

Published by:

Creamer Media's

**RESEARCH CHANNEL**

A F R I C A

# LIQUID FUELS

NOVEMBER 2018

Sponsored by:

**ZEST**  
WEG Group







# 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.

The information in this report is correct as of October 26, 2018.

Report edited by Sheila Barradas, David Shepherd and Ria Theron.

## Ordering information

To subscribe to *Research Channel Africa* or purchase this report contact:

Creamer Media (Pty) Ltd

Tel +27 11 622 3744

Email [subscriptions@creamermmedia.co.za](mailto:subscriptions@creamermmedia.co.za)

Cover picture by Creamer Media

Sponsored by:

**ZEST**  
WEG Group







# Table of Contents

○ List of abbreviations and acronyms	4
○ Key developments	5
○ Business environment	6
○ Crude oil and synthetic fuel refineries	8
○ Cleaner fuels	12
○ Biofuels	14
○ Fuel pricing	15
○ Pipeline and other infrastructure	17
○ Oil and gas production	19
• Offshore oil and gas	19
• Onshore natural gas	20
○ Global market	22
○ Outlook	24
○ Main sources	25





# List of abbreviations and acronyms

AA	Automobile Association
ARA	African Refiners and Distributors Association
Bcf	billion cubic feet
BFO	bunker fuel oil
CBM	coal-bed methane
CEF	Central Energy Fund
CF1	Clean Fuels I
CF2	Clean Fuels II
CSA	Chevron South Africa
CTL	coal-to-liquids
EIA	US Energy Information Administration
EV	electric vehicle
FT	Fischer-Tropsch
GTL	gas-to-liquids
Iata	International Air Transport Association
IEA	International Energy Agency
IMO	International Maritime Organization
JV	joint venture
LNG	liquefied natural gas
LRP	lead replacement petrol
MPP	multiproduct pipeline
MPRDA	Mineral and Petroleum Resources Development Act
Nersa	National Energy Regulator of South Africa
NOC	national operating centre
Opec	Organization of Petroleum Exporting Countries
OTS	Off The Shelf 56
ppm	parts per million
PSA	production sharing agreement
RAF	Road Accident Fund
Sapia	South African Petroleum Industry Association
SLM	Slate Levy Mechanism
synfuel	synthetic fuel
tcf	trillion cubic feet





# Key developments

**October 2017:** Chevron South Africa empowerment partner, Off The Shelf Investments 56 (OTS), exercises its pre-emptive right to match an offer of China's Sinopec for the US group's South African unit. Supported by Glencore, OTS pursues a bid valued at \$973-million.

**November 2017:** Chemicals and energy group Sasol unveils a new strategy that focuses the group's growth on speciality chemicals, Southern Africa fuel retailing, as well as gas and oil exploration and production in Mozambique and West Africa. It further notes that it will no longer pursue greenfield gas-to-liquids (GTL) projects. This includes Sasol's proposed GTL project in the US, for which it was delaying a final investment decision since January 2015.

**February 2018:** International energy group Total announces the sale of a 25% interest in exploration block 11B/12B, in the Outeniqua basin off the shore of South Africa, to Qatar Petroleum. The new partnership structure comprises: Total (45%), Qatar Petroleum (25%), CNR International (20%) and Main Street (10%).

**March 2018:** Chinese oil giant Sinopec wins regulatory approval for its \$900-million bid for South Africa's second-largest oil company, Chevron South Africa. Several conditions are imposed, including a commitment by Sinopec to invest R6-billion in upgrading Chevron's Cape Town refinery.

**March 2018:** The National Energy Regulator of South Africa grants freight logistics group Transnet a lower-than-requested allowable revenue increase for the 2018/19 tariff period. The State-owned group applied for an increase in allowable revenue of 36% to R5.68-billion in 2018/19, which would have increased tariffs by 28%. However, the regulator has approved only a 26% increase in allowable revenue, which translates to an effective tariff increase of 19%.

**May 2018:** State-owned rail, port and pipeline company Transnet and the South African Petroleum Industry Association sign a memorandum of understanding to collaborate and, subsequently, strengthen the liquid fuels supply chain.

**May 2018:** The South African Petroleum Industry Association, Chevron South Africa, Engen, Shell South Africa, Total South Africa, BP South Africa and Sasol reach a settlement agreement with the Competition Tribunal on the sharing of information that enables them to track one another's diesel sales. The agreement commits to changing the way they share information.

**June 2018:** South African Energy Minister Jeff Radebe initiates bilateral discussions with Mozambique regarding the further

development of cross-border gas infrastructure. More than 100-trillion cubic feet of natural gas has been discovered in Mozambique.

**June 2018:** South African State-owned energy utility the Central Energy Fund warns that the country's flagship gas-to-liquids refinery at Mossel Bay, in the Western Cape, could run out of natural gas within two years when offshore reserves dry up.

**June 2018:** The South African Department of Mineral Resources publishes a notice restricting new applications for petroleum exploration to allow for a change in its licensing process.

**August 2018:** South African Mineral Resources Minister Gwede Mantashe withdraws the Mineral Petroleum Resources Development Act Amendment Bill and announces that a new legislative framework to address the needs of the petroleum sector will be developed.

**September 2018:** Energy Minister Jeff Radebe intervenes to hold fuel prices steady, rather than to allow for the August under-recovery to be passed on to motorists as usual.

**September 2018:** The Competition Tribunal approves the merger between Off The Shelf Investments 56 and Chevron South Africa (CSA), imposing several conditions, one of which is a commitment to a significant investment in refining capacity for the Cape Town refinery. CSA changes its name to Astron Energy.

**September 2018:** The public comment period opens on the draft environmental-impact assessment report for ENI and Sasol's planned exploration drilling programme in Block ER236, off South Africa's KwaZulu-Natal coast.

**October 2018:** Energy Minister Jeff Radebe announces that the long-awaited biofuel blending regulatory framework is being finalised and that it will be presented before Cabinet for approval before the end of March 2019.

**October 2018:** South Africa's fuel price hits a record high, following the largest-ever single increase of 99c/ℓ for 93 octane and 100c/ℓ for 95 octane petrol, pushing the inland price through the R17/ℓ barrier.

**October 2018:** The National Treasury warns that the Road Accident Fund (RAF) is a potentially large liability and that it will require large increases to manage its short-term liability, forecast to increase from R206-billion currently, to R393-billion in 2021/22. The RAF levy increased by 30c/ℓ in February 2018.





# Business environment

Without any significant crude oil reserves, South Africa relies on imported oil for about 80% of its fuel needs and is also increasingly importing refined petroleum products, making the country vulnerable to international market developments.

The rising price of crude oil – influenced by geopolitical tension – and the depreciation of the rand against the US dollar are the main contributors to the recent sharp increases in South Africa's fuel price. The price of petrol pushed to a record high on October 1, 2018, with 95 grade in Gauteng breaking the R17/ℓ mark.

Energy Minister Jeff Radebe has said that resolving the challenge of higher fuel prices is not a quick fix and that it will require a multidimensional approach. One way of dealing with the high fuel price is to ensure that South Africa produces its own gas, which highlights the significance of the shale gas resources in the Karoo basin.

Government is also keen to bolster the country's supply of refined products. The National Development Plan suggests five options, including a new oil-to-liquids refinery, a new coal-to-liquids (CTL) plant, the upgrading of existing refineries, importing refined product and partnering with Angola or Nigeria on a refinery.

Radebe has ruled out a new CTL plant and a partnership with Angola or Nigeria, while cautioning that an over-reliance on imports may not be feasible until import infrastructure is debottlenecked. There is also concern about the impact that increased refined product imports will have on the current account balance of payments.

A new crude oil refinery and the upgrade of the current refineries, in government's view, are considered more feasible and has put the country's "on-off" oil refinery plan back into play. The Minister has indicated that an implementation framework for a new oil refinery would be finalised in 2018.

The State has long had plans for such a project. The merits of a new refinery have been extensively debated, but the main impediment remains cost. A 2012 initial estimate for a new refinery at Coega, in the Eastern Cape, was about R100-billion for a 360 000 bbl/d to 400 000 bbl/d refinery. The cost of the proposed project increases further if a pipeline to transport fuel to the inland market is also considered.

## South African liquid fuel market developments

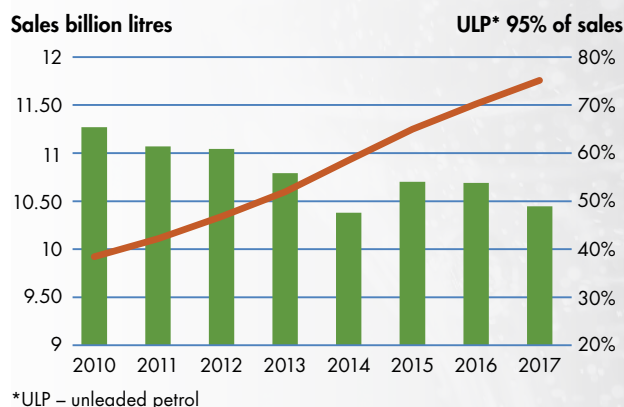


The South African Petroleum Industry Association (Sapia) states that petrol consumption has been stagnant to declining and is forecasting a flat long-term trend. Diesel demand is linked to gross domestic product growth.

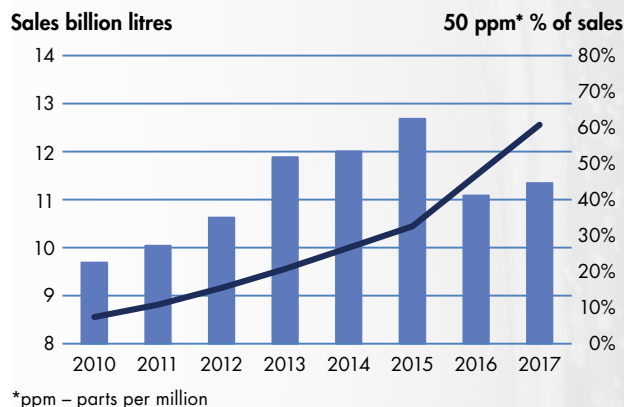
Petrol has traditionally been a two-tier market, with low-octane (93) fuel used inland and high-octane (95) fuel used at the coast. However, demand for high octane has risen from about 35% of the total petrol market, to about 78%. Lead-replacement petrol has a penetration of less than 3%.

On average, 50 parts per million (ppm) diesel consumption has registered a compound annual growth rate of 35% since 2010 and is now about 70% of the total diesel market. Sapia states that refiners are responding to the demand by switching to 50 ppm.

### Petrol consumption/high-octane (95) penetration



### Diesel demand/low-sulphur diesel



Source: South African Petroleum Industry Association

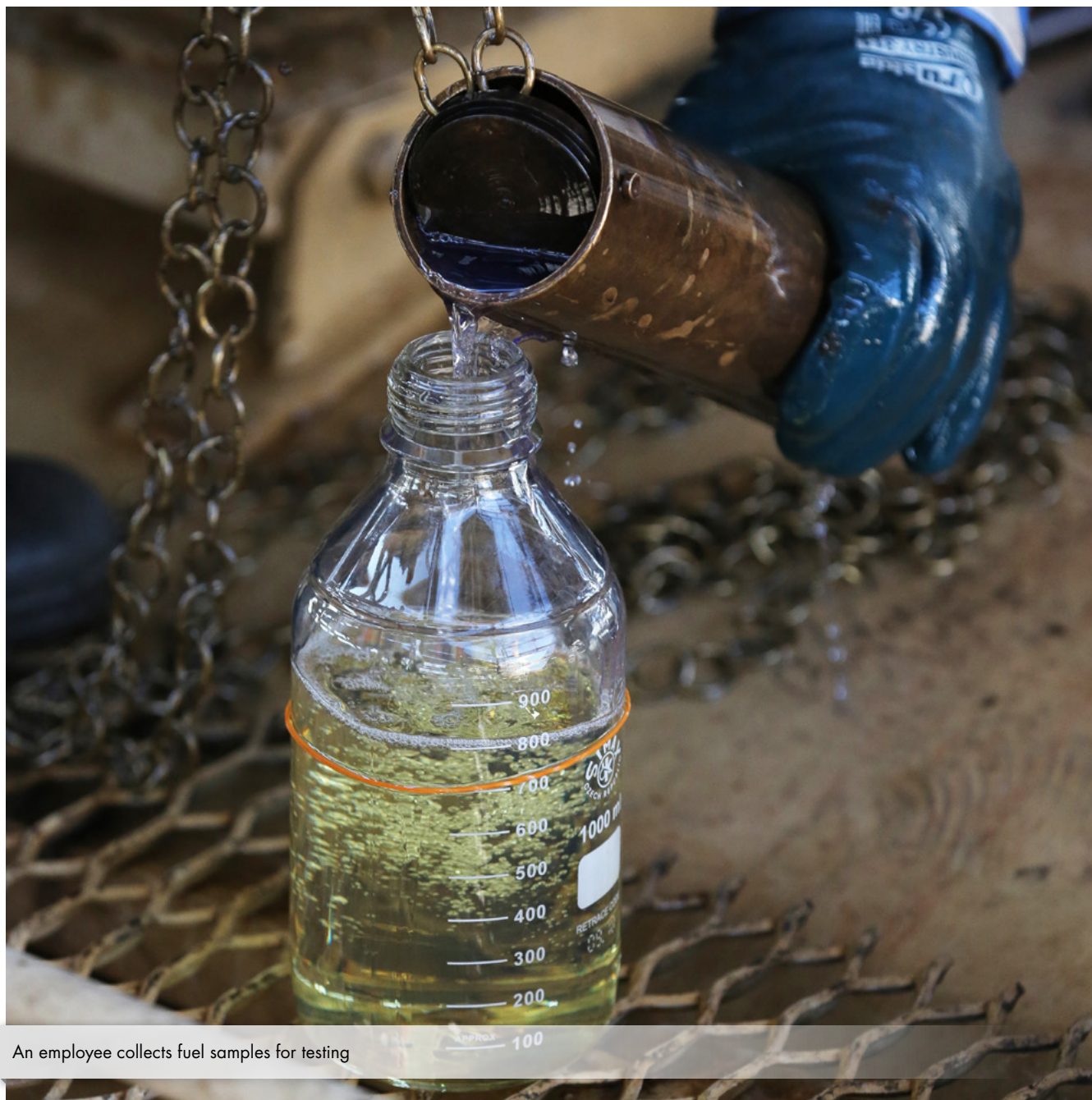






Commentators have warned that it is unclear whether South Africa could absorb a refinery of the scale necessary to make it competitive. The South African Petroleum Industry Association believes that the volume of fuel being imported is too small to justify building a new refinery solely to supply the local market and that a new refinery will have to be large enough to service the export market.

S&P Global Platts global director of analytics Chris Midgley believes that South Africa should take advantage of refining margins, which are expected to remain stable until 2020, to reinvest in its existing refineries to produce cleaner fuels. However, uncertainty about funding investments in refining capacity remains a sticking point in discussions about upgrading the country's refinery fleet.



An employee collects fuel samples for testing

Picture by Bloomberg





# Crude oil and synthetic fuel refineries

South African refining ownership and crude throughput		
Name	Crude throughput	Ownership
Chevref	100 000 bbl/d	Astron Energy
Enref	120 000 bbl/d	Engen Petroleum
Natref	108 000 bbl/d	Sasol/Total South Africa (64:36)
Sapref	180 000 bbl/d	Shell South Africa/BP Southern Africa (50:50)
Coal and gas processed and refined		
Sasol Secunda (crude equivalent at average yield)	150 000 bbl/d	Sasol
Gas processed and refined		
PetroSA (crude equivalent at average yield)	45 000 bbl/d	PetroSA

Location of refineries in South Africa	

Source: South African Petroleum Industry Association

South Africa has the second-largest refining capacity in Africa after Egypt, at 703 000 bbl/d of total crude oil. Of this, 508 000 bbl/d is attributed to the country's four crude oil refineries – Sapref and Enref, in KwaZulu-Natal; Chevref, in the Western Cape; and Natref, in the Free State. Two synthetic fuel (synfuel) plants – Sasol Secunda, in Mpumalanga, and PetroSA, in the Western Cape – have a combined capacity of 195 000 bbl/d.

The refineries produce petrol, diesel, liquefied petroleum gas, illuminating paraffin, aviation fuels, bitumen, heavy fuel oil, solvents and sulphur. The country is self-sufficient in producing illuminating paraffin, jet fuel, heavy fuel oil and sulphur, with some bitumen and solvents being imported.

About 5% of the country's petrol and 40% of total diesel demand are imported, according to the South African Petroleum Industry Association (Sapia).

South Africa's two largest refineries are Sapref and Enref, both located in Durban. The 180 000 bbl/d Sapref refinery is owned in a 50:50 joint venture (JV) by Shell South Africa and BP Southern Africa. The 120 000 bbl/d Enref refinery is owned by Engen Petroleum, an 80% subsidiary of Malaysia's Petronas.



Synthetic jet fuel

Picture by Creamer Media







The Natref refinery is a 64:36 partnership between Sasol and Total South Africa. It is the country's only inland crude oil refinery. Sasol has invested R1.50-billion over the past two years at Natref to improve plant stability and replace significant machinery as it continues to review its future options for the plant. These investments have resulted in an improved performance, with the Natref refinery achieving average run rates of 661 m<sup>3</sup>/h in the September 2018 quarter, compared with 600 m<sup>3</sup>/h in the previous quarter. However, Sasol no longer views oil refining and gas-to-liquids (GTL) as growth drivers. According to news service Bloomberg, Sasol has considered various options for Natref, including using it as an inland depot, closing the plant or selling it. A decision is expected by the end of 2018.

The smallest of South Africa's refineries, Chevref, in Cape Town, is under new ownership, following Chevron's sale of its South African unit in September 2018. The US group has been seeking to sell Chevron South Africa (CSA) since 2016.

Several companies were reportedly interested in acquiring 75% of CSA and, in March 2017, China Petroleum and Chemical Corporation (Sinopec) made a \$900-million bid for the US group's South African interests. However, CSA empowerment partner, Off The Shelf Investments 56 (OTS) exercised its pre-emptive right in October 2017 to match the Chinese offer. Bankrolled by global oil trader and miner Glencore, OTS pursued a bid valued at \$973-million.

Economic Development Minister Ebrahim Patel has concluded a framework agreement with the potential acquirers, placing public-interest conditions on the deal, in line with South Africa's competition legislation. One of the conditions includes a commitment by the acquirer to invest about R6-billion into the Cape Town refinery.

The other conditions pertain to the preservation of black shareholding in the company, the retention of jobs and employee benefits, the establishment of a development fund to support small and black-owned businesses, the continuation of CSA's branded marketer programme, and a commitment to funding the rebranding costs.

The conditions were embedded into the Competition Tribunal's September 13, 2018, approval for the OTS merger.

### Petroleum product suppliers settle information sharing complaint



South African petroleum product suppliers have agreed, under a settlement agreement with the Competition Tribunal, to change how they share information.

The Competition Tribunal confirmed the settlement agreement in May 2018 with the South African Petroleum Industry Association (Sapia), Chevron South Africa, Engen, Shell South Africa, Total South Africa, BP South Africa and Sasol in connection with the sharing of information that allegedly enabled them to track one another's diesel sales.

An October 2013 investigation by the Competition Commission found that the respondents were involved in exchanging information in aggregated and disaggregated format on a monthly basis, and that they were involved in reviewing the wholesale list selling price of diesel with the Department of Energy, which formed part of their price build-up for diesel.

The companies maintain that the conduct was not unlawful and the commission has elected not to pursue the matter further.

However, the companies have undertaken to provide data only to an independent third party, appointed by Sapia, which will collect and aggregate the data supplied by the respondents. The information that is disseminated to the third-party provider must be aggregated across all market participants and the information disseminated should not be older than three months.

Other conditions of the settlement include that the information disseminated to an independent third party must be an aggregation of not fewer than four market participants and that the information can be broken down by trade category per province, subject to its containing an aggregation of no fewer than the four market participants.

The conditions of the agreement will apply for five years.

Source: *Engineering News*

Following the conclusion of the transaction on September 27, 2018, CSA changed its name to Astron Energy and appointed Mashudu Romano chairperson and Jonathan Molapo CEO. The sale also includes a lubricants plant, in Durban, storage tanks and distribution facilities, as well as about 850 fuel service stations trading under the Caltex brand. The new owners have six years to transition away from the Caltex retail brand and the new branding will be finalised in the coming months.

South Africa has two synfuel refineries – the 150 000 bbl/d coal-to-liquids (CTL) plant in Secunda, Mpumalanga,





## South Africa's synfuels know-how could give it edge as world mulls power fuels

The newly formed Global Alliance Power Fuels believes that South Africa is well positioned to become a leading site for the large-scale production of liquid fuels from renewable energy and has confirmed to *Engineering News* that the country is on its radar for possible future demonstration projects.

The alliance was launched in Germany, in September 2018, following several studies indicating that synthetic fuels (synfuels) produced using renewable electricity could be the 'missing link' in reducing greenhouse-gas emissions in sectors where it is difficult to use clean electricity directly.

Conducted by the German Energy Agency, known by its German acronym 'dena', the studies conclude that the main applications for power fuels would be in transport, heating and storage in the electricity sector, as well as in a host of industrial applications.

Power fuels are produced in electrolyzers, which are able to split water into hydrogen and oxygen. When powered by renewable electricity, the fuels produced are considered to be carbon neutral.

The hydrogen emerging from an electrolyser can then be used directly in various industrial and transport applications, including fuel cells. Alternatively, the hydrogen can be processed further, using the Fischer-Tropsch (FT) process, to produce synfuels such as methane, petrol, diesel or kerosene.

The alliance believes South Africa's extensive FT knowledge and experience – developed by Sasol and PetroSA for the production of liquid fuels and chemicals from coal and gas,

could, in future, be harnessed to produce clean power fuels.

In fact, dena deputy head of renewable energies and mobility Stefan Siegemund describes South Africa's extensive experience in deploying and operating large-scale FT plants as a "big advantage".

Developing a market for power fuels is expected to take a number of years and Global Alliance Power Fuels emphasises that it will require political will and the cooperation of companies along the entire supply chain.

The alliance's initial utility, technology, transport and energy participants are mostly from Europe and include Audi, Daimler, the German Liquid Gas Association, Enertrag, the German Aerospace Centre, the Institute of Heating and Oil Technology, Robert Bosch, Shell, Uniper Kraftwerke and the Federal Association of Small and Medium-Sized Oil Companies.

The technology components required for the production of power fuels already exist and are proven. The challenge for the alliance lies in scaling up production and reducing costs by 2030.

The cost of renewable electricity, as well as the capacity factor of those plants, is a key cost driver. For this reason, countries with superior wind and solar resources, such as South Africa, could have an advantage over other jurisdictions. However, cost and conversion efficiency of electrolysis and the future level of carbon pricing will also be key to determining the competitiveness of power fuels.

Source: *Engineering News*

and the 450 000 bbl/d GTL plant in Mossel Bay, Western Cape.

JSE-listed Sasol owns the Secunda plant, which 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 a year of fuel products. Coal is sourced from Sasol-owned mines in Mpumalanga. Uninterrupted coal supply is secured until 2050.

In terms of GTL, Sasol's new strategy that was unveiled in November 2017 avoids investing in new GTL projects. This is a departure from its previous strategy to internationalise the business on the back of advances it has made in using the Fischer-Tropsch

technology to convert coal and gas to fuels and chemicals.

Polish miner JSW, however, has expressed an interest in using Sasol's technology to establish a plant to process coal into fuels. Representatives of JSW visited the Secunda plant in 2018 to learn more about the technology.

Central Energy Fund (CEF) subsidiary PetroSA operates the Mossel Bay refinery using GTL technology, which is partly under licence from Sasol.

A shortage of gas feedstock is affecting operations at the Mossel Bay refinery, which is operating at less than half of its 45 000 bbl/d capacity. The CEF has







## PetroSA – scandals and astronomical losses

National oil company PetroSA has reported massive losses over the past few years – including a R14.60-billion loss in 2014/15 – and has been embroiled in numerous scandals.

In June 2018, Energy Minister Jeff Radebe rejected PetroSA's 2018/19 budget and five-year corporate plan, which contained a R22-billion commitment to Nigerian oilfields owned by controversial Jacob Zuma Foundation benefactor Kase Lawal. The company had planned to procure 23-million barrels of oil over the next five years from Nigeria Oyo to produce petrol and diesel.

The Mail and Guardian reports that Radebe's other concerns with the corporate plan included:

- an assumption that Eskom would spend about R600-million to convert its 150 MW diesel open-cycle gas turbines at the Gourikwa power plant, in the Western Cape, to combined-cycle gas turbines, to consume tailgas residue from PetroSA's gas-to-liquid refinery process.
- increased projections of financial losses for the 2018/19 year and subsequent years.
- a lack of solutions to the problem of depleting gas feedstock.

Source: Mail & Guardian and *Engineering News*

warned that the plant could run out of gas between 2020 and 2022.

PetroSA has failed to secure additional gas reserves in a \$1-billion offshore drilling campaign, dubbed Project Ikhwezi. The drilling programme found only 25-billion cubic feet of commercially extractable gas, compared with the 242-billion cubic feet that was expected to be found. Acting CEO Kholly Zono has hinted that PetroSA may have erred by investing in the failed project on its own and has questioned how differently things may have panned out if it had taken on an international partner.

If the Mossel Bay plant runs out of gas resources, PetroSA will be exposed to a decommissioning liability of R9.60-billion, which will threaten the national oil company's financial viability.

Government has held meetings with Mozambique to assess the prospects for further gas cooperation beyond the imports that currently flow from the Pande and Temane gasfields to Secunda. South Africa believes that the gas finds in the Rovuma basin provide an opportunity for both

- rapidly deteriorating cash reserves at PetroSA, which account for 80% of the Central Energy Fund's (CEF's) revenue.
- PetroSA's lack of a permanent board and its poor safety record.
- a "drastic increase" in newly created positions at PetroSA, and an increase in salaries and wages while PetroSA was conducting a strategy review.

According to the corporate plan, PetroSA will report a R687-million loss for the 2017/18 year that ended in March. Further losses are projected for three of the next five financial years, including a R670-million loss for 2018/19, R633-million for 2020/21 and a R1-billion loss for 2021/22.

PetroSA lacks effective leadership and has had several resignations from people occupying senior positions in 2018.

Radebe indicated in May 2018 that work was under way to finalise a turnaround strategy for the CEF group of companies, which includes PetroSA. The strategy was being finalised with the support of Boston Consulting Group.

countries to benefit from the beneficiation of the resources, including GTL plants and other petrochemical facilities.

Shell is progressing plans for a scalable GTL plant in Mozambique, with an initial capacity of 38 000 bbl/d.



PetroSA's Mossel Bay GTL refinery

Picture by Creamer Media





# Cleaner fuels

In 2006, South Africa introduced Clean Fuels I (CF1) specifications for petrol and diesel. The regulations prohibit the addition of lead in unleaded petrol, but allow the use of other metals, such as manganese and phosphorous, in metal-containing unleaded petrol, called lead replacement petrol (LRP), to cater for older vehicles. In 2018, LRP comprised less than 3% of total domestic petrol demand.

CF1 lowered the sulphur levels of diesel from 3 000 parts per million (ppm) to 500 ppm, with a niche grade of 50 ppm also introduced.

Since then, there has been a global move to even tighter fuel specifications and in 2012, regulations regarding the introduction of Clean Fuels II (CF2) were gazetted, which will require that sulphur levels in petrol and diesel be reduced from 500 ppm to 10 ppm. These regulations were to be effective on July 1, 2017; however, the implementation has been postponed to a future date to be decided by the Energy Minister.

The CF2 regulations are meant to upgrade South Africa's oil refineries from producing so-called Euro level 2 fuels to Euro 5 – the high-quality grades sold in Europe and other developed markets. The Euro 2 fuel that South Africa currently produces not only has higher levels of benzene and sulphur than Euro 5 fuels, but also requires modern vehicles to be adapted to use lower-quality fuel. The National Association of Automobile Manufacturers of South Africa has warned that many new technology engines being introduced in Europe will not be able to run on the fuel that South Africa produces. South African motorists, thus, will either be denied access to the latest-technology vehicles or the engines will require expensive modifications.

The challenge in implementing CF2 regulations is a cost recovery mechanism for oil companies, as they have to invest in refinery upgrades in a regulated market. A 2009 study estimated that it would cost \$3.90-billion (more than R55-billion) to upgrade the country's refining fleet.

Some refiners have said that it could be more effective to shut down their refineries than to upgrade them. Sasol, for instance, has indicated that it is considering closing or selling the 108 000 bbl/d Natref refinery, in the Free State. The company has reportedly found a "relatively affordable" way of producing clean fuels at the Secunda

coal-to-liquids plant and plans are due to be announced once they receive board approval.

If South Africa fails to invest in local refinery capacity, and relies only on clean fuel imports, the country's refinery fleet is likely to be demolished in the next five to ten years, the South African Petroleum Industry Association (Sapia) has warned.

Energy Minister Jeff Radebe has made it clear that the refineries have to be upgraded, as the country can "ill afford to mothball" these plants.

Discussions between government and major oil companies have been held to help inform a final decision on how the country could locally produce enough refined product to meet CF2 specifications. Policy certainty is expected by the end of 2018.

The African Refiners and Distributors Association (ARA) has committed to introducing cleaner fuels across Africa in the next two years. The AFRI-4 specifications will lower the sulphur content allowed in diesel to 50 ppm and in petrol to 150 ppm. By 2020, all imported fuel will have to meet AFRI-4 specifications, although domestic production will be allowed a time-limit waiver to enable refineries to upgrade production quality levels.

AFRI-5 fuel will have a minimum sulphur content of 50 ppm and ARA members are expected to meet the specifications by 2030.

Meanwhile, South African refineries also face a significant challenge in meeting the International Maritime Organization's (IMO's) bunker fuel oil (BFO) sulphur cap by 2020. The IMO announced in 2016 that the sulphur content in marine bunker fuels would need to be reduced from the current level of 3.50% to 0.50%.

It is expected that Durban-based refineries will be particularly impacted on by the IMO sulphur cap, as the shipping industry is a vital outlet for their fuel.

The cost of upgrading refineries to produce lower sulphur content fuel is hefty, with industry experts estimating that it can cost \$1-billion (about R14-billion) for each refinery to install the required plant and equipment to meet the cap.

Sapia strategic projects head Kevin Baart states that, unlike South African refiners, European and







US refiners will not struggle to meet the IMO 2020 requirements because of already imposed sulphur limits of 0.10% in bunker fuels in emission control areas on the east and west coast of the US, as well as the North Sea in the Baltic.

Wright Consulting MD Dave Wright says the simplest option for South Africa's coastal refineries will be to shut down, noting that "refineries that cannot dispose of the fuel oil – produced simultaneously with all the other crude-based products – cannot continue to operate". He notes that the one way of solving the problem is to produce more bitumen. This will create a surplus of bitumen, driving down the price (which is already comparatively low for crude-based products), thereby reducing the profitability of the refineries.

Another option is to change the crude diet to a lighter crude that produces less BFO and/or BFO with a lower sulphur specification. However, lighter crudes are more expensive, significantly impacting on profitability. Moreover, South African coastal refineries are designed to process heavier crudes – using lighter crudes will not use the refinery capacity adequately or require hardware modifications, both of which will also impact negatively

on profitability. Wright notes that refineries could try selling a blend of diesel and fuel oil, but adds that this is not economically viable, given the price, as well as the quantities of diesel needed to produce the required BFO specification.

The third option is to simply continue high-sulphur BFO production. This option can play out in several ways. Wright explains that local refiners could export high-sulphur BFO to offshore processors, which will convert it into the 0.50% sulphur specification. However, with BFO already selling at a price below that of crude, it will have a negative impact on the overall refining margin. Further, as the 3.50%S BFO will be considered a distressed product from 2020 onwards, its price "must drop". This price dip, combined with the additional shipping costs for transporting the high-sulphur BFO, impacts on the refinery's economics tremendously, and is unsustainable – even in the short term. Wright points out that refineries could decide to sell high-sulphur BFO to ships equipped with stack gas scrubbers, but comments that there "aren't enough ships with scrubbers to sustain the local refineries". Similarly, the refineries could continue to sell high-sulphur BFO to shippers prepared to buy it, although that will break international law.



Cleaner fuels will require refinery upgrades

Picture by Bloomberg





More than a decade since the approval of a national biofuels strategy in 2007, South Africa is finally making headway with its biofuels regulatory framework.

Energy Minister Jeff Radebe committed to finalise the long-awaited biofuel blending regulatory framework in October 2018 and have it approved by Cabinet by the end of March 2019.

The biofuels framework will target 2% of the country's fuel consumption needs.

The regulatory framework has three pillars. The first is the mandatory purchase of biofuels by licensed petroleum manufacturers in accordance with the Mandatory Blending Regulation of Biofuels with Petrol and Diesel, which came into effect in October 2015. According to the blending regulations, 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.

The second pillar is the Biofuels Feedstock Protocol, which will regulate and approve biofuels feedstock plans in a way that does not compromise food security and prioritises rain-fed crop production.

Currently, sorghum, sugar cane and sugar beet are permitted for producing bioethanol, and canola, sunflower and soya beans for biodiesel. 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.

Thirdly, the framework will publish standards for biofuels in transport fuel, as well as fuel specifications for the blended fuel.

Nonprofit organisation FairPlay states that an initial 2% blend will be enough to stimulate the distressed sugar industry. The group believes that the mandated blend could increase to 10% or more as the local fuel ethanol industry grows. A policy such as this has the potential to

## Waste to Wing – a first for South Africa



In trying to find innovative ways of manufacturing green aviation fuel at a larger scale, South African researchers have launched the Waste to Wings initiative, which will determine the feasibility of using waste biomass to produce aviation fuel.

A consortium comprising enterprise development specialist Fetola, the World Wide Fund for Nature South Africa and global sustainable aviation fuel supplier SkyNRG will pilot the development of 25 micro, small and medium-sized enterprises that will supply the raw material or feedstock. The project will demonstrate the workings of pretreating the feedstock and converting it to sustainable aviation fuel.

A strong requirement and guiding principle of the Waste to Wing project is that the fuel should conform to the Roundtable on Sustainable Biomaterials' sustainability standard to develop a fuel sector that promotes food security and biodiversity, as well as water, land and labour rights.

Waste to Wing has the financial support of the European Union's Switch Africa Green Programme of €1.20-million. It will also aim to share key learnings with other African countries.

Meanwhile the International Air Transport Association (Iata) has announced a target of having one-billion passengers fly in an aircraft powered by a mixture of jet fuel and sustainable aviation fuel by 2025. In 2008, the first flight that used a blend of jet fuel and sustainable aviation fuel took off from London to Amsterdam. The threshold of 100 000 flights was passed in 2017 and Iata expects to achieve one-million flights during 2020.

The airline industry has committed itself to carbon-neutral growth from 2020 and to halve its net carbon emissions in comparison to 2005. Flights powered by only sustainable aviation fuel could reduce carbon emissions by as much as 80%.

Source: World Wide Fund for Nature South Africa and *Engineering News*

create 125 000 jobs in the ethanol industry and 25 000 new jobs in the sugar industry.

The increased use of fuel ethanol will reduce the country's reliance on oil imports.







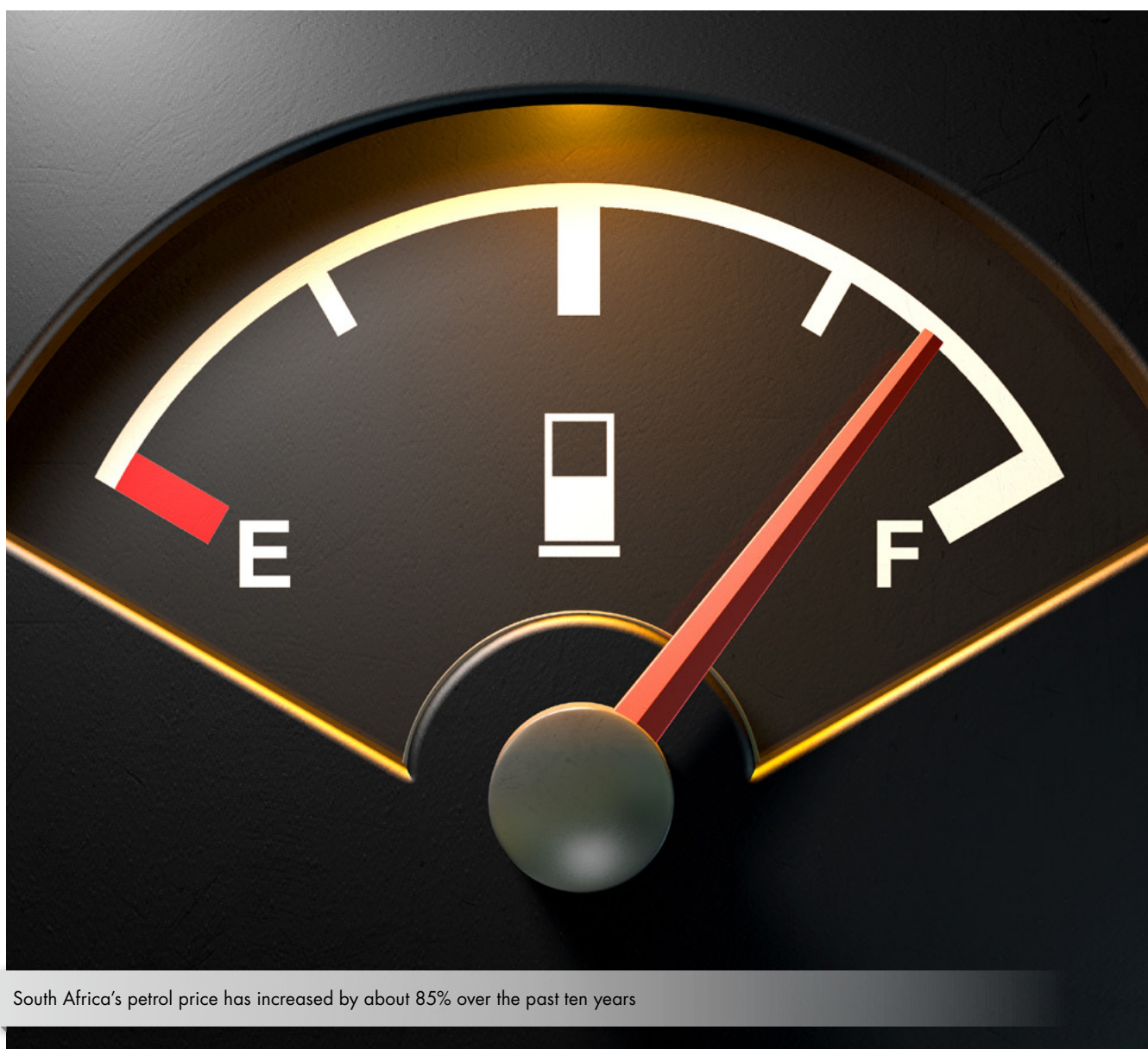
# Fuel pricing

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

The fuel price comprises the general fuel levy; the Road Accident Fund (RAF) levy; the basic fuel price, including freight and insurance costs, cargo dues, storage and financing; and wholesale and retail margins, as well as distribution and transport costs.

The general fuel levy is tax charged on every litre of petrol sold. In April 2016, the general fuel levy increased from R2.55/ℓ to R2.85/ℓ. In 2017, the levy increased by 30c to R3.15/ℓ and in 2018 by 22c to R3.37/ℓ. The money collected through the general fuel levy is administered by the National Treasury; the Automobile Association (AA) states that it is treated as a general tax, rather than for road-related expenses.

The RAF levy collects money for the RAF, which compensates victims of road accidents. The RAF levy



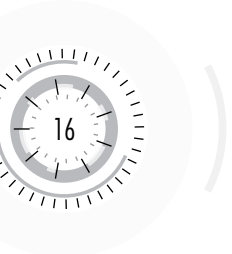
South Africa's petrol price has increased by about 85% over the past ten years

Picture by AdobeStock

Sponsored by:

**ZEST**  
WEG Group





remained unchanged at R1.54/ℓ in 2016, but rose to R1.63/ℓ in 2017 and to R1.93/ℓ in 2018.

Combined, the general fuel levy and the RAF levy constitute R5.30/ℓ of fuel sold in the country.

Motorists had been forced to absorb several large fuel hikes since the start of 2018, and in October, the country experienced its biggest fuel price increase yet, when 93 octane petrol increased by 99c/ℓ and 95 octane petrol increased by 100c/ℓ, while diesel (0.05% sulphur and 0.005% sulphur) rose by 124c/ℓ.

Subsequently, the inland price of 95 octane petrol surged to a record R17.08/ℓ and the coastal price to R16.49/ℓ. The inland price of 0.05% sulphur diesel rose to R15.64/ℓ and the coastal price to \$15.16/ℓ.

South Africa's petrol price has increased by about 80% in the past ten years, if the October 2008 inland price of R9.41/ℓ is compared with the October 2018 price. Over the same period, the fuel levy has increased by 165%, from R1.27/ℓ to R3.37/ℓ.

Energy Minister Jeff Radebe has attributed the sharp increase in the October fuel price to the weakening rand against the US dollar and rising Brent crude oil prices.

In the past two-and-a-half years, oil prices have nearly tripled, from below \$30/bl in January 2016 to more than \$85/bl in October 2018, supported by the decision of the Organization of Petroleum Exporting Countries (Opec) and key non-Opec producers to remove 2% of global oil production.

In September 2018, Radebe surprised the market, and the liquid fuels industry, when he decided to breach the rules of South Africa's well-established pricing framework to facilitate a fuel price freeze. Government insisted, however, that the intervention would not be repeated and was designed primarily to offer relief to motorists.

In the event, fuel prices rose by only 4.90c/ℓ in September 2018 to accommodate an increase in the retail margin for petrol to allow for a wage agreement for forecourt staff. Ahead of the intervention, it was anticipated that fuel prices would rise by about 25c/ℓ in September to accommodate a R550-million-plus under-recovery in August 2018, which arose as a result of increases to the oil price and a weakening in the rand.



Picture by Creamer Media

To pay for the freeze, government leaned on the Slate Levy Mechanism (SLM) Trust Account, which had surplus resources, despite the fact that the actual SLM had been held at 0c/ℓ for some time. The self-adjusting SLM was implemented with effect from January 2009 to manage a negative balance in the cumulative over/under recovery. The levy is applicable only on petrol and diesel if the cumulative under-recovery on the slate balance is more than R250-million.

The AA has estimated that the October fuel price increase will extract a further R2.50-billion a month in transport costs. This will be felt across every industry, but it will be particularly catastrophic for the agriculture sector, which is already reeling from a prolonged drought. The organisation has warned that extreme fuel price hikes could push marginal businesses, including farms, to financial breaking point, and have a negative impact on consumer pricing.

The high fuel price has intensified calls for the deregulation of the industry and for indirect taxes on fuel to be scrapped. The Department of Energy has ruled out deregulation, partly as it could threaten the jobs of up to 50 000 attendants if fuel station owners opted for self-service and because there is no guarantee that the fuel price will come down.

Radebe has said that there is a commitment to contain future fuel tax increases. Government is considering fixing a maximum allowable price for 93-octane unleaded fuel and has appointed a task team to work on proposals.





# Pipeline and other infrastructure

South Africa's liquid fuels pipeline network is operated by State-owned freight logistics group Transnet's pipeline division, which operates 3 800 km of pipelines traversing the provinces of KwaZulu-Natal, Free State, Gauteng, North West and Mpumalanga.

The intake stations are the Enref and Sapref refineries in Durban, KwaZulu-Natal, the Natref refinery, in the Free State, and the synthetic fuel plants at Secunda, in Mpumalanga. The network includes a tank farm, at Tarlton, with a capacity of 30-million litres, which is used mainly for storage and the distribution of liquid fuels into Botswana.

Transnet invested R30.40-billion in a high-pressure multiproduct pipeline (MPP) to replace the previous Durban-to-Johannesburg line that reached the end of its economic life after 50 years of operation. The new pipeline network includes a 555 km main pipeline, a 160 km inland pipeline network, incorporating links from Kendal to Waltloo, Alrode to Langlaagte and Jameson Park to Alrode, inland and coastal terminals, and three pumpstations.

The MPP started transporting diesel in 2012 and has transported nearly 200-billion litres of diesel from Durban since commissioning.



Transnet's new multiproduct pipeline

Picture by Creamer Media

## Pipeline planning, control and security functions amalgamated



In July 2018, State-owned freight group Transnet officially opened its national operating centre (NOC), in Durban, which will serve as the nerve centre for Transnet Pipelines (TPL) and its 3 800 km underground national pipeline network.

The control centre was previously based at TPL's head office in the Durban central business district, while various other functions operated from different platforms. The new standalone facility combined these and also functions as a security hub and planning centre.

The amalgamation of the planning, control and security functions at one location is expected to improve not only safety but also reliability and efficiency. It is also expected to reduce the cost of doing business once volumes in the multiproduct pipeline (MPP) begin to grow. The NOC comprises a master control room that can track the entire MPP's activities using high-technology visuals and controls. It also includes a built-in war room designed to ensure that Transnet can maintain infrastructure and quickly respond to all pipeline incidents.

Source: *Engineering News*

The coastal terminal was commissioned in August 2017, allowing for the new pipeline to operate as a multiproduct operation, transporting diesel, two grades of petrol and jet fuel at a capacity of one-million litres an hour (1 000 m<sup>3</sup>/h). The inland terminal was commissioned and became fully operational in December 2017.

The MPP transported 16.35-billion litres in the 2018 financial year ended March 31, which was lower than the 16.98-million litres of the previous year, mainly owing to the shutdown of the Natref refinery and lower demand for refined volumes in the current economic environment. Transnet has a target of transporting 17.52-billion litres in the 2018/19 financial year.

The National Energy Regulator of South Africa (Nersa) determines Transnet's allowable revenue for its pipelines business, with an application for an increase of 35.60%, to R5.68-billion, having been filed for 2018/19. In March 2018, Nersa announced that it had approved only a 26% increase in allowable revenue, which is an effective tariff increase of 19%, resulting in an increase of about 6.57c/ℓ in





the petroleum transportation levy for the Durban to Alrode destination.

Contrary to previous years, Nersa set the tariff for one year only. Transnet had applied for a 10% increase for 2019/20.

Transnet's dedicated gas pipeline, a converted line previously used for liquids, operates from Secunda, in Mpumalanga, to Durban through Empangeni. It has take-off points at Newcastle and Richards Bay, as well as along the route between Empangeni and Durban, in KwaZulu-Natal.

Another major gas pipeline is a joint venture between South African and Mozambican companies. Rompco, in which petrochemicals firm Sasol owns a 50% interest, with a 25% shareholding by South African government-owned iGas and a 25% shareholding by Mozambican firm Companhia Moçambicana de Gasoduto.

The 865 km high-pressure gas pipeline has a capacity of 191-billion standard cubic feet and connects the onshore gasfields in Pande and Temane, in Mozambique, to Sasol's operations, in South Africa. Until the commissioning of the cross-country pipeline, Mozambique's natural gas assets had effectively been stranded.

South Africa is keen to expand its relationship with Mozambique in terms of gas cooperation.

Sasol is advancing a production sharing agreement (PSA) project with Mozambique. The first phase of the PSA licence area development proposes an integrated oil, liquefied petroleum gas and gas project adjacent to Sasol's petroleum production agreement area, where the Pande and Temane fields are located. The PSA project includes the development of a fifth train at the central processing facility to process additional gas from the PSA licence area. Tranche 1 of the first phase of the PSA development project, including the fifth train, will cost an estimated \$1.40-billion.

Meanwhile, Transnet is considering recommissioning an existing tank in the Port of East London, in the Eastern Cape, for handling liquid bulk and to introduce a liquid bulk terminal through a 25-year port concession. The group is targeting a new entrant or consortium that must have a minimum Level 4 broad-based black economic-



A wellhead at Sasol's Temane field, in Mozambique

Picture by Sasol

empowerment status, be at least 51% black-owned, at least 51% new port-entrant-owned and, at most, 49% owned by cargo interests.

Four oil majors currently operate in the Port of East London, with products including unleaded petrol, automotive diesel, kerosene and aviation fuel. The overall capacity is three-million kilolitres. The existing tank on the port's West Bank that is proposed for heavy fuel oil operations was commissioned in 1977 and has a working capacity of 7.60-million litres. It is envisaged that the liquid bulk terminal will be developed from its existing 8 000 m<sup>2</sup> footprint to 21 000 m<sup>2</sup> and that the operator will use the port's existing tanker berth.



# Oil and gas production

South Africa has very limited oil reserves. The country imports its crude oil, with Saudi Arabia accounting for the most of its imports in 2017, at 49%; Nigeria accounted for 24% and Angola 20%; and Ghana, Cameroon, the US and Equatorial Guinea contributed 1% each, with Togo contributing 2%.

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

Regulatory uncertainty, linked to an amendment of the Mineral and Petroleum Resources Development Act (MPRDA), has hampered the development of oil and gas resources. The main concern with the proposed amendments was that they could allow government to partially nationalise licence blocks.

After five years of uncertainty, Mineral Resources Minister Gwede Mantashe announced in August 2018 that the Amendment Bill had been withdrawn. The Minister believes that the mining industry should be governed by the MPRDA in its present form and that the particular needs of the petroleum sector – which are addressed in the Amendment Bill – should be dealt with in a dedicated, directly targeted legislative framework.

The oil and gas industry has lobbied for some time to have legislation separate from that of the MPRDA.

New, potentially more favourable legislation that suits petroleum companies' objectives better, combined with a rise in the oil price, could stimulate appetite for gas and oil exploration. Energy Minister Jeff Radebe believes that South Africa should prioritise natural gas as the country migrates to a low-carbon economy.

There is currently a moratorium on new applications for petroleum exploration and development. The Department of Mineral Resources published a notice restricting new applications on June 28, 2018, to allow for a change in its licensing process. According to the notice, the restriction "is primarily aimed at using licensing as a tool to achieve the transformation ideal" and fast-track exploration.

The moratorium does not affect applications received before June 28, 2018. Companies that already have

technical cooperation permits can also apply for exploration and production rights.

## OFFSHORE OIL AND GAS

South Africa's offshore basins are divided into three distinct tectonostratigraphic zones. The western offshore area 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<sup>2</sup> of two-dimensional seismic data and 40 000 km<sup>2</sup> of three-dimensional 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 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 is desperately trying to find new gas reserves to feed its Mossel Bay GTL refinery, which is at risk of shutting down. PetroSA's F-O field development project, known as Project Ikhwezi, has failed to find sufficient gas reserves. South Africa signed a R5-billion deal with Russia's Rosgeo in 2017 to help PetroSA locate and extract new gas reserves for the Mossel Bay GTL plant.

In the Outeniqua basin, the focus is on Block 11B/12B, where French group Total and its joint venture (JV) partners will resume drilling on South Africa's first deep-water well by late 2018 or early 2019. Total's first attempt to drill the Brulpadda prospect in 2014 was suspended, owing to strong currents. The prospect is at a water depth of 1 431 m and the well is expected to be drilled to a target depth of about 3 500 m. In February 2018, Total sold a 25% interest in the block to Qatar



**Net oil reserves in PetroSA-operated Block 9 fields**

Field	Net oil and gas reserves at April 1, 2017		
	1P	2P	3P
Oribi Oryx	0.00	0.00	0.00
F-A	1.12	2.58	3.36
E-M	3.23	5.92	8.40
SCG	1.83	3.45	5.26
FO	2.87	4.34	5.99
<b>Total</b>	<b>9.06</b>	<b>16.28</b>	<b>23.01</b>

Petroleum. The new partnership structure is Total (45%), Qatar Petroleum (25%), CNR International (20%) and Main Street (10%).

In the Durban and Zululand basins, JV partners Eni (40% and operator) and Sasol (60%) are considering conducting exploration drilling for oil and gas in Block ER236. An environmental-impact assessment study for future potential drilling activities is in progress.

The draft study indicates that Eni intends to drill the first of up to six deep-water wells between November 2019 and March 2020. The expected drilling depth will be about 3 800 m to 4 100 m in the Zululand basin, and to about 5 100 m in the Durban basin. Environmental conservationists have raised concerns about the exploration plan.

The Orange basin is shared between South Africa and Namibia. It is believed to hold significant oil and gas potential, with several gas discoveries having been made in the South African side of the basin, including the Ibhubesi gasfield, which is estimated to hold at least 540-billion cubic feet (bcf). The Ibhubesi project is owned by private company Sunbird Energy (76%) and PetroSA (24%).

Explorer Azinam, which already owns a portfolio of offshore licences in Namibia, announced in September 2018 the acquisition of a 40% interest in Block 3B/4B and a 51% operating interest in Block 3B/4B in the Orange basin, with Ricocure retaining 60% and 49% in the blocks respectively.

In 2015, Sasol and PetroSA were granted the right to negotiate the exploration right for Block 3A/4A, in the Orange basin, but the right expired in July 2018. Sasol has explained that the final terms could not be agreed upon and that the exploration right had not been executed.

Royal Dutch Shell also relinquished a licence in South Africa in 2017.

**ONSHORE NATURAL GAS**

One area of significant potential in developing South Africa's natural gas resources is the shale gas reserves in the Karoo basin. The US Energy Information Administration (EIA) estimates South Africa's shale gas reserves at 390-trillion cubic feet (tcf), making it the eighth-largest holder of technically recoverable shale gas in the world. Geologists at the University of Johannesburg and three other institutions estimate that the gas resource is probably 13 tcf, which ranks its thirty-fourth out of forty-six nations in the EIA estimates. However, even at a lower estimate, the resource still holds significant development potential for the South African petroleum industry.

Exploitation of the shale gas resources could help South Africa become energy-sufficient and reduce its reliance on imports. Mineral Resources Minister Gwede Mantashe has vowed to fast-track the exploration and exploitation of shale gas and, in July 2018, published a notice calling for comments from persons who might be "materially and adversely affected" by government's decision regarding shale gas applications from Shell, Bundu Gas and Oil Exploration and Falcon Oil and Gas.

Shell announced in April 2018 that it was withdrawing from its shale gas exploration venture while awaiting clarity on the legislative environment. It has rescaled its Karoo team and reduced the number of staff.

Environmentalists and farmers have opposed opening up the water-stressed Karoo for shale gas, development of which requires a technique called hydraulic fracturing, or fracking, which involves pumping water and chemicals at high pressure to crack the rock and release the gas.

However, Energy Minister Jeff Radebe said in June 2018 that there was "no doubt in government's mind" that shale gas exploitation would be proceeding. He has called for all impediments to shale gas exploration to be removed







as part of government's response to the record-high fuel prices.

South Africa also plans to introduce other unconventional sources of gas, such as coal-bed methane (CBM). South Africa has an estimated CBM resource of about 10 tcf, according to a 2012 estimate by Petroleum Agency South Africa. Tanzania and Mozambique also have CBM resources.

Meanwhile, South Africa's first onshore conventional gas project with a production right is Renergen's helium and natural gasfield project in Virginia, in the Free State.

The Virginia project, spanning 187 000 ha of gasfields across Welkom, Virginia and Theunissen, has an estimated 6.21 bcf of reserves on a discovered commercial basis, or 3P. The contingent resources, or 3C, amount to 24.6 bcf. Total proven and probable gas reserves were valued at about R8.40-billion at the end of February 2018.

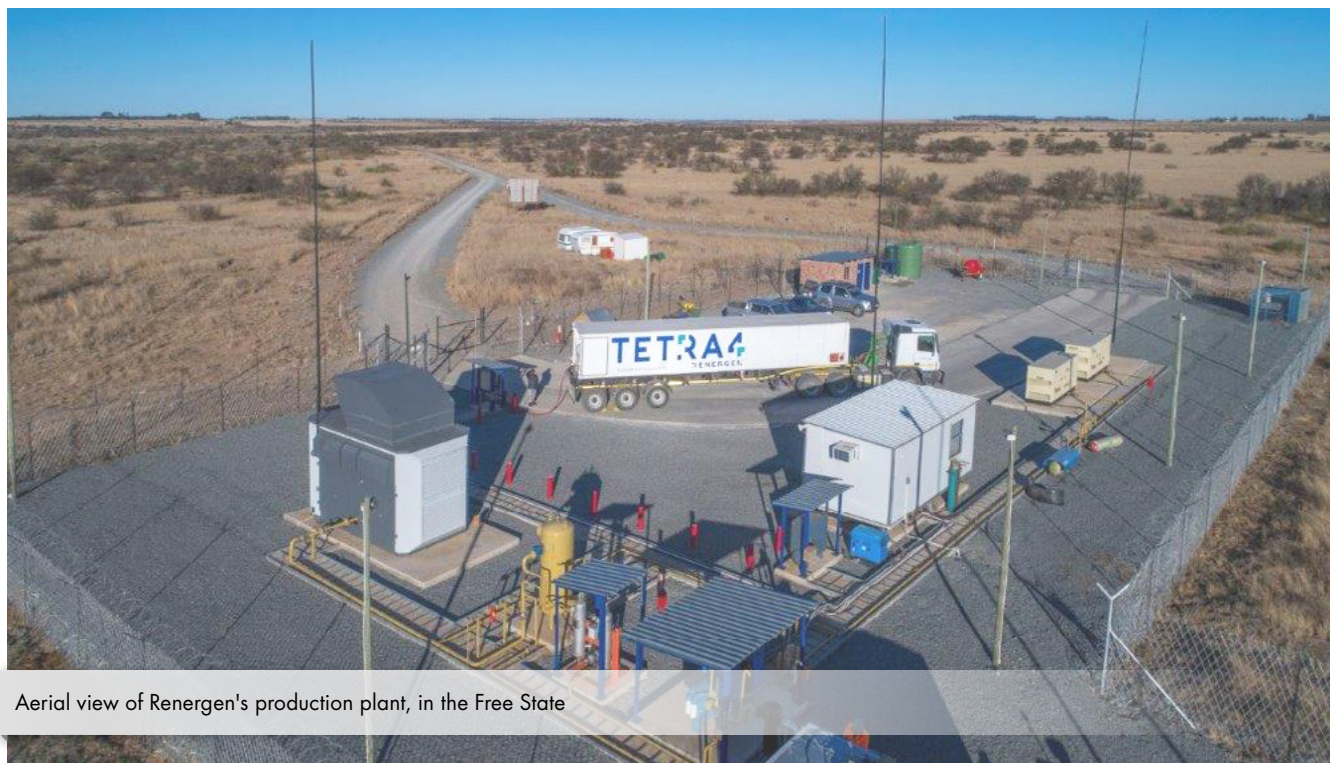
The project will produce helium, with Tetra4, a subsidiary of Renergen, targeting daily output of between 1 000 kg and 1 500 kg. South Africa uses about 350 kg/d of helium, which is largely used by the medical industry for magnetic resonance imaging machines, fibre optics and

electronics such as microchips, as well as specialised welding applications. South Africa will become the eighth country in the world to export helium when the project enters into production.

Renergen will also produce 10 000 GJ/d of liquefied natural gas (LNG). This amount of energy is equivalent to 45 000 l/d of diesel, which will be ramped up to the equivalent of between 200 000 l/d and 250 000 l/d of diesel. The company signed an offtake agreement with South African Breweries in May 2018, which will initially run a small fleet of trucks in Gauteng on LNG from Tetra4. This will be expanded to a significantly larger fleet once Tetra4's plant reaches operational status.

Tetra4 will start construction of natural gas liquefiers in late 2018 or early 2019. It is envisaged that liquefier construction will take about 18 months to complete.

A new onshore conventional gas entrant is Tosaco Energy, which in 2017 was granted three onshore technical cooperation permits over 2 900 km<sup>2</sup> to study a potential gas resource in Mpumalanga. The targets are sandstone deposits in the Vryheid formation. The company is a private entity and limited public information is available.



Aerial view of Renergen's production plant, in the Free State

Picture by Renergen





The world's oil consumption increased by 1.75% to 98.79-million barrels a day in 2017, with China (500 000 bbl/d) and the US (190 000 bbl/d) being the largest contributors to the 1.70-million-barrels-a-day growth.

The strong demand for oil – its highest level since the commodity supercycle of 2006/7 – fed into refining, energy group BP states, noting that refining throughput increased by an above-average 1.60-million barrels a day. Refining capacity growth was below average for the third consecutive year, at 600 000 bbl/d day, pushing refinery utilisation to its highest level in nine years.

Global oil production increased by 0.70% to 92.65-million barrels a day in 2017, of which members belonging to the Organization of Petroleum Exporting Countries (Opec) produced 42.60%, or 68.75-million barrels a day.

As Opec nations continued to implement production cuts announced in 2016, growth in consumer-led fuels most exposed to oil price movements, such as petrol, started to slow in the middle of 2017.

Opec countries had a target for production cuts of about 1.80-million barrels a day, relative to the base month of October 2016, but BP reports that the production cuts have far exceeded that, totalling nearly 2.50-million barrels a day in April 2018. The overshoot was mainly as a result of Venezuela's economic and political crisis, which has caused production to fall by about 700 000 bbl/d. The production cuts resulted in daily oil consumption exceeding production for much of 2017.

BP believes that the impact of Opec production cuts would have been bigger, had it not been for the response of US tight oil and natural gas liquids, which have increased by about two-million barrels a day since 2016.

As the Opec production cuts started to impact on oil stocks, prices began increasing in the second half of the year, ending 2017 at a high of \$66/bl. For the year as a whole, Brent averaged \$54/bl, up from \$44/bl in 2016. By October 2018, Brent crude had risen to \$85/bl – the highest in four years – as concern mounted over a shortage of supply ahead of US sanctions on Iran, due to begin on

November 4. However, by late October, oil fell to about \$75/bl, as prospects of a possible oversupply began to emerge.

The International Energy Agency, which advises most major economies on energy policy, appealed to Opec and other major oil producers in October 2018 to raise production, warning that prices were reaching a point of inflicting damage on the global economy.

Russia and Saudi Arabia struck a private deal in September 2018 to raise oil output until the end of December to cool prices.

However, Iran's exports have dropped faster than expected, as major buyers are halting purchases even before US sanctions are enforced in November. In Venezuela, output has also dropped amid economic collapse.

The Bank of America Merrill Lynch estimates that if oil prices head above \$100/bl, it could shave 0.20 percentage points off global economic growth in 2019.

In its October 2018 monthly oil market report, Opec lowered its 2019 estimates for the expansion in global crude demand, owing to weakening economic growth and higher output from rivals, notably US shale. The cartel estimates that demand growth of 1.54-million barrels a day in 2018 will slow to 1.36-million barrels a day in 2019. It also added 200 000 bbl/d to its estimate for non-Opec supply in 2018.

The group states that stockpiles of crude and refined products in industrialised countries increased by 14.20-million barrels a day in August 2018 and that the outlook for supply and demand in 2019 indicates that inventories could continue to rise.

According to the short-term energy outlook of the US Energy Information Administration (EIA), which was published in September 2018, worldwide crude oil prices will average \$73/bl in 2018 and \$74/bl in 2019.

The forecast of stable crude oil prices between September 2018 and the end of 2019 will likely keep global liquid fuels inventories relatively stable too. The EIA forecasts that global liquid fuels inventories will







decrease by about 400 000 bbl/d in 2018, followed by an increase of 100 000 bbl/d in 2019.

According to the EIA, world production of petroleum and other liquids increased from 97.05-million barrels a day in 2016 to 97.68-million barrels a day in 2017. Its forecast is for global production to increase to 99.67-million barrels a day in 2018, growing to 101.65-million barrels a day in 2019.

Total daily consumption increased from 97-million barrels in 2016 to 98.52-million barrels in 2017, with demand set to increase to 100.10-million barrels in 2018 and 101.57-million barrels in 2019.



Oil barrels

Picture by Flickr – Carsten ten Brink

## Petrochemicals driving global oil demand



Petrochemicals are becoming the largest drivers of global oil demand, ahead of cars, planes and trucks, a study undertaken by the International Energy Agency (IEA) has revealed.

Petrochemicals, which are components derived from oil and gas that are used in all sorts of daily products, such as plastics, fertiliser, packaging, clothing, digital devices, medical equipment, detergents and tyres, are set to account for more than one-third of the growth in global oil demand by 2030, and nearly half the growth to 2050. This, the study points out, will add nearly seven-million barrels a day of oil demand by then.

The study, titled *The Future of Petrochemicals*, is part of a new IEA series focusing on blind spots in the global energy system, namely issues that are critical to the evolution of the energy sector but that receive less attention than deserved.

Petrochemicals are particularly important, given how prevalent they are in everyday products, the IEA notes.

"Our economies are heavily dependent on petrochemicals, but the sector receives far less attention than it deserves," says IEA executive director Dr Fatih Birol.

"Petrochemicals are one of the key blind spots in the global energy debate, especially given the influence they will exert on future energy trends. In fact, our analysis shows they will have a greater influence on the future of oil demand than cars, trucks and aviation."

Demand for plastics – the key driver for petrochemicals from an energy perspective – has outpaced all other bulk materials, such as steel, aluminium or cement, and has nearly doubled since 2000. Advanced economies currently use up to 20 times more plastic and up to ten times more fertiliser than developing economies on a per capita basis, underscoring the huge potential for global growth, the IEA states.

The dynamism of the petrochemicals industry is also driving new trends worldwide. After decades of stagnation and decline, the US has re-emerged as a low-cost location for chemicals production, as a result of the shale gas revolution, and is now home to about 40% of global ethane-based petrochemicals production capacity.

Meanwhile, the Middle East remains the lowest-cost centre for many key petrochemicals, with a host of new projects announced across the region.

Source: *Engineering News*







The national yearly demand for petrol, diesel and jet fuel, according to an estimate published by Transnet, is expected to grow from 29.90-billion litres to 83-billion litres from 2015 to 2044. The national figure includes exports to neighbouring countries.

However, until South Africa is more self-sufficient in oil and gas, the country's liquid fuels industry will continue to be heavily influenced by international pressures, such as currency movements and oil import prices. The oil price is forecast to remain at elevated levels, which does not bode well for the retail fuel price.

Analysts warn that there is not much that can be done about local fuel prices, considering that about half of the price is a simple function of global oil prices and the rand:dollar exchange rate, while about 15% represents the margins earned by various players.

The balance comprises the fuel levy and the Road Accident Fund (RAF) levy. Although government could lower those levies, it will still have to collect the revenue through other means, for instance raising value-added tax or an increase in personal income tax rates.

The National Treasury has warned that the RAF may require more levy increases and that the 30c/ℓ increase from 163c/ℓ to 193c/ℓ in February 2018, may not be enough to cover the fund's liability. The Medium-Term Budget Policy Statement, tabled in October 2018, states that the RAF's liability is expected to increase from R206-billion currently, to R393-billion by 2021/22.

Energy Minister Jeff Radebe is hopeful that the October 2018 appointment of Tito Mboweni as Finance Minister, replacing Nhlanhla Nene, will strengthen the rand, which should alleviate fuel price pressures.

There is the argument that high fuel prices should initiate a serious debate in South Africa about the role that electrification could play in financially derisking domestic transport.

Rising oil prices could turn consumers towards electric vehicles (EVs). Globally, EV sales are forecast to increase from a record 1.10-million in 2017 to 30-million in 2030, as the vehicles become cheaper to make than internal combustion engine cars. Wood Mackenzie estimates that EVs will displace about five-million barrels to six-million barrels a day of oil demand by 2040 – or about 5% of total oil demand.

South Africa has surplus electricity, which means that there is no immediate constraint to the fuelling of a growing fleet of EVs, but a lack of charging infrastructure and range remain the main impediments to EV uptake.

Despite an EV future waiting, Volkswagen South Africa believes that it remains important for the South African government, local refineries and the automotive industry to pursue the much delayed programme to produce cleaner fuels for use in traditional internal combustion engines.

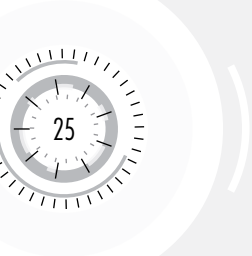
Providing cleaner fuels adhering to minimum emission standards and meeting the bunker fuel oil sulphur cap of 2020 are some of the main challenges facing the refining sector. Energy Minister Jeff Radebe has promised a regulatory framework to provide policy certainty for the industry by the end of 2018.

A detailed plan for a new refinery should also be finalised before the end of 2018. Such a refinery will require a significant investment and forms part of \$100-billion target for investment set by President Cyril Ramaphosa.



Picture by AdobeStock





# Main sources

African News Agency. Radebe moots shale gas exploration as answer to high fuel price (September 13, 2018).

African Refiners and Distributors Association. Newsletter issue no 25 (July 2018).

Automobile Association. Petrol price breakdown (April 10, 2018).

Bloomberg. Total back to drill in South Africa as fuel network grows (May 4 2018).

Bloomberg. SA halts oil exploration permits to revamp licensing (June 29, 2018).

Bloomberg. Sasol reviewing refinery upgrade, sale due to cleaner fuel law (August 20, 2018).

Bloomberg. IEA urges Opec to open the taps as oil market enters 'red zone' (October 9, 2018).

Bloomberg. Opec sees weaker demand for its crude next year as rivals surge (October 11, 2018).

BP. BP Statistical Review of World Energy 2018 (June 2018).

Business Day. Mantashe wants to axe long-delayed MPRDA Amendment Bill (August 22, 2018).

Competition Commission. Decisions by the Competition Commission (August 23, 2018).

Department of Energy. Speech by Jeff Radebe at the Japan – Africa Public Private Economic Forum (May 3, 2018).

Department of Energy. Speech by Jeff Radebe: Experience sharing workshop on investment (September 14, 2018).

*Engineering News*. Despite electric-car future, SA must pursue clean fuel agenda, says VWWSA MD (July 14, 2017).

*Engineering News*. Looming 2020 bunker fuel deadline spells trouble for coastal refineries (February 2, 2018).

*Engineering News*. Total sells 25% stake in South African offshore prospect to Qatar Petroleum (February 5, 2018).

*Engineering News*. Global airline body sets new target for use of sustainable aviation fuels (February 27, 2018).

*Engineering News*. South Africa to become eighth country to export helium in 2019 – Renergen (March 12, 2018).

*Engineering News*. Nersa announces petroleum pipelines tariff hike (March 16, 2018).

*Engineering News*. Petroleum product suppliers settle information sharing complaint (May 4, 2018).

*Engineering News*. Transnet to review tenders, expand petrochemicals capacity at East London port (May 14, 2018).

*Engineering News*. Radebe sees energy contributing \$25bn to South Africa's \$100bn investment target (May 16, 2018).

*Engineering News*. Gas high on the agenda as SA seeks to attract energy investment (June 1, 2018).

*Engineering News*. Renergen impairs hydro project to focus on South African natural gas market (June 1, 2018).

*Engineering News*. BMW SA expects small gains in EV market; in talks with fuel group on charge points (June 25, 2018).

*Engineering News*. Transnet Pipelines unveils new national operating centre (July 13, 2018).

*Engineering News*. No concrete plans for now to douse high petrol price (August 21, 2018).

*Engineering News*. South African refineries pulled in two (September 7, 2018).

*Engineering News*. Glencore backs \$1bn acquisition of Chevron South Africa by black-owned consortium (September 28, 2018).

*Engineering News*. Govt to finalise biofuels regulatory framework by March 2019 (October 1, 2018).

*Engineering News*. PetroSA says it is committed to ethical leadership (October 1, 2018).

*Engineering News*. South Africa's synfuels know-how could give it edge as world mulls power fuels (October 15, 2018).

*Engineering News*. Sasol reports strong Natref turnaround as oil, rand provide Q1 tailwind (October 18, 2018).

Fin24. Govt considering price ceiling for unleaded petrol (October 11, 2018).

Fin24. Road Accident Fund fuel levy requires 'large increase' (October 24, 2018).

IOL. SA's dirty fuel is costing motorists dearly (November 10, 2018).

PetroSA. 2017 integrated annual report (July 31, 2017).





Reuters. South Africa Karoo shale gas deposits seen less than earlier estimates (September 28 2017).

Reuters. PetroSA's GTL refinery could run out of natural gas in two years (June 12, 2018).

Reuters. Polish miner JSW to work with Sasol on new plant (September 28, 2018).

Reuters. Saudi Arabia and Russia quietly agreed to lift oil output (October 4, 2018).

Reuters. Oil falls on oversupply worries despite Iran sanctions (October 26, 2018).

South African Petroleum Industry Association. Cleaner fuels presentation (March 2018).

Mail & Guardian. On-off oil refinery back on the table (May 18, 2018).

Mail & Guardian. Minister halts R22bn PetroSA deal (August 17, 2018).

Moneyweb. Adding fuel to the fire (October 9, 2018).

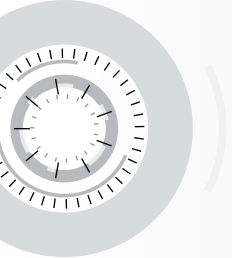
US Energy Information Administration. Short-term energy outlook (September).

World Wide Fund for Nature South Africa. Waste to Wing project a first in South Africa (May 23, 2018).

<https://www.erm.com/en/public-information-sites/eni-south-africa-offshore-exploration-eia/>







## LIQUID FUELS 2018

The material contained in this report was compiled by Creamer Media (Pty) Ltd's Research Unit, based in Johannesburg, South Africa. It has been compiled from sources believed to be reliable, but no warranty is made as to the accuracy of such information.

Creamer Media's aim is to present its reports in an impartial, user-friendly format for easy reference. The reports draw on material published over the past 12 months and are a summary of other sources of information published in *Engineering News* and *Mining Weekly*, as well as of information available in the public domain. The report does not purport to provide analysis of market trends.

This report is designed to be a source of information for subscribers to Creamer Media's *Research Channel Africa* and Creamer Media's *MiningWeekly.com Research*, and is not to be reproduced or published for any other purpose. In particular, the report may not be republished on any other websites and it may not be reproduced or redistributed in any manner.

© Copyright Creamer Media (Pty) Ltd



**To subscribe to Research Channel Africa or purchase this report contact:**

Creamer Media (Pty) Ltd | Tel +27 11 622 3744 | Fax +27 11 622 9350 | Email [subscriptions@creamermedia.co.za](mailto:subscriptions@creamermedia.co.za)

Picture by Creamer Media

