

**SOUTH AFRICA COUNTRY SPECIFIC ENERGY SECURITY
ASSESSMENT**

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Profile:

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1. Introduction

For well over a decade South Africa has been plagued by energy insecurity particularly electricity shortages. This has led to regular rolling power blackouts, euphemistically called loadshedding, that are estimated in some quarters to cost the economy somewhere in the order of R87.5/kWh of unserved energy, which has led to losses to the economy of well over a Billion Rand per day (CSIR, 2022). Business Unity South Africa (BUSA) estimated in 2020 that South Africa had a supply gap of about 5GW (ADC Projects, 2022). This situation unfortunately continued to escalate, to the point that in July 2020 the Department of Mineral Resources and Energy (DMRE) launched, through a Ministerial Determination gazetted on 7 July 2020, following NERSA public consultation and concurrence, the Risk Mitigation Independent Power Producer Procurement Programme (RMIPPPP) as a complement to the country's Renewable Energy Independent Power Producer Procurement Programme (REIPPPP) (DMRE, 2020a, DMRE, 2020b). The aim of the RMIPPPP was to “fill the current short-term supply gap, alleviate the current electricity supply constraints, and reduce the extensive utilisation of diesel-based”.

To this end 2,000 MW of new generation capacity to be added to the grid was to be procured through a competitive process: A combined 1,845.76 MW of capacity was announced from eight qualified Preferred Bidder Projects on 18th March 2021, with an additional 150 MW from three further Preferred Bidder Projects added on 1st June 2021, so a total of 1,995.76 MW of new generation capacity has been selected.

On 18 March 2021, three Karpowership SA (KSA) Projects were selected through this competitive bid process to provide a total of 1,220MW of electricity via gas-fuelled floating power stations, Powerships, moored in three of South Africa's largest industrial harbours, Saldanha Bay, Richards Bay and Port of Ngqura, for a 20-year Project Term (which is a standard Term requirement for all Preferred Bidders) (DMRE, 2020a). This award led to an outcry from some quarters such as environmental lobby groups and some of the losing bidders. These complaints ranged from allegations and insinuations of malfeasance to direct and indirect environmental impacts such as temperature changes that will kill off a variety of marine life in the immediate vicinity of the Powerships and possibly change underwater oxygen levels and disrupt the wider marine ecology, underwater noise that will destroy the livelihoods of small-scale fishers, CO₂e (carbon dioxide equivalent) emissions, availability of alternative renewable energy sources and insufficient Public Participation Processes among others.

What is clear and has been proven, in spite of continued pressure from environmental lobby groups, is that the bid process was open, transparent and competitive, that courts have

dismissed accusations of malfeasance, and that government entities such as the National Energy Regulator of South Africa (NERSA) have reviewed the merits of the Projects and issued the generation and distribution licences while additional regulatory and licencing processes are in progress, albeit saddled with delays.

Following the appointment of its Preferred Bidder status, Karpowership SA has:

1. been awarded distribution and generation licenses from the National Energy Regulator of South Africa, NERSA, of which the generation licenses have subsequently been objected by lobby groups in court,
2. worked cohesively with Department of Transport and TNPA toward receiving a Section 79 and putting in place a technical, legal and commercial agreement in order to place the required ships and infrastructure within the national ports, unknown delays are in place,
3. completed the public hearing for the gas licenses to be granted by NERSA, Karpowership awaits issuing of the latter licenses, subject to finalisation of the regulators finalisation of the licensing conditions,
4. submitted an EA that was rejected in June 2021, appealed in July 2021, a refusal for the appeal received in August 2022, and currently engaged in an on-going process with the DFFE to close the identified gaps in the initial EA, with a Final Environmental Impact Report to be submitted in January 2023.

The delay in the Project implementations as a direct consequence of the above, have led to continued highly significant direct costs to the economy due to loadshedding and indirect costs such as the loss of investor confidence in the country. Access to sufficient reliable energy is a fundamental driver of any country's economy, and this delay being spoken about here is in a country with a 35% overall unemployment rate, an unemployment rate of 63,9% for those aged 15-24 and 42,1% for those aged 25-34 years (StatsSA, 2022).

This is also despite the fact that the DMRE has shown the impact that the Karpowership SA projects will have on the country's energy security and the number of jobs they will create (around 2,287 job years per Powership Project vs around 1,341 on average by each of the other RMIPPPP projects), having a larger impact than renewable energy winning bidders, as shown on Figure 1 (DMRE, 2020a). It is important to note that this is in reference to the original 8 awarded projects, not the full 11 that have subsequently been awarded, but the objective facts remain, nonetheless.

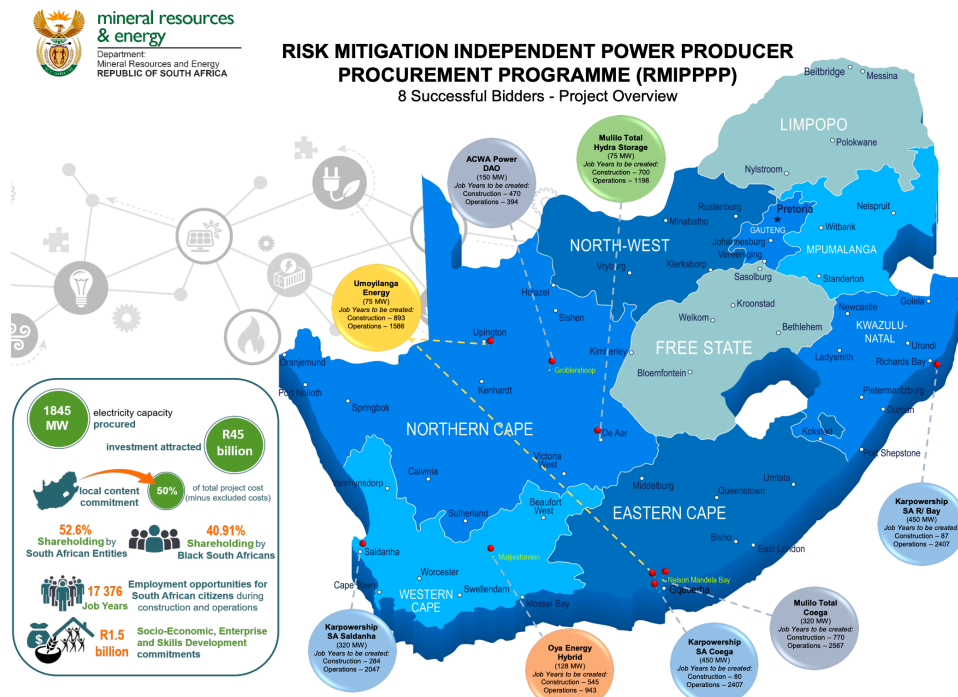


Figure 1: Energy security and job creation impact of the RMIPPPP (DMRE, 2020a)

Why this state of affairs has been allowed to continue and deteriorate even further needs to be put into context. Questions must be asked about whether South African decision-makers take into consideration global energy geopolitics in terms of how other countries approach their energy security when making their decisions. It needs to be asked if they take into consideration South Africa’s energy security, considering gas as a transitional fuel on our path to decarbonisation of the economy and the need for South Africa to make the most of its oil and gas reserves for economic and social benefits. It is also very important to raise an understanding of the term "just transition", considerations of the energy mix and the role of NGO's, COP 26, and the Paris Agreement proposals.

2. Energy Context: Global and Country Specific

No conversation about energy can ever be complete without discussion of global geopolitics, and global geopolitical risks undoubtedly need to play a role in making decisions on energy security. It is essential that South Africa takes into consideration some of the more pressing global geopolitical risks as listed by the ISA (2022), as they directly influence energy availability and fluctuating costs across all technologies balanced against energy security:

- The US-Chinese Cold War: The US has in recent times become more emboldened in their foreign policy towards Taiwan and this has raised the ire of the Chinese government.

- China and India: Himalayas territorial claims along their shared border have not cooled down over the years.
- Vaccine Politics: North-South split delays.
- Russian – Ukraine conflict has escalated into a full-blown war with NATO involvement risks.
- Cyber Terrorism: both state and non-state actors threat to global security and the economy will continue to grow. This has the potential to trigger other conflicts.
- East Africa: Ethiopian internal ethnic and religious divisions, economic dislocations caused by the Covid-19 pandemic and massive locust swarms, tensions in this region have risen to even higher levels. Conflict has broken out in Ethiopia, and the potential for conflict in places such as Uganda and northern Mozambique is still dangerously high.
- Iran’s Nuclear Program: hardliners in the US and an alliance of Middle Eastern countries trying to thwart Iran’s efforts to gain influence in the Middle East
- The Volatile Eastern Mediterranean: NATO member Turkey’s efforts to claim more of the waters (and their resources) conflict with Greece (and some of its European allies).
- COVID economic recovery.

2.1 Oil and Gas Geopolitics

It is arguable that throughout history, the quest for energy sources has been the source of much global conflict and a basis for foreign policies. A telling illustration of this is the global oil price at times of conflict as shown on Figure 2.

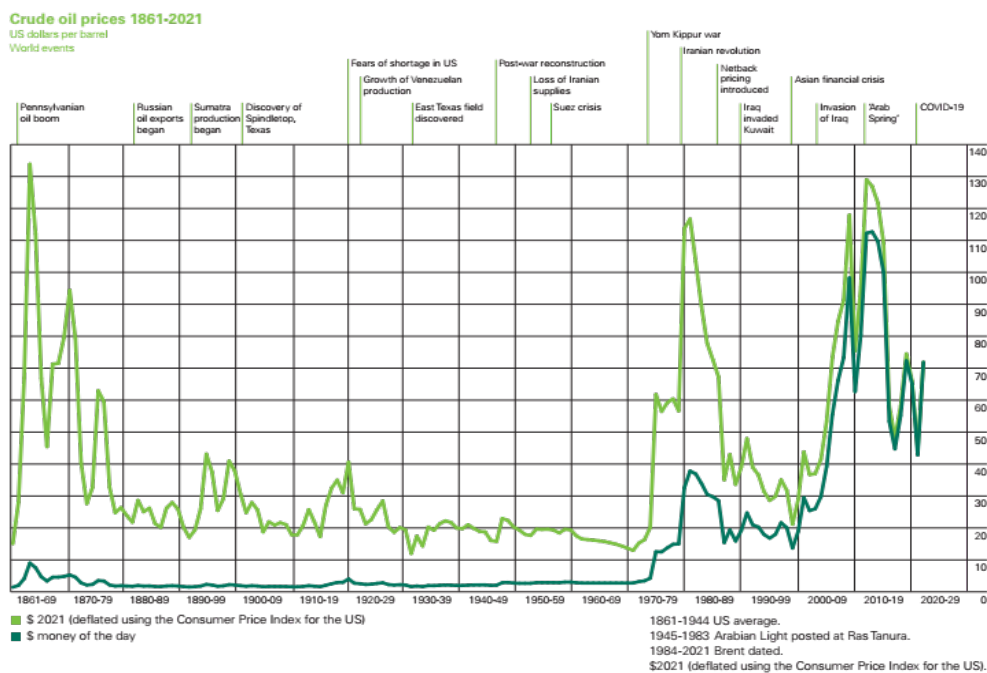


Figure 2: Global conflict and global energy prices (bp, 2022)

What Figure 2 tells us is that in times of conflict, global energy prices inevitably rise as nations are interdependent on each other for energy and each nation looks to safeguard their energy security, driving up demand. It also tells us that energy has throughout history been used as a weapon of war and that disruptions in energy supply chains has the potential to adversely affect the economies of nations that have not developed their own indigenous sources. This is no different to what has happened to global energy prices since the outbreak of the Russia-Ukraine conflict. Whilst there is a need to use the international market as a steppingstone in the just transition, this drives home the need for South Africa to develop indigenous energy sources and to protect her longer-term energy security over all else, since energy is the lifeblood of a healthy thriving economy.

To further drive home the point about global energy geopolitics, the data presented on Figure 3, Figure 4 and Figure 5 tells us that in spite of all the talk from industrialised nations about committing to decarbonisation of their energy systems; global energy demand and in particular the demand for coal, oil and gas, has continued to grow. These nations have made commitments on funding decarbonisation from the Paris Agreement and subsequent Congress of Parties (COP) meetings, but their actions when it relates to own energy security point in the opposite direction.



Figure 3: Global primary energy consumption by source (OurWorldInData, 2022a)

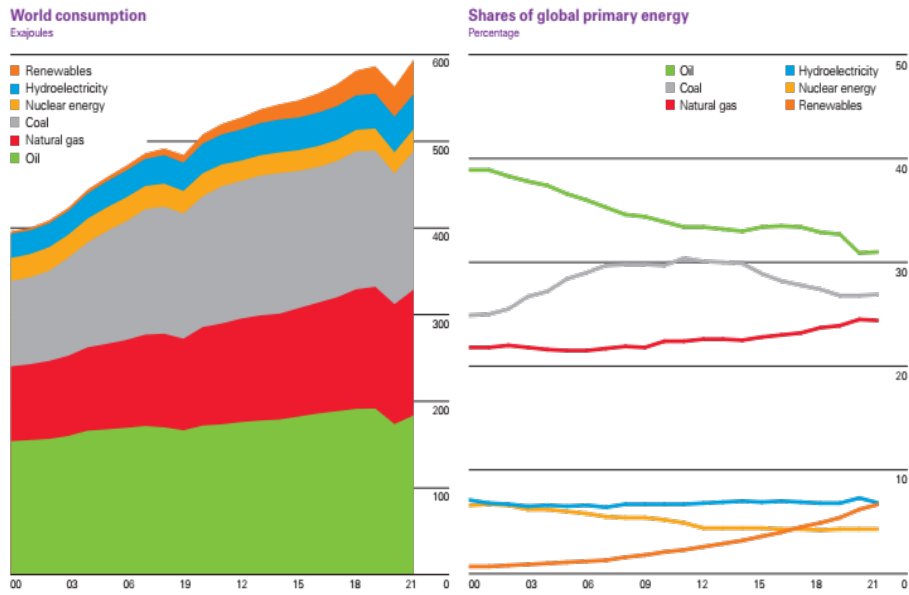


Figure 4: World energy consumption in 2021 (bp, 2022)

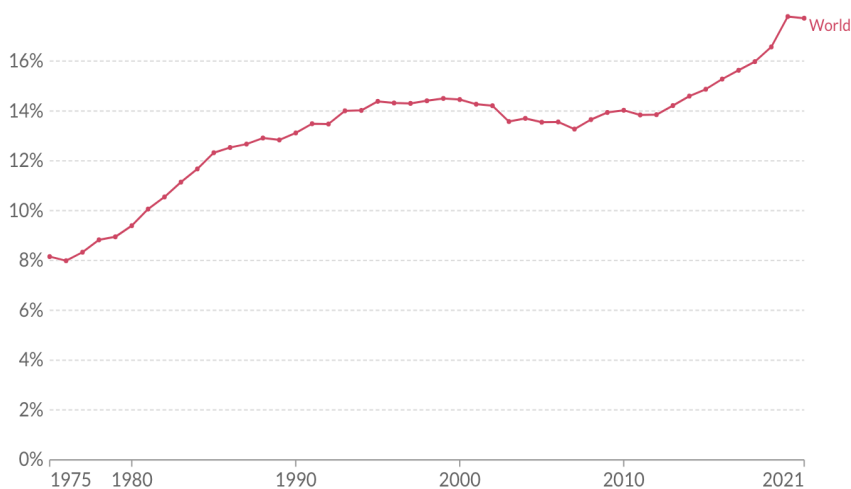


Figure 5: Share of primary energy from low-carbon sources (OurWorldInData, 2022b)

The data presented above shows that coal, oil, and gas consumption has continued to grow or in the worst-case scenario, has remained steady and if anything, the share of primary energy from low-carbon sources dropped in 2021.

According to an ESG report by Liberty Energy (2022), the use of fossil fuels has not only grown in the recent years, but it is also expected to continue to grow for at least the next 30 years, as can be seen on Figure 6.

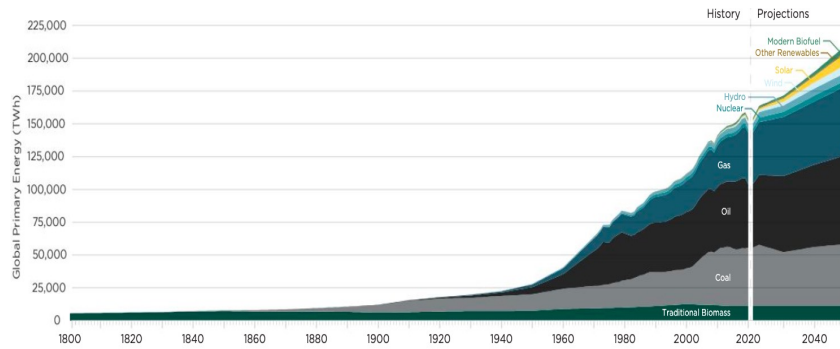


Figure 6: Global Primary Energy Consumption (Liberty Energy, 2022)

This data presented above shows an inconsistency bordering on hypocrisy, on the part of industrialised nations, in their push for developing nations like South Africa to decarbonise compared to what they practice in securing their own energy. In other words, certain developed nations continue to ensure that their energy security is solid, allowing their economies to retain strength and grow, create and maintain jobs, and attract Foreign Direct Investment (FDI), whereas they preach to and actively influence developing nations to take an alternate and experimental approach, knowing full well that those methods will weaken that developing nation's ability, through lack of consistent electricity and grid stability, to rise to their developed level, ultimately to the benefit of protecting their own economic interests.

2.2 The Renewable Energy Myth: Key Considerations for the KSA projects

Much of the opposition to the Karpowership SA projects in South Africa are based on the belief that renewable energy sources such as solar and wind energy, together with battery storage should be the only sources considered to decarbonise the energy sector and to meet our NDC's and that these technologies have no barriers whatsoever to overcome. There is in addition a highly funded (including funding from foreign governments with the specific aim to 'vilify gas'), vociferous and media campaign that new energy projects should be predicated entirely upon the basis that only renewable projects should be considered. The reality on the ground however is very different from this utopian view and as a result several issues need to be considered, before South Africa makes the big blunder of betting her energy security solely on these technologies.

2.2.1 Materials

One of the most prevailing myths in renewable energy circles is that all the materials needed are available and that global manufacturing capacity is available and supply chains are ready

to handle all the materials and products needed. The IEA however estimates for a path that is far short of completely eliminating hydrocarbons and this decarbonisation path shows the need to increase the supply of minerals such as lithium, graphite, nickel, and rare earths by 4,200%, 2,500%, 1,900%, and 700%, respectively, by 2040 (Mark P Mills, 2022). Figure 7 shows the list of the most important materials needed for the energy transition. It is evident that global mining capacity will have to increase many times fold and the planet may not even possess enough of some of the rare earth minerals needed for a low carbon world, and many of these vital material rights are controlled outside of South Africa too.

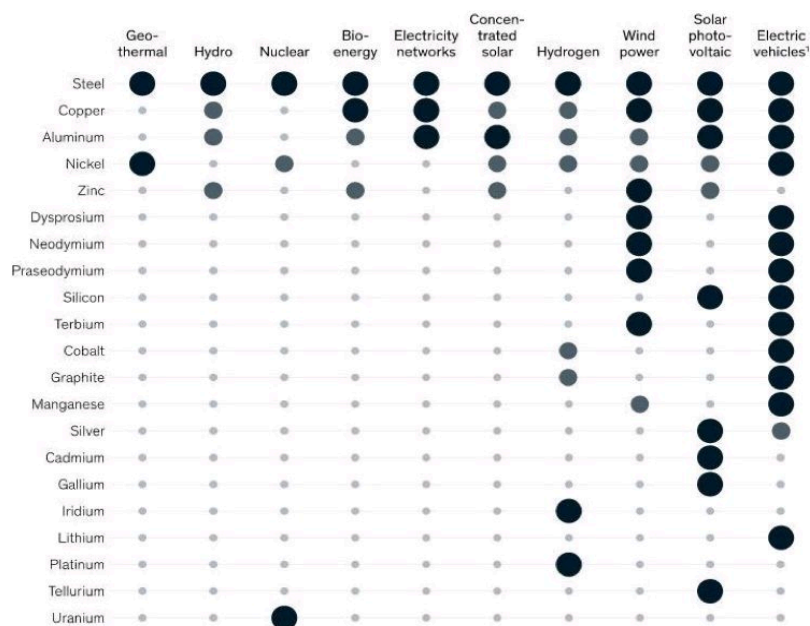


Figure 7: Materials critical for transition to a low carbon economy (Bobba et al., 2020)

2.2.2 Suppliers and Supply Chains

One of the other main challenges that need consideration before deciding on basing this country's energy security on renewables is the issue of concentration of suppliers and the capacity of global supply chains. A prime example of this is that according to Mark P Mills (2022):

- The U.S. today is dependent on imports for 100% of some 17 minerals that are already listed as critical for national and economic security and that, for 28 other critical minerals, U.S. imports account for more than half of existing domestic demand. The picture is much worse for South Africa, as the country imports the bulk of not only energy minerals but finished energy products.
- China's global market share in refined energy minerals is double the market share that OPEC has in oil markets. China is the world's top producer (40% market share) of

aluminium. The key raw material for solar panels; China has about an 80% market share of all polysilicon supply.

- Russia produces 6% of the world's aluminium (four times the U.S. output) and 10% of global nickel (number three in the world) and 4% of copper (Cu) world supply (roughly equal to that of the U.S.).
- Chile is the largest copper producer with a 20% market share.
- Peru and DRC are number 2 and 3 copper producers globally.
- The top nickel producer is Indonesia, and is not generally viewed as having a stable political environment.

Notwithstanding the availability of raw materials and if somehow the world can build the manufacturing capacity for renewable energy materials overnight; it is clear that in the event of global geopolitical shifts, South Africa will leave herself exposed to the whims of global geopolitics and supply chains, if she proceeds on this path of only relying on renewable energy, instead of a wider energy mix that includes hydrocarbons.

2.2.3 Cost

The low cost of renewable has been much touted as a reason for abandoning fossil fuels both globally and in South Africa. While it is undeniable that prices of renewable energy technologies have come down over the past 2 decades, this has not been reflected in the actual cost to consumers. Considering the case of Germany and Britain, both much further down the renewable grid transition path than the U.S., they have seen average electricity rates rise 60%–110% over the past two decades (Mark P Mills, 2022).

Mark P Mills (2022) also argues that the same pattern is visible in Australia and Canada and that this pattern is also apparent in U.S. states and regions where mandates have resulted in grids with a higher share of wind/solar energy. It can be seen on Figure 8 that in general, overall U.S. residential electricity costs have risen over the past 30 years, with an average increase of over 65% in the past 20 years.

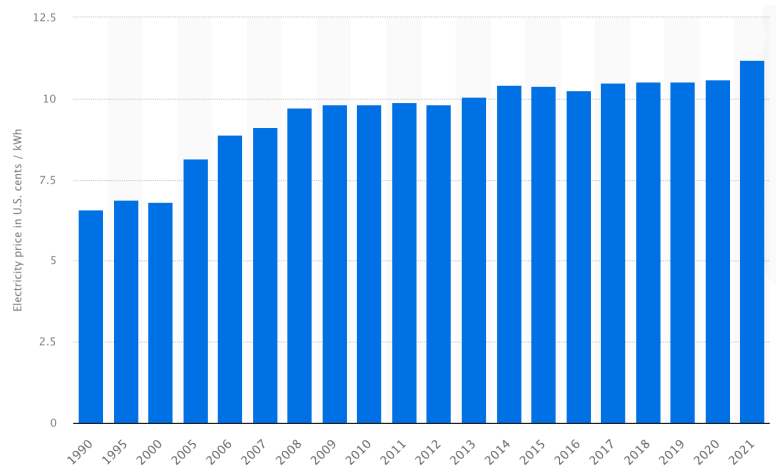


Figure 8: Average retail electricity prices in the United States from 1990 to 2021 (Statista, 2022)

Coming to the issue of the specific Karpowership SA projects, the average bid cost for KSA in 2020 was R1,55/kWh for the 3 winning projects, while the other winning bidders, offering primarily renewable energy technologies backed up with battery and fossil fuel technology to provide the required benefit of dispatchability, averaged about R1,63/kWh per project (DMRE, 2020a). This clearly shows that there are no grounds to insist that renewable energy is consistently cheaper than Gas to Power in South Africa, which can provide dispatchable power at scale, which renewables are unable to, at present.

It is also important to mention that even though South Africa has introduced circa 6GW of renewable energy electricity onto the grid since the first REIPPPP bid window, the cost of electricity has continued to rise in South Africa, by over 582% since 2007, as can be seen on Figure 9 (Labuschagne, 2021).

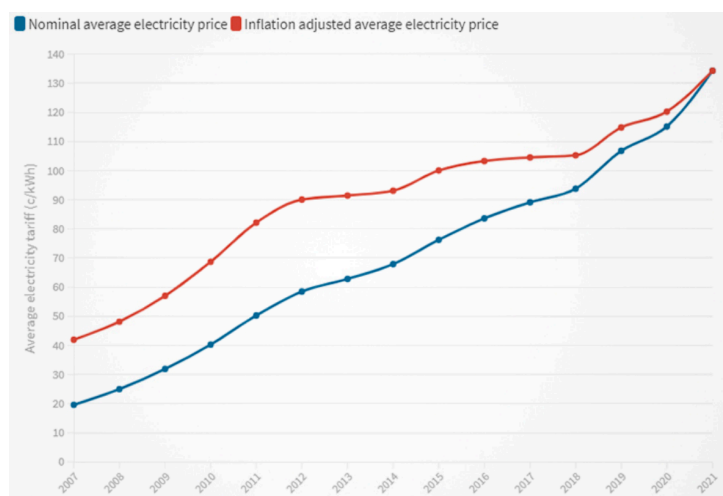


Figure 9: South African electricity prices (Labuschagne, 2021)

Finally, to drive the point on costs home; Jeff Curie, respected banker, economist and the Global Head of Commodities Research in the Global Investment Research Division at Goldman Sachs recently commented on CNBC (2022) that “At the end of last year, overall fossil fuels represented 81% of energy consumption. 10 years ago, they were at 82%. \$3.8 trillion of investment in renewables moved fossil fuels from 82% to 81% of the overall energy consumption”. Some have also argued that the 1% drop in fossil fuel use is due to efficiency gains in using hydrocarbons and not so much to the impact made by renewables.

2.2.4 Environmental considerations

In a developing country’s energy strategy, it is important to look at the overall environmental impact of that strategy. It is evident that even simply looking at the materials necessary for a transition will create a massive environmental impact due to mining activities necessary to extract the required materials and this cannot be ignored in the bigger context any more than greenhouse gases are considered in that wider context.

In addition, gas has been accepted by developed nations as a transitional fuel to provide dispatchable, reliable grid connected generation capacity, as it has a lower greenhouse gas impact than coal, diesel and other similar alternatives.

2.2.5 Velocities

A lesson to be learned by South Africa is from the Russia/Ukraine conflict; an event that has exposed the vulnerabilities of poor energy strategy based on ideology instead of proper analysis and as a result:

- European policymakers have had to face up to the difficulty of making rapid changes to very large systems.
- The EU plan announced in May would attempt to substantially reduce Russian imports over the coming five years.
- As a result of this, Russia throttled back energy deliveries.
- The Nord Stream 1 and 2 pipelines were sabotaged on or around September 28, 2022, showing just how energy supply can be used as weapon of war (Reuters, 2022).
- The European plan focuses on the need to find other places to buy hydrocarbons and they started looking towards Africa to provide these, while at the same time being non-supportive and/or blocking any attempts by Africa to develop gas resources for her own use.
- The plan raises, by five percentage points, the previous goal for the renewable share of all energy by 2030 (Mark P Mills, 2022).

- And it also subsidizes and mandates conservation efforts and rationing, intended to achieve a decline in Europe’s overall energy use.

Mark P Mills (2022) also argues that history has lessons for us, about the velocity of building global energy infrastructures and to this end:

- The IEA’s net zero energy transition path would require a construction program that could, within 20 years, build out a 15-fold increase over today’s solar/wind hardware.
- He also argues that “this is a scale equal to or greater than the expansion of all global energy infrastructures that have taken place over the past 60 years”.
- Additionally, if one was to set aside the economics and today’s regulatory challenges, there’s no evidence of sufficient construction capacity and capabilities to build so much hardware at a sustained rate of nearly triple that seen in modern history.

The energy transition vision also entails building infrastructures that require using about a 1,000% greater quantity of material inputs to produce the same quantity of delivered energy as conventional generation technologies. Mark P Mills (2022) adds that “this would be analogous to replacing—not repairing or augmenting— all existing U.S. highways built since 1921 and doing so in about one-third the time it originally took while using 1,000% more materials per road-mile”.

In a recent apparent admission to the failure of their energy transition policies, the UK’s House of Lords in a committee publication says “while many low carbon technologies are low cost, many other technologies required for the energy transition are at an early stage in their development and not yet commercially viable” (House of Lords Economic Affairs Committee, 2022).

2.2.6 Spatial Footprint

Land is an asset, often with multiple environmental considerations and possible beneficial uses, from agriculture to industry, tourism to nature reserve and so on. There is also the added dimension of history and sensitivity around land use, ownership, and land claims/reparations in South Africa.

One Khan Class Powership, capable of delivering up to 470MW of dispatchable power reliably and consistently, has a footprint of circa 15,000m². It is important to keep in mind however that this footprint is based in the sea, with minimal use of land for minor connection infrastructure. To generate a similar scale of power from a land-based gas to power plant, the footprint would be approximately four times larger.

To put this into perspective, Scatec's projects under the RMIPPPP will be close to 10km², using about one and a half to two million solar PV modules together with battery to provide less than one third of the dispatchable power to the Eskom grid.

The largest battery storage facility in the world currently is a \$300 million battery that has a 409MW capacity that can dispatch this power for only around 2 hours , built as part of the Manatee Energy Storage Centre in Florida – 132 containers covering 40 acres of land (more than 160,000m² just for the battery array), triumphantly touted as equivalent to 100 million iPhone batteries; now one can only imagine the environmental impact of the manufacturing of those batteries, let alone the unavailability of supply chains to tender to South Africa's power storage needs.

2.3 Russia Conflict

The economic and energy fortunes of Europe and indeed the world are inextricably linked to those of Russia. Figure 10 shows the interconnectedness and reliance of Europe on Russian gas, and this can be argued to have been a strategic mistake on the part of Europe as this has left the region exposed to political tensions and has threatened their national security.

This point is succinctly emphasised by Liberty Energy (2022) who say that “The intimate link between energy security and national security has been underappreciated in recent years. This all changed on February 24, 2022, when Russia invaded Ukraine. Russia's invasion of Ukraine did not cause today's energy crisis. In fact, it's the reverse: Today's energy crisis is likely an important factor in the timing of Russia's invasion. Over the last 20 years, Europe has significantly reduced its hydrocarbon production, becoming more dependent on imported energy, primarily from Russia. Europe has invested massively in wind, solar, and biofuel energy to reduce GHG emissions. These energy sources are far more capital intensive and lower in energy density and reliability. Hence today, Europe is in the unenviable position of heavy reliance on Russia for natural gas, oil, and coal. This energy pivot appears a failure as it has delivered significantly higher energy costs, grave energy insecurity, and relatively modest GHG emissions reductions after factoring in the impact of Europe outsourcing manufacturing emissions to more coal dependent countries”.

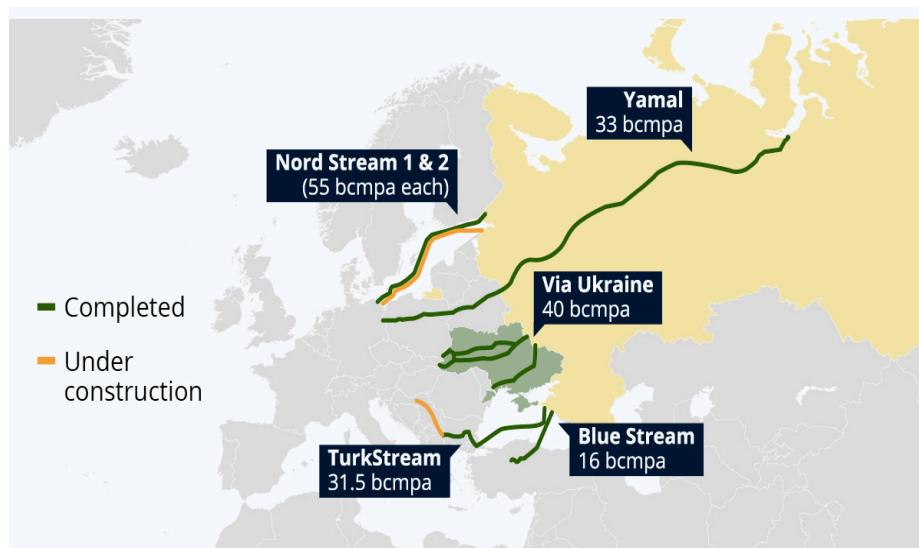


Figure 10: Russia-Europe Gas Pipelines (StatistaCharts, 2022)

This is a strategic mistake scenario that South Africa needs to actively avoid by:

- Diversifying the energy mix to include Gas to Power and abandoning the idea that renewable energy alone will provide energy security.
- Developing indigenous gas reserves.
- Diversifying energy supply through regional links.

The current energy situation in Europe can be described as a full-blown energy and economic crisis as shown on Figure 11, with:

- Gas imports from Russia down.
- Gas reserves have gone down from 2020 levels.
- Power output from gas, nuclear and hydro also down.
- Power and gas demand down, signs of an imminent economic crisis.
- Coal imports, ironically largely from South Africa having gone up many times over.

EUROPE'S ENERGY CRISIS DEEPENS AS RUSSIA CHOKES GAS SUPPLY INTO Q4-22

Europe is now in the midst of a full-blown energy crisis, with prices having surged to new record highs in August and the EU pledging gas and electricity demand curtailments. The fourth quarter of 2022 — and the onset of winter — will provide the first real challenge for how resilient the sector will be in the face of sharply lower Russian gas supplies and concerns over French nuclear. With Russian gas now accounting for less than 10% of the EU's gas supply, focus has switched to whether Europe can secure enough LNG to meet demand in Q4, while the weather will be a key determining factor on how much gas storage will be called on.

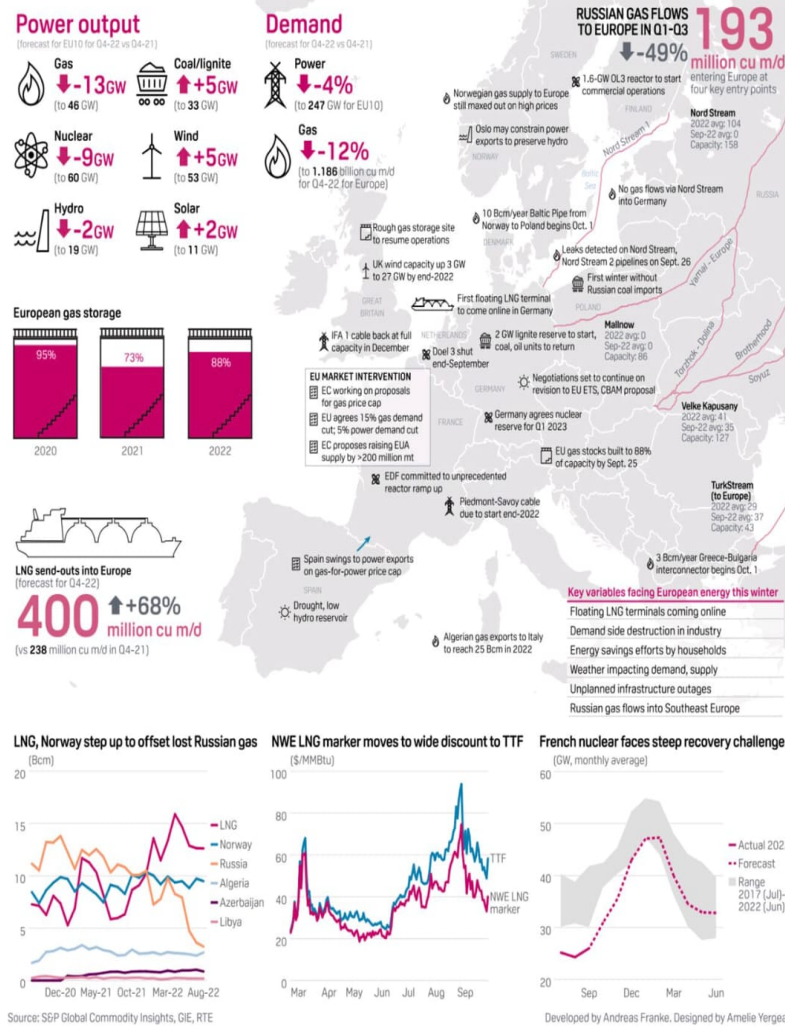


Figure 11: Summary of the current European energy crisis (S&P Global, 2022)

2.4 Energy poverty in Africa and lack of Justice

2.4.1 Electricity

The issues of energy access, sustainable development goals (SDGs) and justice cannot be separated, especially in light of the tremendous pressure put on Africa by the developed world, to decarbonise and not make use of indigenous fossil fuels, in complete contrast to Europe's own decisions to focus on their energy security. Figure 12 and Figure 13 show the discrepancy in electricity consumption in Africa vs the EU, and this shows a clear indication of the developed world's hypocrisy, as per capita, the average EU citizen uses as much as 10 times more electricity than the average African citizen.

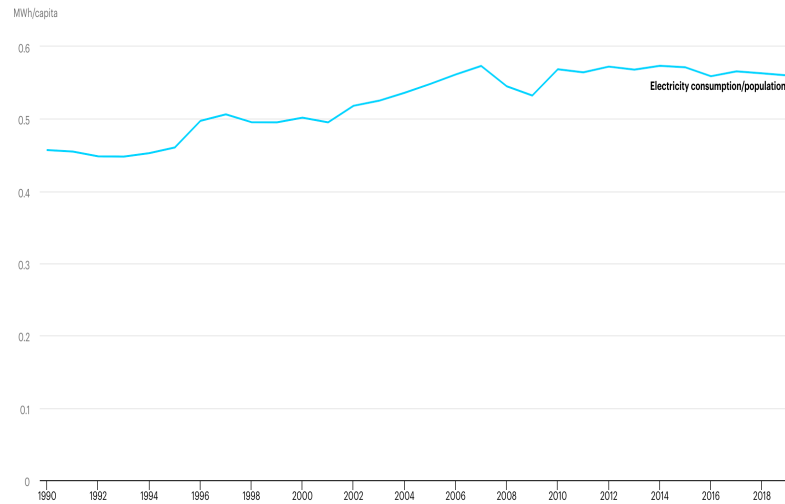


Figure 12: Africa electricity access (IEA, 2022)

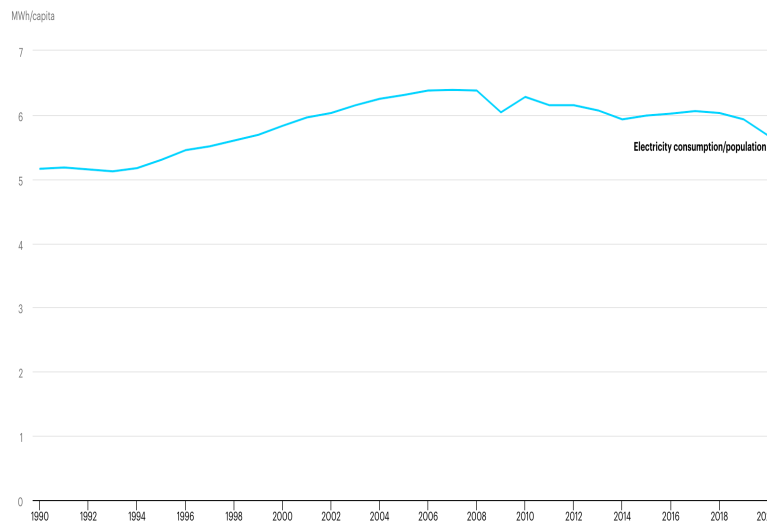


Figure 13: EU Electricity access (IEA, 2022)

2.4.2 Access to Clean Cooking

Moving beyond access to electricity, access to clean cooking is one of the key tenets of the SDGs and it is clear from Figure 14 and Figure 15 that Africa still lags far behind the rest of the world in providing access.

Liberty Energy (2022) in their ESG study, make the point that “the most urgent challenge with energy today is that one-third of humanity still lacks access to basic modern energy, electricity, and clean cooking fuel, including over 80% of Africans and half of Indians. Over

two billion people still cook their daily meals and heat their homes with traditional fuels, typically wood, dung, agricultural waste, or charcoal.

They go on to add that “simply for lack of access to a basic stove and an LPG canister, over three million people die every year from the resulting indoor air pollution. This staggering loss of human potential can and must be eradicated” (Liberty Energy, 2022).

Further, “the World Health Organization (WHO) estimates there are several million additional deaths from outdoor air pollution from the same source: particulate matter, or PM_{2.5}, which is one of the world’s most deadly pollutants. Transitioning from traditional solid fuels to liquid fuels (or natural gas or electricity) is the key to reducing outdoor PM_{2.5} concentrations just as it is for reducing indoor PM_{2.5} levels” (Liberty Energy, 2022).

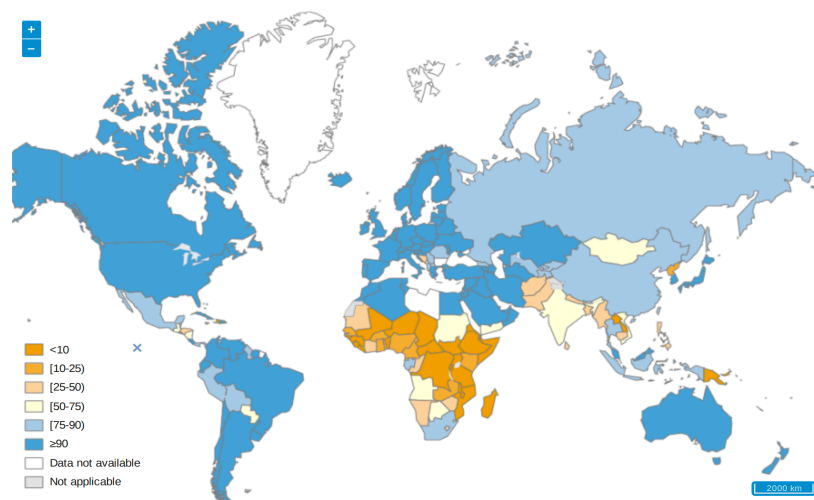


Figure 14: Proportion of population with primary reliance on clean fuels and technologies for cooking (%) (WHO, 2022)

It is clear from above, that South Africa still has not achieved universal access to clean cooking and so the country needs to take its energy security very seriously if we are to make inroads in this regard. Universal access to electricity contributes directly — and significantly — to a wide range of South Africa’s most important development goals. Access to electricity is essential to leveraging and increasing the impact of existing state expenditure across a wide range of areas, from small enterprise development to household food security. Conversely, lack of access undermines these goals and makes them more difficult to achieve. It is the main reason why government has put addressing electricity supply constraints as the number one goal of Operation Vulindlela and universal access remains as one of the key strategic focuses of Eskom and government in their annual plans (T Ledger & M Rampedi, 2022).

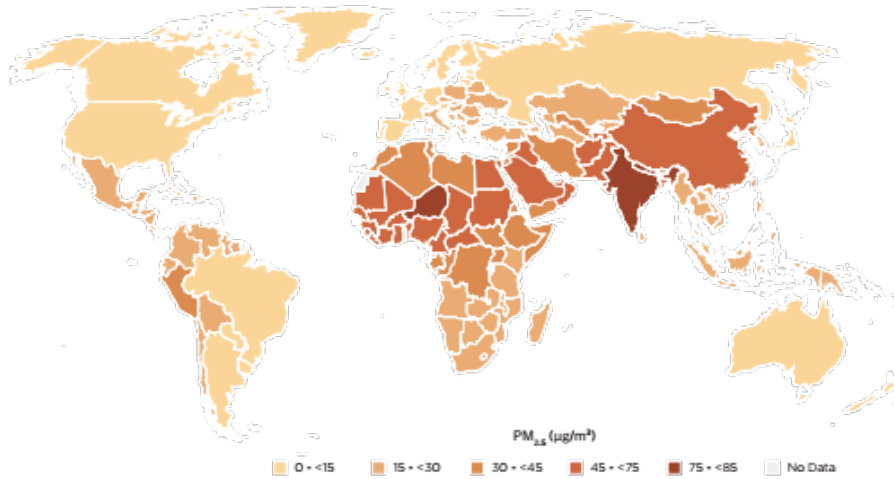


Figure 15: Global population-weighted PM_{2.5} 2019 (Liberty Energy, 2022)

It is evident from Figure 15 that the problem is most prevalent in Africa, south Asia, southeast Asia, and China, the same places where energy poverty drives the indoor air pollution crisis. Wealthy countries have used technology to have both highly energized societies and clean air. This makes the point that one cannot address issues of energy transition without addressing issues of justice and energy access.

2.4.3 Energy access equals better health

To make this point Liberty Energy (2022) present Figure 16 and Figure 17, to show that there is a clear correlation between energy access and the state of health. Figure 17 clearly shows that the same places with low energy consumption per capita, also present high levels of children under the age of 5, who are underweight.

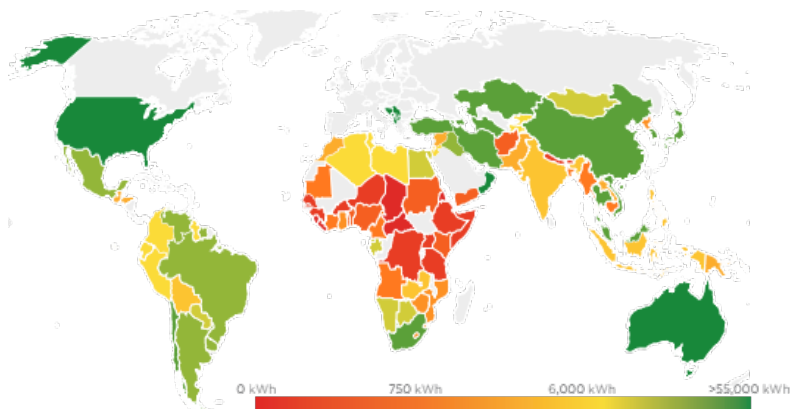


Figure 16: Energy consumption per capita (Liberty Energy, 2022)

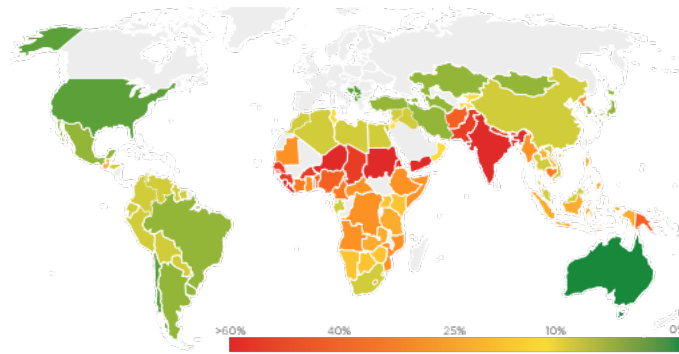


Figure 17: Percentage of underweight children at the age of 5 (Liberty Energy, 2022)

2.4.4 Human Development Index

Another critical measure that speaks to energy access is the United Nations’ Human Development Index (HDI). This is used as a rough proxy for the human condition, combining life expectancy at birth, years of education received, and per capita gross national product.

It is reported that in 1990, 62% of the global population (5.3 billion) scored “low” on the HDI, but the last three decades have shown tremendous progress as now only 12% of today’s larger population (7.6 billion) score “low” on the HDI (Liberty Energy, 2022). The problem, however, is that the 12% is still over 900 million people, many of whom are African.

As with child mortality, there seems to be a clear correlation between energy consumption and an improved HDI, as can be seen of Figure 18. South Africa and the African continent need to improve access to affordable energy, to be able to improve the HDI.

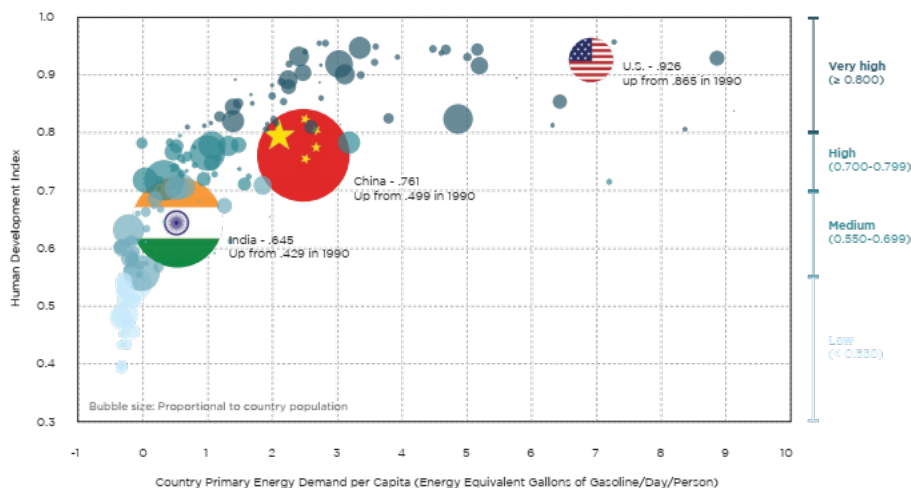


Figure 18: Access to energy is critical for HDI improvement (Liberty Energy, 2022)

2.5 Decarbonisation Agenda

There is a global agenda driven through various international bodies such as the UN to decarbonise the energy sector, and much pressure has been put on developing nations by the developed world to move away from fossil fuels as they emit significant greenhouse gases (GHGs) during operations, whilst the significant GHGs emitted at manufacture stage and waste created at decommissioning stage by renewable projects are conveniently washed over. This pressure includes enticing nations with promises of funding to decarbonise, such as the Just Energy Transition Partnership (JETP) to which South Africa has committed itself (Messetchkova, 2022). What seems to be a carrot is however shrouded in mystery in South Africa, as the government has not yet explained exactly what this funding is made up of, though it is understood to consist mainly of loans and guarantees, or the conditions attached to their use.

The pressure does not end there however, as it also includes threats such as the Carbon Border Adjustment Mechanism (CBAM), a European policy slated to come into effect in 2023, that threatens taxes on carbon-intensive products and electricity from Africa and others at similar stage of economic development. This is tantamount to a direct attack on trade agreements, trade relations and the economies of countries like South Africa, that still rely heavily on fossil fuels for their energy needs.

The irony however is that in addition to the EU buying up African gas from countries like Algeria, Nigeria, Senegal, Mauritania, and Mozambique (ABC News, 2022, FurtherAfrica, 2022). They are also buying up coal in large quantities (coal exports from South Africa are currently at very high levels) to secure their energy needs as can be seen on Figure 19 below. Africa, contributes the least of any region (around 3%) of global GHGs, and this begs the question then as to why Africa is being forced into this decarbonisation path, when those who have benefited and continue to benefit from fossil fuels, are not forcing themselves to do so. The further irony is that several European countries have very recently stated that they are seeking Powerships from Karadeniz Holdings or other floating gas to power solutions to meet their energy needs this winter and beyond.

In making energy policy decisions, South Africa and the rest of the African continent needs to take these geopolitical agendas into account. It cannot be acceptable that other countries prioritise their energy security hypocritically through fossil fuels, whereas South Africa is expected to sacrifice her energy security in the name of protecting the environment.

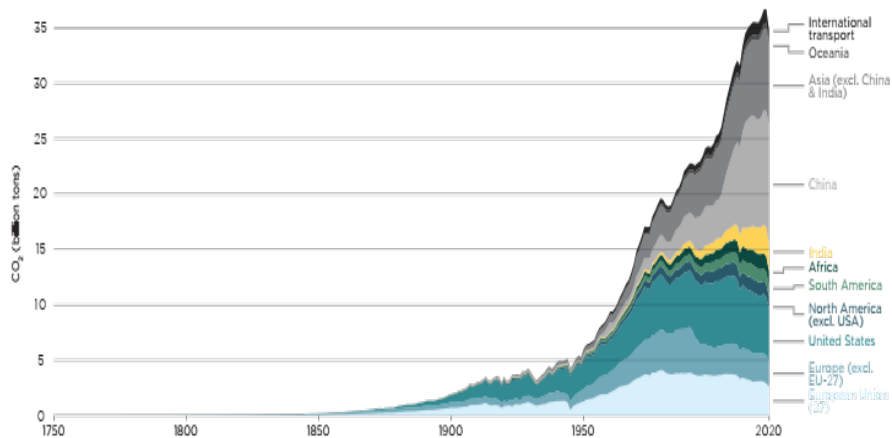


Figure 19: Annual Global CO₂ emissions (Liberty Energy, 2022)

3. International approaches to energy security and lessons for South Africa

3.1 North America

The conversation about energy security would be incomplete without looking at what history tells us about the approach of North America. Figure 20 shows us that in the US, the use of oil and gas has increased steadily over the years and that circa 2005 there was a clear uptick in US gas consumption. This was driven particularly by the increased use of and investment in shale gas; this did not happen coincidentally, but it was clear and deliberate US policy to delink their economy from Middle East oil and gas. Since this uptick in domestic gas production, the US has moved from being a net energy importer to a net producer and the country has become less and less involved in direct global conflicts as this is no longer a strategic imperative for the country.

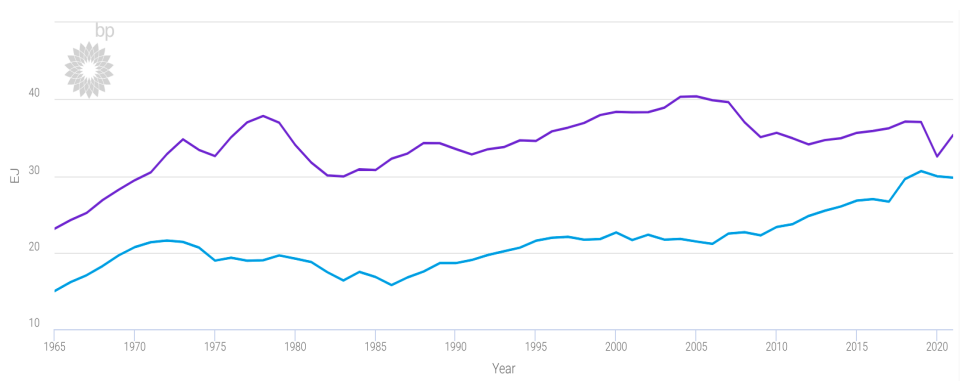


Figure 20: US Oil and gas consumption (bp, 2022)

The increase in use and production of oil and gas is not isolated to the US, but North America as a region shows an increase as can be seen as a percentage of their Total Energy Supply shown on Figure 21.

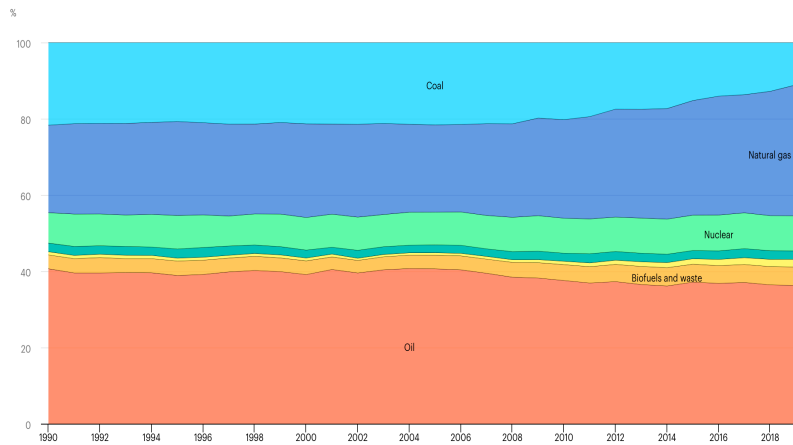


Figure 21: Total energy supply (TES) by source, North America 1990-2019 (IEA, 2022)

The clear lessons for South Africa from the North American data are that energy security needs to be a deliberate policy decision and that developed countries put their energy and national security concerns and priorities above their climate commitments, despite their rhetoric to the world.

3.2 Europe

The picture in Europe is no different to that of North America and the US, as they have made energy security a priority ahead of their climate commitments, as can be seen on Figure 22 below. Europe continues to use more and more oil and gas and as already shown, they have now increased their use of coal. Once again, energy security trumps all other concerns and priorities, a show of the continued double-speak by these nations.

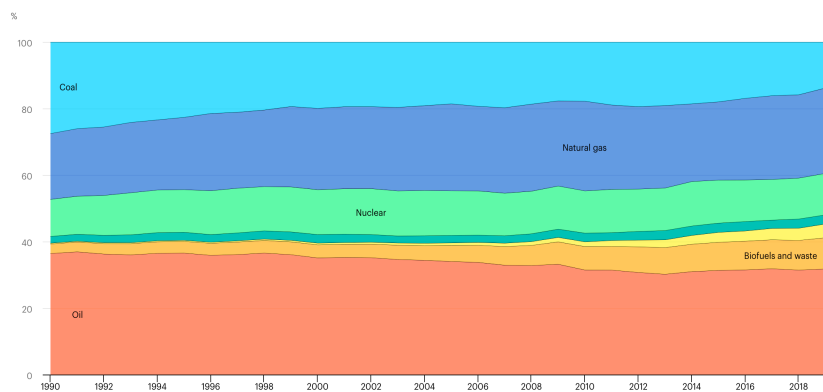


Figure 22: Total energy supply (TES) by source, Europe 1990-2019 (IEA, 2022)

Clearly stating their position on the issue of energy security being paramount over climate and general environmental commitments, the House of Lords in the UK says “the consequences of the Ukraine crisis have made the task of achieving net zero, while ensuring energy security and affordability, more complex. To help avoid a disorderly transition and to provide clarity to investors, the Government should publish a net zero delivery plan which takes account of energy security, making clear what decisions and operational actions are needed, and by when. Any such plan will need to incorporate the flexibility required by a three-decade, economy-wide transition” (House of Lords Economic Affairs Committee, 2022).

Again, emphasising their approach to energy security, from which South Africa should learn, the report goes on to state “In the short term, Europe needs alternative sources of oil and gas to replace supply from Russia; and the UK will continue to require gas during the transition. Enabling more investment in North Sea production can help address this, although it will not provide a significant reduction in energy prices” (House of Lords Economic Affairs Committee, 2022).

3.3 Global trends

Despite the continued pressure on South Africa to decarbonise and do away with her fossil fuel exploits, the world clearly sees energy security as more important than any climate and environmental concerns. It is commonplace to see headlines such as:

“In Germany and Italy, coal-fired power plants that were once decommissioned are now being considered for a second life”.

“In South Africa, more coal-laden ships are embarking on what’s typically a quiet route around the Cape of Good Hope toward Europe”.

“Coal-burning in the U.S. is in the midst of its biggest revival in a decade, while China is reopening shuttered mines and planning new ones” (Bloomberg, 2022).

“As the energy crisis worsens around the world, the European Union and the United States have welcomed Canada's controversial decision to ship back to Germany a turbine that Russia says is key to resuming gas flows through the Nord Stream 1 pipeline” (Euronews, 2022).

“EU declares nuclear and gas to be green” (Deutsche Welle, 2022).

These trends also reflect in the data such coal prices as shown on Figure 23. It is evident that whilst putting pressure on South Africa and other developing nations to decarbonise their economies, the rest of the world has continued over the past few years to look to the same

developing nations to quench their thirst for energy, taking up most of the available coal and driving up prices.



Figure 23: Global coal prices over 3 years

3.4 Lessons for South Africa

Looking at international geopolitics, energy data, trends, policy decisions, supply chain networks, manufacturing capacity, rhetoric etc., there a few key lessons that South Africa needs to learn among others:

- Energy geopolitics are intertwined with global political agendas and therefore energy policymaking needs to be done within this context.
- Geopolitical alignment is key to securing a nation’s energy future.
- The rest of the world puts their own energy security higher on their priority list, than any environmental or climate concerns.
- Very importantly, the rest of the world sees Gas as a bridge to a lower-carbon future. This is very important in the context of the IRP 2019, South African energy mix and the Karpowership projects that have yet to be implemented.
- South Africa and indeed the rest of the continent, has poor indicators including electricity access, access to clean cooking, child health rates etc., and this is a direct result of being energy poor.
- Transitioning recklessly to a low-carbon economy puts the country’s energy security at risk.
- The uptick in renewable energy has not translated to lower or constant energy prices for the consumer.

- The ideal of a low-carbon future may not be attainable in the near future because of many constraints such as the availability of materials, supply chains, and the need for reliable energy security.

4. South African energy security and current energy solutions

4.1 South Africa's current energy mix

South Africa's energy mix (Total Energy Supply) is currently dominated by coal at about 75%, followed by oil at around 15%, with gas currently playing a minor role in the region of 5%, as can be seen on Figure 24. South Africa currently imports most of its gas through the ports, in the form of LPG, or from the Pande and Temane gas fields in Mozambique through the ROMPCO pipeline as methane rich gas. This energy mix poses a serious challenge in decarbonising the energy sector, as it has a major impact on the country's economy. Natural Gas (which can be imported in LNG form), is preferred over LPG for industrial and electrification applications due to higher available efficiency and lower environmental impact. Karpowership Projects would represent the first imports of LNG into the country at significant scale and would potentially represent an anchor client to enable further development of a wider gas economy.

The renewable energy sector currently plays a very limited role in South Africa's energy mix, with only about 6GW installed to date.

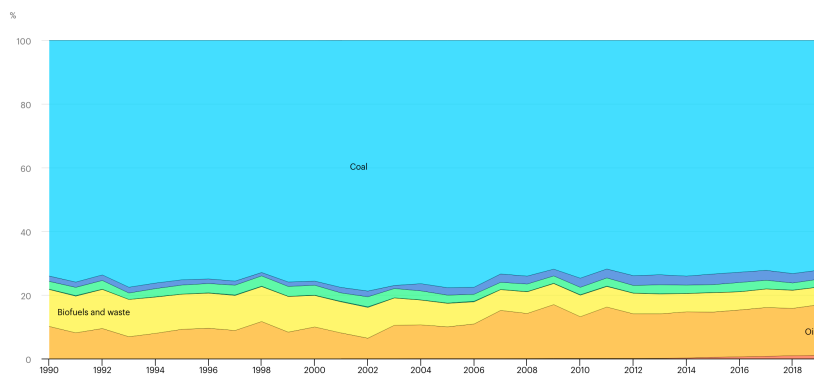


Figure 24: South Africa's energy mix (IEA, 2022)

The implications for South Africa are:

- The country depends heavily on fossil fuels, primarily coal, and this cannot be abandoned overnight.
- Decarbonising the economy rapidly will undoubtedly lead to increased load shedding and even lower energy security, stifling the economy and causing major job losses in the country, potentially leading to increased crime, political and social upheaval.

- Dependence on Mozambiquan gas exposes South Africa to single source political risk in Mozambique.
- South Africa’s energy policy needs to take the shape of a diversified mix including more gas as a bridge to decarbonisation of major sectors including power, metals and mining, transport and chemicals, to lower supply and geopolitical risks. Gas can be sourced from a number of locations and supplied for the Karpowerships, and is not tied to specific locations.

4.2 Access to electricity

South Africa has done very well since the dawn of democracy, to improve access to electricity (SDG 7.1) to about 95% of the population, as can be seen on Figure 25. This however is not sufficient as access alone without the security of supply and affordability, does not guarantee energy equity.

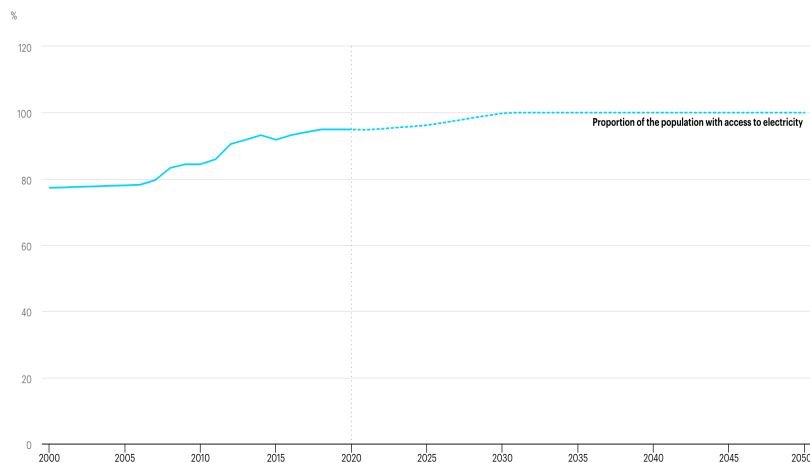


Figure 25: South Africa access to electricity (IEA, 2022)

4.3 Access to clean cooking

Another important measure of SDG 7.1 is access to clean cooking, which can be facilitated by both gas and electricity. South Africa currently has about 13% of the population (Figure 26) without access to clean cooking. As a percentage of the population, this number may seem relatively small, but this is a staggering 7.8 million people in South Africa without access to clean cooking.

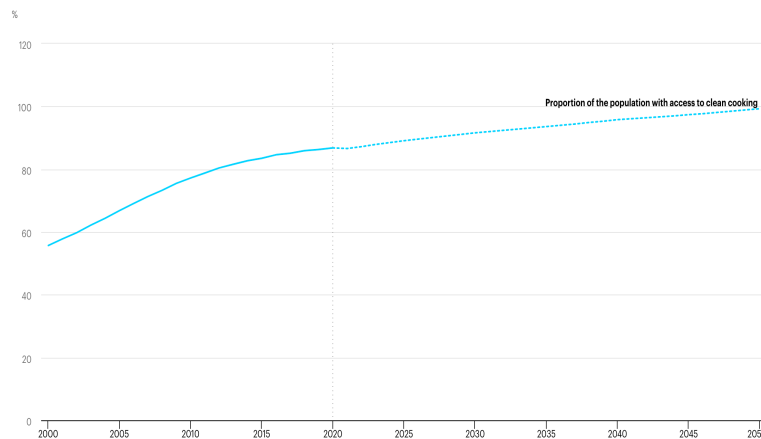


Figure 26: South Africa access to clean cooking (IEA, 2022)

It is very clear that if South Africa is to reach its Sustainable Development Goals (SDGs), the country’s energy policy certainly must include gas in the energy mix.

5. South African gas resources in the context of the Energy Transition

“Energy security equals economic security and national security”, says Chris Wright, the Chairman and CEO of Liberty Energy (Liberty Energy, 2022). This statement is particularly poignant in the South African context, as we are an energy insecure country, with large potential for gas resources. If South Africa is to transition successfully from a coal-powered economy, the country will have to make use of gas as a transitional fuel as it is undeniably cleaner than coal and also follows in the footsteps of the global community in terms of energy and national security considerations.

The critical role of energy has also been highlighted in this road by the former United Nations Secretary-General Ban Ki-moon when he stated that “energy is the golden thread that connects economic growth, social equity, and environmental sustainability”. As a result of the low carbon policy, developing countries can leverage lower emitting fuels such as natural gas and renewable forms of energy to compete with the developed countries and to power up their economies. It is believed that by achieving the SDGs in this sector, many sustainable jobs will be created, affecting the stability of the economy.

At a recent colloquium, the COO of the Petroleum Agency of South Africa (PASA), Bongani Sayidini, gave a presentation on South Africa’s gas sector potential. Figure 27 and Figure 28 present PASA’s view on the potential for gas in South Africa (PASA, 2022).

PETROLEUM EXPLORATION AND PRODUCTION ACTIVITIES IN SOUTH AFRICA

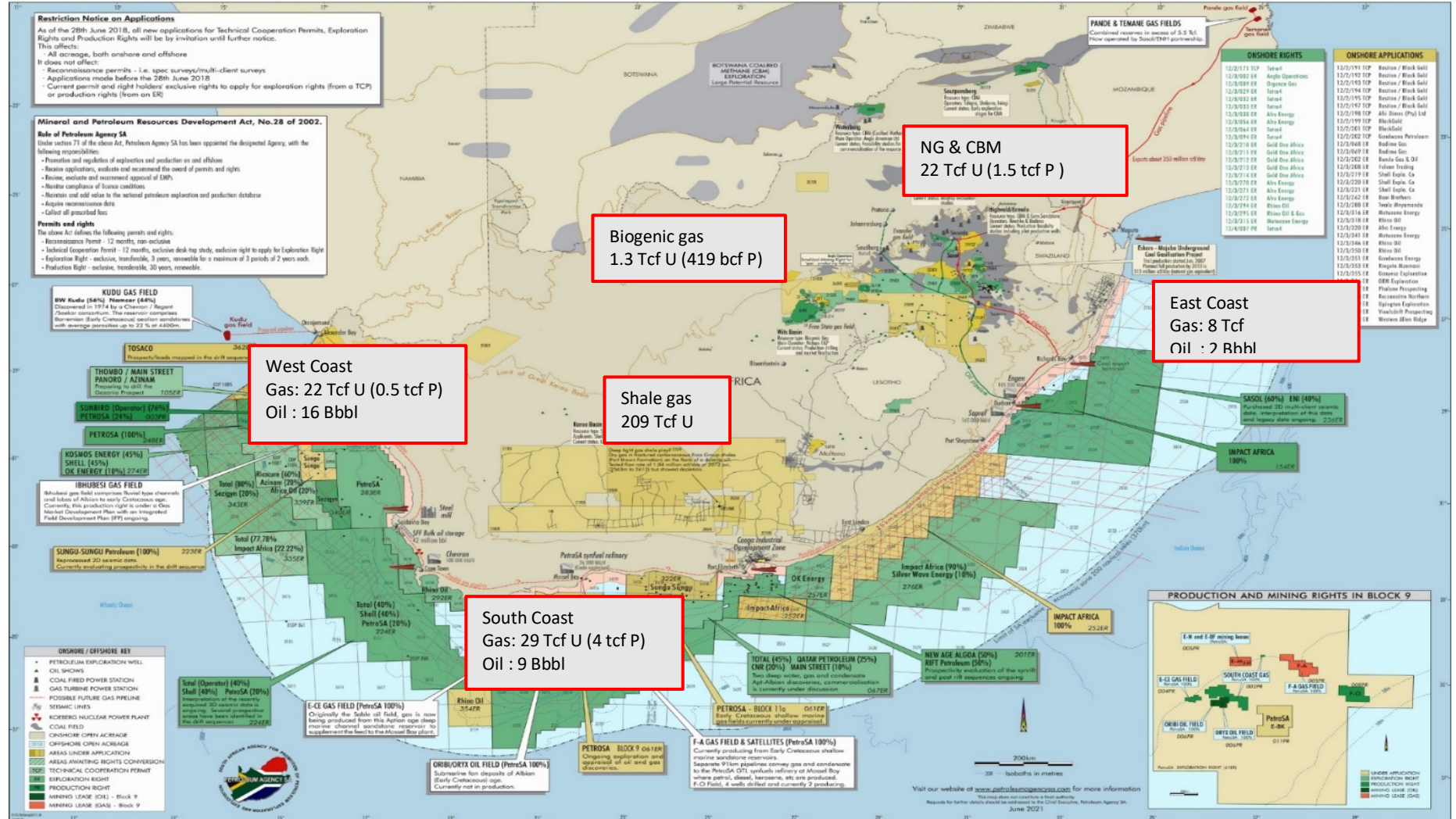


Figure 27: Petroleum exploration and production activities in South Africa

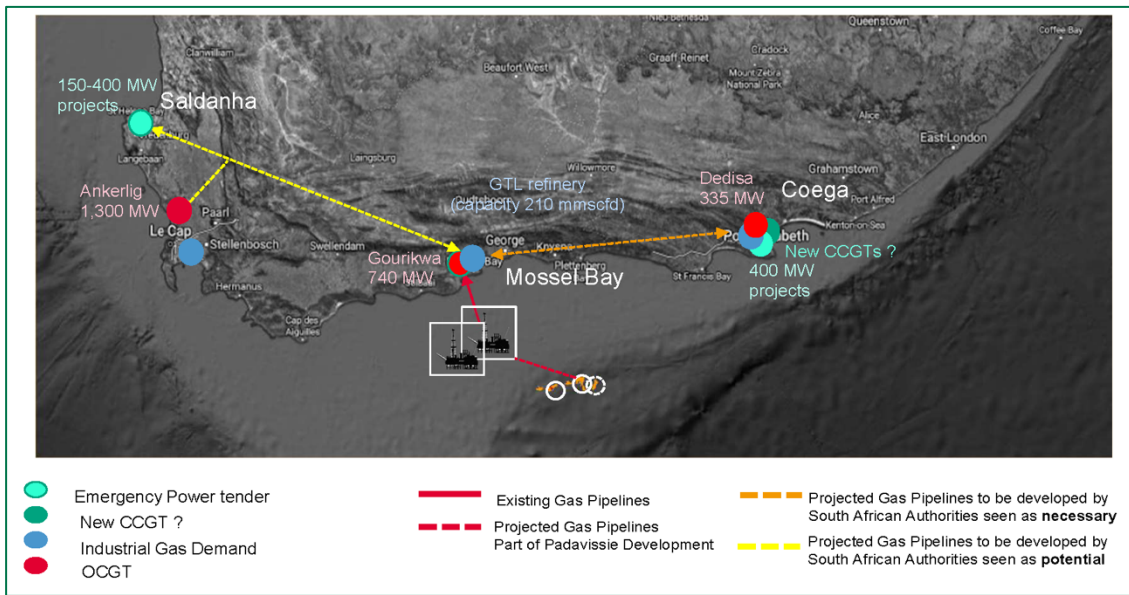


Figure 28: Block 11B/12B Potential Gas Market

To summarise PASA’s view on the potential for gas in South Africa:

- Litigious environment potentially eliminating investment through an highly adverse and onerous sector landscape, stifling development of an upstream petroleum sector.
- Energy security, local beneficiation, economic revival and growth, skills development and jobs are at risk.
- Gas is key as a transitional fuel towards net-zero carbon emissions.
- Looking at Block 11B/12B alone –
 - Confirming gas market of ~ 560MMscf/d (3,000 MW)
 - GTL Refinery in Mosselbay a potential anchor market, requires:
 - 210 MMscf/d gas and 18,000 barrels to avert permanent closure
 - Conversion of existing peaking power plants to base load gas could yield 2,000 MW, e.g Gourikwa, Dedisa, Ankerlig.
 - New gas power plants (IPP) add additional potential market.
 - The macro-economic impact -
 - Jobs
 - Direct: 1500
 - Indirect: 5000
 - Employment Opportunities: 42,500
 - Fiscal Contribution
 - Annual GDP: R22 bn
 - Government Take: R25 bn in tax & royalties
 - BOP: R26.5 bn
 - Decommissioning Liability: Defers ~ R12 billion (decommissioning liability related to the F-A Platform and GTL Refinery).

6. South Africa's "Just Transition"

6.1 Core principles of the "Just Transition"

South Africa's "just transition" framework is based on 3 principles of justice: distributive, restorative and procedural justice (Presidential Climate Commission, 2022).

The principle of distributive justice can be embodied in South Africa by:

- "Equipping South Africans with skills, assets, and opportunities to participate in industries of the future, with particular attention on impacted groups, the poor, women, people with disabilities, and the youth.
- Implementing transformative national economic and social policies that clearly consider how benefits and burdens will be distributed (this includes clear indication of where jobs are gained, where jobs are lost, and the quality and longevity of future employment).
- Increasing provincial and local capacity (both resources and skills) to promote local economic development.
- Ensuring corporate responsibility to support a green and inclusive economy".

The principle of restorative justice can be embodied in South Africa by:

- "Acknowledging the health and environmental impacts to communities in coal and other fossil fuel impacted areas and supporting all South Africans' constitutional rights to a healthy environment.
- Shifting away from resource intensive sectors and fossil fuels to (1) improve ecosystems with community ownership and stewardship, (2) improve energy security and eliminate energy poverty, and (3) create opportunities for rehabilitation of degraded land, air sheds, and water systems, the improvement of biodiversity, as well as related employment opportunities.
- Creating a more decentralised, net-zero-emissions economy, which allows for greater economic inclusion, ownership, and participation, especially for women and the youth.
- Remediating past harms by building on, and enhancing, existing mechanisms such as equitable access to environmental resources, land redistribution and Broad-based Black Economic Empowerment".

The principle of procedural justice can be embodied in South Africa by:

- "Assisting communities to understand what the just transition entails, specifically, and discuss points of agreement and disagreement openly and transparently.

- Supporting worker and community organisations (unions, civics, advocacy groups, etc.) to participate actively in just transition policy-making processes ensuring decisions are made in their best interests and allow them to take advantage of opportunities.
- Collaborating actively with a range of stakeholders, through inclusive and participatory decision-making structures, allowing each to play to their respective strengths, fostering a more dynamic, competitive, diversified, and equitable economy.
- Supporting the design and implementation of just transition projects, as proposed by individuals and communities in affected areas”.

It is important to note the above core principles of the Just Transition framework because in reality the implication is that for South Africa’s transition to be “just” it needs to:

- Be centred on Energy security, which is embodied in the principles of Distributive and Restorative Justice This includes Ownership of:
 - Energy Resources
 - South Africa driving its own energy agenda, making own decisions on the energy mix
 - South African energy Policy needs to be owned and driven by and in South Africa’s national interests
- Energy security also must include the principle of Energy Equity, which speaks to:
 - Availability which includes all energy sources available to the country
 - Accessibility and
 - Affordability
- Innovation as a reflection of the 3 principles of the Just Transition framework:
 - Ownership models
 - Funding models
 - Technology solutions
- Economic growth
 - Economic growth that protects today’s jobs and creates future jobs
 - That is Inclusive of:
 - Those who are currently unemployed
 - Gender
 - Youth
- It is also very important that a Just Transition is inclusive of protecting the environment in the process of decarbonisation, ensuring environmental sustainability. This is why it is vital that gas becomes part of the country’s energy mix as a transitional fuel, as it lowers our greenhouse gas emissions.

6.2 South Africa’s pressing challenges

Among the myriad of challenges that South Africa faces, unemployment is perhaps one of the most pressing, that threatens not only the economy, but also poses serious political risks. Figure 29 is a clear indictment of the situation in South Africa, and of government policies that are focusing on decarbonisation instead of creating jobs in the country, where unemployment sits at around 35%. The fact of the matter is that within a global context, South Africa has a much bigger problem than CO₂e and its NDC of 420 – 350 Mt by 2030.

As already shown and argued previously, if allowed to proceed, the Karpowership SA Projects will have a positive impact on job creation that goes beyond direct employment by opening up and uplifting gas, power generation and maritime industries through jobs, skills transfer and supplier development amongst others.

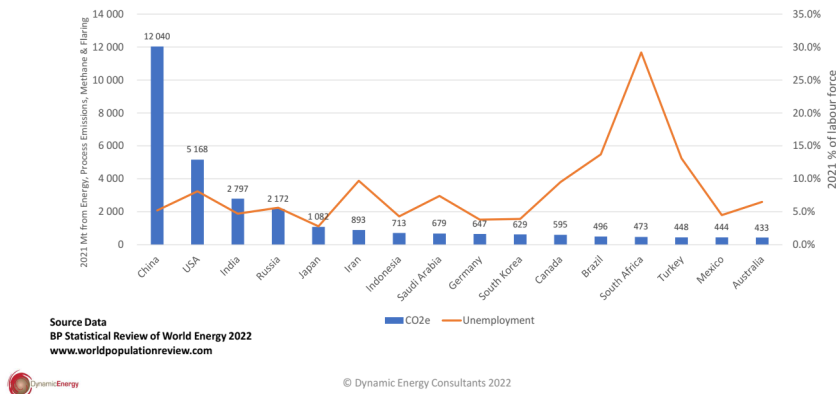


Figure 29: Unemployment and CO₂ emissions (Dynamic Energy Consultants, 2022)

Just as important, as highlighted previously and shown on Figure 30 and Figure 31, South Africa still does not have universal electrification, currently sitting at around 95%. This is however not the acute problem to the economy, since the actual availability of stable electricity capacity is severely lacking; a problem that the Karpowership SA projects aim to and are specifically designed to help address.

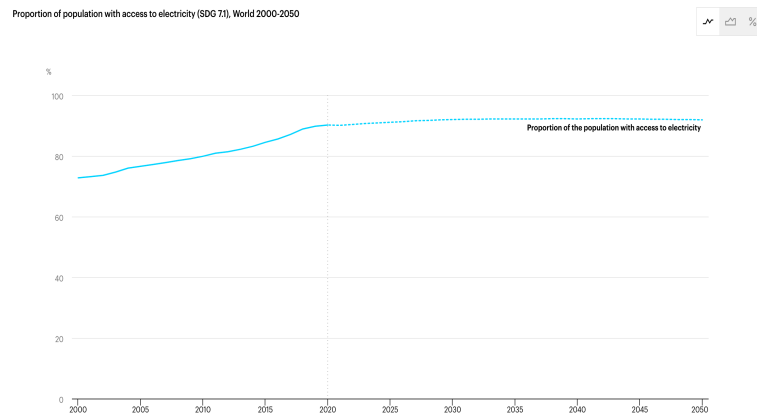


Figure 30: Global access to electricity (IEA, 2022)

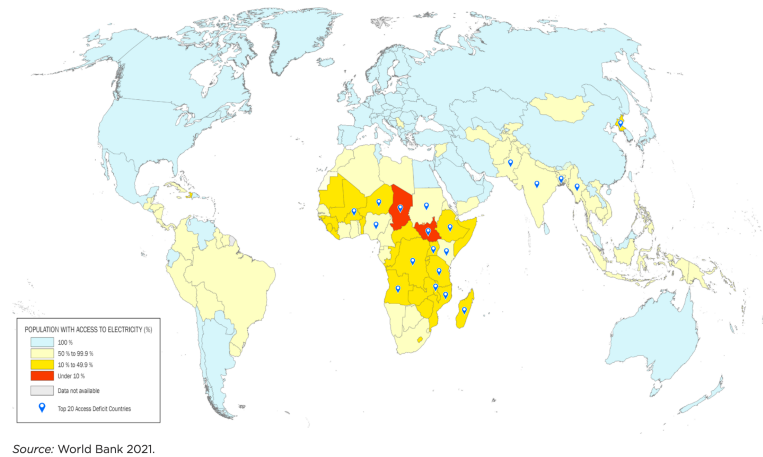


Figure 31: Access to electricity in Africa (IEA, 2022)

6.3 South Africa's future electrical energy mix

A pragmatic approach to South Africa's energy mix, that takes into account issues of energy security, justice, access and affordability has been proposed by the Stellenbosch School of Business as shown on Figure 32 (Stellenbosch Business School, 2022). This plan proposes up to 6GW of Gas to Power, in line with PASA's views, and also very importantly it foresees proper integration of South Africa's electricity system into the Southern African Power Pool (SAPP), minimising political risk that may arise due to instability in some countries in SADC.

South African Electrical Energy Context Future Decentralised Energy Mix

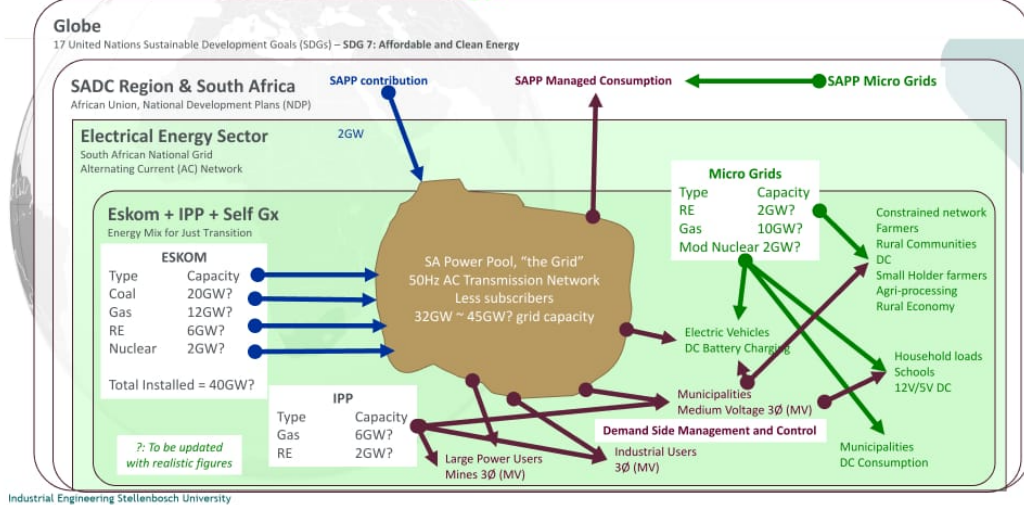


Figure 32: Future South African electrical energy mix (Stellenbosch Business School, 2022)

7. Interpretation of energy access and security according to the South African Constitution

The Constitution (Act No. 108 of 1996) requires that Government establish a national energy policy to ensure that national energy resources are adequately tapped and delivered to cater for the needs of the nation; further, the production and distribution of energy should be sustainable and lead to an improvement in the standard of living of citizens. Among the many matters it addresses, the Constitution of the Republic of South Africa, 1996, specifically Chapter 2 of the Bill of Rights (RSA Government, 1996), speaks to:

- Equality
 - Everyone is equal before the law and has the right to equal protection and benefit of the law.
 - Equality includes the full and equal enjoyment of all rights and freedoms. To promote the achievement of equality, legislative and other measures designed to protect or advance persons, or categories of persons, disadvantaged by unfair discrimination may be taken.
- Human dignity
 - Everyone has inherent dignity and the right to have their dignity respected and protected.

It is argued that energy, environmental policies, ministerial determinations and the implementation thereof, that discriminate based on technology choices to the exclusion of

others, are in fact against the spirit of the country's constitution in that it denies energy access and security and thereby:

- Infringes on the human dignity of those who do not have access.
- Infringes on the health rights (as argued in the Liberty Energy ESG report) of those marginalised by these choices.
- Not treating all as equal before the law and advancing all persons. A glaring example is the decision by the DFFE to “remove red tape” for granting EA of solar energy projects, to the exclusion of other technologies.

The above views are supported by Dube and Moyo (2022) who conclude that:

“Under the Constitution, the right to access to electricity flows from the constitutional and statutory obligations of Eskom, South Africa's power utility, to provide reliable electricity supply and to ensure just administrative action when taking actions that result in the deprivation of electricity. From a Bill of Rights perspective, the cases show that the right to electricity, albeit not expressed in the text of the Constitution, is a condition for the exercise of other rights, including the rights to human dignity and access to adequate housing, water, and health care. We conclude that the deprivation of electricity through loadshedding and other interruptions by Eskom, landlords and body corporates are violations of the right to access to electricity”.

8. Opposition and challenges to the implementation of energy solutions

8.1 Why Well-Meaning NGOs Sometimes Do More Harm than Good

Non-governmental organisations (NGOs) play a very crucial role in our society, which includes advocacy and protection of the environment, vulnerable members of our community, etc., as part of civil society. In South Africa however of recent times, this role seems to have shifted from advocacy to lobbying, particularly in the energy and environment space. These organisations now seem to be hellbent on lobbying for particular technologies over others, instead of advocating for what is in the best interests of society.

To give context, the 17 SDGs were developed to ensure economic and environmental sustainability however, conflicts between each goal exist. This causes the need for trade-offs to be identified i.e., lessening parts of one goal to benefit another goal when it is impossible to achieve both. Until all trade-offs and conflicts are identified it will be difficult to implement goals. Additionally, “Trade- offs” can depend on the country's priorities, and the interests of its people for specific SDGs. Siloed approaches advocated by environmental activists can negatively influence the implementation of the 2030 Agenda as a whole.

Rather than advocate either of the two extremes, policymakers should aim to establish environmental priorities and goals that are consistent with the real trade-offs that all

regulatory activities inevitably require, that is, policymakers should base environmental goals on the careful balancing of benefits and costs. In so doing, policymakers should seek to reduce the magnitude of those costs by identifying and implementing flexible and cost-effective environmental policy instruments, whether of the conventional type or the newer, market-based breed. Achieving the triple bottom line in the face of inherent trade-offs among social equity, economic return, and conservation are key to true sustainable development and must form the basis of integrated decision making and not biased, inequitable, one-dimensional views.

Unfortunately, the radical goal of sustainable development has been largely forgotten, and the “triple bottom line” thinking has been reduced to a very polarized concept spurred on by the rise in environmental activism resulting in skewed outcomes for development proposals meant to improve and transform ailing economies and ensuring universal access to goods and services. These groups use various tools to communicate their attitudes and attempt to mobilise public opinion to influence the decisions of local or national governance institutions in their favour.

The emerging and changing roles of environmental activists pose interesting questions for national and global progress. On the one hand, environmental activism has become pivotal to the implementation, compliance, and regulation of environmental policies. On the other hand, environmental activists are sometimes viewed by state legislatures and development organizations as “eco-terrorists” and ideological pariahs who impede trade, economic prosperity, and the aspirations to balance the scourge of the have and have nots. This begs the question, where do we draw the line?

This unbalanced polarization has veered its ugly head in countries all around the world and recently more so South Africa. Various Environmental lobbyists have vehemently opposed megaprojects in the country such as the Shell exploration right for the seismic blasting along South Africa’s Wild Coast which aims to explore potential hydrocarbon reserves beneath the seabed and multiple gas to power proposals using turnkey floating gas powerplants proposed by Karpowership. These are examples that promise to significantly contribute to South Africa’s energy security and the government’s economic development programmes. This has been unfolding while the country grapples with a crippling and devastating energy crises affecting the livelihoods of millions of citizens and businesses. The all too familiar term known to many as “loadshedding” comes to mind which strikes a sense of despair into the hearts and minds of its populace exacerbating the deleterious conditions of economic decline, joblessness, and poverty.

Whilst environmental activism prioritises the state of the environment, this view is hardly a balanced one against the backdrop of the country’s Just Energy Transition objectives geared toward a gradual shift from more carbon intensive energy sources to renewable energy systems with gas playing the role of a transitional fuel. No consideration is given to internalize current social and economic realities in the country, even though the bottom line is that governments should be able to protect its society along with its environment.

One of the big concerns with the current work of NGOs and other lobby groups is their opaque foreign funding, which may very well pose a national security threat, if not investigated. An example of this is that foreign funding has seemingly funnelled from institutions such as the Children’s Investment Fund Foundation (CIFF); funding of GBP6,425,000 (circa R130 million) to what was once credible higher education and research institutions in South Africa, UCT and Meridian Economics, with express grant terms to influence public and political thinking to ‘vilify gas’ (CIFF, 2020, CIFF, 2022).

The resulting reports from these institutions mirrored the terms of reference (ToR) issued by the funding institution, removing any kind of credibility to the results of these studies, and bringing into question, the authenticity of the NGOs, and other parties that are opposed to the developments. Are they pro-environment or anti-development? Whose agenda are they driving?

8.2 Paris Agreement proposals (COP21)

Being perhaps the most significant achievement since the Kyoto Protocol, which was not legally binding, at COP 21 in Paris, on 12 December 2015, Parties to the UNFCCC reached an agreement to combat climate change and to accelerate and intensify the actions and investments needed for a sustainable low carbon future. The Paris Agreement built upon the Convention and – for the first time – brought **all nations into a common cause** to undertake ambitious efforts to combat climate change and adapt to its effects, with enhanced support to assist developing countries to do so. As such, it charted a new course in the global climate effort.

The Paris Agreement’s central aim was to strengthen the global response to the threat of climate change by keeping a global temperature rise this century well below 2 degrees Celsius above pre-industrial levels and to pursue efforts to limit the temperature increase even further to **1.5 degrees Celsius and reach net-zero carbon emissions by 2050**. Additionally, the agreement aims to increase the ability of countries to deal with the impacts of climate change, and at **making finance flows consistent** with a low GHG emissions and climate-resilient pathway. To reach these ambitious goals, appropriate mobilization and provision of financial resources, a new technology framework and enhanced capacity-building is to be put in place, thus supporting action by developing countries and the most vulnerable countries, **in line with their own national objectives** (UNFCCC, 2015).

The very last point highlighted above is very important in the context of what is currently happening in South Africa’s energy landscape and the debates around energy security vs climate change commitments. It is apparent that even at COP21, it was never imagined that climate change objectives would supersede national objectives, which include energy

security, development, employment, etc., in the case of South Africa. It does seem however that we have strayed from this principle.

8.3 COP 26

Following up on COP21, the COP26 was perhaps the most significant meeting of Parties. The main pledges that came out of this COP were:

- Global Methane Pledge to cut methane emissions by 30% by 2030
- Global Deforestation Pledge to end deforestation by 2030
- Adaptation Finance for least developed countries on climate resilience
- 40+ countries pledged to phase out coal

In South Africa this has manifested in the Just Energy Transition Partnership (JETP) which is a climate finance facility, channelling finance towards activities that improve social inclusion and drive climate-resilient and zero-emission development. *“Just Transition Framework means South Africa can ‘proceed apace’ with \$8.5bn partnership with the US, the UK, Germany, France, and the European Union, read the headlines”*

It is important to note however that since COP26, a lot has happened in global geopolitics, with the European energy sector shaken to its core with the end of Russian gas supplies. This has now led to countries particularly in Europe, re-evaluating their COP26 targets and pledges, because they are prioritising their energy security over all else.

Africans deserve prosperity as much as everyone else, and we cannot get to our developmental goals without significant increases in power generation. A forced and hasty shift away from fossil fuels would cripple the continent’s economies. It is patently unfair to ask African countries to turn to expensive sources of ‘green’ energy when they barely have used any energy at all.

8.4 Nationally Determined Contributions (NDCs)

The latest and updated Nationally Determined Contributions (NDCs) in South Africa conveys a very ambitious mitigation target, where the country’s emissions are set to peak in 2025, lower than the initially anticipated 510 MtCO_{2-eq}, and where the entire target range has been lowered for 2030. The result may pressure the main buyer of power in the country (Eskom) to curtail generation using fossil fuels and will be further enforced through the sectoral emissions targets which the Minister will implement within one year of the Act coming into operation.

The NDCs commit that in South Africa:

- In the next five years 2021 – 2025, the energy transition will accelerate, with increasing pressure on disinvestment in fossil fuels.
- As the transition accelerates in the period 2025-2030, very rapid investment will take place in new transmission lines and technologies for power generation and storage.
- By 2030 a global carbon price will be established, with constraints on emissions entrenched in trading systems, as countries move to prevent carbon leakage.
- As the transition accelerates in the period 2025-2030 there must be well-defined structures and responsibilities in place to drive transformation of the electricity sector in South Africa.
- By 2030 increasingly mature systems and structures must integrate just transition strategies across government and stakeholder practice, while stakeholder mobilization and improved state capacity to deal with climate change should underpin stronger participatory democracy and industrial policy.

In addition to the determination of national GHG emissions trajectory, the South African parliament is working on a Climate Change Bill. The Bill provides that within one year of the Act coming into operation, the Minister must publish a list of the GHG-emitting sectors subject to sectoral emissions targets. The sectoral emissions targets must be implemented by the Ministers responsible for the administration of the relevant sectors and must be aligned with the national GHG emissions trajectory. The targets must include quantitative and qualitative GHG emission reduction goals for the first five years, the subsequent 5 – 10 years and for a 10 – 15-year period thereafter.

The Bill does not expressly refer to the national departments that would be responsible for the relevant sectors. Although Schedule 1 of the Bill refers to the “Functions relevant to the development of Sectoral Emissions Targets” and lists national departments such as Energy, Mineral Resources, National Treasury, Public Enterprises and Transport.

The Bill is currently under consideration by the National Assembly and members of the public had until 27 May 2022 to submit any comments on the Bill to the Portfolio Committee on Environment, Forestry and Fisheries. If the Bill becomes law, it will form the first legal framework in South Africa to respond to the impacts of climate change.

Companies and governments are increasingly evaluated both in the public sphere and by organizational stakeholders based on the degree to which they are perceived to be promoting the virtues of “sustainability,” yet this is not a straight-forward endeavour due to the multidimensional nature of the concept. It is important to note that as in the example of what is happening globally, managing the tensions at the intersection of the triple bottom line creates a paradox to approaching sustainability. For development proposals to be truly

sustainable, a delicate balance much be achieved, internalizing all three spheres for the betterment of societies at large.

9. South Africa's energy policy instruments

South Africa possesses several pieces of policy and legislation that govern the delivery of energy in the country, but for the purposes of this report only a few applicable regulations will be discussed briefly because of their relevance and how they align to the objectives of the Karpowership SA Projects and shows that these projects are premised within the legal prescripts and appropriate policy environment in South Africa.

9.1 South Africa's White paper on energy 1998

The White Paper on energy 1998 is the bedrock of energy planning and forms the basis of most energy policies and legislation in South Africa (Spalding-Fecher, 2002). The White paper establishes 5 key themes:

- Increased access to affordable energy services
- Improving energy governance
- Stimulating economic development
- Managing energy-related environmental impacts, and
- Securing energy supply through diversity.

The case for the Karpowership SA Projects speaks to just about all elements of this key piece of policy, as it has been shown that these projects are:

- Economically competitive
- Will stimulate economic development
- Manage environmental energy-related impacts by reducing the country's GHG emissions footprint, and
- Finally securing energy supply through diversification.

9.2 Mineral and Petroleum Resources Development (MRPD) Act 28 of 2002

The MRPD Act of 2002 and its subsequent draft amendments such as the Draft Upstream Petroleum Resources Development (UPRD) Bill, 2019 and the Gas Amendment Bill, 2020, etc. aims among others, to:

- "Make provision for equitable access to and sustainable development of the nation's mineral and petroleum resources;

- Substantially and meaningfully expand opportunities for historically disadvantaged persons, including women, to enter the mineral and petroleum industries and to benefit from the exploitation of the nation’s mineral and petroleum resources;
- Promote economic growth and mineral and petroleum resources development in the Republic;
- Promote employment and advance the social and economic welfare of all South Africans;
- Give effect to section 24 of the Constitution by ensuring that the nation’s mineral and petroleum resources are developed in an orderly and ecologically sustainable manner while promoting justifiable social and economic development...” (DMRE, 2002).

The activities of the Karpowership SA Projects are evidently aligned to deliver on the key aims of the MRPD Act of 2002; creation of a new gas sector through LNG by a global leading company in their field with decades of experience and internationally coherent operations which will allow education and skills transfer opportunities to local people including disadvantaged groups, making them inherently more employable both to Karpowership SA and also the wider local and international market.

9.3 Electricity Regulation Act No. 4 of 2006 (ERA)

South Africa’s electricity planning is largely governed by three pieces of legislation (Eric le Grange, 2022):

- National Energy Act No. 34 of 2008 (NEA).
- National Energy Regulator Act No. 40 of 2004 (NERA).
- Electricity Regulation Act No. 4 of 2006 (ERA) and its regulations.

The primary legislation governing electricity generation is the ERA. The ERA's main objective is to establish a national regulatory framework for the electricity supply industry and to make the National Energy Regulator of South Africa (NERSA) the custodian and enforcer of the national electricity regulatory framework.

The Minister of Minerals and Energy can, in consultation with NERSA (section 34, ERA):

- Determine that new generation capacity is needed to ensure the continued uninterrupted supply of electricity.
- Determine the types of energy sources from which electricity must be generated, and the percentages of electricity that must be generated from these sources.
- Determine that the electricity can only be sold to the persons or in the way set out in the notice.
- Determine that the electricity must be purchased by the persons set out in the notice.
- Require that new generation capacity must:

- be established through a tendering procedure which is fair, equitable, transparent, competitive and cost-effective; and
- provide for private sector participation.

The objectives of the Electricity Regulations on New Generation Capacity Regulations are, among others:

- To facilitate planning for the establishment of new generation capacity.
- Regulation of entry by a buyer and a seller into a power purchase agreement.
- To set minimum standards or requirements for power purchase agreements.

9.5 Integrated Resource Plan 2019

The IRP is “an electricity infrastructure development plan based on least-cost electricity supply and demand balance, taking into account security of supply and the environment (minimize negative emissions and water usage)” (DMRE, 2019). The IRP 2019 “incorporated government objectives such as affordable electricity, reduced greenhouse gas (GHG) emissions, reduced water consumption, diversified electricity generation sources, localisation and regional development” (DMRE, 2019). These are all conditions that the Karpowership SA Projects meet.

The Risk Mitigation Independent Power Producer Procurement Programme (RMIPPPP), to which the Karpowership SA Projects respond, was launched as a complement of the country’s Renewable Energy Independent Power Producer Procurement Programme (REIPPPP) (DMRE, 2020a, DMRE, 2020b). The aim of the RMIPPPP is to fill the current short-term supply gap, alleviate the current electricity supply constraints and reduce the extensive utilisation of diesel-based peaking electrical generators.

10. Conclusions

South Africa finds herself at a crossroads in terms of her approach to solving the triple challenges of poverty, inequality, and unemployment. A solution to this triple challenge could find clear expression in the way that the country approaches and implements its energy policy. Unfortunately, there are competing interests and needs that are preventing the country from being able attend to these challenges, stimulating economic growth, using the potential that the energy sector represents for the country. Policy and decision-making in South Africa’s energy sector needs to take several factors into consideration (energy geopolitics, energy security, socio-economic needs, development, sustainability, etc.) and not

serve a narrow set of interests. The current energy situation in South Africa is untenable, destroying the economy, to a cost of over R1 billion Rand per day, for a country with over 35% in the narrow definition of unemployment.

Recent global and a look at historical geopolitical events has proven that the rest of the world takes their energy security and national security needs to be more important than any other considerations, such as commitments to climate change initiatives. Global powers have largely reneged on their climate commitments, increasing their buying of South African coal, and African oil and gas and having a re-look at their NDCs. This is a very important lesson for South Africa to learn and look to emulate. The country needs to be unapologetic about its pursuit of all energy sources, in the face of global hypocrisy, that aims to force the country into an experimental economy, that they themselves are not prepared to partake in.

It is very clear that gas is a necessary transitional energy source (and has been declared as 'green' by the EU) and that all arguments against gas such as cost, environmental impact, etc., have no grounds to stand on. The accusations and insinuations labelled at the Karpowership projects in South Africa have been proven to be nothing but spurious allegations. It has also been shown that the transition to a low carbon world will not be an easy one and there are a few key lessons to note:

- South Africa and indeed the rest of the continent, has poor indicators including electricity access, access to clean cooking, child health rates etc., and this is a direct result of being energy poor
- Transitioning recklessly to a low-carbon economy puts the country's energy security at risk.
- The uptick in renewable energy has not historically translated to lower or constant energy prices for the consumer.
- The ideal of a low-carbon future may not be attainable in the near future because of many constraints such the availability of materials, supply chains, and the need for reliable energy security.
- Decarbonising the economy rapidly will undoubtedly lead to increased load shedding and even lower energy security, stifling the economy and causing major job losses in the country, potentially leading to increased crime, political and social upheaval.
- Dependence on Mozambiquan gas exposes South Africa to single source political risk in Mozambique.
- South Africa's energy policy needs to take the shape of a diversified mix including more gas as a bridge to decarbonisation of major sectors including power, metals and mining, transport and chemicals, to lower supply and geopolitical risks.
- Gas can be sourced from a number of locations and supplied for the Powerships, and is not tied to specific locations.

South Africa's "just transition" framework is based on 3 principles of justice: distributive, restorative and procedural justice. For the core principles of the "just transition" to be reflected in South Africa, the transition needs to:

- Be centered on Energy security, which is embodied in the principles of Distributive and Restorative Justice This includes Ownership of:
 - Energy Resources
 - South Africa driving its own energy agenda, making own decisions on the energy mix
 - South African energy Policy needs to be owned and driven by and in South Africa's national interests
- Energy security also must include the principle of Energy Equity, which speaks to:
 - Availability which includes all energy sources available to the country
 - Accessibility and
 - Affordability
- Be focused on economic growth that protects today's jobs and creates future jobs and is inclusive of those who are currently unemployed, gender and youth inclusivity.
- It is also very important that a Just Transition is inclusive of protecting the environment in the process of decarbonisation, ensuring environmental sustainability. Therefore, it is vital that gas becomes part of the country's energy mix as a transitional fuel, as it lowers our greenhouse gas emissions.

Among the myriad of challenges that South Africa faces, unemployment is perhaps one of the most pressing, that threatens not only the economy, but also poses serious political risks, if energy policies continue focusing on decarbonisation instead of creating jobs in the country, where unemployment sits at around 35%. The hard truth is that within a global context, South Africa has a much bigger problem than CO_{2e} and its NDC of 420 – 350 Mt by 2030; the Karpowership SA Projects have shown that they will have a positive impact on job creation that goes beyond direct employment by opening-up and uplifting gas, power generation and maritime industries through jobs, skills transfer and supplier development amongst others. In addition the designation of the Karpowership SA Projects as Strategic Infrastructure Projects (SIP), in terms of the Infrastructure Development Act, are in itself an acknowledgment of their significant economic and social importance to South Africa and the requirements of the Act that SIP's are to be given priority in planning, approval and implementation.

Just as important, South Africa still does not have universal electrification, currently sitting at around 95%. This is however not the acute problem to the economy, since the actual availability of stable electricity capacity is severely lacking; a problem that the Karpowership SA projects aim to and are specifically designed to help address.

Finally, the 17 SDGs were developed to ensure economic and environmental sustainability however, conflicts between each goal exist. This causes the need for trade-offs to be identified i.e., lessening parts of one goal to benefit another goal when it is impossible to achieve both. Until all trade-offs and conflicts are identified it will be difficult to implement goals. Additionally, “Trade- offs” can depend on the country’s priorities, and the interests of its people for specific SDGs. Siloed and divisive approaches advocated by environmental activists can negatively influence the implementation of the 2030 Agenda as a whole.

Rather than advocate either of the two extremes, policymakers should aim to establish environmental priorities and goals that are consistent with the real trade-offs that all regulatory activities inevitably require, that is, policymakers should base environmental goals on the careful balancing of benefits and costs. In so doing, policymakers should seek to reduce the magnitude of those costs by identifying and implementing flexible and cost-effective environmental policy instruments, whether of the conventional type or the newer, market-based breed.

Achieving the triple bottom line in the face of inherent trade-offs among social equity, economic return, and conservation are key to true sustainable development and must form the basis of integrated decision making and not biased, inequitable, one-dimensional views.

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environmental affairs

Department:
Environmental Affairs
REPUBLIC OF SOUTH AFRICA

DETAILS OF THE SPECIALIST, DECLARATION OF INTEREST AND UNDERTAKING UNDER OATH

File Reference Number:	(For official use only)
NEAS Reference Number:	DEA/EIA/14/12/16/3/3/2007
Date Received:	02 November 2020

Application for authorisation in terms of the National Environmental Management Act, Act No. 107 of 1998, as amended and the Environmental Impact Assessment (EIA) Regulations, 2014, as amended (the Regulations)

PROJECT TITLE

The Proposed Gas to Power Powership Project at the Port of Richards Bay, Umhlathuze Local Municipality, King Cetshwayo District, Kwazulu-Natal.

Kindly note the following:

1. This form must always be used for applications that must be subjected to Basic Assessment or Scoping & Environmental Impact Reporting where this Department is the Competent Authority.
2. This form is current as of 01 September 2018. It is the responsibility of the Applicant / Environmental Assessment Practitioner (EAP) to ascertain whether subsequent versions of the form have been published or produced by the Competent Authority. The latest available Departmental templates are available at <https://www.environment.gov.za/documents/forms>.
3. A copy of this form containing original signatures must be appended to all Draft and Final Reports submitted to the department for consideration.
4. All documentation delivered to the physical address contained in this form must be delivered during the official Departmental Officer Hours which is visible on the Departmental gate.
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Departmental Details

Postal address:

Department of Environmental Affairs
Attention: Chief Director: Integrated Environmental Authorisations
Private Bag X447
Pretoria
0001

Physical address:

Department of Environmental Affairs
Attention: Chief Director: Integrated Environmental Authorisations
Environment House
473 Steve Biko Road
Arcadia

Queries must be directed to the Directorate: Coordination, Strategic Planning and Support at:
Email: EIAAdmin@environment.gov.za


1. SPECIALIST INFORMATION

Specialist Company Name:	Noqazo Group (Pty) Ltd		
B-BBEE	Contribution level (indicate 1 to 8 or non-compliant)	1	Percentage Procurement recognition
			135%
Specialist name:	Lwazi Ngubevana		
Specialist Qualifications:	PhD (Eng.), MBA, BSc.Eng. (Chem.)		
Professional affiliation/registration:	PrEng.		
Physical address:	5 Villa Palmar, 20A Protea Road, Bedfordview		
Postal address:	5 Villa Palmar, 20A Protea Road, Bedfordview		
Postal code:	2007	Cell:	0817850492
Telephone:		Fax:	
E-mail:	lwazib@gmail.com		

2. DECLARATION BY THE SPECIALIST

I, Lwazi Ngubevana, declare that –

- I act as the independent specialist in this application;
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, Regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, Regulations and all other applicable legislation;
- I have no, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- all the particulars furnished by me in this form are true and correct; and
- I realise that a false declaration is an offence in terms of regulation 48 and is punishable in terms of section 24F of the Act.



 Signature of the Specialist

Noqazo Group Pty (Ltd)

 Name of Company:

31 October 2022

 Date

3. UNDERTAKING UNDER OATH/ AFFIRMATION

I, Lwazi Ngubevana, swear under oath / affirm that all the information submitted or to be submitted for the purposes of this application is true and correct.



Signature of the Specialist

Noqazo Group Pty (Ltd)

Name of Company

31 October 2022

Date

I certify that this document is a true copy of the original which was examined by me and that, from my observations, the original has not been altered in any manner.

Signature of the Commissioner of Oaths

Ronnie M. Masinga PR No. SAIBA1438
COMMISSIONER OF OATHS *signature*
Designation: Business Accountant in Practice (SA) Ex Officio
Republic of South Africa, Date: 31/10/22 Place:
Braamfontein, Business Address: 23 De Beer Street, Field
North Building, 4th floor, Braamfontein, JHB

Date



environmental affairs

Department:
Environmental Affairs
REPUBLIC OF SOUTH AFRICA

DETAILS OF THE SPECIALIST, DECLARATION OF INTEREST AND UNDERTAKING UNDER OATH

	(For official use only)
File Reference Number:	
NEAS Reference Number:	DEA/EIA/14/12/16/3/3/2006
Date Received:	08 October 2020

Application for authorisation in terms of the National Environmental Management Act, Act No. 107 of 1998, as amended and the Environmental Impact Assessment (EIA) Regulations, 2014, as amended (the Regulations)

PROJECT TITLE

The Proposed Gas to Power Powership Project at the Port of Saldanha Bay and associated evacuation route within Saldanha Bay Local Municipality, West Coast District, Western Cape.

Kindly note the following:

1. This form must always be used for applications that must be subjected to Basic Assessment or Scoping & Environmental Impact Reporting where this Department is the Competent Authority.
2. This form is current as of 01 September 2018. It is the responsibility of the Applicant / Environmental Assessment Practitioner (EAP) to ascertain whether subsequent versions of the form have been published or produced by the Competent Authority. The latest available Departmental templates are available at <https://www.environment.gov.za/documents/forms>.
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Specialist name:	Lwazi Ngubevana		
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Physical address:	5 Villa Palmar, 20A Protea Road, Bedfordview		
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E-mail:	lwazibn@gmail.com		

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Signature of the Specialist

Noqazo Group Pty (Ltd)
Name of Company:

31 October 2022

Date

3. UNDERTAKING UNDER OATH/ AFFIRMATION

I, Lwazi Ngubevana, swear under oath / affirm that all the information submitted or to be submitted for the purposes of this application is true and correct.



Signature of the Specialist

Noqazo Group Pty (Ltd)

Name of Company

31 October 2022

Date

Signature of the Commissioner of Oaths

I certify that this document is a true copy of the original which was examined by me and that, from my observations, the original has not been altered in any manner.

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Ronnie M. Masinga PR No. SAIBA1438.....
COMMISSIONER OF OATHS *signature*
Designation: Business Accountant in Practice (SA) Ex Officio
Republic of South Africa, Date: **31/10/2022** Place:
Braamfontein, Business Address: 23 De Beer Street, Field
North Building, 4th floor, Braamfontein, JHB



environmental affairs

Department:
Environmental Affairs
REPUBLIC OF SOUTH AFRICA

DETAILS OF THE SPECIALIST, DECLARATION OF INTEREST AND UNDERTAKING UNDER OATH

	(For official use only)
File Reference Number:	
NEAS Reference Number:	DEA/EIA/14/12/16/3/3/2005
Date Received:	08 October 2020

Application for authorisation in terms of the National Environmental Management Act, Act No. 107 of 1998, as amended and the Environmental Impact Assessment (EIA) Regulations, 2014, as amended (the Regulations)

PROJECT TITLE

The Proposed Gas to Power Powership Project at the Port of Ngqura within the Coega SEZ, Nelson Mandela Bay Metropolitan Municipality, Eastern Cape

Kindly note the following:

1. This form must always be used for applications that must be subjected to Basic Assessment or Scoping & Environmental Impact Reporting where this Department is the Competent Authority.
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Signature of the Specialist

Noqazo Group Pty (Ltd)

Name of Company:

31 October 2022

Date

3. UNDERTAKING UNDER OATH/ AFFIRMATION

I, Lwazi Ngubevana, swear under oath / affirm that all the information submitted or to be submitted for the purposes of this application is true and correct.

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Signature of the Specialist

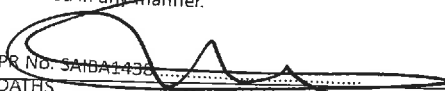
Noqazo Group Pty (Ltd)
Name of Company

31 October 2022
Date

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