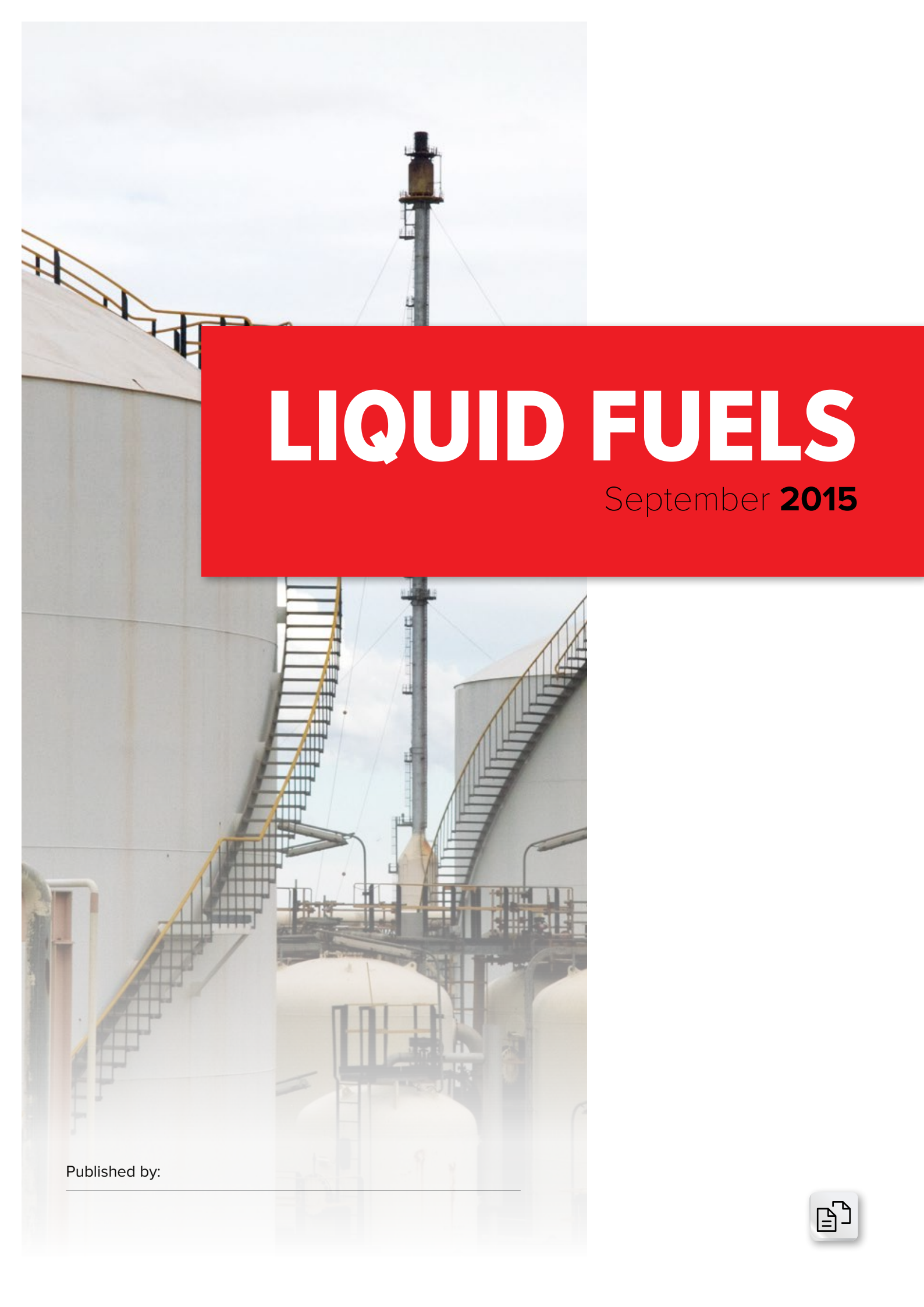


The background image shows an industrial facility, likely a refinery or chemical plant. It features several large, cylindrical storage tanks with yellow safety railings and external ladders. A tall, slender distillation column with a platform at the top is visible in the center. The sky is overcast and grey.

LIQUID FUELS

September **2015**

Published by:



A review of South Africa's liquid fuels sector

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

The information in this report is correct as of September 2015.

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 or

email subscriptions@creamermedia.co.za

Cover picture by Duane Daws.



Picture by Duane Daws

PetroSA's GTL refinery in Mossel Bay, in the Western Cape



Presented by:

Powertech

Table of Contents

■ Abbreviations and acronyms	4
■ Key developments	5
■ Business environment	6
– Crude oil refining	6
– Synfuels production from coal	8
– Synfuels production from gas	10
■ Oil and gas exploration	12
– Offshore projects	12
– Onshore unconventional gas exploration	13
■ Fuel pricing	17
■ Biofuels	19
■ Logistics	21
■ Cleaner fuels	25
■ Outlook	27
■ Appendix: Global oil market	28
■ Main sources	29



Abbreviations and acronyms

BEE	black economic empowerment
BFP	basic fuel price
CCA	customs control area
CEF	Central Energy Fund
CF1	Clean Fuels 1
CF2	Clean Fuels 2
CTL	coal to liquids
DEA&DP	Department of Environmental Affairs and Development Planning
DMR	Department of Mineral Resources
DoE	Department of Energy
DWS	Department of Water and Sanitation
EIA	environmental-impact assessment
EPA	Environmental Protection Agency
fracking	hydraulic fracturing
GTL	gas to liquids
LNG	liquefied natural gas
LPG	liquefied petroleum gas
MOGS	Mining, Oil and Gas Services
MPRDA	Mineral and Petroleum Resources Development Act
Nersa	National Energy Regulator of South Africa

NMPP	New Multiproduct Pipeline
OSSB	offshore supply base
OCGT	open-cycle gas turbine
OPEC	Organisation of the Petroleum Exporting Countries
Petronas	Petroleum Nasional Berhad
ppm	parts per million
REIPPPP	Renewable Energy Independent Power Producer Procurement Programme
RFI	request for information
Samog	South African Code for the Reporting of Oil and Gas
Samrec	South African Mineral Resource Committee
Samval	South African Mineral Valuation
Sapia	South African Petroleum Industry Association
SBIDZ	Saldanha Bay industrial development zone
SEA	strategic environmental assessment
synfuels	synthetic fuels
TKAG	Treasure Karoo Action Group
WWF-SA	World Wide Fund for Nature-South Africa



Key developments

August 2014: PetroSA decides not to establish its proposed floating liquefied natural gas import terminal in the Southern Cape, following extensive research into the feasibility of establishing the terminal near Mossel Bay.

October 2014: PetroSA indicates that it produced 14% less refined product than budgeted, in 2013/14 owing to diminishing gas feedstock, and warns that inadequate feedstock will remain a constraint on its future performance.

December 2014: The National Energy Regulator of South Africa approves Burgan Cape Terminals' licence to develop and construct an independently owned and operated liquid fuel-storage and distribution facility at the Eastern Mole of the Port of Cape Town, in the Western Cape.

January 2015: Malaysian oil giant Petronas pulls out of a deal that could have resulted in PetroSA acquiring local fuel refiner and retailer Engen.

March 2015: The National Energy Regulator of South Africa dismisses oil company Chevron's objections to the licensing of Burgan Cape Terminals to build a petroleum storage facility, petroleum loading facility and a petroleum pipeline in the Western Cape.

March 2015: The South African Petroleum Industry Association indicates it is becoming increasingly urgent for government to address the policy uncertainty with regard to the introduction of cleaner fuels.

March 2015: PetroSA warns of possible job cuts as it reorganises its business to ensure its survival and sustainability.

May 2015: Government launches a R12.5-million, 24-month strategic environmental assessment of shale gas mining in the Karoo, in the Western Cape.

May 2015: Oiltanking MOGS Saldanha starts detailed engineering work for the development and construction of a 13.2-million-barrel commercial crude oil blending and storage terminal. The project is set for completion in the first quarter of 2017.

June 2015: Burgan Cape Terminals secures the required environmental authorisation to develop its proposed oil infrastructure. Chevron indicates that it will not appeal the decision to approve the construction of the project.

June 2015: The Department of Mineral Resources publishes the long-awaited final Regulations for Petroleum Exploration and Production.

June 2015: Senior executives at PetroSA are suspended.

July 2015: Interim chairperson of PetroSA Nonhlanhla Jiyane resigns.

July 2015: A nuclear accord, which will result in Iran's benefiting from international sanctions being eased on the country's exports in return for curbs on its nuclear programme, is signed.

August 2015: The Department of Energy indicates that South Africa's biofuels funding incentive is being revamped, owing to concerns that it is unaffordable in the current crude oil price environment.

August 2015: The inland province of Gauteng experiences a brief period of fuel shortages.

September 2015: South African Petroleum Industry Association warns that, unless urgent progress is made in resolving issues pertaining to the country's new clean fuels standards, the liquid fuels industry could face similar pressures to those being faced currently by the embattled steel sector.



Presented by:

Powertech

Business environment

President Jacob Zuma noted, in August 2015, that the finalisation of the Mineral and Petroleum Resources Development Act (MPRDA) Amendment Bill, which has been tabled in Parliament, would assist the country to accelerate offshore oil and gas exploration. Delivering an update on government's Operation Phakisa, Zuma said there was still an aspiration, under the Oceans Economy Phakisa, to stimulate the development of 30 offshore exploration wells in ten years. He contended that this would mean the creation of up to 130 000 jobs, with a yearly contribution to gross domestic product of \$2.2-billion, while reducing South Africa's dependence on oil and gas imports during the production phase. Operation Phakisa is a government initiative designed to fast track the implementation of solutions on critical development issues.

However, uncertainty about the legislative environment is perceived as a major impediment to such investment, with the oil and gas sector having raised major reservations when the MPRDA amendments were first released in 2012. The draft changes stipulate a 20% free-carry for the State in oil and gas projects, but also indicate that, in certain instances, government might take even higher percentages. The industry has also expressed concern about the Ministerial discretion to declare a mineral "strategic" and a proposal that the Department of Mineral Resources assumes control of the licensing of oil and gas acreages from the Petroleum Agency South Africa. At one stage, it was even suggested that the oil and gas aspects of the MPRDA should be separated from the legislation, which is considered to be more attuned to South Africa's mature mining sector.

There have since been significant consultations on the amendments and industry observers are expecting material changes ahead of eventual implementation. However, few are expecting separate legislation for oil and gas. Key participants in South Africa's liquid fuels industry include several companies that are active throughout the liquid fuels value chain – BP Southern

Africa, Chevron South Africa, Engen Petroleum, PetroSA, Sasol Oil, Shell South Africa Marketing and Total South Africa. There are also a number of companies active in particular areas of the value chain such as biofuels manufacturers, fuel wholesalers and liquefied petroleum gas (LPG) wholesalers.

South Africa has the capacity to produce about 703 000 bbl/d of liquid fuels – 508 000 bbl/d at crude oil refineries and the balance at synthetic fuels (synfuels) facilities.

However, South Africa's current fuel refining capacity is insufficient to meet local demand for liquid fuel products, and the gap is met through the importation of refined products.

Crude oil refining

South Africa crude oil refining capacity is hosted by the Enref, Sapref, Chevref and Natref refineries.

The Enref refinery, in Durban, KwaZulu-Natal, currently has the capacity to produce 120 000 bbl/d of liquid fuels. Enref is owned by Engen, which is majority owned by Malaysia's national oil company, Petroliaam Nasional Berhad (Petronas), while black economic-empowerment (BEE) group Worldwide African Investment Holdings owns a 20% share in the company.

Enref embarked on a 35-day planned maintenance outage in July 2015, as part of an ongoing maintenance programme to ensure that the facility continues to operate safely and reliably. During this time, fuel shortages were reported in the inland province of Gauteng, with the Enref shutdown being partially responsible, while disruptions at the Sapref refinery also contributed to the situation.

Sapref, also situated in Durban, is South Africa's largest crude oil refining facility and one of the largest refineries in Africa, with the capacity to produce 180 000 bbl/d of

Presented by:

Powertech 



liquid fuels. In addition to the refinery, Sapref's facilities include a single buoy mooring, through which 80% of the country's crude oil is imported; a storage facility at Durban harbour; and joint bunkering facilities. Sapref is owned by Shell (50%) and BP (50%).

The Chevref refinery, in Cape Town, in the Western Cape, has the capacity to produce 100 000 bbl/d of liquid fuels, including petrol, diesel, jet fuel, LPG, fuel oil and paving asphalt.

Chevref is currently owned by international energy company Chevron's South African subsidiary Chevron South Africa, which is 75% owned by Chevron, with the remaining 25% being held by a consortium of BEE shareholders and employees.

In early 2015, Chevref underwent a routine maintenance and safety inspection, valued at R440-million. A recent significant capital investment at the refinery resulted in the construction of a multipoint ground flare and a 100 m elevated flare to replace the plant's existing high-level flare. The project was valued at R450-million.

The Natref refinery, in Sasolburg in the Free State, has the capacity to produce 108 000 bbl/d of liquid fuels. The facility is owned by Sasol and Total, which hold 64% and 36% respectively.

South Africa is largely dependent on crude oil imports to provide feedstock to its oil refineries.

Figures from the South African Revenue Service, quoted by the US Energy Information Administration, show that, in 2014, South Africa imported 425 000 bbl/d of crude oil. These imports were mostly sourced from the Organisation of the Petroleum Exporting Countries (OPEC) countries – Saudi Arabia (38%), Nigeria (31%) and Angola (12%).

Recent years have seen a shift in South Africa's sourcing of crude oil. Until 2011, Iran was the largest supplier of crude oil to the country. However, in mid-2012, South Africa ceased importing oil from that country supplementing the difference through increased crude imports from other African countries and Saudi Arabia.



Sasol and Total's Natref refinery, in the Free State

Picture by Duane Daws



Presented by:

Powertech

Africa's oil reserves and production

Africa's oil production accounts for about 9.6% of global oil production. Untapped proven oil reserves on the continent are estimated to be about 8% of the global total, and these reserves are projected to increase as appraisal of new discoveries ensues. New discoveries have been fewer as exploration activity globally has slowed owing to the reduced oil price environment.

From a proven oil reserve totalling 129.2-billion barrels, Africa produced 8.2-million barrels of crude oil a day in 2014. More than 76% of this production came from Nigeria, Algeria, Egypt and Angola.

The fragile political situation in North Africa continues to have an impact on production levels, which resulted in a 22% year-on-year decline in oil production in 2014. In the throes of civil war, production in Libya declined by almost 50% in 2014. Despite continued insurgency in South Sudan, production increased by just over 60%, compared with 2013. At 159 000 bbl/d, this is still significantly less than pre-2013 production levels of 240 000 bbl/d. This is largely owing to the damage that has been sustained by the local infrastructure, and analysts expect a full rebound by 2020.

Africa had proven natural gas reserves of just fewer than 500-trillion cubic feet, as of the end of 2014, with 90% of the continent's yearly natural gas production still coming from Nigeria, Libya, Algeria and Egypt. This is a slight drop in reserves compared with 2013, and production also decreased slightly over the period. Consequently, the continent still has nearly 70 years of natural gas production available given current production rates.

Source: PwC, From Fragile to Agile: Africa Oil and Gas Review, August 2015

South Africa's plan to obtain more oil from Africa could result in the country becoming more involved in refining Africa's oil, with its geographic location supporting South Africa's potential integration into Africa's oil supply chain. South Africa's collaboration with oil producers in sub-Saharan Africa could lead to an increase in continental refining capacity.

South Africa shifted away from Iranian crude imports in August 2012, owing to increasing Western sanctions on Iran with regard to its nuclear programme. South Africa faced pressure to reduce oil imports from the country. South African oil importers responded to this pressure and, as a result of these efforts, the country was granted renewable exemptions from sanctions on Iranian oil.

An accord was signed in July 2015 that will result in sanctions being eased on exports from Iran in return for curbs on the country's nuclear activities.

The sanctions will remain in place if and until the United Nations reports compliance with the deal in December 2015. OPEC countries have been informed that they should prepare for Iran's return to the export market, although the increase in Iranian oil exports is

expected to be gradual. Analysts say it will take many months for Iran to fully ramp up its export capacity, with the first oil from the country expected in the second half of 2016.

Meanwhile, South Africa is developing a new commercial crude oil blending and storage terminal at the Port of Saldanha. The project is being developed by Oiltanking MOGS Saldanha, a joint venture between Oiltanking Grindrod Calulo Holdings and the Royal Bafokeng group's Mining, Oil and Gas Services.

Saldanha Bay is already home to South Africa's 45-million-barrel strategic crude reserve depot which, in mid-2015, was reported to be filled to capacity as oil traders, hoping at the time that prices would rise in future, seized storage capacity. The State-run Strategic Fuel Fund Association operates six underground crude bunkers at the facility, which is one of the largest oil storage centres in the world.

Synfuels production from coal

South Africa has a unique and highly developed synfuels industry which, using coal and gas as feedstock, has the capacity to produce 195 000 bbl/d of liquid

Presented by:

Powertech 



fuel products – 150 000 bbl/d at a facility owned by petrochemicals company Sasol and 45 000 bbl/d at a facility owned by South Africa's national oil company PetroSA.

Sasol's coal-to-liquids (CTL) facility, in Secunda, in the Free State, is the only commercial CTL facility in the world, and produces petrol, diesel, jet fuel, illuminating paraffin, fuel oils, bitumen and automotive and industrial lubricants. The facility beneficiates more than 40-million tons of coal a year to produce more than five-billion litres of liquid fuels. It provides about a quarter of South Africa's total liquid fuel requirements, and in the year ended June 2014, Sasol Synfuels generated an operating profit of R32.99-billion.

However, Sasol noted in August 2015 that its earnings for the financial year to June 30, 2015, were down on the previous year, despite a strong operational performance, with the weaker result being largely attributed to the sharp fall in the oil prices during the period. This was partly offset by a fall in the average rand:dollar exchange rate for the period and higher production and sales volumes for most of the company's business units.

The Sasol Synfuels plant is a complex and ageing facility. In recent years, the company has undertaken careful maintenance planning and has completed a number of construction and renewal projects to ensure its ongoing reliability and stability.

Sasol is largely self sufficient with regard to the provision of coal feedstock for its CTL facility, with Sasol Mining, a wholly owned subsidiary of Sasol, operating one of the largest underground mining complexes in the world.

Sasol has noted that sourcing its coal from its own mining operations, rather than relying on a third-party source, provides it with flexibility of supply, while maintaining reliability and sustainability.

To ensure the ongoing supply of sufficient coal to its CTL facility for years to come, Sasol has been pursuing a R15.3-billion project to replace three of its ageing coal mines in Mpumalanga.

Once fully completed, the project will ensure that the group's nearby Sasol Synfuels complex is supplied with 42-million tons of coal a year for the next 35 years.

As part of the replacement project, the Twistdraai mine is being replaced with the Thubelisha mine; the Brandspruit mine is being replaced with the Impumelelo mine; and the Middelbult operation is being expanded to create the Shondoni mine. In addition, an upgrade project at the Syferfontein mine will provide high-wall access to the newly acquired Block IV reserves.

The overall project will result in the construction of three 65 t payload mining shafts and three 2 700 t/h incline shaft systems, as well as several coal-handling facilities and 66 km of conveyor systems.

Construction of the new 10.5-million-ton-a-year Thubelisha mine started in March 2009, with first production achieved in January 2012. The R3.2-billion operation has 12 production sections and a shaft depth of 160 m, while a 17-km-long conveyor system transports 2 500 t/h of coal to the nearby Synfuels complex.

First production from the R4.7-billion Impumelelo mine was achieved in May 2015, and completion of Phase 1 construction was expected in June 2015. Completion of Phase 2 is scheduled for June 2019. Once complete, the 10.5-million-ton-a-year operation will boast 13 production sections and reach a shaft depth of 235 m. A 2 400 t/h, 28-km-long conveyor system will deliver coal to the Synfuels complex, becoming the longest conveyor system of its kind in the southern hemisphere.

To the north of Impumelelo, the new R3.09-billion Shondoni mine is expected to achieve its first production in January 2016. The operation, which will reach a depth of 150 m and deliver up to 10.5-million tons a year of coal, will deliver coal to the Synfuels operation using a 21-km-long, 2 400 t/h conveyor system.



Construction at Sasol's Impumelelo coal mine, in Mpumalanga

Picture by Duane Daws



Presented by:

Powertech

The Syferfontein mine will be extended at a cost of R1.4-billion to include a high-wall access to Block IV. Construction on the project started in May 2013 and was expected to be completed in July 2015.

The mine will be a 7.2-million-ton-a-year operation, and will include a 4 800 t/h, 1.5-km-long coal conveyor system.

Synfuels production from gas

Sasol's gas activities in Mozambique

Petrochemicals company Sasol is hoping to increase gas production out of Mozambique, with some of that additional capacity possibly entering South Africa in the form of either natural gas or electricity.

In February 2015, the group submitted a new field development plan for the Pande and Temane gasfields to the Mozambican authorities. If approved, the way could be opened for the development of an integrated oil, liquid petroleum gas and gas project adjacent to the existing production sharing agreement area. In addition, it could trigger an investment into a fifth train at Sasol's central processing facility.

Source: *Engineering News*

In addition to South Africa's capacity to produce synfuels from coal, PetroSA produces liquid fuels – including petrol, diesel and kerosene – from gas at a gas-to-liquids (GTL) plant, in Mossel Bay, in the Western Cape.

The output of the plant is distributed by oil companies under their respective brand names in the Southern Cape and parts of the Northern and Eastern Cape.

PetroSA is facing significant financial difficulties, with the company expected to report losses of close to R14.9-billion for the 2014/15 financial year. This is the largest financial loss recorded by a State-owned company since 1994.

Further, the company has missed most of its key performance targets for the financial year, and has been experiencing in-fighting between members of its board.

In May 2015, the PetroSA board requested that its top three executives – CEO Nosiziwe Nokwe-

Macamo, CFO Lindiwe Mthimunya-Bakoro and acting VP of upstream operations Andrew Dippenaar – take gardening leave. Dippenaar accepted the board's proposal, but Nokwe-Macamo and Mthimunya-Bakoro refused.

In June 2015, the board suspended Nokwe-Macamo and Mthimunya-Bakoro at a meeting to which the CEO and CFO were not invited.

The board subsequently held another meeting, in July 2015, after it invited both parties to make written representations on the matter, and upheld the previous decision to suspend them.

In August 2015, the Western Cape High Court dismissed with costs an urgent application launched by Mthimunya-Bakoro to have the two meetings declared invalid. PetroSA maintains that both meetings were legally constituted.

The board, which was reportedly divided over the move to suspend the CEO and CFO, was thrown into further turmoil when interim chairperson Nonhlanhla Jiyane resigned in July 2015, reportedly as a result of clashes with the Central Energy Fund (CEF), of which PetroSA is a subsidiary.

In late 2014, the board of the CEF rescinded the appointment of Tshepo Kgadima as chairperson of PetroSA owing to controversy pertaining to the appointment.

Confidence in PetroSA's board is low, and the chairperson of Parliament's Portfolio Committee on Energy, Fikile Majola, has stated that the entire board should resign for it to be reconstituted.

Meanwhile, PetroSA is facing severe feedstock constraints. The company reported in October 2014 that it had produced 14% less refined product than budgeted in the 2013/14 financial year, owing to diminishing gas feedstock. It produced 5.8-million barrels during the year at its Mossel Bay GTL refinery, compared with the facility's nameplate capacity of about 15-million barrels.

PetroSA has warned that inadequate feedstock will remain a constraint on its future performance. To mitigate this risk, the company has embarked on various initiatives to sustain the GTL refinery.

Presented by:

Powertech 



Key among these is the Ikhwezi project drilling programme, which has been unsuccessful in finding the amount of gas reserves PetroSA has been targeting, with the drilling yielding only 10% of the gas anticipated.

As a result, the project has failed to alleviate PetroSA's feedstock constraints.

PetroSA has also considered other feedstock alternatives, including the importation of liquefied natural gas (LNG). The company had been seriously considering an LNG import facility to shore up gas supplies and potentially supply gas to Eskom's Gourikwa open-cycle gas turbine (OCGT) peaking power plant, in Mossel Bay, which is being fuelled using diesel.

However, in August 2014, PetroSA announced that it had decided not to pursue a floating LNG import terminal in Mossel Bay, following a study that found the proposed sites were "technically and commercially challenging".

Another unsuccessful project pursued by PetroSA involved the company's attempt to buy Engen, including the Enref refinery and Engen's fuel retail network, from Malaysian company Petronas.

PetroSA was advised by transaction advisers and the Treasury that the proposal did not make good business sense, but pursued the project despite the advice. The deal subsequently fell through owing to a lack of financing.

Southern Africa's gas, private energy sector at 'tipping point'

According to Standard Bank Oil & Gas head Paul Eardley-Taylor, Southern Africa is "catching up" on a 30-year trend that has resulted in increasing demand for gas as a substitute for coal and oil.

Following the recent announcement of the 13 preferred bidders for 1 121 MW of capacity under the enlarged fourth round of the Department of Energy's (DoE's) Renewable Energy Independent Power Producer Procurement Programme (REIPPPP), the issuance of a request for information (RFI) for South African gas-to-power projects and the selection of a contractor for a 12-million-ton-a-year liquefied natural gas (LNG) plant, in Mozambique, Standard Bank believes the Southern African region's gas and private energy sector has reached a "tipping point".

South Africa's gas RFI could lead to total investment of between \$4-billion and \$5-billion by 2017, which will mainly be LNG-driven, while a further "tipping point" would be Eskom joining the process and replacing its R18-billion-a-year diesel purchases with LNG.

Eardley-Taylor has noted that, "In recent years, we have seen significant discoveries in Mozambique and Tanzania, while South Africa is estimated to have large quantities of shale gas resources, as well as potential offshore resources . . . Southern Africa seems to be at the 'tipping point' of developing a natural gas-driven economy".

Synthetic fuels manufacturer Sasol is working with State-owned power utility Eskom's War Room on a possible public-private partnership to build a floating LNG facility along the South African coast, which will facilitate the importation of gas to be used by Eskom and independent power producers. Sasol is willing to support efforts to initially build a floating LNG terminal, which will facilitate the conversion of the expensive diesel open-cycle gas turbine plants, in the Western Cape, to gas. Sources of supply for such a facility are likely to be the US or the Middle East.

Research on the implementation of a gas policy in South Africa has been ongoing, including research by the DoE, which is formulating a Gas Utilisation Master Plan, which will aim to provide a framework for investment in gas-supporting infrastructure and outline the role that gas could play in the electricity, transport, domestic, commercial and industrial sectors. It will also assess constraints in the gas industry and consider different types of gas supplies, such as imported piped gas, as well as locally extracted natural and shale gas.

Source: *Engineering News*

Presented by:

Powertech 



Oil and gas exploration

In the ten-year period up to and including 2014, interest in oil and gas exploration in Africa soared and, in that time, the continent yielded some significant discoveries. For example, six of the ten largest global hydrocarbon discoveries in 2013 were made in Africa. Sub-Saharan Africa was described as one of the fastest growing and largest potential oil and gas regions in the world.

Historically, exploration for oil and gas in South Africa has been limited, as the country has only small deposits of conventional oil and natural gas.

However, on the back of discoveries in nearby countries in the past decade, along with the high oil prices during that period, exploration interest in the country has expanded. In August 2014, the Petroleum Agency South Africa reported that nearly all the country's offshore exploration blocks were under licence or under application for exploration. Companies with interests offshore South Africa include domestic companies PetroSA and Sasol, as well as various international players.

However, the major dip in the oil price in 2015 has caused oil and gas explorers around the world to revise and reduce their budgets, and a number of projects in the sector are likely to be delayed as a result. Professional services firm PwC in its report entitled *Fit for \$50 oil in Africa: Will the boom go bust?* has noted that, while "oil companies with stakes in Africa are not strangers to risky environments", the diminished oil price together with other risk factors faced in Africa has prompted a "re-evaluation of prospects".

As a result, PwC has identified South Africa as one of the countries that could face project delays.

Offshore projects

The South African Oil & Gas alliance indicates that South Africa has three offshore areas of upstream interest – the Orange River basin, the south and the east coasts.

The Orange River basin is the area off the north-west coast of South Africa, adjacent to the Namibian border. Within this area, one of South Africa's largest oil and gas projects – the Ibhubesi gas project – is under way. The project, which has a reported maiden reserve of 540-billion cubic feet, is a joint venture between South African national oil company PetroSA (24%) and independent Australian energy group Sunbird Energy (76%). The initial phase of Ibhubesi could involve an investment of between R12-billion and R14-billion to produce 28.3-billion cubic feet of gas yearly over an initial six- to eight-year horizon. Sunbird is confident of taking the project to the bankable feasibility stage. Thereafter, the company will look for a big farm-out partner to be part of developing Ibhubesi.

Meanwhile, Sunbird has been engaged with electricity utility Eskom about supplying gas to Eskom's Ankerlig power plant. Sunbird expects that it will sign a gas supply agreement with Eskom before the end of 2015.

Sunbird received a takeover offer from South African power infrastructure company Glendal Power, in July 2015. The proposal was subject to a number of conditions, including due diligence, third-party financing arrangements and Glendal achieving a minimum acceptance of at least 51% of all Sunbird shares on issue. Sunbird noted that while there was no guarantee that a firm takeover bid would be made by Glendal, the Sunbird board was considering the proposal and was engaging with Glendal to clarify the terms of the indicative offer, assist the suitor in completing its due diligence investigations and to determine whether to enter into and negotiate terms for a binding implementation agreement.

In August 2015, Sunbird announced a plethora of developments, including changes to management, a debt restructuring, a potential capital raise and a dual listing on the JSE. The company explained that its rapid evolution from a purely upstream junior explorer to a gas project development company has necessitated a

Presented by:

Powertech 



shift in the company's centre of gravity of activity from Australia to South Africa.

The South Coast is described as a relatively challenging development environment, owing to strong ocean currents and depths. The area is home to PetroSA's F-A production platform, from where gas is piped to the company's gas-to-liquids plant, in Mossel Bay. PetroSA has undertaken exploration aimed at accessing gas in the F-O field, 40 km from the F-A platform, through the Ikhwezi project. PetroSA contends that the area has more than one-trillion cubic feet of gas reserves, which will be sufficient to fuel PetroSA's Mossel Bay refinery for about six years. However, the Ikhwezi project has experienced numerous challenges, including difficult drilling conditions, delays and rising costs. Further, PetroSA's ability to undertake growth projects is questionable, as the entity has experienced significant financial difficulties. For the 2014 financial year, PetroSA impaired its production and exploration assets by R3.4-billion, largely because of delays and rising costs at Ikhwezi.

Onshore unconventional gas exploration

In addition to the oil and gas exploration activities taking place offshore South Africa, there has been significant interest recently in the country's onshore unconventional gas resources, particularly shale gas.

Proponents of shale gas development in South Africa contend that it will yield significant macroeconomic, energy security and employment benefits. However, many environmental concerns exist regarding the exploitation of shale gas, particularly with regard to hydraulic fracturing (fracking), the process by which shale gas is extracted.

In the context of the highly polarised debate on South Africa's shale gas resources, and in the absence of clarity on the issue, government placed a moratorium on shale gas exploration in early 2011 while it awaited policy and technical reviews. The moratorium was initially for a six-month period and was subsequently extended. During this time, a task team was established to evaluate the use of fracking to extract shale gas in South Africa. On the basis of the report produced by the task team, in September 2012, government lifted the moratorium on the processing of existing applications for exploration in the Karoo, giving permission for normal exploration

activities (excluding fracking) to be allowed to proceed alongside "augmentation of the current regulatory framework". In October 2013, draft regulations for petroleum exploration and exploitation were published for public comment.

A two-year strategic environmental assessment (SEA) into domestic fracking was launched jointly by the departments of Environmental Affairs, Science and Technology, Energy, Water Affairs and Sanitation; and Mineral Resources in May 2015. The R12.5-million SEA is intended to attain better understanding of the currently little-known potential environmental risks of exploiting unconventional gas resources. The scope of the assessment covers biodiversity and ecosystem services; water resources, including surface and ground water; geophysics; economics, including the impact on agriculture and tourism; spatial planning; national energy planning; waste management; human health impacts; air quality; the impact on the social fabric; visual and noise impacts; heritage resources and the possible impact on the area's 'sense of place'. It will also establish whether shale gas mining poses possible risks to the Square Kilometre Array project.

The SEA project team is being led by internationally accredited scientist Professor Bob Scholes, a Council for Scientific and Industrial Research research associate from the University of the Witwatersrand. A project executive committee is responsible for coordinating a multi-author drafting process, while a multistakeholder process custodian group will be established to oversee the governance of the process. Scholes has indicated that opponents and proponents of fracking will be included in the custodian group, which will not determine what is written but will ensure the drafting process is "salient, legitimate and credible". It is expected that as many as 50 expert authors will be involved in the project, with a further 28 international reviewers likely to be involved. Members of the public will also be able to contribute to the process.

Antifracking lobby group, the Treasure Karoo Action Group (TKAG) called on government in May to delay publishing final regulations and issuing rights for shale gas exploration in the Karoo until the 24-month SEA was concluded. In an open letter addressed to Mineral Resources Minister Ngoako Ramatlhodi, Deputy Minister Godfrey Oliphant and director-general Dr Thibedi Ramontja, TKAG CEO Jonathan Deal has noted that the SEA should inform regulations and the way forward.

Presented by:

Powertech 



South Africa's new JSE-backed oil, gas code globally aligned

The recently published South African Code for the Reporting of Oil and Gas (Samog) is fully aligned to the oil and gas reporting standards used globally.

The new code – a companion code to South Africa's existing South African Mineral Resource Committee (Samrec) and South African Mineral Valuation (Samval) mineral codes – is the outcome of close liaison with leading global organisations, the Petroleum Agency South Africa and the JSE.

Ensuring that all oil and gas companies list according to the same reporting standards no matter the stock exchange, the code is based on the Canadian oil and gas reporting code – National Instrument 51-101 – in respect of general disclosure.

For reserves and resources classification, the code is based on the Petroleum Resources Management System, a classification developed by organisations including the Society of Petroleum Engineers, the American Association of Petroleum Geologists, the Society of Petroleum Evaluation Engineers and the World Petroleum Council.

While the South African government's newly promulgated oil and gas regulations focus largely on the technical and engineering aspects of oil and gas well drilling, the code formalises the standard of reporting on the size of oil and gas fields and reservoirs, as well as items that must be disclosed in public reports.

As is the case in Canada, the South African Oil and Gas Committee has insisted that, when reporting oil and gas findings, companies must publish proven reserves and probable reserves, in the same way as mining companies are obliged to report on measured and indicated resources, in accordance with Samrec and Samval. Proven oil and gas reserves, known as P1, are those for which there is a 90% certainty of production occurring. Probable reserves, known as P2, are those for which there is 50% confidence that the oil or gas being referred to will be extracted economically.

Listed South African and Canadian companies will thus differ from companies listed in the US, where the Securities and Exchange Commission has determined that only P1 – the highest level of confidence – may be disclosed. Canada and South Africa have opted to disclose P1 and P2 because that gives the investor the opportunity to assess the value of the project.

Unlike Samrec and Samval, Samog combines oil and gas reserves, resources and their US dollar valuations, on a standard form that is compulsory to complete.

When the committee set out to compile Samog four years ago, it decided to adopt in principle the National Instrument 51-101 code, which is administered by the Alberta Securities Commission of Canada. On the local front, the JSE was an important contributor in drafting Samog, which resulted in the National Instrument 51-101 being modified to take into account local JSE considerations and the Petroleum Association of South Africa being included as part of a broad industry consultation process.

Oil and gas companies applying to list on the JSE will now be required to compile a qualified reserves evaluation report, which will be reviewed before being released into the public domain. The Alberta Securities Exchange has also agreed to advise the JSE should approval issues arise. The steps that have been taken ensure that all oil and gas companies, whether listed in Johannesburg, London, Calgary or Toronto, list according to the same reporting code.

Amendments to Section 12 of the JSE's listing requirements, which were introduced at the same time as the exchange adopted the globally aligned oil and gas reporting standard, became effective on March 10, 2015, following the publishing in the Government Gazette of Board Notice 38 of 2015.

Source: *Mining Weekly*

Presented by:

Powertech 



However, in June 2015, with the SEA ongoing, the Department of Mineral Resources (DMR) released the final regulations on petroleum exploration and production, which encompass shale gas exploration and fracking. These regulations will enable government to process applications to explore for shale gas, and will allow exploration companies to conduct fracking if all necessary statutory approvals are in place. The move has been defended on the basis that any major potential impacts of fracking will occur during the exploitation phase rather than the exploration phase.

Law firm Norton Rose Fulbright notes that the final regulations contain a few important departures from the draft version.

Confusion about the nature of the environmental-impact assessment required has been removed by aligning the relevant provisions with the National Environmental Management Act. The final regulations are explicitly limited to onshore exploration whereas the draft version applied to offshore operations in some respects.

The timing of the gazetting of the final regulations has been criticised, with concern existing that the DMR has not waited for the findings of the SEA before finalising the regulations. TKAG has taken the DMR to task for advancing its plan to issue exploration licences prior to the results of the SEA. "This is counterintuitive and ignores precedent in the US and other countries, where full investigations have preceded the granting of even exploration permits," it argues. The organisation has

added that the DMR appears to have overlooked the implementation of an adequate public consultation process, with several communities in the Karoo remaining "factually uninformed" and, thus, unaware of the potential implications of shale gas mining.

Further, the content of the regulations has been criticised, with environmental groups indicating that the regulations are inadequate to control fracking. TKAG, for example, has stated that the regulations are "largely inadequate to control an activity which presents the intrinsic risk allied to shale gas exploration and production". It further alleges that the regulations have been developed from a set of standards published by the American Petroleum Institute – a US-based industry-funded group. Thus, it is alleged, the regulations favour industry at the expense of the environment and affected communities.

A scientific adviser to the Southern African Faith Communities' Environment Institute Stefan Cramer, has stated that almost all the public comments made on the draft fracking regulations have been ignored in the final version, and contends that, in some cases, the final version is poorer than the draft. For example, in the final version, fracking sites are allowed to be 500 m from an existing water borehole, compared with 1 000 m in the draft version.

Despite the ongoing environmental concerns relating to the regulations, Minister of Mineral Resources Ngoako Ramatlhodi is expected to take a decision on pending Karoo exploration rights in the coming months. The

Free State gas project

Alternative-energy company Renegen announced in August that it was planning to acquire 90% of gas exploration and development company Molopo from Windfall Energy in a deal valued at R650-million.

Molopo holds onshore production rights covering 187 000 ha in the Free State, as well as additional exploration rights in both the Free State and Mpumalanga provinces. Proven reserves in the production right area have been signed off by Venmyn Deloitte and have a net present value of about R2.2-billion. A reserve of 27-billion cubic feet of gas has been proven, which translates into a diesel equivalent of about a billion litres. However, the property remains prospective, with probable reserves currently estimated at about 250-billion cubic feet.

Renegen expects to begin small-scale production in the first half of 2016 and to ramp up output when it has secured the environmental authorisations required to increase output.

The company is initially planning to invest about R25-million to process the gas into compressed natural gas for sale to local transport companies keen on converting their vehicles from diesel to gas.

Source: *Engineering News*

Presented by:

Powertech 



companies that applied for these rights, prior to the institution of the original moratorium in 2011, were Shell South Africa Upstream, Falcon Oil and Gas, and Challenger Energy's Bundu Oil and Gas Exploration.

Shell's enthusiasm for shale gas has cooled since its application for exploration rights, with the company indicating in March 2015 that it was scaling back shale gas exploration in the Karoo owing to low oil prices. TKAG has accused the company of feigning withdrawal to put pressure on government to accelerate its consideration of the fracking issue.

The lobby group stated, "Shell is a seasoned campaigner and what may at first blush appear to be a withdrawal from Karoo shale gas, may just be a Trojan horse". While Shell indicated that its withdrawal was related to lower energy prices, the company voiced frustration that it was taking more than twice as long as the 36 months it had expected to get an exploration licence to start work in the Karoo.

Challenger Energy indicated in May 2015 that it expected to pursue its shale gas exploration programme in parallel with government's SEA.

Meanwhile, Water and Sanitation Minister Nomvula Mokonyane indicated in May 2015, in reply to a Parliamentary question that no water-use licence applications had been received for shale gas exploration in the Karoo region.

She stated that the Department of Water and Sanitation (DWS) planned to publish a notice declaring the exploration and production of onshore naturally occurring hydrocarbons that required stimulation, including fracking, as a controlled activity.

Further, the DWS is undertaking a study, expected to be completed in November 2015, on the water reserves of the Gouritz catchment, in the Western Cape, and has embarked on a process of initiating a preliminary reserve study for the entire Lower Orange catchment.

EPA releases report on shale gas

In mid-2015, the US Environmental Protection Agency (EPA) released a draft assessment on the potential impacts of hydraulic fracturing (fracking) on water resources.

The report, conducted at the request of the US Congress, claims that, while fracking activities have not led to widespread, systemic impacts on drinking water resources, there are "potential vulnerabilities" in the water life cycle that could impact on drinking water. The assessment followed the stress on surface and groundwater supplies from the withdrawal of large volumes of water used in drilling and fracking; chemical mixing at the well pad site; well injection of fracking fluids; the collection of hydraulic fracturing wastewater and wastewater treatment and disposal.

The review of data sources available to the EPA found specific instances where well integrity and wastewater management related to fracking activities impacted on drinking water resources, but they were considered "small" when compared with the large number of hydraulically fractured wells across the US. The assessment also provided information about potential vulnerabilities to drinking water resources – some of which were not unique to fracking.

Meanwhile, a preliminary report by the World Wide Fund for Nature-South Africa (WWF-SA) has described shale gas as a marginal resource that remains reliant on a high gas or oil price and reasonable tax incentives, and may not provide as "cheap" a source of domestic energy as contended by private firms and State agencies.

WWF-SA believes that the case for the successful, economic extraction of the gas in South Africa cannot be solely based on the US and Canadian experience, which is not necessarily commensurate with the South African context and conditions.

Meanwhile, nonprofit organisation for cancer prevention the Cancer Association of South Africa has advised farmers whose farms border on officially identified fracking operations in the Karoo to finance professional baseline analyses of their drinking water before fracking starts. This will ensure that they are able to produce proof of water contamination, should that be the case, after fracking has taken place.

Source: *Engineering News*

Presented by:

Powertech 



Fuel pricing

The retail price of fuel in South Africa, determined by the Department of Energy, comprises an international and a domestic component.

The international component, known as the basic fuel price (BFP), is based on the import parity principle, which determines what it would cost a South African importer to buy the fuel from an international refinery, transport the product from that refinery, insure the product against losses at sea and land the product on South African shores.

The BFP takes into account prices from fuel refineries in Singapore and the Mediterranean Sea region producing products of a similar quality to local specifications. Factors affecting the BFP include international crude oil prices, international product supply/demand balances, product inventory levels, geopolitics, the rand:dollar exchange rate, international refining margins and weather patterns in the northern hemisphere.

The BFP comprises about 55% of the retail price of fuel, and varies monthly.

World economy damned if oil prices are high, damned if they are low

The world economy may be damned if oil prices are high (by suppressing demand) and damned if they are low (by creating systemic financial risks).

Oil prices fell sharply in the second half of 2014, and in mid-January 2015 the price of crude fell below \$50/bl for the first time since the depths of the global recession in 2009. Why did the price fall so dramatically? The short answer relates to a combination of slackening demand and rising supply, which created a glut. Demand seems to have been hammered by China's cooling economy – after all, the Asian giant has been responsible for about half of new oil demand in the past few years – as well as stagflation in Europe. The main supply-side factor is the surge in US shale oil production, which was virtually zero in 2008 but has gradually ramped up to more than three-million barrels a day.

The economic repercussions of the price rout are increasingly evident.

For much of the world, falling oil prices are usually an economic blessing. Cheaper transport fuels raise real disposable incomes, take the pressure off inflation and may actually bring down prices of goods, such as food, in absolute terms.

However, oil exporting countries are hurting, with many of their governments having come to rely on oil prices near \$100/bl to balance their budgets.

Further, there are concerns that falling prices could be the greater of economic evils for the eurozone, which is dabbling with deflation. Deflation is dangerous because consumers can rein in spending on the expectation that goods and services will become cheaper in time, creating a vicious cycle of demand contraction and recession. Further, businesses facing falling demand seek to cut costs by laying off workers, which, in turn, reduces household incomes and demand. Meanwhile, the real value of outstanding debt increases and so a larger fraction of household, corporate or government income has to be allocated to debt repayments.

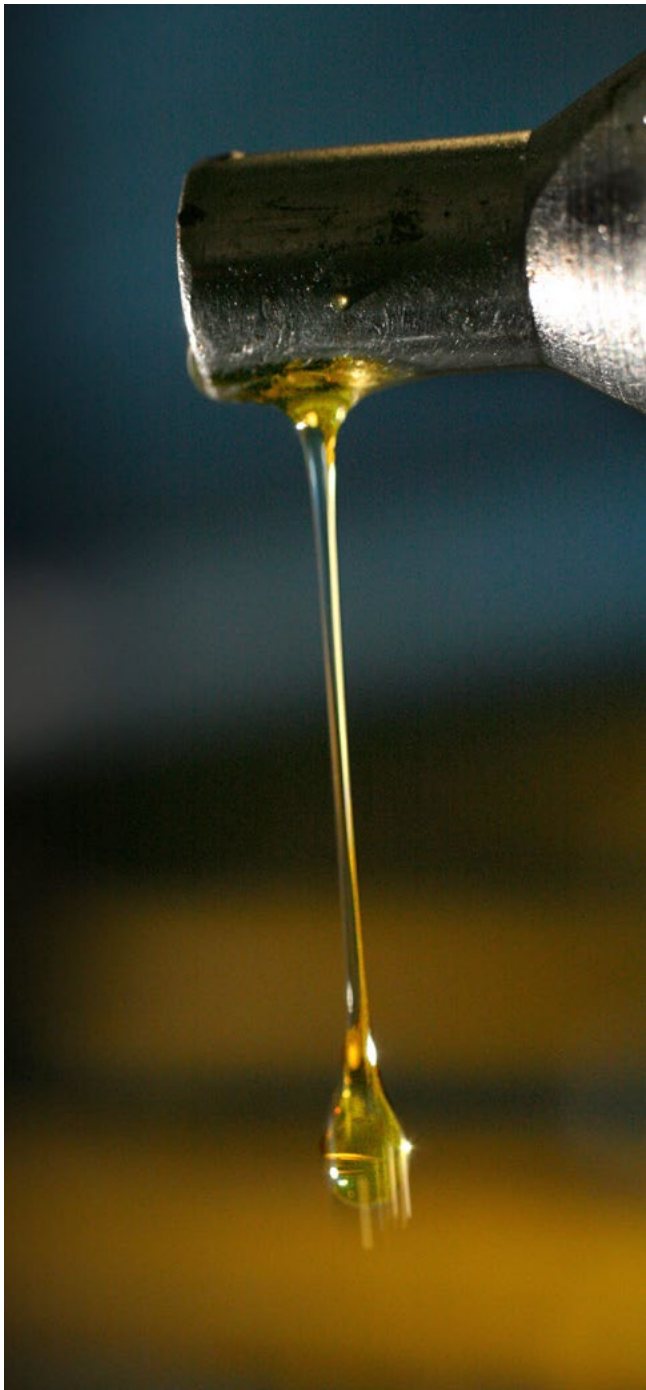
Source: Jeremy Wakeford, published in *Engineering News*

Presented by:

Powertech 



The domestic component of the retail fuel price, which is determined once a year, comprises various local costs, taxes and levies, and comprises about 29% of the South African fuel price. The balance includes transport costs and industry margins.



South Africa's fuel prices compare well with international prices

In 2014/15, the National Treasury collected R46-billion in fuel levies.

However, the fuel levy is becoming a less productive source of income for government in relation to road use, as advances in technology are making road vehicles more fuel efficient. Stellenbosch University transport economics lecturer Johann van Rensburg, believes that a review of fuel levy regulations is necessary, as increasing the levy each year will only be a temporary solution to the problem of diminishing income.

Currently, the retail price of fuel in South Africa is benefiting from low crude oil prices. However, economists have noted that as much as the country stands to benefit from lower oil prices, it loses out because other mineral prices are also low. In addition, many African economies, such as Nigeria and Angola, are dependent on oil exports, and a slowing regional economy would be negative for South Africa.

Further, the benefits of a lower oil price are being mitigated by the 80.5c/ℓ increase in the fuel levy implemented in April 2015, comprising a 50c/ℓ increase in the Road Accident Fund levy and a 30.5c/ℓ increase in the general fuel levy. The retail fuel price will also increase with a weaker rand, which plunged to a new low against the dollar in August 2015.

Meanwhile, South African fuel prices compare well with international prices. International data collection website Global Petrol Prices shows that, as of mid-August 2015, the price of petrol in South Africa was \$1.04/ℓ. Hong Kong and the Netherlands were the most expensive, at \$1.93/ℓ and \$1.88/ℓ respectively.

Norway is the third most expensive country for fuel, with the price being \$1.86/ℓ, despite the country being a major oil producer. The reason is that, instead of subsidising fuel at the pump, Norway directs its oil profits back into the country's social services. The country also tries to discourage driving through a heavy taxation on fuel to decrease pollution.

As a general rule, however, countries that produce and export oil have significantly lower prices. For example, the price of fuel in Saudi Arabia is \$0.16/ℓ; in Kuwait the price is \$0.21/ℓ and in Qatar the price is \$0.27/ℓ. Venezuela has the cheapest fuel in the world, at \$0.02/ℓ; however, fuel in that country is heavily subsidised by government.

Presented by:

Powertech 



Biofuels

Ongoing regulatory uncertainty regarding biofuels in South Africa is having a crippling effect on the country's fledgling biofuels industry, with the development of the policy environment required to facilitate the establishment of a local biofuels industry having been a protracted process that has not yet been concluded.

The issue of biofuels has been on the policy agenda since at least 2003, when the White Paper on Renewable Energy identified biofuels as a key renewable-energy resource. In December 2006, Cabinet approved a Draft Biofuels Industrial Strategy, which then underwent a public consultation, and a revised Biofuels Industrial Strategy was approved in December 2007.

Regulations for the mandatory blending of biofuels with petrol and diesel were released in August 2012, with October 1, 2015, being set as the date that these regulations would come into effect.

The mandatory blending regulations were formulated to control the required blending of bioethanol and biodiesel with petrol and diesel respectively to produce a biofuel blend to be sold in South Africa. According to Section 3 of the 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.

In January 2014, a draft position paper on the South African biofuels regulatory framework was published for public comment. The position paper, which proposed a biofuels pricing framework and rules for the administration of biofuels prices, outlined how financial support would be provided to biofuels manufacturers through a general fuel levy earmarked to subsidise manufacturers of biofuels. In terms of the draft paper, between 4.5 and 6.5 cents per litre has been proposed for 20 years to give firms a 15% return on equity.

It was expected that the Department of Energy (DoE) would publish the Final Position paper by May or June

2014. These deadlines were missed, and the DoE then committed to publishing the document by the end of December 2014. By mid-2015, the final document had still not been published, and stakeholder engagement by the DoE had dwindled.

However, in August 2015, it was reported that South Africa's biofuels incentive was being revamped over concerns that it would be unaffordable, owing to the halving of global crude oil prices over the previous year. Deputy director-general at the DoE Ompi Aphane has noted that "there is a fiscal risk posed by the subsidy under the circumstances of a declining crude oil price".

The new proposed subsidy will result in producers competing directly against each other on the basis of their individual needs. "You tell us how much subsidy you need and that will be a competitive element in determining who gets the subsidy," Aphane says.

Prospective producers are wary. Phillip Bouwer, CE of Mabele Fuels, which plans to build South Africa's largest sorghum-to-ethanol plant at a cost of R2.5-billion, says it seems government wants to replicate its successful renewable energy bidding scheme in other sectors. "The kind of equity return that players want in this market is going to be in the low 20s and I don't think going a competitive bidding route is going to drive down that requirement because investors will simply not take the risk".

Meanwhile, the policy delays are severely hampering the development of the industry. Companies hoping to participate in the sector have noted that construction on their respective biofuels projects can only start once the final regulations have been published.

Biofuels company Phytoenergy International, for example, has noted that it will not proceed with the development of its planned R5-billion canola-fuel plant until government finalises the necessary legislation. The plant, to be situated in the industrial development

Presented by:

Powertech 



zone at Coega, will produce 400 000 t/y of diesel when complete. However, Phytoenergy has warned that the project could be abandoned completely if there are ongoing delays from government.

Warnings such as these have led to concerns that the entire biofuels industry may be jeopardised if the provision of regulatory clarity continues to be delayed. Certainly, the October 2015 implementation date for the mandatory blending regulations will not be met.

The delays in the development of a local biofuels industry are delaying consequent benefits to the South African economy. Such benefits include potential capital investments in rural areas, driving job creation, rural development, black farmer development, improvements to South Africa's balance of payments, expanded crop production and improvements to air quality. In addition, many biofuel projects incorporate combined heat and power systems into their design, with the potential therefore existing for these projects to export excess power into the national electricity grid. Further, a biofuels industry would reduce the country's dependence on imported crude oil, thereby lowering the risk of uncompetitive import pricing negatively affecting the petrol price.

Biofuels projects raise concerns about food security and water resources. To some extent, however, it is



Biofuel feedstock

possible to mitigate these risks through the careful selection of the crops to be used in biofuels production. South Africa has permitted three crops to produce bioethanol – sorghum, sugar cane and sugar beet – and three to produce biodiesel – canola, sunflower and soya beans. Maize, a common bioethanol feedstock throughout the world, has been excluded, owing to its importance to local food security. Other potential feedstocks have been excluded on the basis of biodiversity and environmental concerns, and to protect existing industries, such as forestry.

SAA makes headway on journey to becoming biofueled airliner

South African Airways (SAA) is making headway on its journey to becoming a biofueled airliner by 2020 through the conversion of nicotine-free Solaris tobacco plants into more environment-friendly jet fuel.

SAA, aiming to become the “most sustainable airline in the world”, plans to scale up its use of biofuels for its flights to 20-million litres in 2017, before reaching 400-million litres by 2023.

The benefits to the airline of replacing fossil fuels with sustainable aviation biofuels include reduced operational costs and stability in fuel price planning, purchasing and foreign exchange. The constant fluctuation in fuel prices often causes early-booked seats to run at a loss owing to unpredictable fuel hikes.

The use of sustainable jet fuel also provides reputational and competitive advantages and aids in the mitigation of global environmental taxes, further reducing operational costs.

Project Solaris started in 2012 with 2 ha of crop, which increased to 11 ha in 2013, before expanding to 50 ha in 2014. By 2016, the crops will span 350 ha, increasing to 2 000 ha, 5 000 ha and 15 000 ha in 2017, 2018 and 2019 respectively. The Solaris crop was developed and patented by Italy-based research and development company Sunchem Holding. The Roundtable on Sustainable Biomaterials has certified the Solaris crop, with Project Solaris having demonstrated that it can deliver sustainably and in line with global standards.

Source: *Engineering News*

Presented by:

Powertech 



Logistics

The supply of liquid fuels is dependent on an extensive and reliable logistics network. Key to this network is the ability to transport liquid fuels effectively, particularly considering that 60% of fuel demand in South Africa is in inland regions, such as Gauteng.

Transnet Pipelines, formerly known as Petronet, is the custodian of South Africa's strategic petroleum and gas pipeline assets. The pipeline infrastructure operated by Transnet Pipelines transports about 50% of total demand in South Africa, the majority of which is for inland regions.

Demand for liquid fuels in South Africa outstrips supply and the capacity of the primary pipeline – the Durban–Johannesburg pipeline – is constrained. To address this constraint, Transnet has, for a number of years, been engaged in the development of the so-called New Multiproduct Pipeline (NMPP).

The project has faced numerous delays and cost escalations. It was initially intended to become operational in 2010, and the cost was intended to be about R11.1-billion. The first phase of the project



Transnet Pipelines' New Multiproduct Pipeline has faced numerous delays and is now expected to be completed in March 2018

Picture by Duane Daws



Presented by:

Powertech 

eventually entered operation in 2012, and the pipeline is now expected to be completed in March 2018. The cost of the project has increased to more than R25-billion.

The Transnet Pipelines network has intake stations at the Enref, Sapref and Natref refineries, and the Sasol 2 and Sasol 3 synthetic fuels plants. There are no inbound pipelines running from the Chevref refinery, with swap agreements ensuring that Chevref services the Western Cape region on behalf of the other oil companies, which do the same for Chevron in the inland region.

Once the fuel is transported to depots and storage facilities around the country, it is distributed to customers by the oil companies, branded marketers or independent wholesalers.

In addition to the NMPP project, there are a number of other logistics-related projects under development in South Africa's liquid fuels industry.

Oiltanking MOGS Saldanha, a joint venture between Oiltanking Grindrod Calulo (OTGC) Holdings and the Royal Bafokeng group's Mining, Oil and Gas Services (MOGS), is developing a new commercial crude oil blending and storage terminal, at the Port of Saldanha. It is intended that the facility will have a total capacity of 13.2-million barrels, comprising twelve 1.1-million-barrel in-ground concrete tanks.

The terminal, which will be built as a state-of-the-art facility in accordance with the highest safety and environmental standards, will be connected to an existing jetty capable of handling vessels up to very large crude carrier size.

Detailed engineering work for the development and construction of the project has started, and the project is set for completion in the first quarter of 2017. Further, Oiltanking MOGS Saldanha is at an advanced stage of securing the initial customer baseload for the terminal.

Also under development is a R2.9-billion liquid-bulk-terminal storage project, in the Port of Ngqura. The project, being developed by OTGC Holdings, is expected to be completed in the first quarter of 2019, although the project has faced delays linked to the National Energy Regulator of South Africa's (Nersa's) tariff model. The first phase of the project will involve

the construction of a 230 000 m³ storage facility, that will be used to store all petroleum products except crude oil and liquefied natural gas, and land is available to expand the facility to 720 000 m³, if required.

Meanwhile, in Cape Town, the development of a new independent fuel storage and distribution facility has faced significant opposition from oil major Chevron.

The project, under development by Burgan Cape Terminals, is intended to result in the development of fuel storage and distribution facilities at the Eastern Mole, in the Port of Cape Town, with Burgan Cape Terminals having been awarded a 20-year contract by Transnet National Ports Authority to develop and manage the project.

Chevron, which owns the only refinery in the region, contends that the project will stifle local production on the back of an influx of unregulated imports, including clean fuel imports.

Burgan, on the other hand, claims that oil companies in the Western Cape will continue to buy fuels from the Chevron refinery, as the supply of domestic fuel in the market is cheaper than imports and coastal supplies.

Burgan explains that, in the case of product shortfall, customers have the option to import product, but notes that imports are subject to the import regulations governing the fuel industry.

Despite Chevron's objections, Nersa has issued Burgan with combined licences to build and operate the petroleum storage facility, the petroleum loading facility and the petroleum pipeline in the Western Cape.

The regulator dismissed Chevron's objections as an attempt to avert increased competition, accusing the oil producer of seeking a "special dispensation of protection" that no other refiners in South Africa enjoy.

Nersa contends that the establishment of a new loading and storage facility in Cape Town will ensure security of supply as demand for petroleum products in South Africa increases, particularly when the Chevron refinery is shut down which, in recent years, has increasingly led to a shortage of fuel, requiring imports and transfers from other refineries in South Africa. As the bulk of these imports are delivered by ship, Nersa



maintains that Burgan will be able to provide additional storage capacity.

Further, Nersa believes the Burgan facility could provide an option to assist in reducing State-owned power utility Eskom's diesel shortage. In June 2015, Burgan secured the required environmental authorisation, with the Western Cape Department of Environmental Affairs and Development Planning (DEA&DP) approving the environmental-impact assessment (EIA) for the project.

Chevron unsuccessfully opposed the EIA process on the grounds that the economic impact of the development would result in the closure of its refinery. The company has subsequently indicated that it will not appeal the DEA&DP's decision to approve the project. Instead, Chevron intends to approach government to find a solution to ensure the viability of the local refining industry.

The approval of the EIA is one of the final regulatory hurdles for the Burgan project. The company now intends to put in place the final necessary permits and licences to start breaking soil on the project that will result in a R650-million investment in the first two years of development. Only the local municipal licences are outstanding; however, there are no expectations of further potential delays in securing the approvals.

Burgan has signed multiple long-term contracts with major established and emerging customers to store

and distribute locally produced and imported fuels. The customers will use an aggregate of up to 805 000 m³/y of capacity.

Another logistics-related project under development in South Africa is a liquefied petroleum gas (LPG) import terminal, being built in the Port of Saldanha. The project is being developed by Sunrise Energy, owned by MOGS (60%), the Industrial Development Corporation (31%) and Ilitha Group Holdings (9%), in response to LPG supply shortfalls in the region. The facility will be open access, with the infrastructure accessible to third-party LPG distributors, importers and bulk consumers. Sunrise Energy will provide terminal services; however, it will not own or trade LPG product.

The terminal will comprise marine facilities incorporating a multibuoy mooring system, as well as a transfer pipeline, onshore storage bullets and product dispatch facilities for road-tanker loading, pipeline transfers or direct cylinder filling. The initial phase of development involves the construction of 5 500 t of receiving storage, comprising five off-mounded storage bullets. Modular expansion of the facilities in the future will allow for an increase in available capacity in line with the growth in market requirements. The maximum throughput capacity of the facility will be 52 000 t/m onshore receiving storage.

Phase 1 of the Sunrise project will cost an estimated R800-million, and the facility is set to be commissioned at the end of 2016. Construction on the project started in February 2014.



An artist's impression of Sunrise Energy's liquefied petroleum gas import terminal, in the Port of Saldanha, on the West Coast of South Africa

Picture by Sunrise Energy

Presented by:

Powertech 



Despite oil price headwinds, Saldanha Bay IDZ roll-out progressing

A project is under way to develop an oil services hub in Saldanha Bay, in the Western Cape. The sharp decline in oil prices witnessed over the past year has resulted in questions being raised about the wisdom of South Africa's aspiration to pursue an aggressive roll-out of this project.

Prior to the decline, there was widespread support for the concept, owing to the rapid growth of upstream exploration and development in West Africa, which resulted in increasing demand for dedicated oil and gas services and a marine repair hub. In fact, a report published by the Saldanha Bay Industrial Development Zone (SBIDZ) Licensing Company in 2014 has estimated that Africa has produced about eight-million barrels of crude oil a day, or about 10% of global production.

Against this background, demand for offshore oil and gas platforms and components and repair services is perceived to be strong and growing. South Africa, particularly the Port of Saldanha Bay, is viewed as geographically well positioned to service the oil and gas sector.

The SBIDZ Licensing Company acknowledges that the lower oil price has had an impact on exploration and production activities. However, it does not expect the cyclical development to deter investors, who are showing interest in the SBIDZ as a long-term hub for upstream oil and gas services, marine repair and fabrication. Saldanha port manager Willem Roux has noted that, while it is a difficult time in the oil industry, there is still an appetite for the development of a dedicated facility in Saldanha for the oil and gas sector. By June 2015, more than 26 companies active in logistics, support services, oil and gas contracting and drilling, marine and rig building, and fabrication and repair, as well as specialist industries, had shown interest in relocating their businesses to the SBIDZ, with eight of the companies developing and finalising agreements with the zone operator.

One of the value propositions of an oil and gas and marine repair and engineering cluster is to provide investors with an ease-of-doing-business model by offering a Customs Control Area (CCA), otherwise known as a free port, or free-trade zone. The CCA will allow the seamless flow of goods into the SBIDZ. These goods will be re-exported from the terminals. This includes no time limitations on goods serviced and stored within the zone. This free-port offering supports the ease-of-doing-business model that the SBIDZ Licensing Company considers as the key incentive for investors in terms of reduced procedures and timelines. Two components are believed to be key to the successful development of the SBIDZ – the land-based development at the back-of-quay and port-based infrastructure that includes the new, dedicated rig-repair facilities, and the offshore supply base and servicing jetty.

The SBIDZ Licensing Company is responsible for the land-based development and has started with conceptual engineering studies and the appointment of service providers for the bulk engineering services. The SBIDZ Licensing Company has appointed service providers to upgrade the wastewater treatment works, and build and upgrade bulk services.

Port infrastructure construction is managed by Transnet National Ports Authority and construction works to upgrade the existing general maintenance quay into an offshore supply base (OSSB) has begun. The OSSB will facilitate receipt of equipment and waste from offshore exploration and production activities and facilities for loading and shipping of equipment, stores, goods, bunkers and drilling fluids.

Prefeasibility studies, including geotechnical and seismic studies, as well as preliminary designs, have been completed to establish Berth 205 – a 380-m-long quay, with a depth of 21 m, that will be dedicated to activities such as rig repair. The facility will be able to accommodate two rigs at a time.

The 500-m-long jetty at the Mossgas quay will support vessel and equipment repair, and fabrication activities associated with the upstream oil and gas and marine engineering services. The jetty will have a depth of 8.5 m and 12 m pockets to accommodate floating docks for vessel building, repairs and maintenance.

Source: *Engineering News*

Presented by:

Powertech 



Cleaner fuels

Investment in South Africa's downstream liquid fuels industry is being constrained by regulatory uncertainty relating to the country's clean fuel specifications.

Currently, South Africa's refineries comply with Clean Fuels 1 (CF1) specifications, which prohibit the addition of lead to all grades of petrol and prescribe an allowable level of sulphur in diesel of 500 parts per million (ppm). About R10-billion was invested in the upgrade of the country's refineries to meet the CF1 specifications. To further improve the quality of the liquid fuels being used in the country, new specifications – Clean Fuels 2 (CF2) specifications – have been developed. The CF2 requirements stipulate a reduction in sulphur to 10 ppm or less, as well as a reduction in benzene and aromatics levels in the petrol and diesel produced. It is estimated that an investment of about R40-billion (in 2010 rand terms) will be required to comply with the CF2 specifications.

The CF2 specifications were initially intended to come into force in 2017. However, in early 2014 this compliance date was delayed, and details of a new deadline have not yet been revealed. The delay was linked to delays in finalising a cost-recovery mechanism for the upgrades required by the local refineries to meet the new specifications. In the absence of an implementation date and a cost-recovery mechanism, South Africa's refineries have put their upgrade plans on hold.

In this context, the possibility has emerged that the market could be flooded by clean fuel imports, with the deferment of the clean fuels policy having opened a gap for importers. The potential for clean fuels imports has been heightened by the National Energy Regulator of South Africa's (Nersa's) December 2014 approval of the construction of a new liquid fuels storage and distribution facility at the Port of Cape Town.

Oil major Chevron, which opposed Nersa's decision to grant Burgan Cape Terminals a licence to develop the

new Cape Town facility, has noted that the facility will allow traders to import large quantities of clean fuels products. Chevron contends that such an outcome could halt and reverse the development of the local petroleum industry, while rendering existing refineries economically unviable.

The detrimental impact forecast by Chevron could be mitigated through restrictions on clean fuels importation, and Burgan CEO Muziwandile Mseleku has noted that any fuel imports require a permit from the Department of Energy (DoE). He contends that "permit guidelines indicate that local manufacturing and security of supply should be taken into consideration during the issuing process".

However, Chevron chairperson Nobuzwe Mbuyisa, who is also the chairperson of the South African Petroleum Industry Association (Sapia), has stated that if clean fuels are imported on a large scale prior to industry investing in local manufacturing, it could have a significant adverse economic and socioeconomic impact on the South African economy, including negatively impacting on the security of supply for petrol, diesel, jet fuel, liquefied petroleum gas and bitumen, besides others. She contends that "refiners would be forced to reduce production, sell locally at a discount or export at a loss".

Bearing this in mind, Sapia has indicated that it is becoming increasingly urgent for government to address the current policy uncertainty surrounding the introduction of cleaner fuels.

The association has called for the resolution of lingering uncertainty about the financing of the transition to new cleaner fuels standards, warning that, unless urgent progress is made, the refining industry could face similar pressures to those being faced currently by the embattled steel sector.

In March 2015, the DoE indicated that a task team would be assembled to deal with outstanding issues relating

Presented by:

Powertech 



to the introduction of cleaner fuels. The task team was expected to have its inaugural meeting in mid-April, where its composition and terms of reference were expected to be determined.

Meanwhile, South Africa's automotive industry continues to bemoan the absence of clean fuels in the country. Local automotive companies require cleaner fuels than those being produced under the CF1 standards if they

are to market high-technology, highly fuel-efficient and low-emission vehicles in South Africa. Currently, South African car companies are unable to sell some of the world's most modern cars, as local fuels will damage the engines of these vehicles. When automotive companies do import sophisticated engines, they have to be "reverse-engineered" to use the fuel available in South Africa, thereby mitigating the environmental benefits that these vehicles offer.



An investment of about R40-billion will be required for refineries to comply with South Africa's new clean fuel specifications

Picture by Bloomberg

Presented by:

Powertech 



Outlook

Investment in South Africa's liquid fuels industry has, for some time, been constrained by regulatory uncertainty and it seems likely that the uncertain regulatory framework for oil and gas exploration and development is likely to continue causing delays in the development of offshore and unconventional "frontier" projects, particularly in the depressed pricing environment.

However, PwC Africa oil and gas advisory leader Chris Bredenhann in August 2015 expressed optimism that discussions between government and the industry on amendments to the Mineral and Petroleum Resources Development Act (MPRDA) could result in "significant updates" to the legislation. He stated, "... we expect to see favourable legislation soon".

Despite this, Bredenhann has cautioned that it is unlikely that separate legislation will be drafted for the mining and oil and gas industries as had initially been proposed to cater for the vastly different stages of development of the two industries.

Mineral Resources Minister Ngoako Ramatlhodi has noted that this is, in part, to save time, as companies are uncomfortable with the prolonged process that will have to be followed if the oil and gas sector is to fall under separate legislation.

Meanwhile, the oil and gas industry has expressed unhappiness with proposed MPRDA amendments, which not only stipulate a 20% free-carry for the State in projects developed in South Africa, but give an indication that, in certain instances, government might take an even higher position.

No pricing formula has been outlined for the acquisition of additional stakes, which will also be over and above prescribed black economic-empowerment ownership.

The industry is also concerned that the Minister has discretion to declare minerals "strategic", which could affect the ability of companies to export resources



Picture by Bloomberg

that have been designated for beneficiation within the borders of the country.

There are also concerns about the Department of Mineral Resources assuming control of the licensing of oil and gas acreages – a function currently performed by the Petroleum Agency South Africa, which is considered relatively independent and efficient.

Companies are hoping for greater certainty on the ownership formula, in particular, so that they can model its effect on project returns.

The legislation might also need to take account of the relative underdevelopment of the sector to find a risk-reward balance that is supportive of investment.

Globally, the tendency in 'frontier plays', or territories that do not have proven resource bases, is to be encouraging towards investment, with the result that government's stake remains small until the reserves base increases.

Presented by:

Powertech 



Appendix: Global oil market

The annual BP Statistical Review of World Energy 2015, released by UK-based oil giant BP in June 2015, shows that global oil consumption amounted to 92.09-million barrels a day in 2014, an increase of 0.8% on the 91.24-million barrels a day consumed in 2013. The Asia Pacific region is the largest consumer of oil, accounting for 33.9% of total consumption in 2014, having consumed 30.86-million barrels a day. Within the region, China was the largest consumer, using 11.06-million barrels a day of oil, accounting for 12.4% of global consumption. However, China is only the world's second-largest consumer of oil, with the US being in the top position, having consumed 19.04-million barrels of oil a day in 2014 representing 19.9% of total global consumption for the year.

BP figures show that global oil production amounted to 88.67-million barrels a day in 2014, which was 2.3% up on the previous year's production. The largest oil-producing region in the world, the Middle East, produced 28.56-million barrels a day of oil during the year, accounting for 31.7% of total global oil output for 2014.

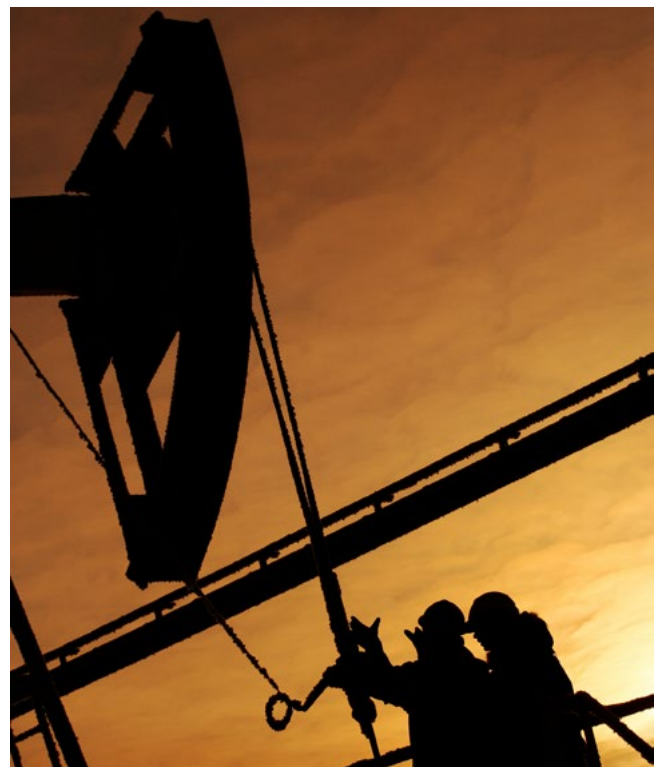
Saudi Arabia is the region's largest producer, accounting for 12.9% of global oil production, followed by the United Arab Emirates, Iran, Iraq and Kuwait, which each accounted for about 4% of total global production.

North America was the second-largest oil-producing region in the world in 2014, producing 18.72-million barrels a day, representing 20.5% of the year's total output. The US, the largest oil-producing country in that region, accounted for 12.3% of global output for the year.

Europe and Eurasia accounted for 19.8% of global oil production in 2014, producing 17.2-million barrels a day of oil; the Asia Pacific region produced 8.32-million barrels a day; Africa produced 8.26-million barrels a day; and South and Central America produced 7.61-million barrels a day.

According to BP, global proved oil reserves stood at 1.7-trillion barrels at the end of 2014. This was similar to total proved oil reserves at the end of 2013. The world's largest holding of proved oil reserves are situated in Venezuela, with 298.3-billion barrels, followed by Saudi Arabia, with 267-billion barrels. Other countries with more than 100-billion barrels of proved oil reserves include Canada, the Russian Federation, Iran, Iraq and Kuwait.

In terms of regions, the Middle East holds the largest share of global oil reserves, at 48%. It is followed by South and Central America (19%), North America (14%), Europe and Eurasia (9%), Africa (8%) and the Asia Pacific region (3%).



Global proved oil reserves stood at 1.7-trillion barrels at the end of 2014

Picture by Bloomberg



Presented by:

Powertech

Main sources

BP. Statistical review of world energy (June 2015).

Business Day. Project Ikhwezi eats into PetroSA assets (October 22, 2015).

Business Day. Oil, gas legislation to remain within current act, for now, says Ramatlhodi (February 24, 2015).

Business Day. SA government delays imperil R5bn canola-fuel plant (April 10, 2015).

Business Day. What the nuclear accord means for the oil industry (July 15, 2015).

Business Day. Documents in suspension battle reveal PetroSA's financial disaster (July 23, 2015).

Business Day. Now chair quits embattled PetroSA (July 28, 2015).

Business Report. Chevron fumes over fuel import laws (December 18, 2014).

Business Report. Deferred clean fuels policy puts jobs at risk (March 13, 2015).

Business Report. Shell quits fracking projects as energy prices fall (March 17, 2015).

Business Report. Shell's fracking move 'may be a ploy' (March 19, 2015).

Business Report. Fracking given the green light (June 11, 2015).

Centre for Competition, Regulation and Economic Development. Study on barriers to entry in liquid fuel distribution in South Africa (October 2014).

Chevron. Presentation to the National Energy Regulator of South Africa on Chevron South Africa's objection to Borgan Cape Terminals application for facilities at the Eastern Mole in Cape Town (November 2014).

Department of Energy. Draft position paper on the South African biofuels regulatory framework (January 2014).

Engineering News. Not feasible to establish LNG import terminal in Mossel Bay – PetroSA (August 26, 2014).

Engineering News. Diminishing gas continues to stifle PetroSA's GTL output (October 21, 2014).

Engineering News. Shell says SA could recoup LNG terminal costs within four years (November 5, 2014).

Engineering News. Borgan takes WC fuel terminal fight to CompComm (December 2, 2014).

Engineering News. SAA to test biofuel flight next year (December 9, 2014).

Engineering News. Nersa approves Borgan's licence for WC facility, Chevron still opposed (December 9, 2014).

Engineering News. SA seeks investors for R10bn Saldanha oil-services hub roll-out (January 26, 2015).

Engineering News. Oil price volatility masks deeper trends (January 30, 2015).

Engineering News. Grindrod to invest in Maputo port, RB coal and Africa rail projects (February 25, 2015).

Engineering News. DoE goes to ground over mandatory blending of biofuels deadline (March 6, 2015).

Engineering News. Policy delay opens door for clean fuels imports, threatens S African refinery (March 6, 2015).

Engineering News. Sasol working with SA's power 'war room' on gas-importation plan (March 9, 2015).

Engineering News. Will SA continue to benefit from low oil prices as rand weakens, levy rises? (March 13, 2015).

Engineering News. Eskom seals 15-year gas term sheet with Sunbird for Ankerlig power station (March 18, 2015).

Engineering News. Nersa says Borgan terminal key to security of supply (March 23, 2015).

Engineering News. Sapia pins hopes on new task team to end cleaner fuels uncertainty (March 31, 2015).

Engineering News. Sasol nears tail end of R15.3bn mine replacement project in Secunda (May 6, 2015).

Engineering News. SA set to allow shale gas exploration to proceed despite 24-month risk assessment (May 12, 2015).

Engineering News. Energy firm expects to explore Karoo in parallel with shale-gas risk assessment (May 15, 2015).

Presented by:

Powertech 



Engineering News. Saldanha Bay crude oil terminal to be completed by 2017 (May 20, 2015).
Engineering News. TKAG wants Karoo exploration delayed until conclusion of enviro assessment (May 22, 2015).
Engineering News. Ibhubesi gas supply deal with Eskom expected before year-end (June 4, 2015).
Engineering News. Antifracking group slams DMR for 'inadequate' shale gas regulations (June 8, 2015).
Engineering News. PetroSA board should resign – Portfolio Committee (June 10, 2015).
Engineering News. Burgan gets EIA green light for WC fuel storage facility (June 12, 2015).
Engineering News. Despite oil price headwinds, Saldanha Bay IDZ roll-out progressing (June 12, 2015).
Engineering News. PetroSA suspends CEO, CFO (June 22, 2015).
Engineering News. Southern Africa's gas, private energy sector at 'tipping point' – Standard Bank (June 24, 2015).
Engineering News. Chevron won't appeal enviro green light for CT fuel storage facility (June 29, 2015).
Engineering News. Iran, 6 world powers reach historical nuclear deal (July 14, 2015).
Engineering News. South Africa's new JSE-backed oil, gas code globally aligned (July 22, 2015).
Engineering News. S Africa's offshore supply base construction starts despite difficulties in oil industry (July 22, 2015).
Engineering News. Oil traders fill South Africa storage to the brim (July 27, 2015).
Engineering News. Sunbird gets buyout offer from S African power infrastructure firm (July 29, 2015).
Engineering News. Expert highlights coal projects 'likely to succeed' (July 31, 2015).
Engineering News. Regulatory uncertainty continues to weigh down South Africa's oil and gas sector (August 5, 2015).
Engineering News. Weak oil price exacts toll on Sasol's earnings (August 7, 2015).
Engineering News. Major changes flagged for Sunbird (August 10, 2015).
Engineering News. Cheaper oil forces South Africa to rework biofuels subsidy (August 11, 2015).
Engineering News. Legislative changes to be supportive of offshore oil, gas drilling – Zuma (August 13, 2015).

Financial Mail. Transnet pipeline: Still static on the line (June 18, 2015).

Financial Times. South Africa oil: Time to look offshore? (January 9, 2014).

PwC. Fit for \$50 oil in Africa: Will the boom go bust? (February 2015).

PwC. From fragile to agile: Africa oil and gas review (August 2015).

Sasol. Annual integrated report (2014).

Sasol. Interim results announcement (March 2015).

South African Petroleum Industry Association. Annual report (2013).

Sunbird Energy. Annual report (2014).

US Energy Information Administration. South Africa: International energy data and analysis (April 2015).

www.cefgroup.co.za

www.globalpetrolprices.com

www.transnet.net

Presented by:



Powertech

Liquid fuels 2015: A review of South Africa's liquid fuels sector

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

Presented by:

Powertech 





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



Presented by:

Powertech