

ANNUAL REPORT
of the **IGUA-SA**
2020



Contents

Message from the Chairperson	1
<hr/>	
Review by the IGUA-SA	
<hr/>	
1. Gas energy availability	5
<hr/>	
2. Gas energy policy	13
<hr/>	
3. Gas energy pricing	16
<hr/>	
Membership	21
<hr/>	



Message from the Chairperson

IGUA-SA's primary objective is to ensure the efficient availability of hydrocarbon gas in Southern Africa to meet significant and growing demand, both by organisations requiring more gas to expand and organisations wishing to switch to gas from costly and environmentally harmful alternative energy sources.

It gives me great pleasure to write to you and reflect on a full year of operations of the Industrial Gas Users Association – Southern Africa (IGUA-SA).

At the time of writing, the COVID-19 pandemic has taken an insufferable toll on society through illness and the loss of life. Economic growth prospects have been and will be curtailed for some time to come, whilst developing economies will experience the adverse economic effects of COVID-19 for longer.

From a South African perspective, the COVID-19 pandemic will undoubtedly also provide opportunities for a focussed and collaborative approach between stakeholders to now transform the South African economy and place it on a path of sustainable and inclusive growth and prosperity for all. The transformation of the energy sector at large is an imperative and has a key role to play in unlocking the full potential of the South African economy.

GLOBAL CONTEXT

Natural gas plays an ever-increasing role in the energy mix of many countries. It is one of the mainstays of global energy. Where it replaces more polluting fuels, it improves air quality and limits emissions of carbon dioxide. In a global drive towards low carbon economic development, gas is seen as a bridging fuel for the next three to four decades as the prominence of renewable energy and technological advances in this field take hold.

The global outlook for gas¹ can be summarised as follows:

- ▶ Demand projected to grow by 2% per annum over the long term
- ▶ Expected demand growth will make gas the biggest fossil fuel in use by 2040
- ▶ Liquefied natural gas (LNG) will play a critical role in meeting demand with expected annual growth rates of 4-5%

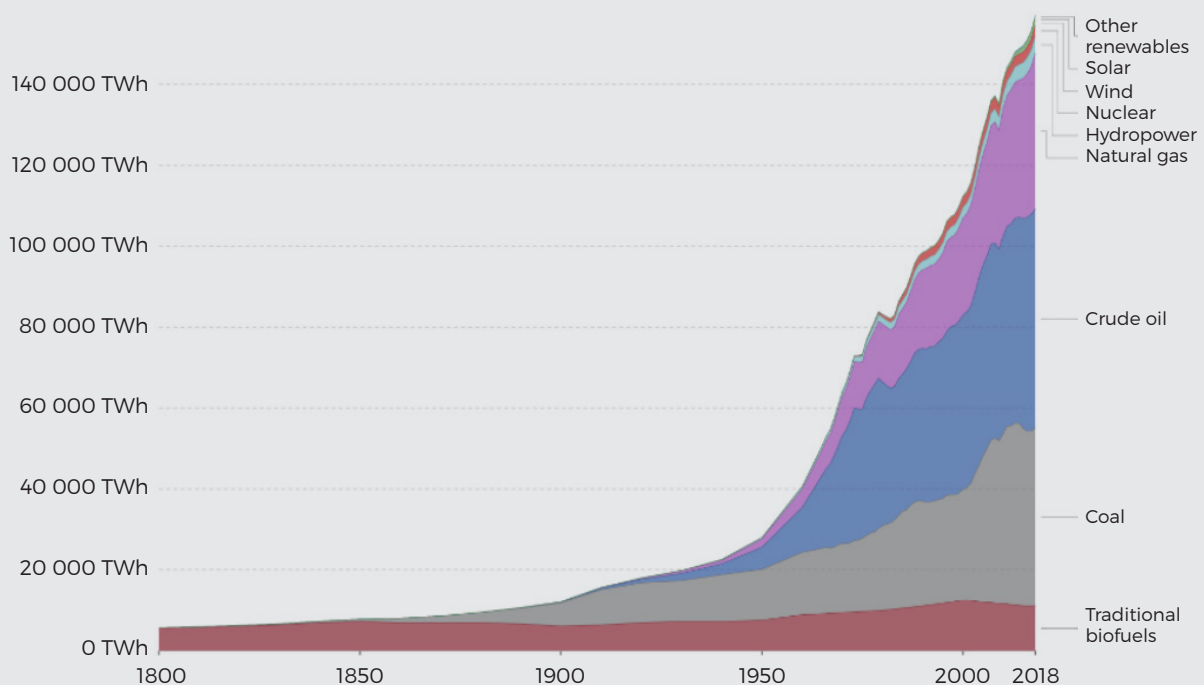
¹ Source: International Gas Union: The Role of Natural Gas in the Energy Transition, 2019

(The global outlook for gas continued)

- ▶ Despite rapid deployment of renewable energies, fossil fuel market share will remain dominant for some time to come with gas as destination fuel
- ▶ Policy frameworks need to develop in support of gas to fully capture the advantages of a more sustainable energy mix
- ▶ Infrastructure regulations and permitting should encourage investment in gas systems, which enables/accelerates more sustainable development
- ▶ Gas is a major contributor to reducing carbon emissions and cleaning polluted air
- ▶ Switching power generation from coal to gas has the greatest short-term impact
- ▶ Gas is advancing as a transport fuel, with rapid developments of gas in most other energy applications such as heating and small-scale power generation

The ever-increasing prominence of natural gas energy is well illustrated in the following graph:

Global Primary Energy Consumption (TWh)²



SOUTH AFRICAN CONTEXT

Natural gas makes up 24% of global energy consumption, growing at a rate of approximately 5% per annum. In contrast, natural gas energy in South Africa constitutes only 3% of the energy mix having experienced zero growth over the last 7 years.

Yet, current supply of gas energy will be curtailed from 2024 by approximately 20% per annum as a result of dwindling gas resources in Pande and Temane, Mozambique.

Whilst natural gas as energy source plays an increasing role globally, the importance thereof in the South African economy is being overlooked as stakeholders focus on the current electricity generation crisis.

² Source: Vaclav Smit and BP Statistical Review of World Energy (2018)

The South African Government does not at present have an integrated gas energy policy. The current policy towards gas is only focussed on gas demand for power generation as contained in the Integrated Resource Plan (2019). This lack of stakeholder focus is evident in the lack of growth in the sector and shortages of gas energy. Whilst large parts of the industrial sector are reliant on gas energy, demand for gas has exceeded supply for the last 7 years constraining fixed capital investment and growth not only in the industrial sector, but also in the mining and logistics sectors alike.

South Africa is a developmental state, and this requires the unified cooperation and focussed approach by public and private stakeholders to come up with economically sound and expedient solutions to the impending gas energy crisis. However, South Africa is faced with another energy challenge if immediate action is not taken by public and private stakeholders to develop the gas economy.

THE IGUA-SA MANDATE

We have concluded, since the establishment of the IGUA-SA, that no organisation in South Africa today, whether public or private, has firm and tangible plans to develop the gas economy and meet the current and future supply deficit for gas energy. This holds significant environmental, social and economic risk for South Africa. The IGUA-SA will therefore continue with its mandate to advocate the efficient and expedient development of the gas economy in South Africa. This active, continued and fact-based engagement with public and private stakeholders requires the support of all industries with interests in gas energy.

I therefore extend an invitation to all public and private organisations and institutions with an interest in the development of the gas economy to urgently engage and/or join the IGUA-SA to enable the development, coordination and implementation of suitable gas energy solutions for South Africa.

South Africa, as is the case with electricity, is facing an imminent gas cliff.



IGUA-SA presenting at the “Enabling a viable gas sector for SA” seminar in September 2019

The IGUA-SA had the privilege to engage with multiple stakeholders throughout the year and had the opportunity to present its views across multiple forums and platforms. Stakeholder engagements are a continuous part of the IGUA-SA’s work and serve both as a platform for learning and sharing of information.

These ranged from Government i.e. Departments of Minerals and Energy, Trade Industry and Competition, NERSA, Central Energy Fund, CSIR, Transnet; to social partners i.e. NEDLAC, BUSA, NEPAD; and business i.e. global oil and gas majors, financial institutions, leading legal firms, large energy users and suppliers.

Relevant conferences were attended whilst the IGUA-SA were invited to share its views on platforms such as EE Publishers and Nedbank Gas Energy Forum, EY IPFA Gas Energy event and various other corporate firms.

I would like to conclude by saying that a significant amount of work has been completed over a relatively short period of time where the IGUA-SA managed to establish itself as a credible, objective and fact-based advocacy group.

This does not simply materialise and I would like to take this opportunity to thank Mr. Jaco Human for working tirelessly to advance the mandate of our association as well as for his thought-leadership and coordinating role he plays with the various work streams. Furthermore, I would like to thank my fellow Exco members for their ongoing support and all our member organisations, who have all been involved and actively participated financially and otherwise, to the work of the IGUA-SA. I also would like to commend the level of cooperation between our members with the work we do and the efficient manner in which we reach decisions to advance our mandate.

The founding mandate of the IGUA-SA remains unchanged. IGUA-SA's primary objective is to ensure the efficient availability of hydrocarbon gas in Southern Africa to meet significant and growing demand, both by organisations requiring more gas to expand and organisations wishing to switch to gas from costly and environmentally harmful alternative energy sources. It is the unassuming nature of this mandate that provides clarity and focus on **three key areas of work:**



**Gas energy
availability**



**Gas energy
policy**



**Gas energy
pricing**

Please allow me then, on behalf of IGUA-SA, to share some more in-depth views on gas energy availability, policy and pricing, together with details on our membership.

The natural gas landscape is faced with various challenges related to policy, availability and pricing in the immediate future. These can only be effectively addressed if more organisations participate in IGUA-SA's work.

Stakeholders are therefore implored to join IGUA-SA to collectively address these challenges and to jointly share in the knowledge and participate in the strategic actions undertaken by IGUA-SA. Appropriate resources are being deployed and utilised on an ongoing basis. A broader participation in membership will not only assist in achieving IGUA-SA's strategic objectives but will also assist in efficiently meeting its financial obligations through a wider membership base.

I look forward to our continued, focussed and constructive engagement to make a positive impact on the gas landscape in South Africa to the benefit of the South African economy and society at large.

Yours sincerely



Thomas Shaw

IGUA-SA Chairperson

1. Gas energy availability

The development of the current gas energy economy in South Africa can be demonstrated across four distinct periods:

South Africa Gas Economy Development Stages

1998 – 2005:

South Africa significantly reforms its energy sector

- ▶ 1998 White Paper on energy
- ▶ 2001 The Gas Act
- ▶ 2004 Rompco
- ▶ Development of TX and DX networks

2013 – 2018:

Gas development gains momentum driven by major global trends

- ▶ Global development of LNG markets
- ▶ Mozambique LNG takes off with Rovuma development
- ▶ >USD128 billion investment between 2017 and 2029
- ▶ Gas prices change from long to short term contracts attracting new buyers globally
- ▶ SA announced various programs from around 2012 for gas growth in energy mix & GUMP
- ▶ SA Sate was not to act nor execute on any gas policy soon due to focus on nuclear power generation
- ▶ Period of stagnation
- ▶ Downscaling of international gas majors' presence in SA

2006 – 2012:

Gas starts to feature more strongly in South Africa's energy policy

- ▶ Gas energy matures
- ▶ Finds place in policy
- ▶ Shale gas potential reported
- ▶ Discoveries in Mozambique & Tanzania for regional trade
- ▶ Electricity blackouts in 2008
- ▶ Eskom turns to costly diesel OCGT

2018 – Present:

Gas energy shortages and demand exceeding supply

- ▶ Characterised by gas energy shortages
- ▶ Limited or no gas pipeline & receiving infrastructure in South Africa
- ▶ Significant increases in gas cost for users
- ▶ Policy uncertainty as to the future role of gas in SA's energy mix & timing
- ▶ Gas energy insecurity amidst dwindling Sasol supply

SOUTH AFRICA'S HISTORY WITH GAS CAN BE DELINEATED INTO FOUR PERIODS.

Phase 1

Firstly, from 1998-2005, South Africa significantly reformed its energy sector. This included the 1998 White Paper on energy, which recognised natural gas as an option to diversify the country's energy mix. In 2001 the Gas Act was implemented, facilitating the development of gas infrastructure in the country through pipelines and the regulatory framework. Significantly, in 2004, a pipeline between Mozambique and South Africa began pumping gas. Sasol, a dominant player in the country's liquid fuels industry, was behind the 865 km gas pipeline. While most of the gas ($\pm 130\text{mGJ/a}$) transported through the pipeline goes to Sasol, the pipeline has nonetheless created demand ($\pm 50\text{mGJ/a}$) to around 370 industrial and commercial customers via 530 off-take points.

Phase 2

The **second** phase covers 2006 - 2012. During this period gas started to feature more strongly in South Africa's energy policy. A few turning points occurred. One was the substantial shale gas potential reported by the United States Energy Information Agency. This encouraged policy makers to include gas into the energy mix. Secondly, natural gas discoveries in Mozambique and Tanzania raised the potential for regional trade. South Africa experienced an electricity crisis, culminating in blackouts in 2008. In response, the state power utility Eskom turned to the costly diesel Open Cycle Gas Turbines at a huge cost to Eskom and now the economy at large.

Phase 3

During the **third** phase, from 2013 to 2018, gas development started to gain momentum driven by major global trends. These include the trend toward liquefaction of gas which enabled transportation of gas to places where pipelines weren't possible. Also, during this time regional developments in Mozambique took off with development of the Rovuma gas basin and the investment by oil majors expected to be in excess of USD128 billion between 2017 and 2029. Gas prices began changing from long-term to short-term contracts. This opened the trading of gas to competitive spot markets attracting new buyers. The South African Department of Energy announced various programs from around 2012 focused on the change in energy mix in South Africa to gas mainly through intended gas-to-power programs. Also, during this phase, it suggested details of a Gas Utilisation Master Plan – a framework plan for the development of the gas economy in South Africa. However, it became evident during this period that the South African Government was not to action nor execute any gas policy soon as it focussed on nuclear power generation. This resulted in a period of stagnation in which very little policy direction was provided by the South African Government on gas energy developments that also resulted in time in the downscaling of international oil majors' gas presence in South Africa.

Phase 4

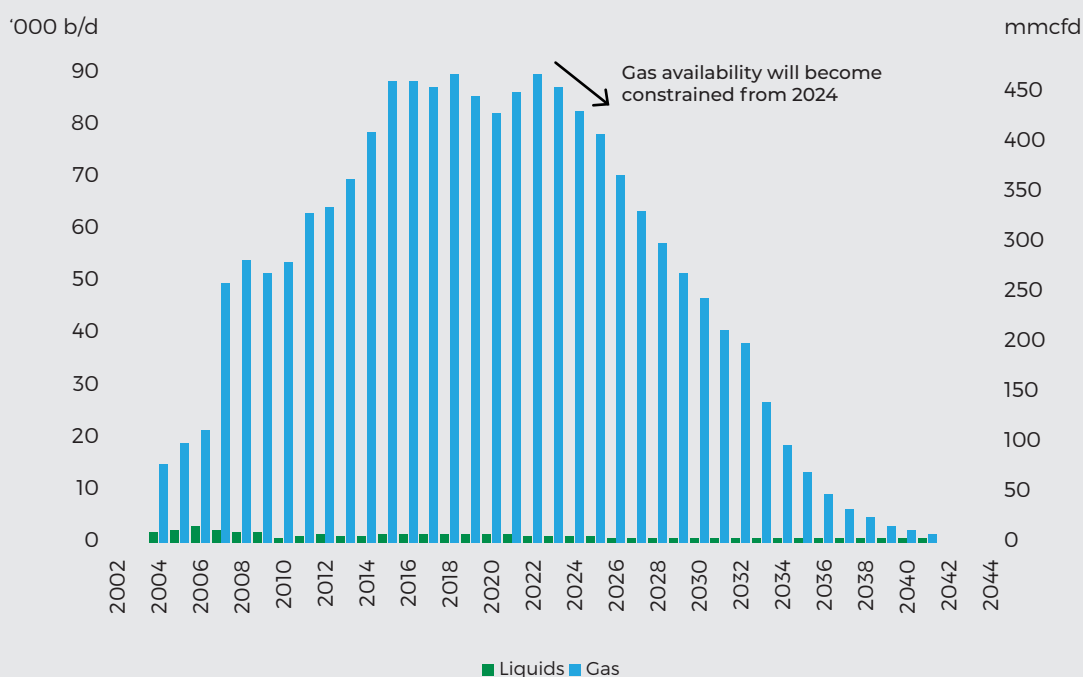
The above culminated in the present **fourth** phase that is and will be characterised by gas energy shortages, demand that exceeds supply, limited or no gas pipeline and receiving infrastructure in South Africa, significantly increased gas costs for users and policy uncertainty as to the future role of gas in the energy mix of South Africa. Sasol, the only supplier of natural gas in South Africa, is under pressure to optimise its dwindling Pande and Temane gas resource. Demand continues to exceed supply for natural gas in South Africa. This has an adverse impact on economic growth prospects as fixed capital investments are either at a standstill or deferred by IGUA-SA members and other industries.

Little or no additional gas has been made available for industrial use over the last 5 years. Demand is further exacerbated by the Eskom supply crisis, the exponential increase in electricity costs, and the need to adopt clean energy in the context of carbon emission reductions.

This is happening whilst the current gas supply and demand deficit for South Africa is already estimated by IGUA-SA to be some 80mGJ/a for industry; and 175mGJ/a if the intended gas-to-power programs of the (Integrated Resource Plan 2019 (IRP 2019) and others are added. The deficit is greatest for Gauteng, Western Cape and KwaZulu Natal (KZN).

Current gas availability will become constrained from around 2024. Sasol and various sources indicate, on the assumption that no further progress can be made on the various projects, that gas supply will reduce from mid-2024 by some 15% per annum. This will be due to the expected drop in pressure at Sasol's Pande and Temane fields.

Pande & Temane Production Profile (PPA)³



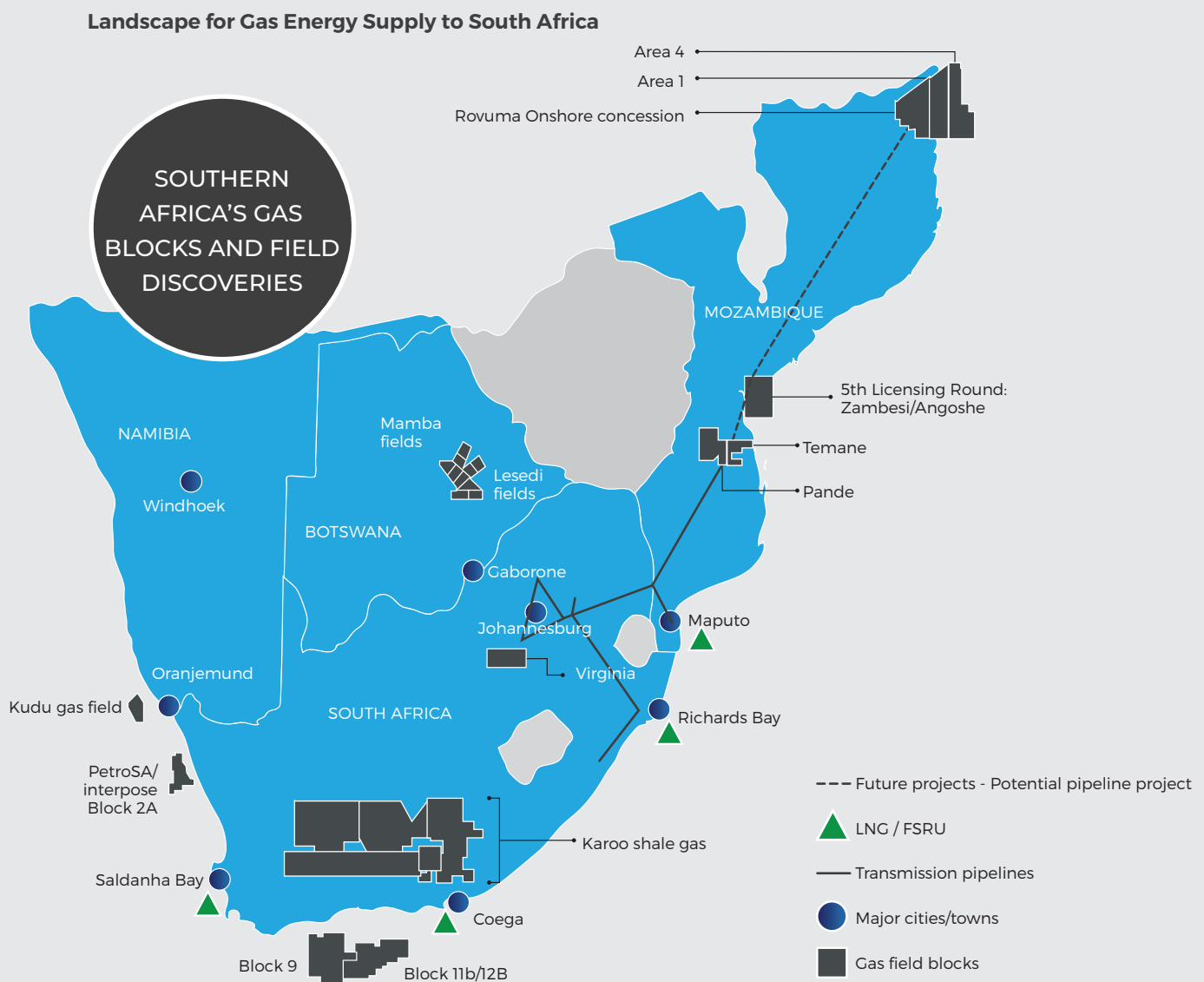
Natural gas demand and supply also needs to be viewed in the context of network capacity and the ability to receive gas into the network and deliver gas to point of consumption. South Africa has limited gas infrastructure capacity. It has no gas LNG import facilities and is therefore unable to receive large quantities of imported LNG gas. Sasol's Central Processing Facility (CPF) at Pande/Temane has a capacity to process 197mGJ/a with no spare capacity available. The spare capacity across the gas transmission pipelines operated by Rompco, Sasol and Transnet can be summarised as follows: Rompco (CPF to Secunda) – 16mGJ/a or 120mGJ/a with loop line 3 & 4 upgrades; Lily (Secunda to Durban) – 7mGJ/a; SWM (Mpumalanga) – 7mGJ/a; GNP (Secunda to Sasolburg) – 9mGJ/a; GNT (Gauteng) – 44mGJ/a.

³ Wood Mackenzie; Asset Report; Pande, Temane and Inhassoro Fields 2019

Taking the above into consideration, certain fundamental questions arise:

- ▶ How will industry, and the South African economy for that matter, bridge the pending gas energy shortage?
- ▶ To what extent can the increased costs of gas energy be absorbed together with increased costs of electricity?
- ▶ How can this be mitigated to ensure industry remains globally competitive whilst meeting increased environmental requirements?
- ▶ To what extent can industry rely on Government to timeously facilitate meeting these energy challenges?
- ▶ How must policy and law change to facilitate efficient private sector investment and execution of needed gas projects?
- ▶ More importantly now; what initiatives do Government and industry need to pledge to ensure the most efficient and reliable outcome for gas energy security?

South Africa has very limited gas energy supply options available over the short term i.e. within the next 4-5 years. The landscape for gas energy and supply alternatives could be summarised as follows:



Placing aside the immediate supply/demand deficit for gas, the inflection point for gas supply is 2023/4 when Sasol is likely to start reducing gas volumes from its Pande/Temane fields.

Limited alternatives exist for mitigating the above situation before 2023. Stakeholders have referenced the development of various gas resources and supply options and commentary is provided in the context of the previous diagram:

- **Kudu gas field** – discovered in 1974 off the coast of Namibia, it is estimated to hold some 1,3TCF gas ($\pm 1,5$ billion GJ) with development anchored on a gas-to-power plant in Oranjemund and the ability of Namibia to export power to the region. Prospects for development appear to have reduced as Namibia failed to conclude power export agreements to the region. From a technical perspective a subsea tie-in would be required which is considered to be one of the longest in the world. The economic feasibility for the development of this field remains unclear and it is unlikely to be developed over the medium term.
- **PetroSA Block 2A** – discovered in 1987 off the West coast of South Africa, it is estimated to hold some 1,5TCF gas ($\pm 1,7$ billion GJ). PetroSA holds a 24% stake in this field. The economic feasibility for the development of this field remains unclear and it is unlikely to be developed over the medium term.
- **Blocks 9 and 11** – block 9 supplies gas to the Mossgas Refinery that was commissioned in 1992, and is virtually depleted with some 0,2TCF (± 234 million GJ) gas available. A 2015 drilling campaign to increase the reserve base was unsuccessful. PetroSA also owns block 11 with limited gas resources estimated at some 0,5TCF (± 590 million GJ) and is unlikely to be developed.
- **Block 11B/12B Brulpadda** – Total announced (in February 2019) a significant gas condensate discovery on the Brulpadda prospects, located on Block 11B/12B in the Outeniqua Basin, 175 kilometers off the southern coast of South Africa. The Brulpadda well encountered 57 meters of net gas condensate play in lower cretaceous reservoirs. Following the success of the main objective, the well was deepened to a final depth of 3,633 meters and has also been successful in the Brulpadda-deep prospect. Following the success of Brulpadda and confirmation of the play potential, Total and its partners plan to acquire 3D seismic this year, followed by up to four exploration wells on this license. The Block 11B/12B covers an area of 19,000 square kilometers, with water depths ranging from 200 to 1,800 meters, and is operated by Total with a 45% working interest, alongside Qatar Petroleum (25%), CNR international (20%) and Main Street, a South African consortium (10%). Prospects for the monetisation of gas and availability to South African markets remain unclear. Gas availability may only realise around 2029.
- **Karoo shale gas** – appears to have sizeable potential, but these estimates are highly uncertain and environmentally controversial. Sources previously estimated reserves at a dazzling 485TCF, but recent estimates (September 2017) showed much less potential. More realistic reserves range around 13 TCF (± 14 billion GJ) with environmental concerns associated with them. At a September 2017 conference, Shell SA stated that there is a strong likelihood that this process may not proceed beyond exploration. Commercial viability is also uncertain. Even if development did occur, it is unlikely that any sizeable output would be produced by 2030 given the shale reserves' dispersed nature and the need to develop infrastructure and a supply value chain (which is likely to take more than a decade).

- Virginia – Renergen/Tetra4** has been exploiting small quantities of gas for the compressed natural gas market (mainly transport) since 2016 and is in the process of establishing a small gas liquefaction facility to ultimately supply $\pm 2,5\text{mGJ/a}$ gas in LNG form by 2023 to mainly the transport sector. Recent announcements have been made for the funding of the development of the underlying helium gas resource.
- Mamba/Lesedi fields** – CBM or coal bed methane gas reserves are present in Botswana. The concession is owned by Tlou Energy and is estimated to hold around 0,2TCF ($\pm 200\text{mGJ}$) of gas. Recent announcements confirm a steady flow of gas that is likely to be consumed by smaller type gas-to-power plants.
- Panda/Temane** – owned by Sasol, it supplies some 197mGJ/a gas at present to South Africa (167mGJ/a) and to Mozambique (30mGJ/a) under a Petroleum Production Agreement through the Rompco, Sasol and Lily gas transmission pipelines. As of July 2019, available gas resources are 0,8TCF (± 800 millionGJ). Gas availability will become constrained from around 2023. To partially mitigate the situation, Sasol is evaluating the viability for compression and infilling (CIP) of this resource at an estimated cost of \$500m and FID will be in June 2020. In addition, Sasol is exploring the area under a second agreement which is the Production Sharing Agreement (PSA). Under this agreement gas needs to be prioritised for the industrialisation of the Mozambique economy. Well drilling resulted in additional gas reserves estimated at 0,7TCF ($\pm 725\text{mGJ}$), earmarked however for the development of a gas-to-power plant in the area. The future gas prospects of Pande/Temane remain uncertain. IGUA-SA is of the view that the CIF and PSA, if successful and viable, may supplement current gas availability for an additional 2 years before volumes would be curtailed.
- Zambesi/Angoshe** – although very early in exploration phase, this resource is potentially holding some 3-5TCF (approximately equal in size to the Pande/Temane resource) with ENI and ExxonMobil to potentially starting well drilling and seismic analyses in early 2020. Although very well located for linking into the Rompco network, the potential monetisation of this resource is estimated to be from 2029 onwards.
- Rovuma** – this basin holds significant gas resources on a global scale. Proven resources are estimated to be some 121TCF across Area 1 (63TCF, Total/Anadarko) and 4 (58TCF, ENI) with potential for further development. First gas in LNG form will become available from 2022 from the floating Coral platform with LNG destined for Asian markets. Total/Anadarko reached FID in June 2019 for the development of two 6mtpa LNG trains onshore for commissioning in 2022. Approximately 92% of this capacity has already been contracted for supply of LNG to Asia. Investment in the exploitation of these resources will reach approximately \$128 billion by 2029. BP is looking at distributing LNG regionally off the Coral Platform onto markets in African East and West coast markets. South Africa will however first need to develop LNG receiving infrastructure to benefit from this initiative. Long distance ($\pm 1\,700\text{km}$) pipeline development from Rovuma linking into the existing Rompco remains an alternative over the long term, but is subject to regional demand aggregation and economic development.

Although gas energy would become available from certain of the above alternatives, it is unlikely that any will materialise for South African consumption in time before 2023 – the inflection point where current gas energy availability will become constrained.

LNG imports remain the only option to bridge the gap between reduced gas energy supply from 2023 and demand, provided that such a project is executed in time and located where demand for gas energy could be serviced. IGUA-SA's current view is that three LNG terminals are being considered of which only two could play a role in servicing industrial demand for gas energy.

► **Coega LNG** – the DMRE recently announced its plans to establish an LNG import terminal at Coega that is likely to be coupled to future gas-to-power programs as contemplated in the IRP 2019. Transnet is in the pre-feasibility stages for development of a FSRU in the port of Coega. The required development of South Africa's gas industry and supply infrastructure are anchored on the demand for gas provided by the IRP 2019's proposed gas-to-power programme. The development of the gas sector is heavily dependent on the location of a gas-to-power plant as it has the potential, as economic aggregator, to be the catalyst for extensive gas pipeline and import infrastructure developments. This requires careful consideration by Government as to the location of the intended gas-to-power plant i.e. it has the potential to justify the investment in extended gas pipeline networks if located inland whilst stimulating broad access to gas energy by industry. Considering the pending gas energy security crisis and South Africa's limited ability to fund and justify multiple LNG import terminals, a terminal at Coega will have the unintended consequence of allocating scarce resources to a sub-optimal economic development project. An LNG terminal at Coega is of no consequence to current gas energy consumers. It does not assist in any way to meet the current and future gas energy shortfalls, it does not leverage economically existing gas infrastructure, and it does not act as economic catalyst for urgently needed gas energy infrastructure where gas energy demand is currently concentrated. Contemplating interconnecting pipelines from Coega to inland (Gauteng) and coastal (KZN) regions will result in the most expensive gas energy options long term. It is unclear when this project will be commissioned, but unlikely before 2023.

► **Richards Bay LNG** – Transnet is in the pre-feasibility stages for development of a FSRU in the port of Richards Bay with a view to potentially link into the Lily Pipeline and to enable the third-party distribution of gas in KwaZulu Natal and LNG by rail/road. The successful completion of this project may result in the doubling of the Lily capacity to 40mGJ/a whilst making available an additional 20mGJ/a of gas energy inland (methane rich gas currently supplied by Sasol in the Lily). In the absence of a new interconnecting pipeline and the inland location of a gas-to-power plant, the project is unlikely to meet the inland demand for natural gas efficiently. It is also unlikely that this project will be commissioned before 2023 to supplement any potential gas energy shortfall as contemplated above. This project however does provide for a more feasible alternative as demand for gas exists on the back of existing infrastructure i.e. pipelines resulting in an improved utility value over Coega.

► **Maputo LNG** – the Mozambique Government has recently granted the concession for the establishment of an LNG floating storage and regasification unit (FSRU) in the port of Maputo with unlimited gas importation allowances. This project is anchored on another concession for the establishment of a 2000MW gas-to-power plant in Maputo and the aggregation of sufficient demand for gas energy in South Africa and Mozambique. Total in consortium with regional partners are looking at the USD550 million development hoping to reach final investment decision by end 2020. Its proximity to Rompco makes this alternative a potentially cost-effective solution to supplement any gas energy shortfalls from 2023 onwards in South Africa.

In order to mitigate economic risk, Government should urgently focus on facilitating gas energy supply alternatives from 2023 that will efficiently meet demand for gas energy going forward. Realistic gas energy supply alternatives exist through Richards Bay LNG and Maputo LNG over the short term, and piped gas supply from Rovuma and Zambesi/Angoshe over the medium to long term.

The development of the gas economy requires the aggregation of sufficient scale in gas demand to justify the significant capital investment requirements for associated infrastructure. The South African Government controls energy supply through multiple state-owned entities and legislation. Therefore, a key role of Government should be to facilitate demand aggregation optimally to justify infrastructure investments whilst meeting socio-economic objectives of economic growth and employment creation.

A coordinated gas energy supply strategy is required to meet the 2024 supply challenges. Although South Africa would appear to have various options and alternatives, the only feasible supply alternative to mitigate the pending gas energy shortage, given the time constraints, appears to be LNG imports through the port of Maputo, Mozambique.

The South African economy, to a certain degree, suffers from a lack of scale. Government and stakeholders should therefore focus on how demand between industry and Government could be aggregated to best leverage the investment in extensive gas energy infrastructure to promote broad gas energy access and to facilitate economic growth.

Gas energy availability is a business risk to the efficient operations of members of the IGUA-SA and growth prospects of the South African economy.

The year 2020 will require key outcomes from a policy and infrastructure investment perspective to ensure that these risks are sufficiently mitigated to ensure future investment of industry in the South African economy.

2. Gas energy policy

In addition to the gas energy supply constraints, the policy landscape for gas energy in South Africa appears to be in an indeterminate state.

The South African Government's energy policy is largely focussed on the electricity generation crisis with little or no focus on an integrated energy plan for the country at present. The Integrated Energy Plan was last updated in 2016, whilst no action has been taken by the South African Government on the draft Gas Utilisation Master Plan since its publication in May 2016.

Although the IRP 2019 of the Department of Energy and Mineral Resources makes significant provision for future gas-to-power developments, these are of little consequence to current gas users in the absence of gas transport infrastructure to demand nodes. Transnet is currently looking into the development of a supply chain to receive and transport gas to demand nodes, but again the implications and timelines are unknown at this early stage of the project.

Notwithstanding Government's standpoint on the development of the gas economy and associated infrastructure, the impending gas energy shortage is due to a misalignment of policy, the development of infrastructure and gas availability. It is the view of the IGUA-SA that mitigating this impending gas energy shortage requires coordinated focus by all relevant stakeholders and supporting policy to rapidly develop gas supply-side infrastructure.

What is at risk is the economic contribution in South Africa of gas users that are deeply reliant on the availability of efficient gas energy i.e. the top ten industrial gas users in South Africa contribute over R150 billion per annum in turnover. They employ more than 46 000 people and use a total of around 30-million gigajoules of gas energy each year. In addition, Sasol uses approximately 130-million gigajoules of gas energy each year for up to 25% of its feedstock requirements and power generation needs. Sasol in itself employs some 26 000 people in South Africa contributing approximately R200 billion per annum to the South African economy in terms of turnover. In addition, there are some 8 000 users dependent on gas that include other large industrial users, SME's, schools, hospitals and households.

The demand for gas is further exacerbated by Eskom's inability to supply electricity sustainably and efficiently as industry increasingly adopts strategies to generate electricity for own consumption.

Lack of gas energy, policy uncertainty and security of supply are already preventing strategic industrial investments. It also hampers the growth of the latent market for gas, e.g. in industries that would take advantage of gas over more environmentally damaging energy sources or would wish to change to more efficient gas energy.

IGUA-SA formally joined Business Unity South Africa (BUSA) which is part of the National Economic Development and Labour Council (Nedlac) - the vehicle by which Government, labour, business and community organisations seek to cooperate on economic, labour and development issues and related challenges facing South Africa. IGUA-SA was instrumental in developing various policy positions on gas energy and the creation of the Gas Energy Subcommittee within BUSA to provide focus on energy policy development within the private sector and Government. It further provided gas users with a platform for dealing with various government institutions and departments and other forums like the Public Private Growth Initiative (PPGI) in a collective and consensus based manner.

The objectives of the National Development Plan is not fully reflected in the current gas energy policy landscape and the following regulatory and policy interventions and/or recommendations should be pursued:

- The overarching Integrated Energy Plan (IEP) should be updated as a matter of urgency and reflect the role of gas into the future through the focussed re-implementation of the Gas Utilisation Master Plan (GUMP). An understanding of energy requirements in the longer term for gas is key to setting short- and medium-term objectives in this regard. Consultation on and finalisation of the IEP is therefore key and needs to be prioritised
- The IRP 2019 makes provision for 3GW gas (1GW in 2023 and 2GW in 2027 respectively) and provides the opportunity for more gas in tandem with renewable energy. In this regard, baseload gas to power presents one of the largest opportunities to step up demand to result in economically feasible gas infrastructure projects from which the broad economy could benefit. The next iteration of the IRP needs to revise gas allocations to the energy mix to support gas industrialisation
- The implementation of suitable bi-lateral agreements between Mozambique and South Africa to enable the importation of gas from and/or through Mozambique
- The draft Upstream Petroleum Resources Development Bill needs to reflect the early development stage of the gas industry and the need for South Africa to remain competitive
- The Gas Act to further enable infrastructure development and stimulate the gas market
- Collective demand aggregation to optimally leverage anchor customers, infrastructure investment and the sustainable development of the gas economy

An integrated approach needs to be adopted in the seven departments of the South African Government that are instrumental in the development and crafting of enabling policies to provide for the development of the gas economy.

These departments include:

- ▶ The Presidency
- ▶ Department of Mineral Resources and Energy
- ▶ Department of Trade, Industry and Competition
- ▶ Department of Public Enterprises
- ▶ Department of Transport
- ▶ Department of Environmental Affairs, and
- ▶ Department of Agriculture, Forestry and Fisheries

Given the current economic circumstances, the limited fiscal space, and the need to attract investment especially in infrastructure, the South African Government should create an enabling environment for large-scale gas infrastructure development and investment by the private sector. This will allow for efficient and timeous investments to ensure gas energy security.

South Africa is a developmental state, and this requires the unified cooperation and focussed approach by public and private stakeholders to come up with economically sound and expedient solutions to the impending gas energy crisis. However, South Africa is faced with another energy challenge if immediate action is not taken by public and private stakeholders to develop the gas economy.

IGUA-SA is of the view that there is a coordinating role for the National Planning Commission to perform to coordinate the functions of the South African Government and private sector to ensure the development of clear policies for the development of the gas economy.

3.

Gas energy pricing

NERSA CONSULTATION

NERSA's mandate in law to approve maximum gas energy prices is triggered after following certain steps i.e. defining the various markets in which gas is transmitted, distributed and/or traded; and determining whether adequate competition prevails in those markets. If it determines that there is inadequate competition in any of those markets, it must approve maximum gas prices in those markets. NERSA, following a process in which the IGUA-SA participated, indeed determined in 2019 that Sasol is a monopolist supplier of gas energy requiring it to approve maximum prices for gas energy in South Africa.

The central question framed in the consultation document is this: which of the three options set out in the consultation document is preferable as a methodology for NERSA to use to determine a maximum gas price for Sasol?

Subsequently, NERSA issued late in 2019 its 'Consultation Document: Methodology to Approve Maximum Prices for Gas'. NERSA considers three approaches for gas energy pricing (molecule pricing excluding all other tariffs) namely:

- **Option 1** proposes that the maximum price is the **volume-weighted average price of piped gas** in the United States of America and Europe.
- **Option 2** proposes a **cost pass-through** approach that is a cost-based price build-up, including at the least the cost of the procured or produced gas and any transportation or regasification costs, but excluding transmission and distribution tariffs.
- **Option 3** proposes an **amended cost pass-through approach** that considers Sasol costs (as per option 2) in order to determine a floor of the maximum price using actual costs of production. To this an economic surplus is determined (the difference between the consumers' willingness to pay and the producer / supplier's marginal costs of producing gas energy, the Platts JKM LNG price according to NERSA), then equally divided and added to Sasol's actual cost of production to determine a price for gas energy.

The IGUA-SA responded accordingly and made several submissions and presentations in this regard. Central to the IGUA-SA position on gas price is the decision in the National Energy Regulator of South Africa (NERSA) and Another vs PG Group (Pty) Ltd and Others, handed down in February 2019, of the Constitutional Court⁴ which made a number of pertinent pronouncements on NERSA's role in price regulation and on the meaning of the governing statutory and regulatory principles. Some of these pronouncements include (with reference to the judgement):

- ▮ Para [65]: In this case, NERSA failed to consider Sasol's marginal costs in the method it used to determine the maximum gas price for Sasol. The decision to apply the basket of alternatives approach specifically to Sasol was not rational. Sasol is a monopolist and any rational attempt at regulating its prices needed to consider its costs in order to fairly and equitably divide the economic surplus between Sasol's profit and the economic value for Sasol's consumers.
- ▮ Para [66]: There are a number of interrelated reasons why Sasol's marginal costs are a necessary factor in determining its maximum price. It is important to note that NERSA was regulating the prices of a recognised monopolist. Section 2(e) of the Gas Act requires NERSA to take into account the interests and needs of all parties on an equitable basis. This is given expression in the fairness requirement found in regulation 4(3). Importantly, this can be seen in regulation 4(4), which requires NERSA to account for both costs and profits of the regulated entity.
- ▮ Para [68]: In both the draft and final inadequate competition determination NERSA itself stated that the spot price for gas in a market environment would tend towards its marginal costs. NERSA stated that – *"[i]n competitive market conditions, a firm prices its products at the level where the price equals the marginal cost. If the price is above marginal cost, the economics theory concludes that such a firm has market power to influence prices without losing business to competitors."*

- ▮ Para [69]: Despite this acknowledgment, NERSA did not consider Sasol's marginal costs when trying to set a competitive maximum price. In a traditional competitive market, Sasol's marginal costs would be a required input for finding the competitive maximum price.
- ▮ Para [71]: I do not think NERSA is justified in trying to mimic the outer bounds of an imaginary supply constrained market if that approach would not allow it to regulate the monopolistic vices it seeks to address. This would heavily favour the monopolist, which would be absurd for a legal regime meant to rein in the monopolist. Therefore, in trying to quell the market power of the monopolist by setting a maximum price, it is vital that a regulator considers the monopolist's marginal costs, even if there is a supply constraint. Without that inclusion, there is no way to test whether the maximum price will address the mischief of monopolistic market power.
- ▮ Para [73]: NERSA was required to act in a manner consistent with section 2(e) of the Gas Act, read with the fairness requirement found in regulation 4(3), as set out above. To adhere to this section and regulation, NERSA had to set a maximum gas price that would balance the interests of both the monopolist and the consumers. This means that NERSA needed to find a way to evaluate the economic surplus being created in the piped gas market and to divvy it up between the interested parties.
- ▮ Para [75]: NERSA was tasked with setting a ceiling price for Sasol that allowed it to recover its costs and to make a profit that was commensurate with its undertaken risks, as set out in regulation 4(4). In order for NERSA to rationally decide the maximum price which would include both costs and the chosen allowable profit, it needed to know and consider Sasol's marginal costs of production.

⁴ 2019 ZACC 28.

- Para [76]: Arguably, the Maximum Pricing Methodology has the potential to adhere to regulation 4(4) because it offers the licensee a choice between the pass-through of costs and the basket of alternatives. The former takes into consideration the regulated entity's marginal costs whereas the latter does not. By choosing the latter, Sasol was able to recoup its costs and possibly more than a reasonable profit. However, regulation 4(4) must be read in context. This context includes the task of regulating the prices of a recognised monopolist, the fairness constraint of regulation 4(3)(b), and the lack of any language like "at least" in regulation 4(4) itself. Regulation 4(4) cannot be read to say that NERSA's task was merely to consider the licensee's costs when setting the floor of a maximum price, instead it sets a floor while pointing towards the rational approach that ought to be taken for finding the ceiling as well.
- Para [77]: Instead of considering Sasol's costs, NERSA considered the imaginary marginal costs of production for an admittedly unknown gas seller. The basket of alternatives option of the Maximum Pricing Methodology represents these imaginary marginal costs of production. There is likely some merit in this approach when trying to understand the limitations of an entrant into an imaginary supply-constrained market. However, it is totally divorced from a rational approach to choosing the maximum profit allowed by a recognised monopolist and then adding that profit onto the monopolist's actual costs.
- Para [78]: In trying to replicate a competitive market, NERSA considered what the maximum marginal costs of production of a fictional gas seller might be before it could no longer compete with the energy substitutes. NERSA then used those imaginary marginal costs of production when setting Sasol's maximum reasonable gas price. One of the most relevant factors in NERSA's entire equation for specifically regulating Sasol ought to have been Sasol's own marginal costs of production. Without considering Sasol's costs, NERSA could not set a maximum price that included an equitable division of profit for Sasol and economic value creation for consumers.

Sasol's costs are a mandatory input to this kind of exercise. NERSA failed to consider this mandatory input, and thus I cannot find that NERSA acted rationally in deciding Sasol's maximum gas price."

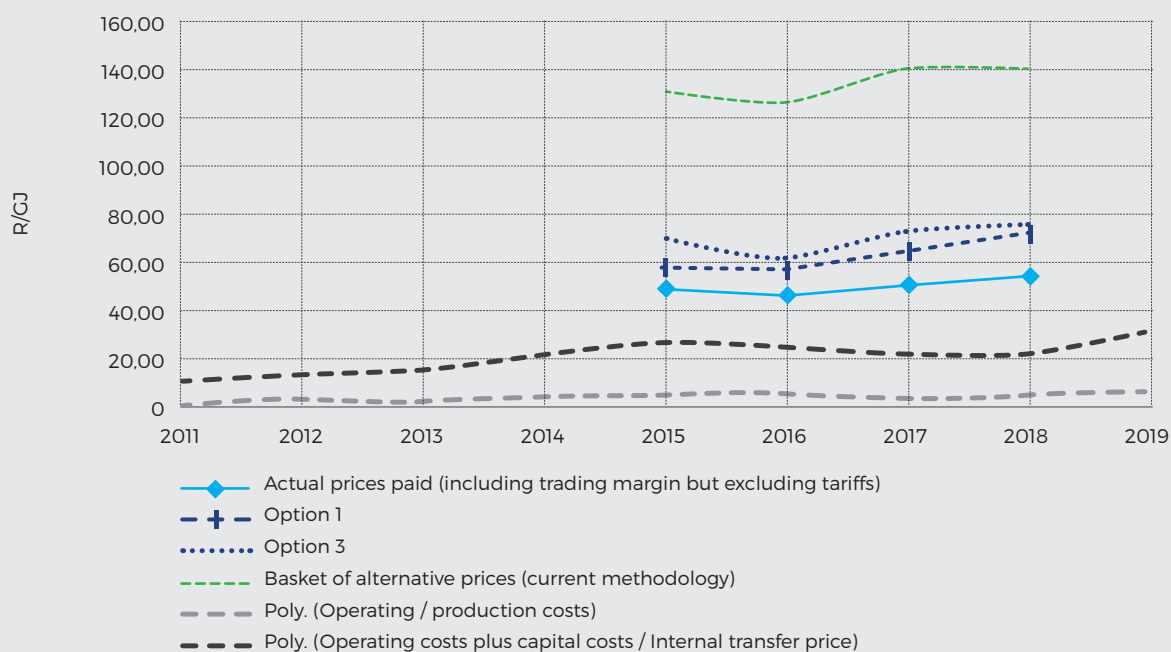
The IGUA-SA position on gas pricing is that the only viable option in law and economics is Option 2, which embodies the pass-through or cost-plus approach that the Constitutional Court approved in the NERSA decision. This is based on the following underlying principles:

- Section 2(e) of the Gas Act, 2001, requires NERSA to take into account the needs and interests of all parties on an equitable basis. This is expressed in the fairness requirement in regulation 4(3) of the Piped-Gas Regulations. It is also reflected in regulation 4(4), which requires NERSA to account for both the costs and profits of the regulated entity, namely Sasol.
- The wording of regulation 4(4) is clear: it envisages that NERSA will mimic a competitive market by allowing Sasol to be remunerated for its outlay to the extent of a reasonable or fair return, one that is commensurate with its risk. This is also consistent with NERSA's own description of the role of regulation: "Regulation should not only be a substitute for competition but a close imitative substitute ... therefore its objective should be to compel a licensee to charge rates approximating those it would charge if free from regulation but subject to the market forces of competition."
- The requirement of equitability inherent in the scheme of the Gas Act and the Piped-Gas Regulations –specifically regulation 4(4) –is at odds with the suggestion that the economic surplus generated by Sasol might be split equally between it and consumers (as NERSA propose under Option 3).
- Economically, for any project to be viable from the perspective of a firm, that firm would in the long run want to recover both its marginal and fixed costs of production, as well as to repay investors for investing capital in the firm. If the firm in question charges a high enough price such that it earns excessive profits, it is likely that, in a competitive market, these profits would be competed away by the entry of other firms offering lower prices.

- Therefore, it is important that the methodology that is used to regulate the maximum price for piped gas properly accounts for each of these aspects of Sasol's operations, specifically: marginal costs of production; fixed costs of production; and a reasonable return on capital.
- A price that over-recovers on those items would not be justified. It would benefit Sasol unduly and, in turn, unduly harm gas users and end-consumers.
- Therefore, Options 1 and 3 are untenable.
- Indeed, several elements of the total gas cost already operate on the principle of a fair return and account for marginal costs, fixed costs and reasonable returns on capital, such as the distribution tariff and the transmission tariff.

IGUA-SA does not have access to detailed information on Sasol's costs, accordingly IGUA-SA used publicly available sources⁵ to illustrate, how the current and proposed pricing alternatives compare to Sasol's fully recovered costs for supplying gas to South African consumers.

Comparison of Costs and Sales Prices for Gas Energy, 2011-2019 (Approximate Years)



⁵The turnover and operating profit data contained in Sasol's FY14 annual financial statements, in conjunction with the natural gas sales volumes presented in the working paper entitled "Economic Benefits of Mozambique Gas for Sasol Gas and the South African Government" Mondliwa, P. and Roberts, S., dated December 2017; the fixed and variable cost data presented in the financial model underpinning the Wood Mackenzie Report entitled "Pande, Temane and Inhassaro Fields" dated January 2019; the operating costs reported in the CMH annual financial statements for FY16-19; and the "average production costs" reported in Sasol's Form 20-Fs.

It appears from the IGUA-SA analyses that Sasol incurs between (approximate values) R2/GJ and R13/GJ (as an absolute maximum) in total operating or production costs. It is further evident that by recovering all Sasol's costs including a return on capital (through internal transfer pricing), the costs equate to between R11/GJ to R36/GJ. This same gas is then sold on to large industrial users at approximately R55/GJ at present. In turn the current pricing methodology allows for a maximum gas energy price of R140/GJ, whilst Options 1 and 3 above allow for a gas energy prices R75/GJ.

Against this background, besides the fact that Option 2 is the only option consistent with the reasoning of the Constitutional Court, IGUA-SA submitted that Option 1 and 3 are highly likely to cause Sasol to earn excessive profits vis-à-vis its operation and capital costs which would unduly hurt gas customers and end-users, and ultimately the broader South African economy.

It is also relevant for IGUA-SA to consider the framework of market definition. This is so since NERSA contends that LNG gas is an alternative energy source to which gas users could switch. Thus, NERSA defines a market comprising at least piped gas together with LNG. It does so to seemingly determine a single price for gas energy that will also attract investment in the supply of LNG. However, for various economic, technical and supply chain reasons, LNG cannot be in the same market as piped natural gas as supplied by Sasol. NERSA therefore must regulate a price of Sasol's piped gas separately from a price for example of LNG.

It was originally envisaged, in terms of NERSA's Gas Price Methodology Consultation Document published, that the public hearing was to be held on 23 January 2020 and the effective date for implementation of the methodology to be on 1 April 2020. The various delays have however changed the proposed schedule from NERSA and due to nation-wide lockdown, NERSA suspended its operations and no new dates have been set.

NERSA's public hearing took place on 23 March 2020 and subsequently, IGUA-SA made further submissions on 28 March 2020. The next anticipated step is for NERSA to publish their decision on the methodology and the effective date for implementation of the methodology. Once NERSA issues their decision on the methodology, Sasol will need to bring an application to have its maximum price approved based on the formula.

Membership

IGUA-SA's founding members included Ceramic Industries Pty Ltd, Consol Glass Pty Ltd, Illovo Sugar Pty Ltd, Mondi Ltd and PFG Building Glass Pty Ltd. We have, in the interim, welcomed Nampak Ltd, Tronox Pty Ltd, Transnet SOE Ltd and Energy Group as members.

The IGUA-SA is governed by a formal constitution as adopted by its founding members and provides for a formal platform to conduct its business.

IGUA-SA engages various other gas users and interested parties on a continuous basis to deliver on its primary objective to ensure the efficient availability of hydrocarbon gas in Southern Africa. This takes place in the context of a growing demand for natural gas - both by organisations requiring more gas to expand and organisations wishing to switch to gas from costly and environmentally harmful alternative energy sources.

IGUA-SA's membership is open to the broader gas value chain and includes various tiers of membership i.e.:



GAS USER MEMBERSHIP –

non-vertically integrated gas end users (current & future) who have voting rights, are represented on the Exco, who reserve right of admissions



INDUSTRY MEMBERSHIP –

new gas suppliers, gas traders, new gas transmission/distribution organisations



ASSOCIATE MEMBERSHIP –

consultants and professionals in the operating, financial, marketing and legal communities; and others who provide services to the natural gas industry



AFFILIATE MEMBERSHIP –

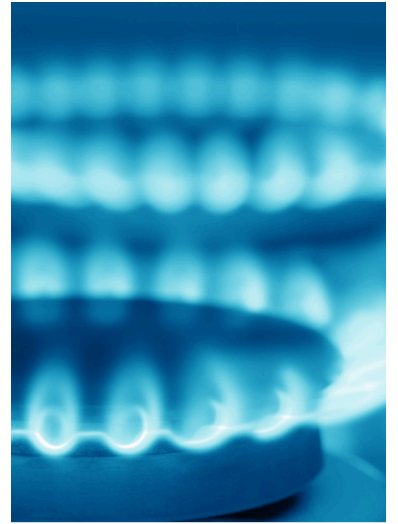
international organisations that are interested in natural gas activities in Southern Africa

The natural gas landscape is faced with various challenges related to policy, availability and pricing in the immediate future. These can only be effectively addressed if more organisations participate in IGUA-SA's work.

Stakeholders are therefore implored to join IGUA-SA to collectively address these challenges and to jointly share in the knowledge and participate in the strategic actions undertaken by IGUA-SA. Appropriate resources are being deployed and utilised on an ongoing basis. A broader participation in membership will not only assist in achieving IGUA-SA's strategic objectives but will also assist in efficiently meeting its financial obligations through a wider membership base.

Current Members





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