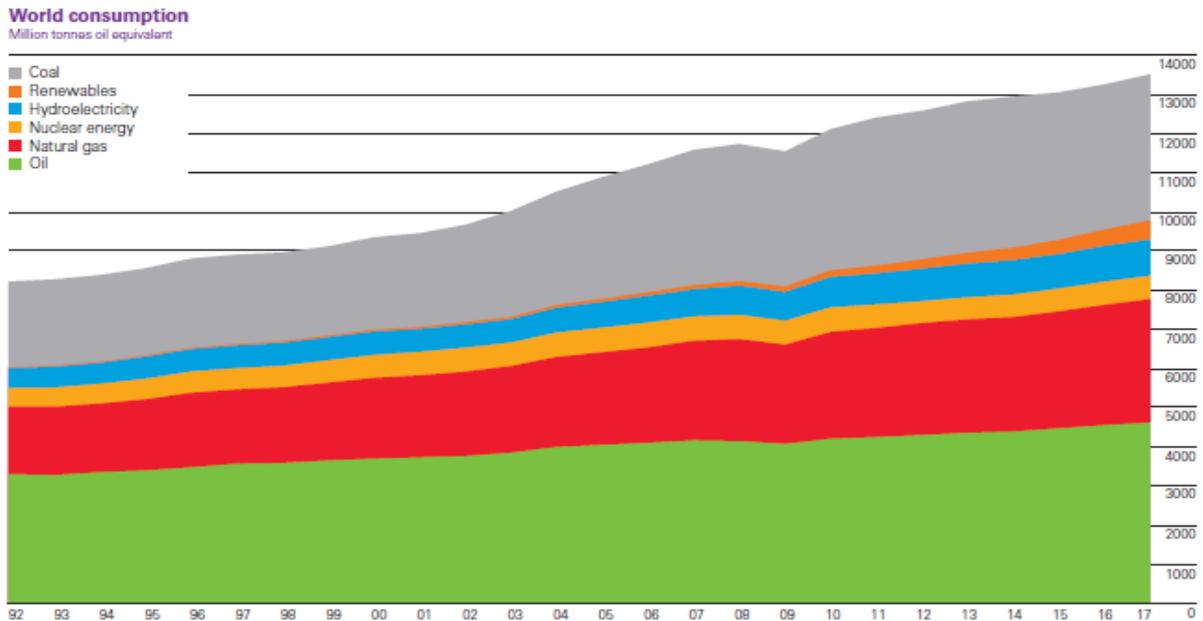
The gas industry in South Africa has a long history. The first gas was produced by the Johannesburg Lighting Company in 1892. Following the expansion of the gas network in Johannesburg by the Johannesburg Gas Works (the city utility that took over the Johannesburg Lighting Company), further development of the gas industry in South Africa was closely aligned to the development of the synthetic fuel industry in South Africa (Lauferts & Mavunganidze, 2009). Sasol pioneered the synthetic fuel industry in Sasolburg in the 1950's and in Secunda in 1980, while PetroSA (initially called Mossgas) introduced the first natural gas into South Africa in 1992.

The most significant event in the gas industry in southern Africa up to now, was the development of the Pande and Temane natural gas fields in Mozambique and the construction of a pipeline, the ROMPCO pipeline, to transport that gas from Pande / Temane to Secunda where it linked into the existing gas pipeline network. The gas flow through the ROMPCO pipeline commenced in 2004, and more than doubled the use of gas in southern Africa.

In this article we take a global perspective on natural gas, consider the current gas market and infrastructure in southern Africa, and discuss the natural gas sources currently exploited in southern Africa.

## Global perspective on gas

Globally, gas consumption has grown strongly over the past 10 years and is predicted to surpass coal to become the second biggest source of primary energy within the next 5 to 10 years. This growth is illustrated clearly in Figure 1, showing the primary energy development over the past 25 years.



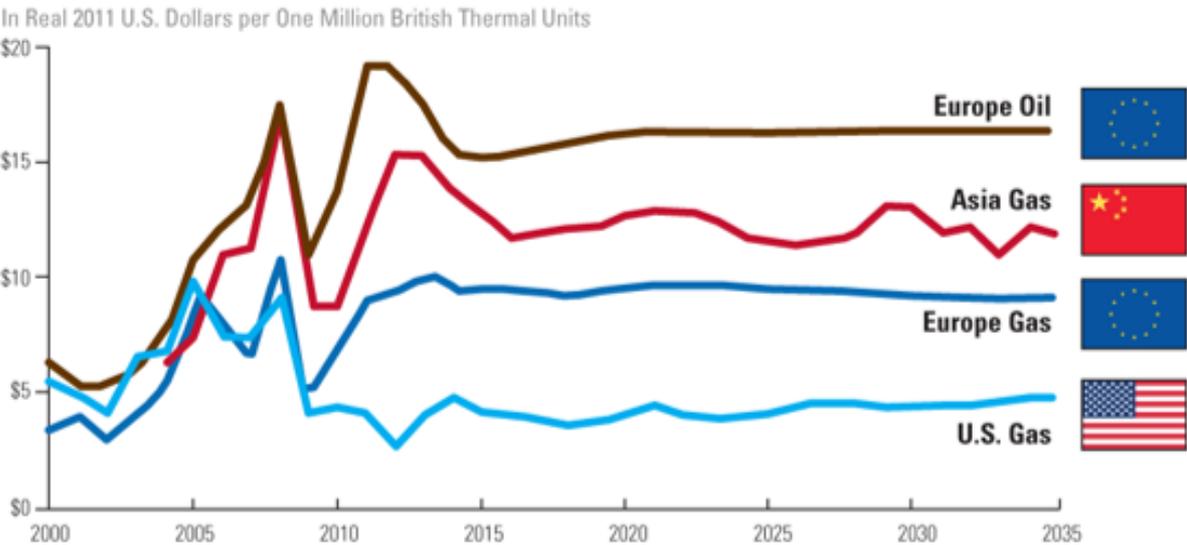
**Figure 1: Growth in Global Primary Energy Consumption** (BP Energy Review, 2018)

The growth in natural gas has been specifically fast in the LNG segment, with growth rates approaching 5 to 10% per year over the past 2 years and LNG consumption now approximately 300 million tpa. Even so, the LNG consumption still represents only slightly more than 10% of the global natural gas consumption. Also noticeable from the LNG statistics over the past 27 years in Figure 2, is the fast growth in regasification capacity and the growth in the number of LNG importing countries.



**Figure 2: Growth in LNG Trade** (IGU, 2018)

Unlike most other commodities, there are significant differences in gas pricing around the world. These differences are driven by the extremely high logistics cost of moving natural gas around, whether in the form of LNG, by pipeline or any other means, and these differences are expected to persist into the future. Figure 3 shows a forecast of global natural gas prices from Cambridge Energy Research Associates (CERA, 2014), showing an expectation for these current price variances to persist into the future.



**Figure 3: Forecast of natural gas pricing (IHS CERA, 2014)**

**Current gas market in southern Africa**

There has been significant growth in the gas industry in southern Africa with the introduction of natural gas from Pande and Temane, but the consumption of gas in southern Africa still lags far behind the rest of the world as illustrated in Table 1.

**Table 1: Natural gas contribution to total primary energy consumption in 2017 (BP Energy Review, 2018)**

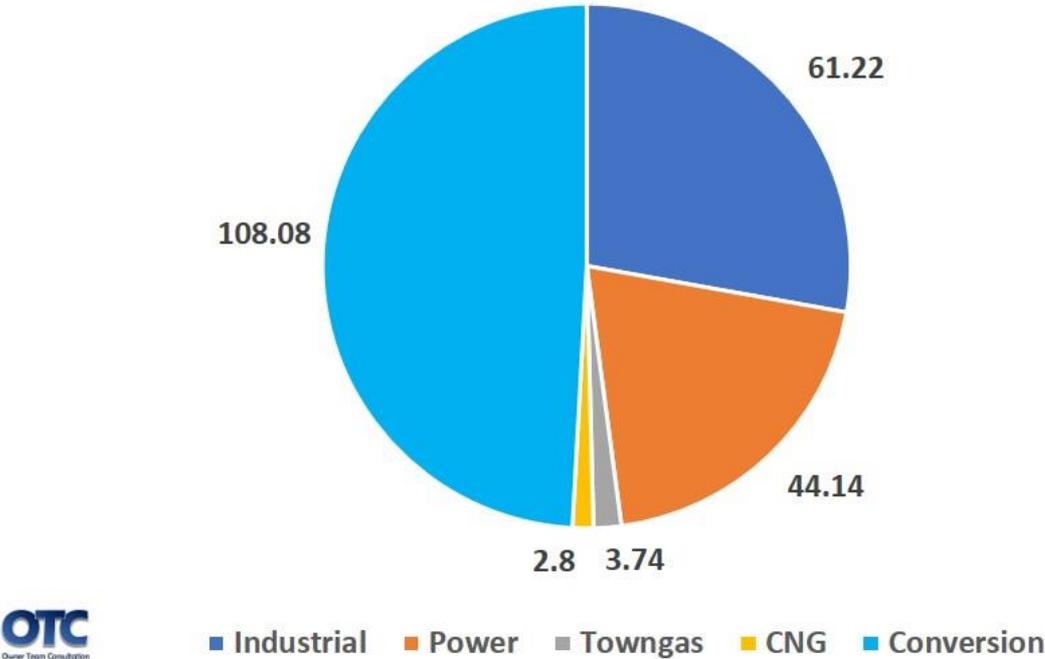
Region	Total primary energy in MTOE*	Natural gas in billion m <sup>3</sup>	Natural gas as % of primary energy
World	13511	3670	23.4%
USA	2235	739	28.4%
Germany	335	90	23.1%
South Korea	296	49	14.2%
Australia	139.4	42	25.9%
South Africa	120.6	4.5	3.2%

\* MTOE: Million tons oil equivalent

Even though the above numbers for South Africa does not reflect the methane-rich gas sent from Secunda to KwaZulu-Natal or the PetroSA internal consumption, less than 4% of South Africa’s primary energy needs are sourced from natural gas or equivalent. This compares with 14.2% for South Korea, a country totally reliant on very expensive imported liquefied natural gas (LNG), 28.4% for the USA where the gas is of the cheapest in the world, and 23.1% for Germany which is mostly reliant on long-distance pipelines for its natural gas supply and with prices similar to South African prices.

In 2017, the gas consumption in southern Africa was approximately 220 million GJ. The breakdown of this consumption is shown in Figure 4.

**Southern Africa gas demand by sector in 2017:**  
Total 220 million GJ/yr

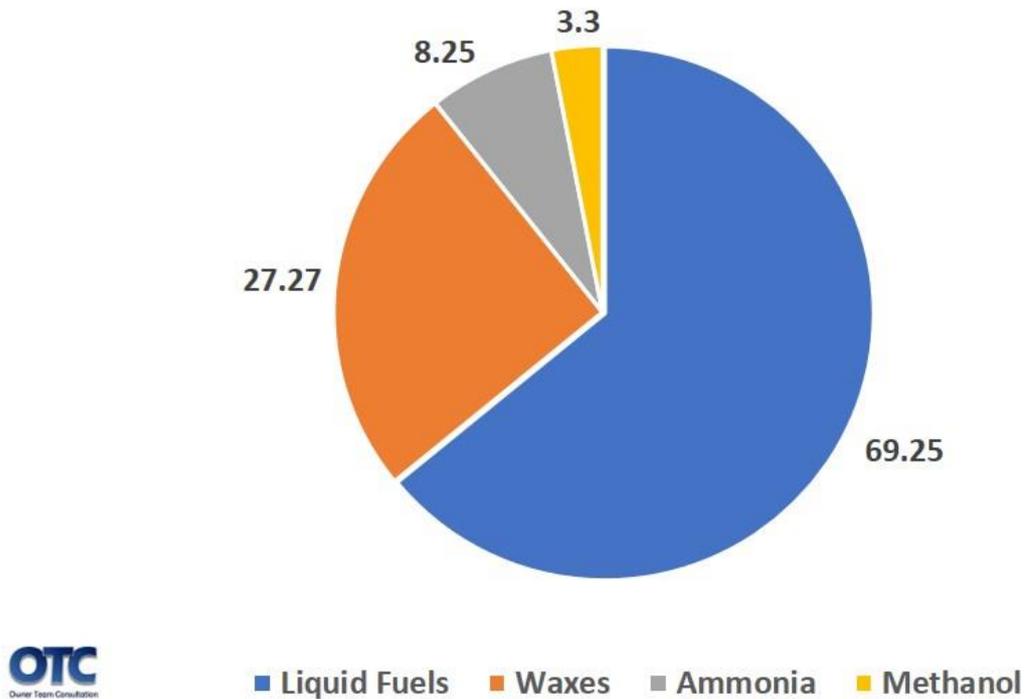


**Figure 4: Gas demand in southern Africa** (from OTC Gas Roadmap model)

The fraction of gas converted in southern Africa to derivatives (such as liquid fuels, wax, ammonia and methanol) is very high when compared to global ratios. Conversely the use of gas in electricity generation and industrial uses is very low compared to the rest of the world. This situation is a result of South Africa’s political history where the strategic need to produce synthetic liquid fuels (GTL) was very high.

The high consumption of natural gas into liquid fuels is demonstrated by Figure 5 showing the breakdown of the gas conversion uses in southern Africa in 2017.

**Southern Africa gas demand for conversion in 2017:**  
Total 108 million GJ/yr



**Figure 5: Derivative gas demand in southern Africa** (from OTC Gas Roadmap model)

### Gas infrastructure in southern Africa

The lack of infrastructure is a major inhibitor to further development of the gas industry in southern Africa (together with the slow development of local gas sources). The few major pipelines in the region is shown in Figure 6 and are concentrated in the east of the region with some branching off these pipelines.

The major pipelines are as follows:

- **ROMPCO pipeline:** This 865 km pipeline from Temane in Mozambique to Secunda in South Africa is jointly owned by Sasol, the Mozambique government and the South African government.
- **Lilly pipeline:** Transnet owns this 600 km pipeline from Secunda to Durban;
- **Sasol pipelines:** Sasol owns several gas pipelines originating in Secunda and reaching destinations such as Johannesburg, Ekurhuleni, Pretoria, Sasolburg and Emalahleni.

Even though South Africa is amongst the top 30 economies in the world, it is not one of those 36 countries (see Figure 2) with LNG import facilities. Over the past couple of

years there has been efforts by the Department of Energy in South Africa to facilitate such a facility. At this stage, it does not appear that anything will be in place within the next couple of years.



Figure 6: Main gas pipelines within southern Africa

### Sources of natural gas in southern Africa

There are currently two producers of natural gas in southern Africa with another project in development, namely:

- **PetroSA gas production:** The offshore shallow gas fields supplying the gas-to-liquids facility of PetroSA has been producing since 1991 and the gas production has been in strong decline over the past number of years;
- **Pande and Temane gas fields:** These onshore Sasol gas fields has been producing since 2004. Gas production has been steadily increasing, but the latest drilling results reported by Sasol does not sound promising; and
- **Mamba gas field, Mozambique:** The Mozambique Rovuma Venture (joint development by ENI, Exxon and CNPC) is progressing their Rovuma LNG project

from the Mamba field offshore Mozambique. The plans entail two floating LNG production trains of 7.6 million tpa each, with first production expected in 2024.

As already alluded to, the lack of local gas resources is inhibiting the growth of the gas industry in South Africa.

## Concluding remarks

It is clearly illustrated in this article that southern Africa is lagging the rest of the world in the use of natural gas. This is primarily due to limited supply and not because of high gas pricing. Growth in the natural gas industry in southern Africa will most probably be driven by the exploitation of additional gas resources and substantial development of the local infrastructure.

In Part 2 of this series of articles, we will explore other potential sources of natural gas in southern Africa and possible future growth scenarios.

## References

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