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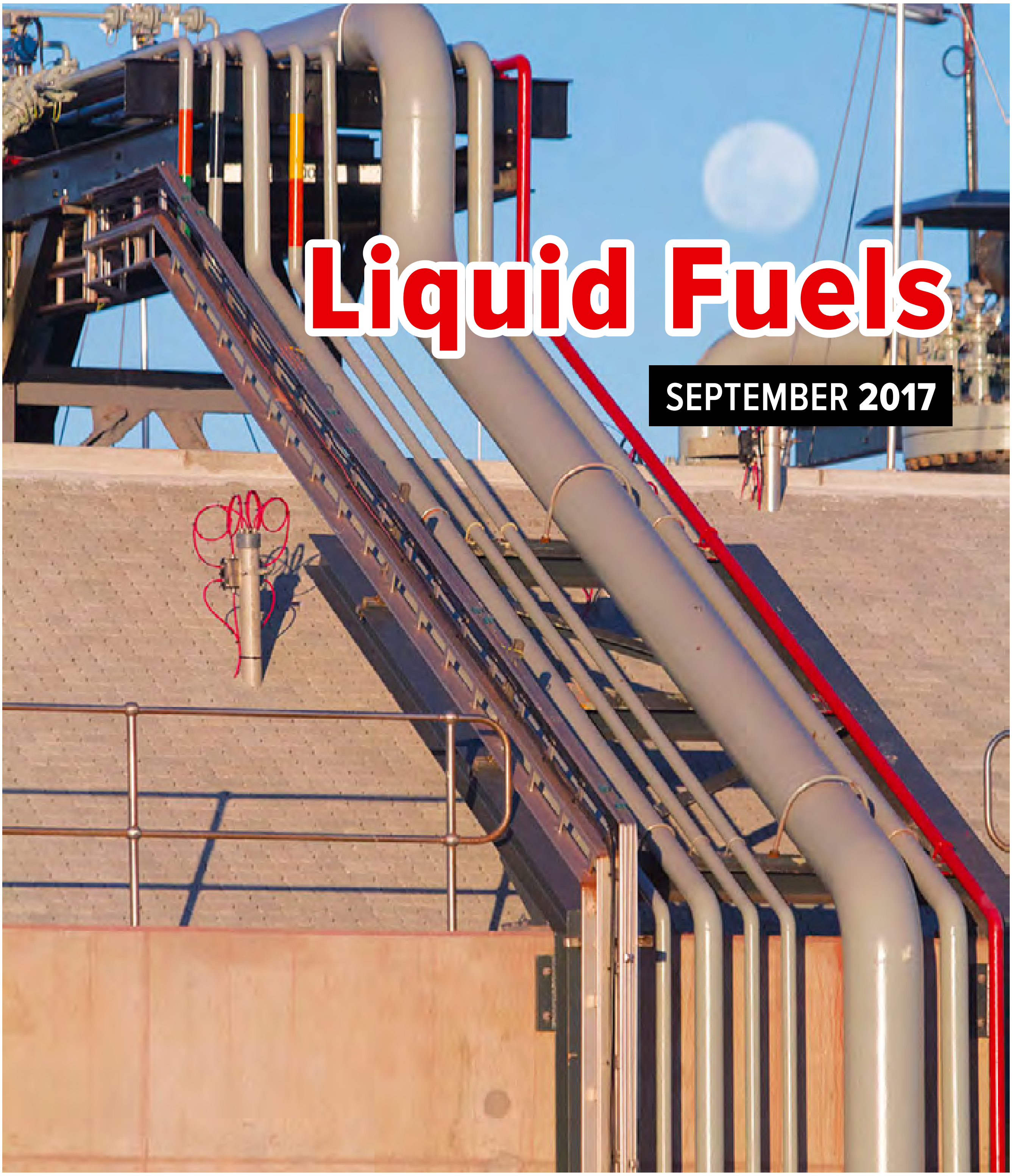

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A review of South Africa's liquid fuels sector

Picture by Bloomberg

The material contained in this report was compiled by Mariaan Webb and the Research Unit of Creamer Media (Pty) Ltd, based in Johannesburg.

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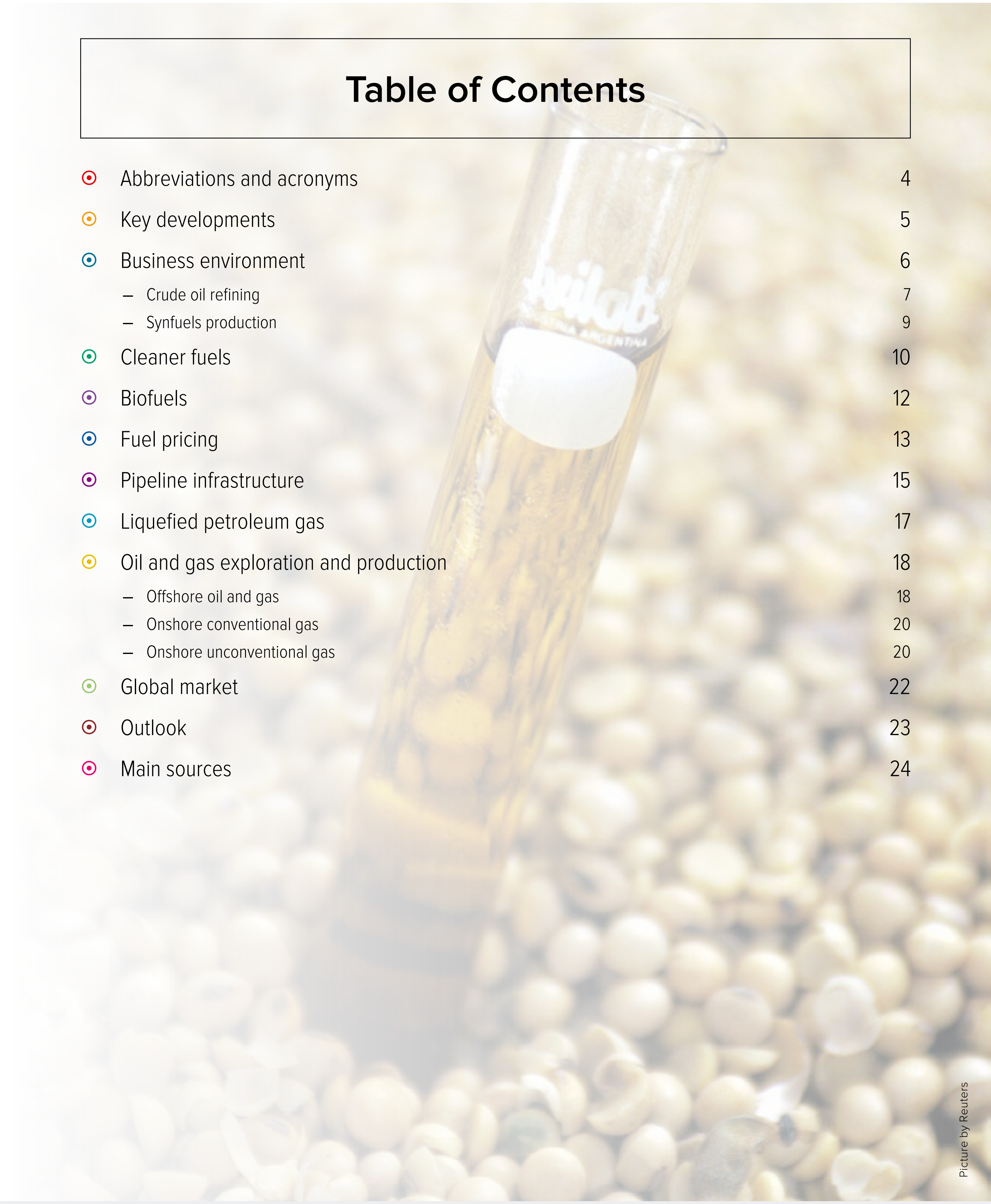


Picture by Reuters

Abbreviations and acronyms

3D	three-dimensional
BFP	basic fuel price
bcf	billion cubic feet
bscf	billion standard cubic feet
CBM	coal-bed methane
CEF	Central Energy Fund
CTL	coal-to-liquid
DMR	Department of Mineral Resources
DoE	Department of Energy
EIA	US Energy Information Administration
EV	electric vehicle
GDP	gross domestic product
GTL	gas-to-liquid
IDC	Industrial Development Corporation
IEP	Integrated Energy Plan
LNG	liquefied natural gas
LPG	liquefied petroleum gas
MPRDA	Mineral and Petroleum Resources Development Act
MRP	maximum refinery price
MRGP	maximum refinery gate price
Naamsa	National Association of Automobile Manufacturers
Nersa	National Energy Regulator of South Africa
NMPP	New Multiproduct Pipeline
OPEC	Organisation of the Petroleum Exporting Countries
PASA	Petroleum Agency of South Africa
ppm	parts per million
RAF	Road Accident Fund
Sapia	South African Petroleum Industry Association
SFF	strategic fuel stocks
synfuel	synthetic fuel
tcf	trillion cubic feet
UCG	underground coal gasification

Key developments

September 2016: The South African Petroleum Industry Association appeals for decisive action to resolve policy uncertainty on the introduction of cleaner fuels and how the cost of upgrading the country's refineries to produce such fuels will be recovered.

November 2016: The Department of Energy publishes the draft Integrated Energy Plan (IEP), which is an umbrella plan guiding policy development in South Africa. The IEP provides some insight into the future options for the liquid fuels sector.

November 2016: The South African Petroleum Industry Association publishes a study on the economic impact of the domestic oil refining sector, which shows that the country's six refineries generate yearly economic activity of more than R200-billion and sustain more than 480 000 jobs.

February 2017: The National Energy Regulator of South Africa announces a surprise decision to increase Transnet Pipeline's tariff to pump fuel from KwaZulu-Natal to Gauteng; the State-owned company actually applied for a decrease.

March 2017: China's Sinopec buys 75% of Chevron's South African assets. It is the Chinese company's first investment in a refinery in Africa.

March 2017: Mineral Resources Minister Mosebenzi Zwane announces South Africa's plans to proceed with shale gas development in the Karoo basin.

April 2017: The Competition Commission publishes its recommendations for dealing with "market distortions" in the domestic liquefied petroleum gas sector.

May 2017: A blast at South Africa's only inland refinery, Natref, forces the shutdown of some operations at the refinery.

May 2017: Energy Minister Mmamoloko Kubayi admits that a large portion of South Africa's strategic oil reserves were sold, rather than "rotated" as her predecessor Tina Joemat-Pettersson previously insisted. Kubayi describes the sale as illegal and says legal action will be taken.

May 2017: The State-owned Industrial Development Corporation approves R218-million in loan finance to support the development of the Tetra4 conventional gas project, in the Free State.

July 2017: The date by which a newer, cleaner standard fuel was to have been introduced. Government has delayed introducing the cleaner fuel standards as a standoff with refiners continues over a cost-recovery mechanism.

August 2017: Sunrise Energy's R1-billion liquefied petroleum gas (LPG) import terminal, in the Western Cape, is officially launched. The open-access terminal should allow for more competition in the LPG import market.

August 2017: Cape Town's first independent oil storage and distribution terminal, Burgan Cape Terminal, is opened, offering storage for 122 000 m^3 of diesel and petrol.

September 2017: State-owned PetroSA and Russia's geological exploration company Rosgeo enter into an agreement to explore for gas offshore South Africa's coast. The companies are aiming to find feedstock for the Mossel Bay gas-to-liquids plant, in the Western Cape.

September 2017: The Competition Commission warns liquefied petroleum gas wholesalers about ignoring earlier recommendations that supply deals should not exceed ten years.

Business environment

South Africa's oil reserves are limited and most of the country's petroleum and petroleum-related products are produced from coal and imported oil.

South Africa's refining capacity is the second biggest in Africa, after Egypt, with a total refining/liquid fuels capacity of 703 000 bbl/d. About 70%, or 503 000 bbl/d, of this is crude oil refining, with the balance being synthetic fuel (synfuel) refining.

The crude oil refining fleet is ageing and will require significant investment if the country is to meet cleaner fuel specifications.

The refineries' inability to produce fuel compatible with the demands of some of the newer automotive engine models has led to an increase in imports. As a result, the country's refined product market has gradually shifted from a net export market to a net import market in the past 15 years.

The sustained net import market has attracted commodity traders, which have limited or no refining capacity. These companies are investing significantly in new petroleum storage infrastructure, which has eased bottlenecks of the imports of finished product into the South African market.

According to the South African Petroleum Industry Association about 20% of the country's fuel needs are being met by refined product imports. Imports are expected to continue to increase, unless significant investments are made in the country's six refineries. These are the crude refineries of Enref and Sapref, in KwaZulu-Natal; Chevref, in the Western Cape; and Natref, in the Free State, as well as the synfuel refineries in Mpumalanga and the Western Cape. The synfuel plants are listed as refineries because of the integral part that they play in South Africa's fuel supply.

The country's refineries are operating at capacity utilisation rates of about 70%.

Some have argued that South Africa should take advantage of the global glut of liquid fuel refining capacity and rely increasingly on fuel imports. It is argued that countries that have their own crude resources and established megarefineries could not be outpriced by a South African refinery.

However, government policy is supportive of ongoing domestic refining. Energy Minister Mmamoloko Kubayi reaffirmed this position when she announced in her May 2017 Budget Vote that plans for a new refinery would be taken to Cabinet before the end of the year.

Government believes that importing fuel is not positive – neither in respect of energy security, nor for the enhancement of industrialisation. The Minister estimates

Chevron refinery

that South Africa will import more than one-third of its fuel requirements by the time a new refinery is built.

Government states that a high level of refined fuel imports exposes South Africa to foreign exchange fluctuations and could place energy security at risk. South Africa's energy security is also of importance to its landlocked neighbours, which import diesel, petrol and other petroleum products from the country. South Africa, however, still imports crude oil and, thus, remains exposed to global price and demand fluctuations.

Strategic fuel stocks

The Strategic Fuel Fund (SFF), which falls under the auspices of the State-owned Central Energy Fund (CEF), manages South Africa's strategic crude oil reserves.

From December 2015 to January 2016, the SSF sold 10.30-million barrels of the country's strategic oil stocks at bargain basement prices of $28/bl.

Former Energy Minister Tina Joemat-Pettersson insisted that it was a "rotation" of stocks, but her successor Mmamoloko Kubayi admitted in May 2017 that the oil stock, in fact, was sold. According to Business Day, the buyers were Taleveras Trading, Vesquin Trading/Vitol and Venus Ray Trading.

The transactions were not authorised by either the CEF or the National Treasury, and have been described as "illegal".

The Department of Energy has indicated that criminal charges are being considered against the SFF officials involved. A forensic investigation to trace the flow of money arising from the transaction will also be instituted.

The sale of the oil stock may not have an immediate impact on the country, but economist Mike Schussler has warned that South Africa will be caught offguard in a crisis situation. The international standard is to have an average of 90 days' stock.

The strategic oil reserve is also meant to cushion South Africa from global fluxes in oil price, helping to maintain a steady fuel price at the pumps. The reserves were sold at a time when oil prices were at an eight-year low. Buying the oil back at a time of higher prices could result in losses of billions of rands.

Source: *Engineering News* and Business Day

Crude oil refining

South Africa's four crude oil refineries – Sapref, Enref, Chevref and Natref – have a combined capacity of 503 000 bbl/d.

The Sapref refinery, in Durban, is jointly owned by Shell SA Refining and BP Southern Africa. The refinery is South Africa's largest, with a production capacity of 180 000 bbl/d to 190 000 bbl/d, depending on the type of crude oil processed. The refinery processes about 24 000 t/d of crude oil and produces ten main products in 46 different grades. The refinery has been in production since 1963.

Sapref is concerned about a loss of staff to oil refineries in the Middle East. In June 2017, Sapref said it could lose 15 key staff members from a department, which in 2015 had lost 25 employees. Sapref believes it is too easy and too lucrative for highly skilled workers to emigrate and it wants government to protect companies that invest in local skills development.

Malaysian group Petronas's 80% subsidiary Engen Petroleum owns the Enref refinery, in Durban. The refinery is South Africa's second-largest and has a nominal capacity of 125 000 bbl/d.

The Natref refinery is jointly owned by petrochemicals group Sasol and Total South Africa in a 64:36 partnership. Natref has a capacity of 108 500 bbl/d. It is located in Sasolburg and is the only inland crude refinery in the country. The refinery suffered unplanned downtime in May 2017 when a blast injured 11 people.

Chevref, in Cape Town, is the smallest of South Africa's refineries, with a capacity of 100 000 bbl/d. Until recently, the refinery was owned by Chevron South Africa, but in March 2017 China's Sinopec announced it would buy 75% of the US oil major's South African business in a $900-million transaction. Chevron had sought a buyer for its local operations for more than a year as part of a global sale of about $15-billion of assets. Several parties were interested, but the need to upgrade the refinery was reportedly a sticking point for bidders. Commentators believe that the transaction is good for South Africa, as the Chinese group is expected to invest capital, technology and expertise in the local fuel industry at a time when refineries have to upgrade to produce cleaner fuels.

Besides the refinery, Sinopec has also acquired a lubricants plant in Durban, service stations and forecourt convenience stores in South Africa and Botswana.

The four existing refineries use crude oil imported from other African countries and the Middle East. In 2014, South Africa imported about 38% of its total oil from Saudi Arabia, followed by Nigeria (29%) and Angola (16%).

Tehran Times reported in March 2017 that Iran is ready to sell 100 000 bbl/d of oil to South Africa. The country was the major exporter of crude oil to South Africa before the imposition of Western sanctions on Tehran in 2012. The country imported about 380 000 bbl/d of oil from Iran in the presanctions era.

Government has indicated that it wants to increase the participation of black wholesalers in importing crude oil. The idea is that black wholesalers should be working with their counterparts in the countries of crude oil origin. The immediate focus will be on West Africa, which currently accounts for about 50% of the country's oil imports.

Government hopes to extend the idea to the transportation of crude oil through joint chartering of vessels.

Study highlights refining sector's big jobs contribution

The employment and economic spin-offs of South Africa's domestic oil refining sector have received prominence in a new study, which suggests that the country's six refineries generate yearly economic activity of more than R200-billion and sustain more than 480 000 jobs.

The study, titled 'The Petroleum Industry's Contribution to South Africa', was commissioned in 2015 by the South African Petroleum Industry Association (Sapia) and has been compiled by KPMG using 2014 data.

KPMG senior economist Jeaunes Viljoen reports that the study found that the Sapia members contributed R9.70-billion in capital expenditure and R200-billion in revenue in 2014.

The total economic impact as a result of capital and operational expenditure in the year was R324-billion, or 8.5% of gross domestic product (GDP), while the sector reportedly sustained more than 96 700 direct jobs across the value chain, from crude oil extraction to retail. The indirect and induced jobs associated with the value chain are stated at more than 692 000.

"Refining activities contributed the most additional economic activity of R213-billion, with retail activities, excluding convenience stores, contributing the second most of R80-billion," Viljoen reports.

Refining activities also sustained the most jobs at 486 478, she adds, despite direct employment in refinery activities being far lower, at 4 809.

The balance of the jobs are determined to be indirect or induced.

The study found that the sector has also led to the creation of 221 580 jobs, including 70 000 direct jobs, in the retail sector.

Source: *Engineering News*

Meanwhile, the idea of a new refinery has been on the cards for nearly a decade. Dubbed Project Mthombo, the proposed refinery is to be built in the Coega Industrial Development Zone, in the Eastern Cape. National oil company PetroSA started feasibility studies for a refinery in 2009, but with a price tag of about $10-billion, the project failed to materialise. PetroSA states that product from a 200 000 bbl/d refinery will be fully absorbed into the local market and that a 300 000 bbl/d refinery will allow for surplus fuel to be exported.

The Energy Minister gave new impetus to the project in May 2017 when she announced that Cabinet would be approached for a "firm decision" by the end of the year. The preference is to develop the refinery as a public–private partnership, which is majority South African-owned, with black business participation and the participation of a crude oil-producing partner.

South Africa is reportedly considering potential partners in West Africa and the Middle East, including Iran, for the new refinery project.

The commercial sense of a new refinery has been questioned, considering the global glut of refined product and the significant cost involved in building a new refinery. Globally, new refineries produce about 400 000 bbl/d to 500 000 bbl/d, with some as large as 1.50-million barrels a day.

In a Fin24 article published in July 2017, EY oil and gas leader Christo Roux emphasised that South Africa had to ensure that any new investment in oil refining infrastructure was procured as cost competitively as possible. A refinery also has to have competitive nameplate capacity and should be able to produce clean fuel according to the latest original-equipment manufacturer specifications.

Cape Town gets independent oil storage terminal

Cape Town's first independent oil storage and distribution terminal, Burgan Cape Terminal, was officially opened in August 2017. The facility offers 122 000 m^3 of diesel and petrol storage and will offer the option to blend bioethanol and biofame (diesel).

It is jointly owned by broad-based black economic-empowerment companies Thebe Investment Corporation and Jicaro, which each own a 15% stake, and global storage and terminal operator VTTI, which owns a 70% stake.

The terminal, which has been designed to receive fuel product by sea, store it and distribute it by truck, will provide an essential alternative for local fuel supply, and significantly reduce the chances of fuel shortages previously experienced in the Western Cape.

The terminal received its first product delivery by sea in June this year.

Source: *Engineering News*

Synfuels production

Besides producing fuel from crude oil, South Africa's liquid fuel mix also includes synfuel, produced using coal and natural gas as feedstock. These refineries are considered important to avoid a complete dependence on international markets, and, in turn, volatile commodity prices and exchange rates.

Petrochemicals group Sasol owns a coal-to-liquids (CTL) plant in Secunda and State-owned PetroSA owns a gas-to-liquids (GTL) plant in Mossel Bay.

Sasol's 150 000 bbl/d plant is the world's only commercial coal-based synfuel manufacturing facility. The plant beneficiates about 40-million tons of coal to produce about five-billion litres of fuel products a year.

Coal for the Secunda operations is sourced from Sasol-owned mines in Mpumalanga. The group is investing R14-billion on a mine replacement programme to ensure uninterrupted coal supply until 2050. The programme involves four new mines – Thubelisha, Impumelelo, Shondoni and Tweedraai – which will replace the long-servicing Twistdraai, Brandspruit, Middelbult and part of the Syferfontein operations respectively.

The mine replacement programme is nearing completion.

PetroSA's refinery at Mossel Bay uses GTL technology, part of it under licence from Sasol.

The Mossel Bay refinery is producing well below its capacity of 45 000 bbl/d. Production has come under pressure in recent years, as a result of depleting gas resources, exacerbated by the failure of an initiative known as Project Ikhwezi to replenish gas resources.

PetroSA is proposing to process liquid feedstock, instead of gas, at the Mossel Bay plant. The company introduced the processing of imported heavy condensate towards the end of the second quarter of 2016, which enabled the GTL refinery to remove the constraints that limited the processing of condensate to 12 000 bbl/d. Condensate processing rates of 18 000 bbl/d can reportedly be achieved and PetroSA is confident that it can increase condensate throughput by a further 28% to 25 000 bbl/d. PetroSA is aiming to process at least 18 000 bbl/d of condensate through the GTL refinery during 2016/17.

PetroSA also plans to spend about R3-billion over the next five years to improve the refining capacity of the Mossel Bay GTL plant. Most of the initiatives are in the feasibility/front-end stages.

The Shondoni coal operation forms part of Sasol's mine replacement programme, which aims to ensure uninterrupted supply to the company's coal-to-liquids plant

Picture by Sasol

Cleaner fuels

A programme to legislate cleaner fuels in South Africa has been ongoing for several years, with the first phase, Clean Fuels I, having been introduced in 2006. Clean Fuels I introduced specifications for petrol and diesel, including prohibiting the addition of lead in unleaded petrol and lowering sulphur levels in diesel from a maximum 3 000 parts per million (ppm) to a maximum of 500 ppm. A niche grade of 50 ppm was also introduced. These specifications match Euro II standards.

In 2012, government gazetted regulations to introduce Clean Fuels II, which uses specifications that are largely in line with Euro V emission standards. The regulations, among other things, will lower sulphur levels in petrol and diesel to 10 ppm.

Government had set a July 1, 2017, deadline to introduce Clean Fuels II, but decided not to enforce the deadline, owing to uncertainty about the financial implications of producing the cleaner fuels. A new timeline has not been published, but it is understood that the regulations have been delayed until after 2020.

South Africa's fuel regulations are about ten years behind those of Europe and the US. The Clean Fuels II plan is also outdated, considering that Euro VI vehicles have been introduced.

Government has recently made changes to the proposed Clean Fuels II regulations. According to an article in transport and logistics magazine Focus on Transport, the Department of Energy (DoE) has changed the olefin specification for petrol from 21% in the 2012 regulations to 18% in the draft regulations. The magazine quotes the South African Petroleum Industry Association's (Sapia's) head of projects, Kevin Baart, as saying that the new olefin specification will set back the Clean Fuels II process, as it will require a redesign of the refineries.

Government has also reportedly indicated that it will reverse a previous decision to separate metal-containing and metal-free petrol, specifically to allow for manganese additives in unleaded petrol to be used.

The National Association of Automobile Manufacturers (Naamsa) has cautioned against the reintroduction of metal additives and has warned that it may affect manufacturers' warranties. Naamsa states that manganese additives may result in damage to a vehicle's emission system over time.

If South Africa allows metal additives, the country will no longer conform with European standards, which means that car manufacturers will have to assemble two versions of each car – one built to handle local fuel and another European standard fuel.

The South African DoE released the draft Integrated Energy Plan in November 2016, which provides a roadmap on future energy infrastructure investments, and identifies and suggests policy developments to shape the future energy landscape of the country. In the plan's preamble, former Energy Minister Tina Joemat-Pettersson wrote: "Compliance to the Clean Fuels II standards require an effective compensation mechanism to existing refineries, as significant upgrades would need to be done on existing facilities."

The main contention between government and local refineries pertains to the costs of upgrading refineries to produce cleaner fuel. It is estimated that upgrading the six existing refineries will cost $4.90-billion. The National Treasury has proposed an accelerated depreciation model of three years, rather than five years, to support upgrades. Accelerated depreciation is a method of depreciation used for accounting or income tax purposes that allows for greater deductions in the earlier years of the life of an asset. Sapia believes that the incentive is insufficient to enable its refining members – BP Southern Africa, Chevron South Africa, Engen, PetroSA, Sasol Oil, Shell South Africa and Total South Africa – to earn acceptable returns. Sapia wants to use the fuel levy to recover the costs. It states that investments will need to be staggered to ensure that there are no supply interruptions, which makes the three-year accelerated-depreciation framework inappropriate. To date, no progress has been reported on a cost recovery solution for South Africa's refiners.

If no investment is made in local refinery capacity, the country will increasingly rely on imports of clean fuel. Internationally, there are ample refineries that produce diesel with a sulphur level of 10 ppm. Increasing imports will likely result in shrinking demand for fuel from local refineries and would increase their vulnerability.

Sapia chairperson Maurice Radebe has warned that refineries could have the same fate as the local textiles industry and that the lingering uncertainty about cleaner fuel could "wipe out" local refineries in the next five to ten years.

Some refiners believe that it could be more cost effective to shut down their refineries than to upgrade them.

According to Wood Mackenzie analyst Alan Gelder, who was quoted in a September 2016 article by Fin24, refineries in the UK had paid for upgrades to meet clean fuel standards and had recovered their cost over time. He notes, however, that the fuel price is deregulated in Europe, while the South African government regulates the local fuel price.

Government has introduced a carbon dioxide emissions tax on new vehicles to encourage consumers to use more fuel-efficient, low-carbon-emitting vehicles.

However, the automotive industry argues that it cannot introduce high technology, highly fuel-efficient and low-emission new vehicles without the availability of clean fuels.

The South African government has missed its deadline to introduce Clean Fuels II, owing to uncertainty about financial implications of producing the cleaner fuels

Picture by Creamer Media

Biofuels

South Africa has expressed an interest in developing a biofuels industry since 2005 and approved the Biofuels Industrial Strategy in 2007, setting a target of producing 460-million litres a year.

Regulations for mandatory blending with petrol and diesel were promulgated in 2012 and came into effect in October 2015. The regulations stipulate that all petrol and diesel supplied to a petroleum blending facility must allow for the blending of biofuels with a minimum concentration of 5% for biodiesel and 2% for bioethanol.

Currently, three crops are permitted for producing bio-ethanol – sorghum, sugar cane and sugar beet – and three for producing biodiesel – canola, sunflower and soya beans. Maize, a common bioethanol feedstock worldwide, is excluded, owing to its importance to local food security, while other potential feedstocks, like jatropha, which produces oil-rich seeds, are excluded on the basis of biodiversity and environmental concerns, and to protect existing industries like forestry. An initial study has been conducted on the feasibility of a biofuel manufacturing plant using sorghum and soya beans as feedstock. Based on 2010 data, the study found that ethanol production from sugar cane would be more expensive than that from sorghum in South Africa.

The arable land required to grow feedstock crops to produce biodiesel is greater than that needed to grow feedstock crops for an equivalent volume of bioethanol. The Farmers Weekly reports that 140 ha (at 95 t/ha) sugar beet, 196 ha (at 64 t/ha) sugar cane, or 902 ha (at 2.66 t/ha) grain sorghum is needed to produce one-million litres of bioethanol, compared with 1 211 ha (at 2 t/ha) canola, 1 979 ha (at 1.27 t/ha) sunflower seed or 3 179 ha (at 1.7 t/ha) soya beans to produce the same quantity of biodiesel.

South Africa has sufficient arable land for large-scale biofuel production, but the availability of water is a concern. The Department of Water and Sanitation has indicated that only underused arable lands must be used for growing biofuel crops and only under rain-fed conditions. Field trials by the universities of KwaZulu-Natal and Pretoria have found that sugar beet and sweet sorghum achieved the highest water-use efficiency of biomass crops tested.

A number of companies have submitted proposals to the Department of Energy to establish biofuel manufacturing plants. These plants, according to a research fellow at the University of KwaZulu-Natal, have the potential to produce about 1.20-billion litres a year of biofuel.

A Biofuels Regulatory Framework is being finalised, which will outline how the industry will be financially supported and how biofuels projects will be selected and supported. Despite the interest in and potential of the industry, biofuels production has remained marginal in South Africa. Biofuel is not deemed financially viable at current feedstock and crude oil prices.

Biodiesel company wins award

Local company Biogreen Diesel has risen to eminence in the biodiesel industry for pioneering a closed-loop system wherein cooking oils no longer fit for human consumption are removed from the food cycle and converted to quality biodiesel.

The company began by processing 3 000 ℓ/m to 5 000 ℓ/m in Cape Town, and now processes 20 000 ℓ/m to 25 000 ℓ/m. With new operations soon set to launch in Johannesburg and Durban, its combined output will be more than 300 000 ℓ/m.

Biogreen was established when South African restaurateur Roy de Gouveia recognised a paucity of biodiesel producers that addressed domestic needs. De Gouveia set up his own biodiesel production facility that not only met the needs of consumers in South Africa but also ensured that waste cooking oils were not recycled and sold to poorer communities.

As feedstock tends to account for 75% of a product's price, the company's use of waste cooking oil as raw material makes its biodiesel affordable. Biogreen adheres to motor vehicle manufacturers' recommended biodiesel blend, which can range from 5% to 100% in more industrial motors.

"Under a licence agreement, Biogreen uses locally developed and patented jet reactor technology to make SANS1935 specification biodiesel," says Frost & Sullivan industry analyst Constance Nyambayo. "While the standard transesterification process is conducted at 60 °C, Biogreen's technology allows it to run its processes at 45 °C. It uses 16% methanol, which is lower than what other reactors use, making it even more environmentally friendly. Further, its biodiesel is of higher quality and requires less time for conversion."

Biogreen received Frost & Sullivan's 2016 South Africa Company of the Year Award.

Source: Frost & Sullivan

Fuel pricing

In South Africa, government regulates the retail price of petrol, but not that of diesel. The fuel price is adjusted once a month taking into consideration a number of factors, mainly relating to international fuel prices and the rand:dollar exchange rate.

The basic fuel price (BFP) is based on costs associated with shipping petroleum products to South Africa from the Mediterranean area, Arab Gulf and Singapore, including insurance, storage and wharfage costs. Other associated costs include transport costs (from the harbour to other areas), customs and excise duties, the retail margins paid to fuel station owners and secondary storage costs. These costs also include the general fuel and the Road Accident Fund (RAF) levies.

The general fuel levy is a tax charged for every litre of petrol sold. The levy was increased by 30c to R3.15/ℓ in April 2017. The National Treasury administers the money raised from the fuel levy and it is treated as a general tax.

After a large increase in the RAF in 2015 and no increase in 2016, the RAF levy was increased by 9c a litre to R1.63 in April 2017. Money collected through this levy is used to fund the RAF, which compensates victims of road accidents in South Africa.

Picture by Duane Daws

The three main fuel taxes – the general fuel levy, the customs and excise levy on petrol, diesel and biodiesel, and the RAF levy – constitute a fairly large portion of the total pump price. In 2017, these taxes amounted to 36% of the petrol price (93 octane) and 40.20% of the diesel price.

Fuel taxes on petrol and diesel

	2015/16		2016/17		2017/18	
Rands/litre	**93 Octane petrol**	**Diesel**	**93 Octane petrol**	**Diesel**	**93 Octane petrol**	**Diesel**
General fuel levy	2.55	2.40	2.85	2.70	3.15	3.00
RAF levy	1.54	1.54	1.54	1.54	1.63	1.63
Customs and excise levy	0.04	0.04	0.04	0.04	0.04	0.04
Total	**4.13**	**3.98**	**4.43**	**4.28**	**4.82**	**4.67**
Pump price*	10.09	9.26	12.15	9.43	13.38	11.63
Percentage of pump price	*40.90%*	*43%*	*36.50%*	*45.40%*	*36%*	*40.20%*

Source: The National Treasury
*Gauteng pump price in February each year. Diesel (0.05% sulphur) wholesale price.

The Central Energy Fund, on behalf of the Department of Energy, calculates the fuel price.

Petrol price in rands a litre (January 2017 to August 2017)

	Reef			Coast		
	Unleaded		LRP*	Unleaded		LRP
	93	95	93	93	95	95
August 2, 2017	12.82	13.05	12.82	12.43	12.56	12.56
July 5, 2017	12.63	12.86	12.63	12.24	12.37	12.37
June 7, 2017	13.32	13.54	13.32	12.93	13.05	13.05
May 3, 2017	13.57	13.79	13.57	13.18	13.30	13.30
April 5, 2017	13.08	13.30	13.08	12.69	12.81	12.81
March 1, 2017	13.30	13.54	13.30	12.92	13.06	13.06
February 1, 2017	13.38	13.62	13.38	13.00	13.14	13.14
January 4, 2017	13.09	13.33	13.09	12.71	12.85	12.85

Source: Automobile Association
* lead replacement petrol

Diesel wholesale price in cents a litre (January 2017 to August 2017)

	Reef		Coast	
		New		New
	0.05%	0.01%	0.05%	0.01%
2 August 2017	11.27	11.33	10.88	10.94
5 July 2017	10.98	11.03	10.59	10.64
7 June 2017	11.58	11.63	11.19	11.24
3 May 2017	11.81	11.86	11.42	11.47
5 April 2017	11.51	11.54	11.12	11.15
1 March 2017	11.61	11.64	11.22	11.26
1 February 2017	11.63	11.66	11.24	11.28
4 January 2017	11.42	11.45	11.03	11.07

Source: Automobile Association

According to the Bloomberg Global Fuel Index, South Africans face "a lot of pain at the pump". Only in Mexico do people spend more of their salaries filling their petrol tanks. The index ranks data from 61 countries on their average fuel price, affordability and the percentage of a day's wages needed to buy a litre of petrol.

In the second quarter of 2017, South Africa ranked sixtieth out of 61 countries on income spent buying petrol. Bloomberg estimates that the average South African driver uses 195.29 ℓ/y, which constitutes 3.18% of the typical salary.

In terms of affordability, South Africa ranked 56 out of 61 countries. Bloomberg states that it takes 5.95% of a day's wages to afford a litre of petrol. It uses an average daily income of R223.56. On a per-litre basis, South Africa has the twentieth cheapest petrol in the world.

Venezuela has the world's cheapest petrol. It takes only 0.03% of a day's wages to buy a litre of petrol. Petrol is the least affordable in India, where it takes 19.29% of a day's wages to buy one litre.

Hong Kong has the world's most expensive fuel at $1.88/ℓ. With an average daily income of $122.43, it takes 1.54% of a day's wages to afford a litre of petrol.

South Africa has the twentieth cheapest petrol in the world

Picture by Creamer Media

Pipeline infrastructure

A pipeline system is the preferred mode of transporting petroleum products for large volumes over long distances, as it is a cost-effective, environment-friendly and reliable mode.

Transnet Pipelines, a division of State-owned freight logistics group Transnet, operates 3 800 km of petroleum and gas pipeline infrastructure, traversing KwaZulu-Natal, the Free State, Gauteng, the North West and Mpumalanga.

Transnet states on its website that all its pipelines conform to ASME B31.4, a US code of practice, with their diameters designated in inches, ranging from six inches (nominally 150 mm) to 20 inches (nominally 508 mm).

The liquid fuels network's intake stations are the Sapref and Enref refineries in Durban, KwaZulu-Natal, the Natref refinery at Sasolburg, in the Free State, and the Sasol 2 and Sasol 3 synthetic fuel plants at Secunda, in Mpumalanga. The network includes a 30-million-litre tank farm, at Tarlton, in Gauteng, which is used for storage and the distribution of liquid fuels to Botswana.

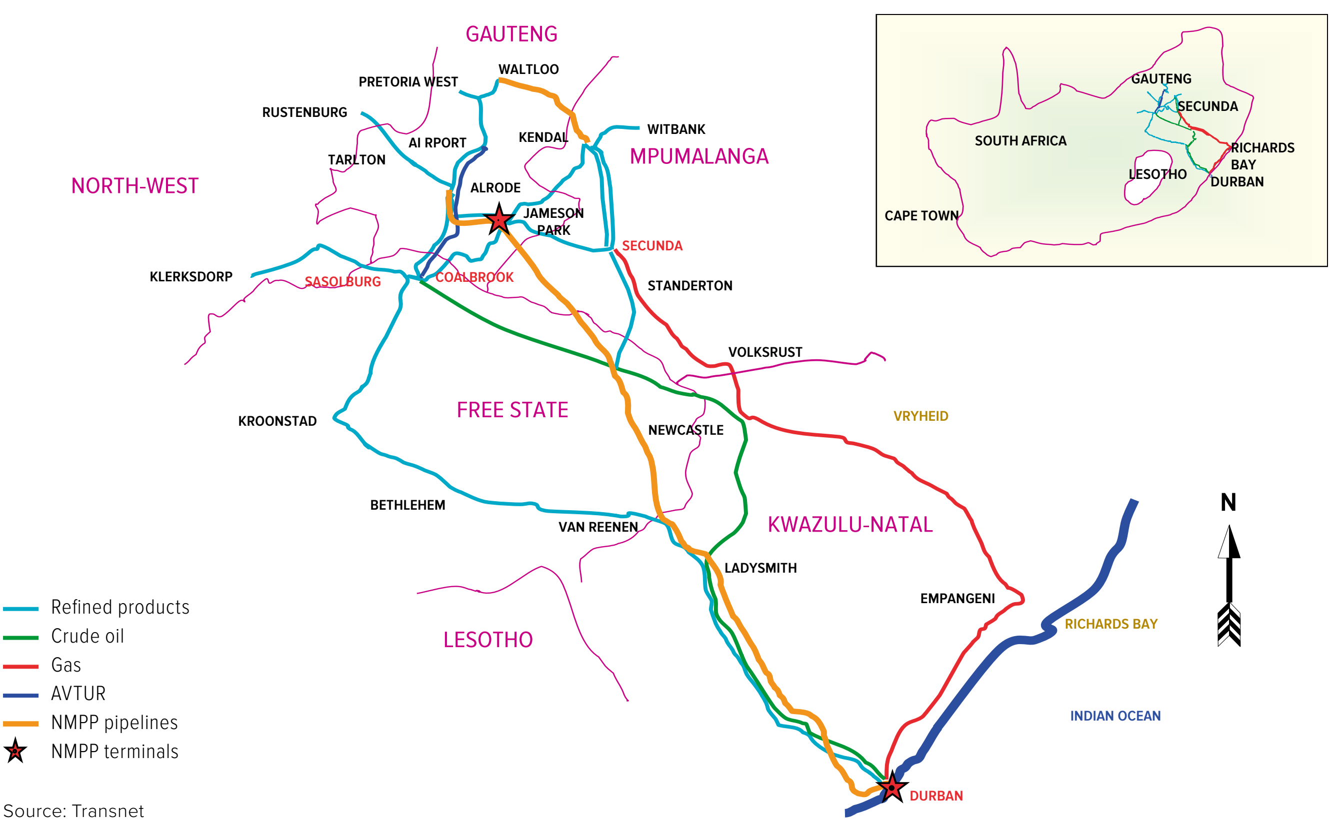
Transnet has invested in new pipeline capacity through the New Multiproduct Pipeline (NMPP) project, which connects Durban to Heidelberg, in Gauteng. The new 555 km pipeline will replace the 48-year-old version and has a 70-year design life.

The project has been criticised for major cost and schedule overruns. The NMPP's price tag has surged from about R11-billion to an estimated R29-billion currently.

Transnet reports in its 2017 integrated annual report that the NMPP's 24" main pipeline and 16" inland pipelines have been fully commissioned and are operational, having transported 15-billion litres of diesel from Durban to the inland region since commissioning in 2012.

The multiproduct operation of the NMPP trunkline through the implementation of "tightlining" at the coastal

South Africa's pipeline infrastructure



Source: Transnet

terminal and completion of the inland accumulation facility is expected to be operational by the end of November 2017. Tightlining is a joint innovation with the oil industry to make the pipeline a fully fledged multiproducts facility.

Transnet's dedicated gas pipeline is a converted line previously used for liquid and runs from Secunda to Durban, with takeoff points in KwaZulu-Natal.

Rompco, a joint venture between petrochemicals group Sasol and Companhia Moçambicana de Gasoduto, operates an 865 km high-pressure gas pipeline connecting the onshore gasfields in Pande and Temane, Mozambique, to Sasol's operations, in South Africa. Until the commissioning of the crosscountry pipeline, Mozambique's natural gas assets had effectively been stranded.

Rompco recently invested \$210-million to complete a 128 km loop line to increase the pipeline's capacity from 169.40-billion standard cubic feet (bscf) to 191 bscf. The project is known as Loop Line 2.

A potential new cross-border terrestrial gas pipeline project is the \$7-billion African Renaissance Project between Mozambique and South Africa. Fortune Capital is studying the potential of building the pipeline, which will transport gas from Mozambique's offshore and onshore basins to major cities in that country and to South Africa. The prefeasibility study was finalised in February 2017 and the final feasibility study was started in mid-2017. Fortune Capital aims to start construction of the pipeline in the latter half of 2018.

Transnet sees significant future regional opportunities for its pipelines business from the discovery of new oil and gas reserves in Africa, which has resulted in demand for new infrastructure capacity and new project opportunities.

Transnet Pipelines tariffs

Transnet applies to the National Energy Regulator of South Africa (Nersa) for its petroleum pipeline tariffs.

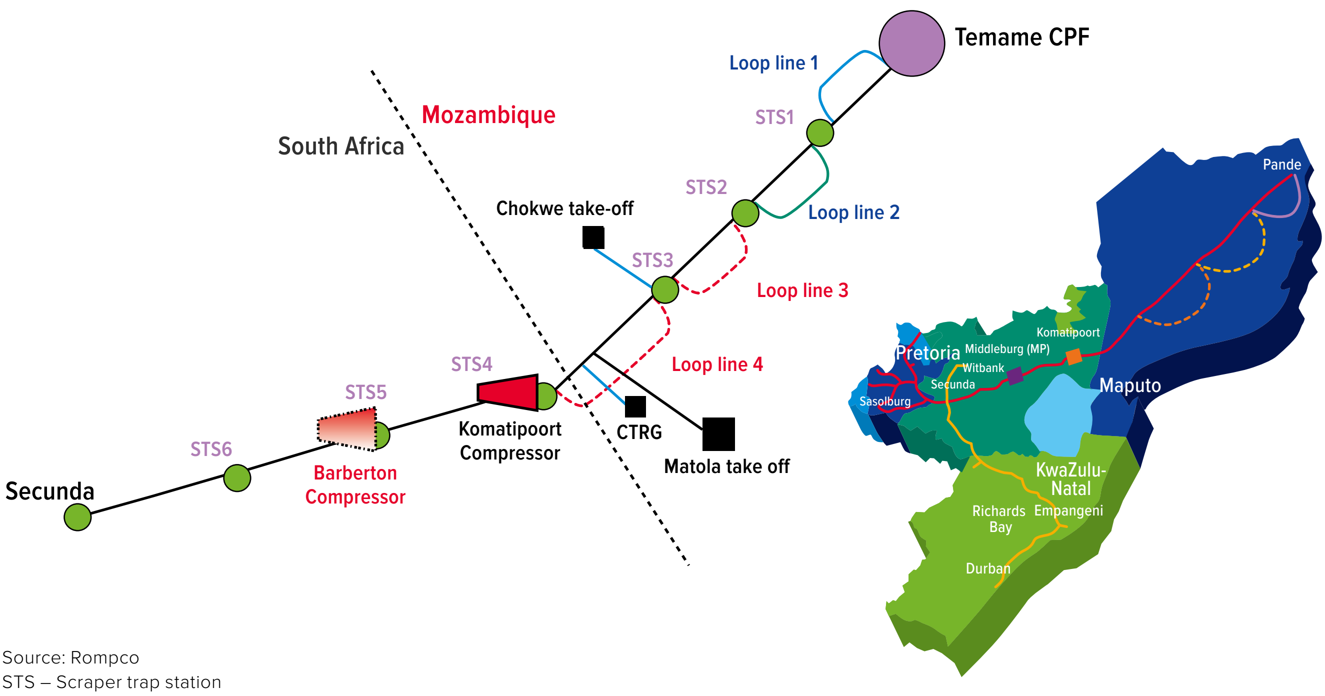
In February 2017, the regulator allowed Transnet Pipelines to claw back more revenue on the NMPP, although the parastatal had applied for a decrease.

Transnet applied for a decrease in its allowable revenue for the pipeline for April 5, 2017, to March 31, 2018, to R3.80-billion, from R4.13-billion allowed in 2016, because its coastal and inland terminals were not operating. Instead, Nersa decided to increase the allowable revenue for the pipeline by 1.43% to smooth expected hikes in future years, when Transnet will be able to fully claw back its investment.

Nersa's ruling increased the pipeline tariff by 0.30%, whereas Transnet's application would have resulted in a 7.87% decrease.

Source: *Engineering News* and Business Day

Natural gas pipeline between Mozambique and South Africa



Source: Rompco
STS – Scraper trap station

Liquefied petroleum gas

The liquefied petroleum gas (LPG) industry is highly concentrated, with about 80% of the yearly supply of 350 000 t arising from the Enref, Chevref, Natref, PetroSA and Sapref refineries, and the balance from imports. Imports are constrained by inadequate pipeline and storage infrastructure, which is, in turn, undermined by policy, regulatory and pricing dynamics.

The refineries have long-term supply agreements with four large wholesalers (Afrox, Easigas, Oryx Energies and TotalGaz), which account for more than 90% of the market. Some of these sales agreements are associated with 20-year-plus 'evergreen' contracts, which are often accompanied by discounts of up to 10% against the regulated maximum refinery gate price (MRGP).

The price paid by end consumers, known as the maximum retail price (MRP), is regulated.

The Competition Commission investigated the LPG market for three years and published nonbinding recommendations in April 2017. The report identifies serious policy and regulatory misalignments that are stifling the production of LPG by existing refineries and investment into new importation infrastructure. It also points to market structures and entrenched behaviours that are raising the costs to industrial and resident consumers and limiting entry into the market by new participants.

To address the constraints to LPG supply, the commission recommends greater alignment between the National Energy Regulator of South Africa (Nersa) and Transnet National Ports Authority in the content and timeframes associated with licensing of new import facilities. The current misalignment is considered a significant impediment to investment and has also made the process of licensing protected.

It also recommends that Nersa, rather than the Department of Energy (DoE), be responsible for wholesale licensing and that the energy regulator also be responsible for the monitoring and enforcement of the regulated prices.

The commission notes that the DoE, which is currently responsible for monitoring and enforcement on the MRGP and the MRP, lacks the inspectorate capacity to fulfil the role. It also notes that the pricing methodology has not been reviewed, despite a DoE commitment made in 2012 to conduct such a review.

Other key recommendations in the report include:

- Capping long-term supply agreements to a maximum of ten years.
- Ensuring that smaller wholesalers receive preferential access to 10% of LPG volumes for contracts with a minimum duration of two years.
- Structuring bulk-supply contracts in a way that separates LPG supply from equipment supply to ensure that end-users own the installed equipment and are, thus, able to switch LPG suppliers.
- Removing restrictions on cylinder exchanges, thereby enabling any wholesaler to enter bilateral exchange agreements.
- Having deposit fees for cylinders set by Nersa and linked to the size and cost of each cylinder.

A significant project that should address some of the concerns raised by the market inquiry is the new R1-billion LPG storage facility, which Sunrise Energy built in Saldanha Bay, in the Western Cape. The facility, which entered commercial operations in mid-2017, is Africa's largest open-access LPG facility.

Phase 1 of the terminal consists of 5 500 metric tons of storage and will allow for the throughput of up to 16 500 metric tons a month of LPG. The project is designed in a modular way to respond to growth in demand, with an ultimate storage capacity of 16 500 t (after the implementation of Phases 2 and 3), with an ultimate throughput capacity of 49 500 metric tons a month or 594 000 metric tons a year.

The facility is a public–private partnership between Mining, Oil & Gas Services (Mogs) and the Industrial Development Corporation (IDC). Sunrise Energy is 60% owned by Mogs, with the IDC holding a 31% stake and ilitha holding 9%. Royal Bafokeng Holdings owns 51% of Mogs, with the balance being held by the Public Investment Corporation.

Oil and gas exploration and production

South Africa has little in the way of proven oil and gas reserves. Although the first organised search for hydrocarbons in South Africa was undertaken in the 1940s, oil and gas production has remain relatively insignificant.

The only commercial production of oil and gas is in the Bredasdorp basin, off the country's South Coast, in a block operated by State-owned PetroSA. Several other discoveries have been made, but they are yet to start production.

Interest has increased in the country's oil and gas reserves, with several companies having acquired rights to explore offshore South Africa. Five companies have also applied to explore the Karoo basin to extract shale gas through hydraulic fracturing (fracking).

However, uncertainties about pending legislation are a major deterrent to active exploration drilling, which is already struggling from low oil prices. Proposed amendments to the Mineral and Petroleum Resources Development Act (MPRDA) are a concern to exploration and production companies, as it could allow government to partially nationalise licence blocks.

The MPRDA Bill, in its current form, grants the State a 20% free-carried interest in all new exploration and production rights. A free-carried interest is defined in Clause 1 of the Bill as an "interest allocated to the State in exploration or production operations without any financial obligation on the State".

The State is also entitled to a further participation interest in any exploration or production right. This entitlement may be exercised either through a production sharing agreement or the acquisition of the interest at an agreed price.

There have been commitments to address industry concerns and government has said that it intends to separate regulations for oil and gas from the mining industry. However, this has not happened yet.

Conventional oil and gas statistics (2014)

South Africa	Production/ reserves	Share of world
Oil production (barrels a day)	191 000	0.22%
Proven oil reserves (million barrels)	15	0.001%
Gas production (cubic metres a year)	970 000 000	0.03%
Proven gas reserves (cubic metres)	27 160 000	0.00001%

Source: South African Oil and Gas Alliance

Offshore oil and gas

South Africa's offshore basins are divided into three distinct tectonostratigraphic zones. The western offshore comprises the Orange basin, which is South Africa's largest offshore basin. The eastern offshore area contains the Durban and Zululand basins. The southern offshore region is known as the Outeniqua basin, which consists of a series of sub-basins, including those of Bredasdorp, Pletmos, Gamtoos and Algoa.

About 300 exploration wells, including appraisal and production wells, have been drilled in the offshore exploration area. Further, more than 300 000 km of two-dimensional seismic data and 40 000 km^2 of three-dimensional (3D) seismic data have been acquired since exploration began in the late 1960s. This exploration has resulted in the discovery of several small oil and gasfields and the commercial production of oil and gas from the Bredasdorp basin. In the Pletmos basin, there are two undeveloped gasfields and a six gas discoveries.

PetroSA operates the Oribi and Oryx oilfields, in Block 9 of the Bredasdorp basin, producing about 5 000 bbl/d of crude oil and lease condensate. However, these oilfields are mature and no new commercially viable oil discoveries have been made yet.

The national oil company also operates the gasfields in Block 9, which supplies feedstock to its Mossel Bay gas-to-liquids (GTL) refinery, in the Western Cape. However, PetroSA has to find new feedstock for the refinery, after its F-O field development project, known as Project Ikhwezi, failed. Gas reserves arising from Project Ikhwezi were far less, at 25-billion cubic feet (bfc), than the 242 bcf initially forecast.

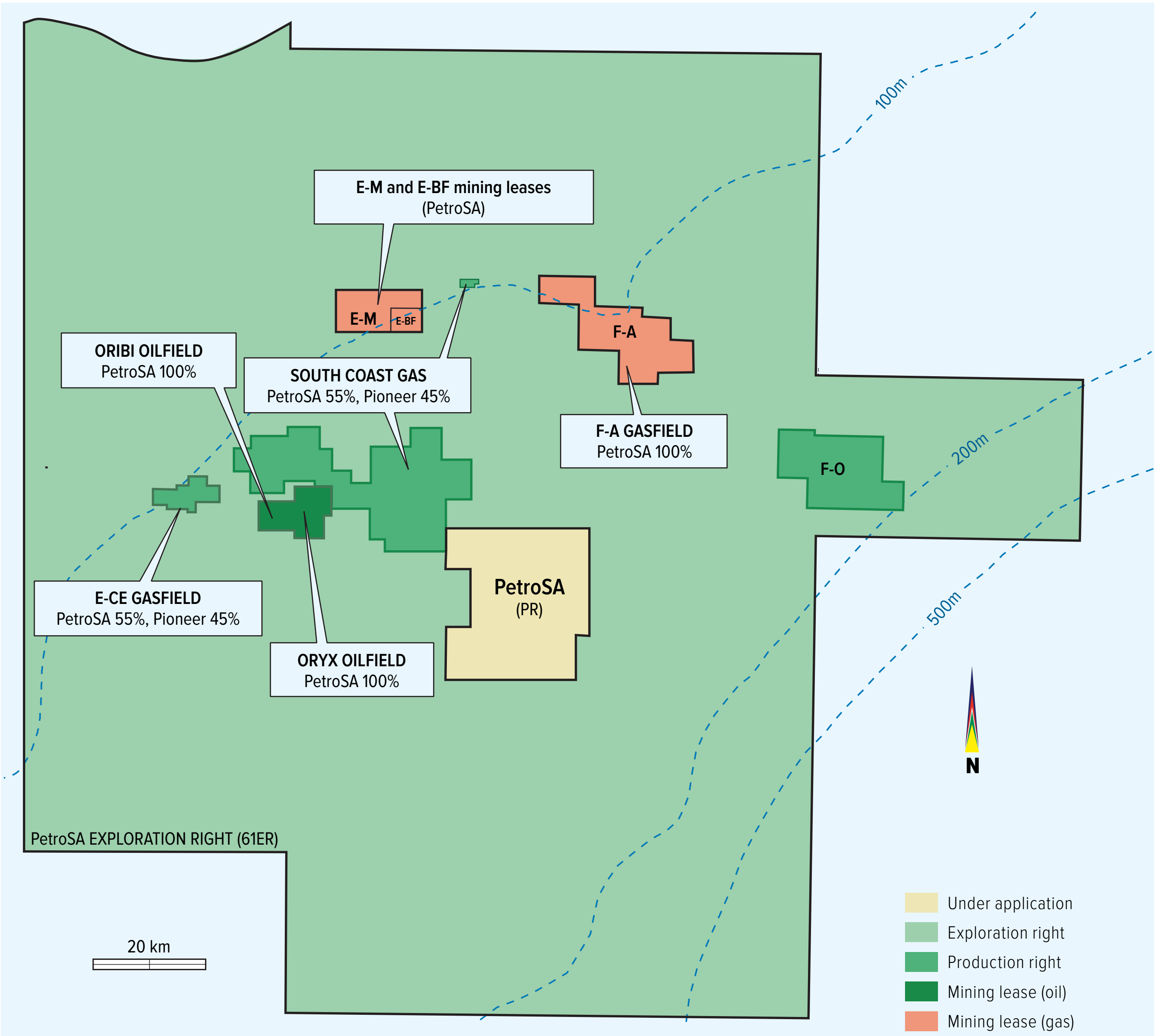
PetroSA has identified the E-BK project, also in Block 9, as a potential development opportunity to extend the life of the GTL refinery. The proposed development plan consists of one horizontal production well tied back through a new 21 km subsea pipeline to a tie-in point on the South Coast gas pipeline. The project is in feasibility study stage.

In September 2017, PetroSA entered into a $400-million agreement with Russian geological exploration company Rosgeo for oil and gas exploration in Block 9 and Block 11a off the South Coast of South Africa. Rosgeo will conduct a considerable volume of geological exploration work within these blocks and plans to conduct more than 4 000 m² of 3D seismic operations and more than 13 000 km of gravity-magnetic exploration works, as well as the drilling of exploratory wells.

The project envisages the extraction of up to four-million cubic metres a day of gas, which will be delivered to the refinery in Mossel Bay.

The Orange basin is believed to hold significant oil and gas potential. Several gas discoveries have been made in the South African side of the basin, including the Ibhubesi gas project, located about 80 km off the Northern Cape coast. The Namibian side of the basin holds the Kudu gasfield.

Production and mining rights in Block 9



Source: Petroleum Agency South Africa

The Ibhubesi project was originally discovered by PetroSA predecessor Soekor in the mid-1980s. Private company Sundbird Energy, funded by Umbono Capital and Musa Capital, currently owns the project. PetroSA has a 24% stake.

Since the Ibhubesi project's discovery, 11 wells have been drilled and a combined R1.60-billion have been invested in the exploration effort, through which 1P reserves of 210 bcf and 2P reserves of 540 bcf have been discovered. Reserves could be expanded to about eight-trillion cubic feet (tcf) through further development and appraisal work.

The current resource is sufficient to establish a commercial operation. Sunbird is aiming to develop Ibhubesi for market availability by 2020. The company is in negotiations with power utility Eskom for the supply of gas to the Ankerlig power station.

Several international companies have exploration rights off the shore of South Africa, including majors such as Anadarko Petroleum, ExxonMobil, Shell and Total.

South Africa launched Operation Phakisa in 2014, which, among other functions, aims to increase offshore oil and gas exploration.

The marine programme aims to create an enabling environment for exploration and to increase the number of exploration wells drilled.

Onshore conventional gas

South Africa has an operational conventional gas project, Tetra4, in the Free State, which supplies compressed natural gas to the transport and mining industry. JSE-listed energy company Renergen owns the project, near Virginia. Tetra4 comprises 13 gas wells and started commercial operation in 2016.

The State-owned Industrial Development Corporation in May 2017 approved R218-million in loan finance to support further development of the natural gas resource through the creation of a 107 km pipeline network and associated gas processing facilities. The current phase is designed to increase gas production to more than 1 300 GJ/d.

Renergen has also concluded a helium take-or-pay agreement with industrial gas giant Linde, which is attracted by the helium-rich nature of the gas found in the Free State. Linde has indicated that it plans to build a facility by 2019 to purify, compress, liquefy and store helium for sale domestically and abroad.

A new entrant is Tosaco Energy, which has been granted three onshore technical cooperation permits over 2 900 km^2 to study a potential gas resource in Mpumalanga. The targets are sandstone deposits in the Vryheid formation.

Tosaco Energy is conducting an in-house desktop study to analyse the early-stage project's geophysical data. This will be followed by an exploration right application and a two-year drilling programme to define a reserve.

Tosaco Energy is the sister company of Tosaco Holding Company, which owns a 25% interest in Total South Africa.

Onshore unconventional gas

Unconventional gas is found in onshore deposits trapped in geological formations, such as shale rock or coal deposits.

South Africa is estimated to have a shale gas resource of as much as 390 tcf, which, if proven, will make it the eighth-largest resource globally. The Department of Mineral Resources (DMR) estimates that up to 50 tcf of shale gas is recoverable in the Karoo basin.

Shale gas is found underground in shale rock, which has to be cracked to free the gas, requiring fracking. The development of shale gas resources has been delayed over environmental objections to the fracking process, which some say could contaminate underground water supplies.

Government has instituted a moratorium on the processing of licences to allow for a technical study of the use of fracking in the development of shale gas and to establish the necessary regulatory and enforcement tools. Mineral Resources Minister Mosebenzi Zwane announced in March 2017 that the country would proceed with shale gas development in the Karoo formation and said the regulatory framework was in place to ensure the gas was developed in an "orderly and safe" way.

Five licence applications are under review for exploration in the Karoo basin. Shell South Africa, Bundu Gas and Oil Exploration and Falcon Oil and Gas are among the firms that have applied to PASA for licences. According to a report by newswire Reuters,


Shale rock drilling

Picture by Bloomberg

the regulator may award its first shale gas exploration licence by the end of September 2017.

The DMR estimates that shale gas development could start in 10 to 15 years' time.

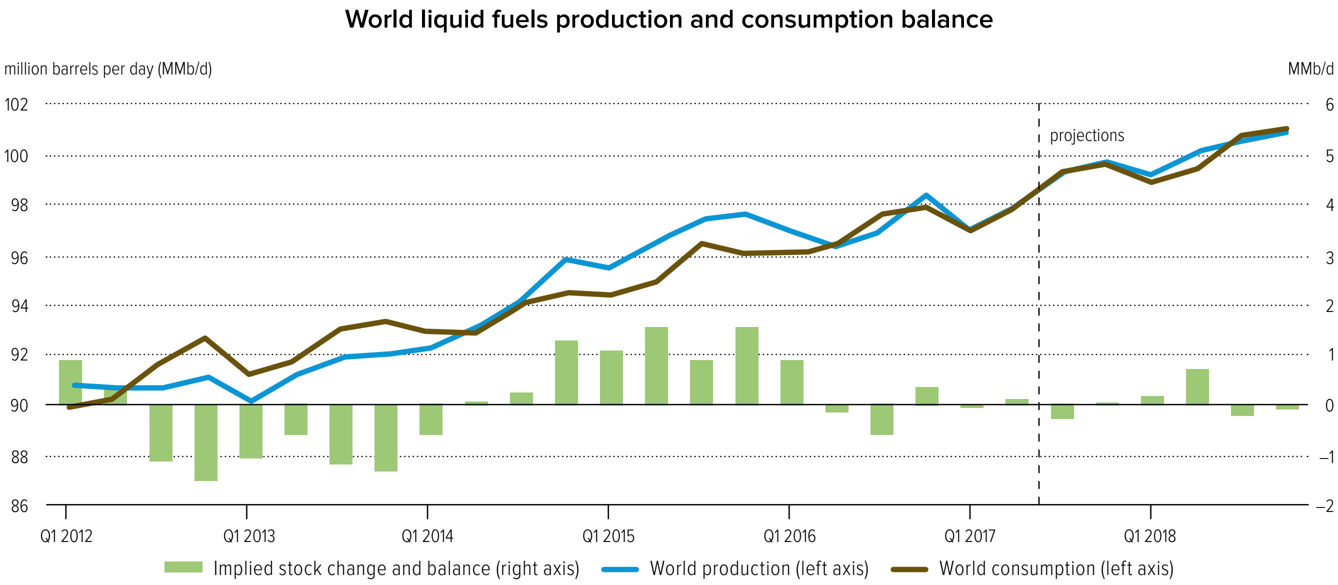
Experts have said that it is crucial that South Africa allow for the exploration of shale gas to determine what quantities of gas are present. University of Cape Town Institute of Marine and Environmental Law's Professor Jan Glazewski argues that the risks and benefits of proceeding with exploitation should only be weighed once it has been established that there are economically payable quantities of gas.

Besides shale gas, South Africa's National Development Plan also calls for exploratory drilling to identify economically recoverable natural gas from coal seam gas reserves. In 2012, PASA stated that South Africa had a coalbed methane (CBM) resource of about 10 tcf. In neighbouring Botswana, CBM is also attracting considerable attention.

Underground coal gasification (UCG) also holds promise as a future source of energy for South Africa. The UCG process unlocks the energy potential of deep coal that would otherwise go unmined by converting the coal into gas while it is still underground. UCG involves igniting coal underground with a controlled flow of oxidant gas such as air and water.

The ignited coal is converted into synthesis gas, which can be used for liquid fuels production or for power generation.

Global market



Source: US Energy Information Administration

Global petroleum and other liquid fuels production increased from 96.72-million barrels a day in 2015 to 97.15-million barrels a day in 2016, according to the US Energy Information Administration (EIA). Consumption increased from 95.40-million barrels a day in 2015 to 96.99-million barrels a day in 2016.

World production and consumption are forecast to increase further in 2017 and will breach the 100-million-barrel-a-day threshold in 2018.

The EIA states that 2017's production is forecast to be 98.42-million barrels a day and that consumption will be 98.41-million barrels a day. In 2018, production of 100.21-million barrels a day and consumption of 100.02-million barrels a day are forecast.

The 14-member Organisation of the Petroleum Exporting Countries (OPEC) accounts for about 40% of global petroleum and liquid fuels production.

However, the global market has undergone a major shift with the shale oil revolution in the US. The shale boom has turned the US from the world's top importer and consumer to a net exporter of fuel. The US became the world's largest net exporter in 2016, exporting a net 2.50-million barrels a day of petroleum products to foreign markets. Net exports are forecast to reach another record in 2017.

US refiners are exporting to countries such as Mexico and Brazil, and even further afield to European and Asian countries.

Shale oil has provided US refiners with abundant and cheap domestic crude supplies, enabling them to produce internally competitive fuel. The shale oil boom in the US has upended the global energy trade and resulted in a crude oil glut, which has sent crude prices crashing. OPEC has responded by cutting oil production and by November 2016, oil had surge back to above $50/bbl. However, this has been a pyrrhic victory, as shale has gained substantial ground. JPMorgan is forecasting US shale production to increase by 1.05-million barrels a day in 2018, while Bank of America Merrill Lynch has forecasted a figure of 950 000 bbl/d.

Picture by Bloomberg

Outlook

Much uncertainty remains in the domestic upstream and downstream oil and gas sectors. Active exploration for oil is under pressure from low oil prices and pending legislation changes are a further deterrent.

In the downstream sector, liquid fuel imports are increasing as global refining capacity increases and more fuel has to be imported to meet demand for cleaner fuel, which South Africa's existing refineries cannot produce.

The South African Petroleum Industry Association has warned that unless a long-standing impasse between government and industry over policy uncertainty on cleaner fuels and how the cost of upgrading the refineries to produce such fuels will be recovered, the current refinery fleet will be "wiped out" in the coming decade.

The draft Integrated Energy Plan (IEP), which the Department of Energy published in November 2016, provides insight into future options for the liquid fuels industry. The plan is based on four scenarios – base case, environmental awareness, green shoots and resource constrained – which are informed by different assumptions.

The IEP assumes the presence of economically recoverable shale gas and that shale gas is moderately priced at R40/GJ. The gas is expected to provide feedstock for new gas-to-liquids plants. However, the IEP finds that the cheap gas will make new crude oil refining capacity unlikely to be economically viable in the short to medium term, and suggests that refined petroleum imports should be a more cost-effective solution.

The base case, resource-constrained and green shoots scenarios expect existing coal-to-liquids (CTL) capacity to be maintained, but do not foresee any new investments in CTL.

In all scenarios, the share of diesel will increase from 50% in 2014 to about 85% in 2050. In absolute terms, diesel demand triples, but petrol demand halves. The IEP makes provision for electric vehicles (EVs) entering the South African market, but expects only a "modest" impact on fuel requirements.

Globally, refineries are closely watching the introduction of EVs, as the automotive industry is actively embracing a battery future. Research published by Bloomberg New Energy Finance forecasts that, by 2040, EVs could account for 54% of all new light-duty vehicle sales globally, displacing about eight-million barrels a day of transport fuel. The estimate was published before China announced in September 2017 that it was considering ending sales of fossil-fuel-powered vehicles. The UK and France will ban new petrol and diesel cars from 2040.

South Africa is expected to be slower on the uptake of EVs than some developed countries. The average age of vehicles in South Africa is about 11 to 13 years, so the transition to EVs will take some time.

EVs are factored in all time intervals in the draft IEP's horizon of 2015 to 2050, but they begin to make a significant contribution only after 2040, at about 1% of the fleet. This increases to about 4% by 2050. The IEP states that lower crude oil prices are likely to delay the switch from conventional petrol and diesel vehicles to EVs, owing to their higher capital outlays.

Although petrochemicals giant Sasol also believes that the take-off of EVs will be gradual in the South African market, the group is refining its long-term strategy to align with the introduction of EVs in the local market. The group believes that the combination of EVs and energy efficiency will squeeze refining margins.

Despite the rise of EVs, automotive manufacturer Volkswagen Group South Africa believes that government, local refineries and the automotive industry should continue to pursue the introduction of cleaner fuels for use in traditional combustion engines.

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Liquid Fuels 2017:
A review of South Africa's liquid fuels sector

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