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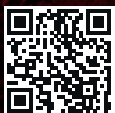
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Inside



COVER STORY

Chris-Marine's power plant customers can rest assured that they get high-quality products, service and support when needed.

Energy



Fabrizio Mozzi, Baudouin
 Managing Director

We are well-positioned to support industries worldwide in achieving reliable, efficient, and eco-friendly energy solutions



William Ruto President of Kenya
 Building reliable, modern energy systems can also help Africa develop its industrial base and manufacturing capacity, including clean-energy technologies

Mining



Stephen A. Agbeyegbe, COO,
 Bank of Nevis International Ltd
 Our clients in sub-Saharan Africa, like our clients everywhere, want to take their ambitions global

Oil



Haitham Al Ghais,
 OPEC Secretary General
 Our energy past has not been a series of replacement events, and nor will our energy future

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ENERGY

Ghana

Ghana Boosts its Renewable Energy Ambitions

Ghana has launched West Africa's largest floating solar project, marking a significant step towards increasing its renewable energy capacity. The country aims to raise its share of renewable energy from the current 1% to 10% by 2030.

The pioneering 5-megawatt floating solar installation is situated on the Black Volta River and was engineered by Ghanaian engineers from the **Bui Power Authority (BPA)**. This innovative project showcases Ghana's commitment to leveraging clean energy and reducing its carbon footprint. The floating solar power plant is a groundbreaking solution that utilises photovoltaic modules on water bodies, optimising land use while enhancing the efficiency of the solar panels.

Additionally, it helps conserve water by reducing evaporation from the surface. This technology can be deployed on ponds, lakes, reservoirs, or other water bodies.

The successful completion of this project aligns with Ghana's National Energy Plan, supporting the goal of increasing renewable energy penetration by 10% by 2030.

Deputy Director of Renewable Energy at the Bui Power Authority, Peter Acheampong, stated "We have completed the 5-megawatt project, and it is already generating power.

The Bui Power Authority (BPA) has made remarkable progress in the renewable energy sector. Before this floating solar project, the BPA commissioned its solar farm in 2020, which is generating 50 megawatts of power.



South Africa

SA Cabinet approves Renewable Energy Master Plan

The Ministry of Electricity and Energy warmly welcomes the recent approval by the Cabinet of the South African Renewable Energy Master Plan (SAREM).

This landmark decision marks a significant milestone in the nation's journey to sustainable development and green industrial development. SAREM outlines a comprehensive framework designed to facilitate



the inclusive industrialisation of the South African renewable energy value chain and battery storage, in support of job creation, economic competitiveness, low-carbon, reliable and affordable energy supply.

The plan articulates a strategic vision to harness South Africa's abundant renewable energy resources—particularly solar and wind and unlock the full economic potential of the value chain through inclusive, green industrialisation.

Minister Ramokgopa expressed his enthusiasm regarding this approval, stating: "The South African Renewable Energy Master Plan is not just a blueprint for green industrialisation; it is a pathway to a more sustainable and equitable future for all South Africans. We have a unique opportunity to lead in the global renewable energy and battery storage landscape, creating jobs and fostering economic growth while protecting our environment."

While the immediate focus will be on implementation, the Master Plan is a living document—one that will be adapted and updated to accommodate emerging technologies and sectoral priorities. Beyond wind, solar, and battery storage, future iterations of SAREM will consider the integration of additional renewable energy technologies, including the fast-emerging green hydrogen sector and waste-to-energy solutions.

To build on the momentum created by SAREM and showcase investment opportunities across the renewable energy and battery storage value chain, the Ministry of Electricity and Energy will host the South African Renewable Energy Expo later this year. This flagship event will provide a platform to attract both domestic and international investors, highlight local industrial capabilities, and convene technology developers, financiers, and policy leaders in support of the plan's objectives.



MINING

Nigeria

Nigeria signs minerals pact with South Africa

Nigeria and South Africa have signed a Memorandum of Understanding (MoU) to boost mining cooperation, focusing on investment, knowledge exchange, and technology transfer between both nations.

The agreement was signed in Abuja by Nigeria's Minister of Solid Minerals Development, **Dele Alake**, and South Africa's Minister of Mineral and Petroleum Resources, Gwede Mantashe.

The agreement on geology, mining, and mineral processing will foster knowledge exchange, promote investment, and encourage regional integration, and is part of efforts to strengthen ties under the Nigeria-South Africa Bi-National Commission framework.

Both ministers pledged ongoing engagement to advance intra-African trade and implement practical steps outlined in the agreement.

They also expressed optimism that the renewed partnership would significantly strengthen the mining industries of both countries through shared expertise and innovation.

Key highlights include capacity building in geological methods





using UAVs, and application of spectral remote sensing technologies for mineral exploration and mapping.

Minister **Dele Alake** reiterated Nigeria's focus on developing its mining sector, noting mutual benefits through mineral wealth and South Africa's technological expertise.

Uganda

Seeking Chinese Investment in Mining and Petroleum Sectors

Uganda stepped up its efforts to attract Chinese investment in its mining and petroleum sectors by hosting the inaugural Uganda-China (Liaoning) Mining and Petroleum Investment Promotion Conference in Shenyang China.

The high-profile event, organized by the Uganda Embassy in China, the Uganda Consulate in Guangzhou, and the Liaoning Provincial Department of Commerce, showcased Uganda's rich natural resources and investment-friendly policies.

The Permanent Secretary ministry of Energy Irene Bateebe, emphasized the country's readiness to partner with Chinese investors.

"Uganda is rich in minerals and petroleum resources, and we are building the right legal frameworks, infrastructure, and incentives to ensure value addition, sustainability, and returns on investment," Bateebe stated.

The conference followed the recent elevation of Uganda-China relations to a Comprehensive Strategic Partnership in 2024, reinforcing deeper economic cooperation.

"Uganda is stable, open, and eager to work with long-term partners. We welcome you to be part of our transformation journey," President Museveni said.

Over the years President has put in place incentives that attract investors in the country, offering tax holidays, land, among other incentives.

A number of Chinese investors are already in Uganda and many find Uganda a good investment ground.



"within the shortest timeframe".

The president said her administration will accelerate strategic partnerships, streamline regulatory processes, and invest in critical infrastructure to unlock the full potential of Namibia's hydrocarbon resources.

"This milestone will not only fuel our energy security, but also drive rural and peri-urban electrification, job creation, local capacity development and sustainable growth for generations to come," she said.

The president also revealed that the Welwitschia Sovereign Wealth Fund, established in 2022 to secure generational wealth, has grown steadily from an initial seed capital of N\$262 million in May 2022, to N\$450 million in January.

The Namibian economy is estimated to have grown by 3.8% in 2024, reflecting a slowdown from 4.2% recorded in 2023, while it is expected to expand to 4.5% in 2025.

"While government debt remained high at 61% of gross domestic product for the year under review, we are hopeful that the projected expansion of economic activity in 2025 and 2026 can lead to a reduction in Government debt," she stressed.

Rwanda

Rwanda to Triple Fuel Depot Capacity

Rwanda plans to increase its petroleum reserve storage capacity from the current 110 million litres--enough to last for about two months in case of supply disruption--to at least 320 million litres in the next two years, the Minister of Trade and Industry, Prudence Sebahizi, announced.

The expansion is aimed at responding to the growing demand for fuel in the country, ensuring that reserves can last for up to six months as the government is considering, as an incentive, increasing the payment to depot investors for the use of their storage facilities, he explained.

The fuel reserve depots established in 2017 can store up to 111 million litres.

"At that time, we could use about 600,000 litres per day. So, the reserve could last for six months. However, due to the growth in the number of vehicles and factories, we now use at least two million litres daily. This means the reserve can only last for about two months," he said.

"Our goal is to increase storage from 111 million litres to at least 320 million litres within the next two years," Sebahizi stated, pointing out that this strategy aims to ensure the country has a sufficient petroleum reserve in case of regional supply disruptions.

In collaboration with companies involved in the petroleum trade, the government is working to build additional storage facilities.

He observed that this is an opportunity for investors and that the facilities will be used by the traders and the government as a strategic as well as a commercial reserve.

"We are in discussions to increase that [payment], what we call throughput - that amount of money that they will gain on one litre of petroleum stored. So, that price is going to increase and it will be an incentive for them to build more storage facilities. We are discussing how much we can increase. It's an ongoing conversation."



Namibia

Namibia Will Produce First Oil Soonest

In her first state of the nation address, Namibian President Netumbo Nandi-Ndaitwah said her administration will focus on ensuring Namibia produces its first oil





Scatec to Begin BESS Project in South Africa



Scatec ASA, reached financial close for the Mogobe battery energy storage system ("BESS") facility totaling 103 MW / 412 MWh and is now making final preparations to start construction of the project.

Mogobe BESS was awarded a 15-year power purchase agreement (PPA) under the first bid window of the Battery Energy Storage Independent Power Producer Procurement Programme (BESIPPPP) in South Africa. As part of the PPA, Scatec will receive payments for making the storage capacity available for the National Transmission Company of South Africa (NTCSA) which will utilise the capacity to balance the grid.

The estimated total capex for the battery energy storage project is ZAR 3.0 billion (USD 170 million) of which Scatec's EPC contracts account for approximately 83%. The project will be financed by ZAR 2.7 billion (USD 154 million) of non-recourse project debt, with the Standard Bank of South Africa as mandated lead arranger, and the remaining by equity from the owners.

Scatec will own 51% of the equity in the project with Perpetua Mogobe (RF) (Pty) Ltd owning 46.5% and a holding company of the Mogobe Local Community Trust 2.5%. Scatec will be the engineering, procurement, and construction (EPC) provider and provide operations & maintenance (O&M), as well as asset management (AM) services to the project.

"This marks a new milestone for Scatec in South Africa and for the renewable energy transition in the country. The Mogobe BESS project is a first of a kind and reaffirms our standing as a leading renewable energy player in South Africa. We continue to see attractive growth opportunities in the market based on the need for growth in power generation, our strong position in the country and our strong and competent local team," says Scatec CEO Terje Pilskog.

Advanced Energy Introduces its Thyro-PX® Modular Solution

The Thyro-PX® Modular Solution, a fully configurable, distributed architecture enables operators to build custom power control with liquid-cooled high-power stacks and external control units to meet their precise needs.

The components are designed to meet the requirements of glass manufacturing, arc furnaces, rectifiers, and other high-current heating elements.



Configuration options include separating control and power functions to minimize EMC issues.

Thyro-PX's silicon-controlled rectifier (SCR) technology optimally controls temperature and power. It offers precise phase angle control and improved efficiency, while reducing costs and CO2 emissions compared to standard thyristors.

"Thyro-PX Modular Solution is built on proven SCR technology and offers unparalleled flexibility in high current applications to simplify switching from gas-fired systems to cleaner electrically generated heat," said Dhaval Dhaytkar, Advanced Energy's vice president, Critical Sensing and Control Products, System Power.

Manufacturers should go PFAS-Free



These "forever chemicals" so-called because of their inability to break down in nature have been linked to widespread pollution of water, soil, wildlife and even human bloodstreams. They're used in everything from non-stick cookware to industrial lubricants and most significantly (for the engineering sector), polymer-based components.

Juan-Eric Davidtz, product manager for bearings at igus South Africa, explained that the widespread use of PFAS in industrial polymers, particularly PTFE (Teflon), is far greater than most people realise.

"Most of the components manufactured today contain some form of PFAS - it's everywhere. Even when companies claim their materials are safe it often means the PFAS they're using simply hasn't made it onto the regulatory blacklist - yet."

The issue is that many manufacturers continue to use hazardous PFAS compounds because they offer great performance in reducing friction and wear. This performance comes at a cost as once these synthetic materials enter the environment they remain there indefinitely. They do not biodegrade they accumulate in living organisms and they can pose long-term health risks.

As a global innovator in polymer technology for over 60 years, igus has taken proactive steps to reduce and eventually eliminate harmful PFAS from its products.

These next-generation materials are not only wear-resistant and self-lubricating but also safer for people and the planet," says Juan-Eric.

igus continues to develop PFAS-free (per- and polyfluoroalkyl substances) engineered plastics in response to mounting evidence of severe environmental and health hazards caused by the chemicals.



Ericsson and Comsol highlight Ericsson Private 5G



Enterprises in the African mining sector are focused on digitalization and are leveraging autonomous or remote-controlled vehicles, asset tracking, and connecting workers for safety, communications, and remote assistance. Current connectivity challenges, like hard-to-reach coverage areas, network congestion, and Wi-Fi limitations have presented significant challenges in executing on smarter operations.

In response to these challenges, **Ericsson and Comsol** have showcased the **Ericsson Private 5G** solutions to accelerate digital transformation and demonstrate robust and reliable connectivity for the mining industry and beyond. Ericsson Private 5G sets a new standard for wireless network performance, enabling secure, reliable, high-speed 4G and 5G connectivity, powered by its robust dual-mode core and industry-leading radio portfolio.

Built for performance and scale, the solution comes pre-integrated to enable quick deployments, enabling advanced, intelligent operations in any environment. Through fruitful discussions around the solution and its use cases, this joint participation aims to support the growth of the enterprise business in South Africa and strengthen the country's and industries strategic objectives.

Majda Lahlou Kassi, Vice President and Head of Ericsson West & Southern Africa, says: "Ericsson is committed to empowering the mining industry with advanced connectivity solutions like Ericsson Private 5G that drive digital transformation and achieve enhanced levels of efficiency and innovation."

SFD funds a project to deliver electricity in Rwanda



The Saudi Fund for Development (SFD), represented by its CEO, Mr. Sultan bin Abdulrahman Al-Marshad, with the Rwandan Minister of Finance and Economic Planning, Dr. Uzziel Ndagijimana signed an agreement for a concessional development loan of \$20 million to

finance the electricity delivery project in the Kamonyi District.

The project aims to build a network of medium and low-pressure power lines and electricity distribution transformers to provide electricity to households, public institutions, and social facilities in the Kamonyi District. This project is part of a wider Energy Access and Quality Improvement program whose objective is to improve access to reliable and cost-effective electricity services for several of the most underserved areas in the country. This program will benefit approximately 60,000 people and enhance economic, agricultural, and industrial activities, create direct and indirect employment opportunities, improve livelihoods, support Rwanda's economic growth, and promote sustainable living.

During the signing ceremony, Sultan Al-Marshad, stressed the importance of this project, which will support the Kamonyi region with electricity infrastructure and enhance sustainable economic and social development in Rwanda. He also praised the 47-year development of relations between SFD and Rwanda.

The Minister of Finance and Economic Planning, Dr. Uzziel Ndagijimana noted that the financing will contribute to electrification efforts in Kamonyi District which currently stands at 58.9%. At the completion of this project, electricity access in Kamonyi District will increase by 6.8%, thus contributing to increased economic and social development within the framework of our National Strategy for Transformation by connecting electricity to more households.

Flare.IQ for flare management control

Reducing greenhouse gas emissions has become a major factor in limiting the impact of global warming, this includes methane gas. The oil and gas industry is not the only source of CO2 and methane but it plays a major role in our efforts to reduce greenhouse gas emissions.

Panametrics' flare.IQ technology helps to monitor, reduce, and control emissions associated with flaring, it can reduce methane slip, minimizes costs from flaring operations, provides steam savings and improves transparency for flare operations.

flare.IQ is a full-stream flare solution based on a well-proven ultrasonic flare flow measurement technology. It covers everything including assisted flares associated with downstream petrochemical and refinery flare operations, all the way to unassisted flares associated with upstream operations.





A Path to Sustainability or a Struggle for Balance

Chege Moses Kasaija

Just like any other inventions that has helped shape human progress and development over the past centuries, energy production, usage, transmission and distribution will continue to evolve for centuries to come, irrespective of the many challenges, either human made or otherwise.

In this edition, HE Haitham Al Ghais, OPEC Secretary General, debates that it is important to take on board our energy past to help better understand our energy futures. What is clear is that our energy past has been a series of energy additions, not energy replacements, as economies grew, populations expanded, and energy demand increased, providing context to how our energy futures are likely to evolve.

Africa's energy transition is a complex balancing act—striving for sustainability while navigating economic and infrastructure challenges. With abundant solar, wind, and hydro resources, the continent has immense potential for renewable energy. Countries like South Africa and Kenya are making strides, yet fossil fuels remain dominant.

Despite global pressure to shift away from coal and oil, Africa's reliance on these fuels is deeply rooted in energy security concerns. South Africa's coal-based grid, for example, faces chronic power shortages, impacting economic stability. While initiatives like the Just Energy Transition Partnership (JETP) offer support, the transition remains slow.

Investment remains a critical barrier. While climate funds exist, many come with conditions that don't align with Africa's immediate needs. The continent requires investment in grid modernization, decentralized energy solutions, and local manufacturing of renewable technologies to make clean energy accessible and affordable.

Africa's energy transition is about more than sustainability—it's about economic growth, energy security, and long-term resilience. By forging a path that balances ambition with practicality, the continent can achieve a future that is both green and prosperous.

Africa's energy transition must be tailored to its unique circumstances. Arbitrary restrictions on fossil fuel use hinders development rather than promote sustainability. Instead, a hybrid approach—where renewables are integrated alongside cleaner fossil fuel technologies—may be the most viable path forward.

Africa stands at a crossroads in its energy transition—caught between the urgent need for sustainable solutions and the realities of economic and infrastructural limitations. While the continent boasts immense potential for renewable energy, the journey toward a cleaner future is fraught with challenges that demand pragmatic solutions.

Meanwhile, Africa's mining industry is a cornerstone of global mineral supply, holding vast reserves of gold, platinum, cobalt, and lithium. Countries like the Democratic Republic of Congo (DRC) and



South Africa play crucial roles in providing raw materials for electric vehicles, batteries, and renewable energy infrastructure. Despite this potential, the industry faces significant hurdles.

Environmental degradation and ethical concerns persist. Unregulated mining leads to deforestation, water contamination, and community displacement. Reports of child labor in cobalt mines have sparked international scrutiny, highlighting the need for stronger ethical standards.

Foreign investment, particularly from China, fuels mining operations but raises concerns about resource control and fair revenue distribution. Africa must transition from being merely a supplier of raw materials to processing and manufacturing, ensuring greater economic benefits remain within the continent.

Africa's mining sector is at a pivotal moment as well. With strategic reforms and responsible governance, it can unlock sustainable economic growth while safeguarding its people and environment. The question

remains: will Africa capitalize on its resources or remain vulnerable to external pressures?

Furthermore, Africa's oil and gas industry remains a critical driver of economic growth, but it faces increasing pressure to transition toward cleaner energy. Nations like Nigeria, Angola, and Algeria rely heavily on petroleum exports, yet global shifts toward sustainability challenge this dependence.

While renewable energy is gaining traction, Africa's fossil fuel sector still underpins industrialization and energy access. The Just Energy Transition Partnership (JETP) aims to support African economies in moving toward cleaner alternatives, but the process must be carefully managed to avoid economic instability.

Rather than abrupt displacement, Africa can leverage oil and gas revenue to fund renewable projects, ensuring a gradual shift. Natural gas—viewed as a bridge fuel—offers a lower-carbon alternative while maintaining energy security. Additionally, expanding local refining and petrochemical industries would create jobs and reduce reliance on imported fuels.

The future of Africa's oil and gas sector depends on strategic adaptation. By embracing innovation while maintaining energy security, the continent can shape its own transition—ensuring growth, sustainability, and economic resilience.

Cheers!

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SUPPORTING GLOBAL POWER PLANTS MITIGATE DOWNTIME



Chris-Marine PTL Portable Lathe

Across the African continent and beyond, millions of households, industries, institutions, and mines depend on power plants for electricity and other essential utilities. Ensuring these plants run efficiently and sustainably is critical to meeting current energy needs without jeopardizing the future.

Diesel and gas power plants are complex systems that rely on large 2- and 4-stroke engines to generate electricity. Maintaining these engines is crucial to ensuring a consistent power supply. Harsh operating conditions can lead to issues like abnormal engine cylinder liner wear, valve/seat leakage, and seized or damaged piston rings, all of which can cause operational failures and personnel safety risks.

For over 60 years, Chris-Marine, a Swedish company, has provided essential support to power plant owners around the world, helping them keep their engines running with minimal downtime. Specializing in the design, manufacture, production and sale of precision tools and machines used when monitoring and overhauling diesel and gas engines in power plants and merchant vessels, Chris-Marine operates globally through subsidiaries, sales and service teams, workshops and agents.

Recognized for its three strong product brands Obel-P®, Chris-Marine®, and LEMAG®, its customers can be found worldwide, including in Tanzania, Ivory coast, Madagascar, Mauritius, Nigeria, Mozambique and South Africa.

Leif Abildgaard, Chris-Marine's Chief Commercial Officer, emphasizes that, in order to increase the lifetime of power plant engines and reduce downtime, it is crucial to regularly monitor the condition of the engines and perform professional maintenance, by using high-quality precision machines and tools, operated by trained staff. This approach helps reduce engine

wear, avoid costly shutdowns, and prevent engine failure and off-hire situations.

Complete Monitoring & Maintenance Solutions

Chris-Marine offers an all-inclusive monitoring and maintenance solutions designed for all types of diesel and gas engines that provide electricity for base load, grid stability, emergency generators and oil & gas applications. These include monitoring and maintenance machines and tools, service of equipment and training conducted by super-users.

"With Chris-Marine's extensive product range and expertise in engine monitoring and reconditioning, customers receive everything they need from a single global supplier, which significantly facilitates the running of their engines," Leif Abildgaard adds.

Monitoring Tools

Chris-Marine offers a range of tools for monitoring of 4-stroke engines, like peak pressure indicators, pressure and temperature calibrators, surface roughness measuring devices, crankshaft deflection indicators and gauges, as well as combustion chamber testers. They all contribute to determining if engine maintenance is needed.

LEMAG® ECI

LEMAG ECI is an electronic cylinder pressure indicator that improves engine uptime and lowers operating costs. It allows power plant technicians to balance, fine-tune and monitor main and auxiliary engines. LEMAG ECI takes continuous engine readings and detects problems before downtime occurs.

LEMAG ECI has been designed to withstand the harsh conditions found in power plants and onboard ships. Its ergonomic handheld unit shows measurements on a large color >



Leif Abildgaard Chief
Commercial Officer
and Tan Lu Wan
skilled CNC operator
next to CNC machine

display, and it is easy to use even while wearing gloves. Confirmation that the measurement process was successful is provided on-site in real time. The results can be copied to a PC and analyzed with the included software or sent to the superintendent for further comparison with historical or reference data.

The step-by-step graphic instructions for different tasks, as well as easy-to-understand menus, make LEMAG ECI easy to oversee, even for new operators.

Maintenance tools

Chris-Marine not only offers an extensive range of maintenance machines and tools for grinding & machining of cylinder heads, cylinder liners and sealing surfaces, but also offers machines for engine parts cleaning, hydraulic power units, test rigs, accessories and consumables.

Chris-Marine® PTL

For more than three decades, Chris-Marine's service crew has re-machined thousands of engine blocks around the world with PTL, a portable lathe used for in-situ machining of engine frames on medium-speed diesel engines. PTL prevents water leakage, ensures continuous engine operation and significantly reduces engine downtime.

PTL is a highly versatile, precise and robust machine. It has a stepless feed for vertical and horizontal movements and can be equipped with mounting adapters specifically designed for individual engine types. PTL has a capacity of machining from Ø300 to Ø900mm and operates at three different levels, ie, upper liner (machining of landing surface and upper guiding surface), lower liner (machining of the lower sealing surface) and intermediate liner (machining of sealing/guiding surface).

According to Chris-Marine, engine parts cleaning must not be forgotten. For a power plant engine to work efficiently its various parts need to be thoroughly cleaned to remove scale deposits, oil deposits and rust. Chris-Marine therefore offers a variety of cleaning solutions, like single stage aqua spray washers for overall cleaning of engine parts, as well as advanced ultrasonic cleaners capable of reaching every orifice.

Chris-Marine® UCS 4600

Chris-Marine's UCS 4600 is a cleaning system which caters for the larger industrious cleaning requirements, including the cleaning of engine parts like intercoolers, valve spindles, fuel injectors, cylinder heads, pistons and heat exchangers. UCS 4600 is electronically driven and has 112 PZT transducers generating ultrasound waves. The waves vibrate the cleaning fluid at very high velocity, thereby creating a superior cavitation process. High-quality transducers and generators integrated into the system provide ultrasonic efficiency leading to reduced cleaning time. This is an efficient and gentle cleaning method, which



extends the lifetime of costly engine parts. The system is user friendly and easy to operate thanks to its color touch panel.

Service and training

Monitoring and maintenance machines & tools are necessary to keep engines running, and so are skilled service and maintenance engineers who can operate the machines. Chris-Marine's service teams have hands-on experience of jobs at power plants and in mines, onboard cruise ships and other marine vessels. They regularly travel to customer sites to support and advise the customer's own technical crew. Chris-Marine's service teams are often involved in projects like PTL machining and training customers' technicians to use PTL.

Customers are also offered remote support around the clock. By having this kind of flexibility, Chris-Marine not only helps its customers reduce costs, but also provides them with more service options to choose from. Chris-Marine also offers rental options for customers who wish to carry out a job but aren't interested in purchasing a machine.

Long-term relationships, a success factor

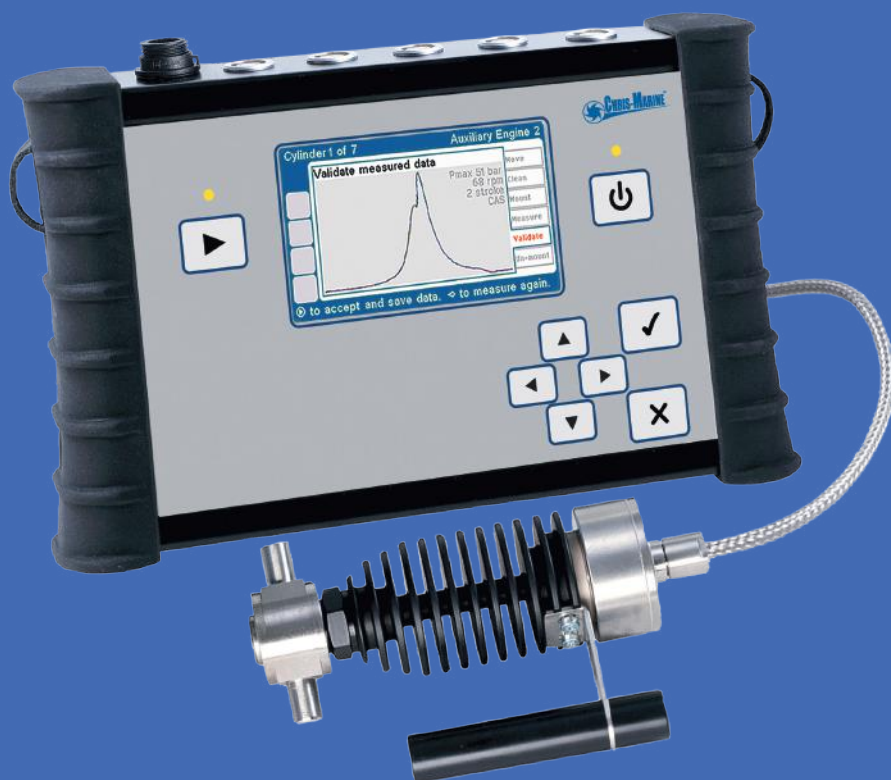
Central to Chris-Marine's success is its commitment to building long-term relationships. The company has not only an extensive product & service portfolio that benefits customers in many sectors, but also believes that taking a personal approach is crucial when interacting with clients. Getting to know clients and their needs in detail, and over time, allows Chris-Marine to act as a trusted partner and advisor, be it power plant workshops, dockyard workshops or onboard ships. Chris-Marine also works closely with major engine makers, to design and develop the high-quality machines and tools necessary to keep their engines in top condition.

"Chris-Marine's power plant customers can rest assured that they get high-quality products, service and support when needed. And down the line, the millions of households, institutions, mines and industries who rely on electricity can go about their business without any power interruption. That's what it's all about," Leif Abildgaard concludes.



▲
Valve spindle grinding with BSP

“Chris-Marine’s power plant customers can rest assured that they get high-quality products, service and support when needed.”



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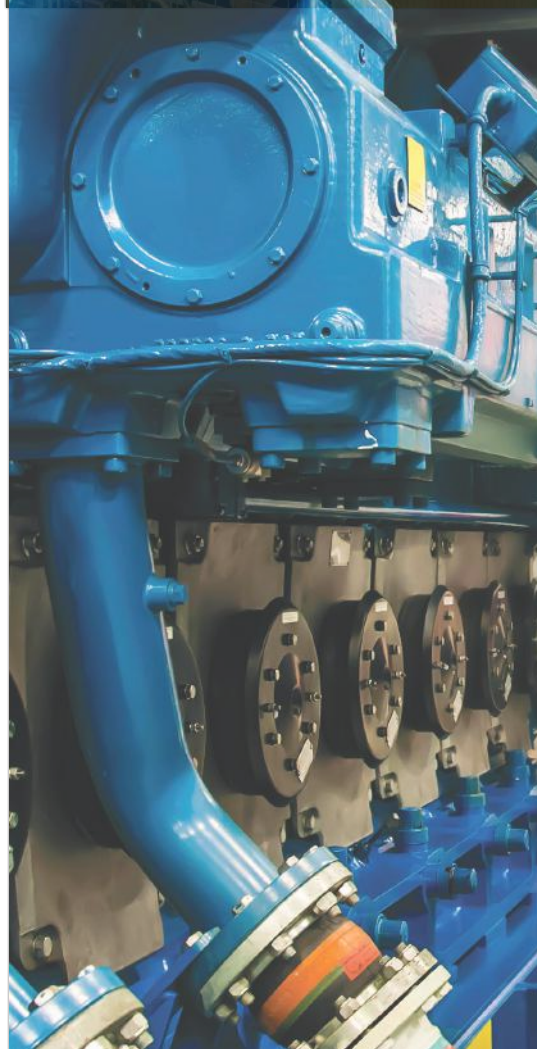


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ADVANCING **POWER GENERATION** FOR A **SUSTAINABLE FUTURE**

In the realm of power generation, French engine manufacturer Moteurs Baudouin has been making significant strides with its groundbreaking PowerKit range of generator sets. Since its launch in 2017, the PowerKit series has witnessed remarkable growth, with a diverse lineup that ranges from 18 to 4125 kVA in Diesel and 63 to 1750 kVA in Gas capacities.

Innovation in Reliable Power

Baudouin has set its sights firmly on advancing power generation with greener solutions, spearheading the charge toward a more sustainable future. Emphasizing reliability and high-efficiency power, the company's latest PowerKit 'M series' engines are designed to meet the demands of Primary and Critical applications.

With a wide array of power generation options, Baudouin not only boasts the largest and most comprehensive power generation range available on the market today, while its fast global delivery times also ensure that customers can promptly acquire and deploy a PowerKit M engine to power their operations.

Baudouin's PowerKit Variable Speed (VS) engines have also earned the trust of customers worldwide, offering agile solutions to support dynamic power requirements. These engines find applications in diverse sectors such as agriculture and irrigation, firefighting, harbor gantry cranes (RTGs), airport ground power units (GPUs), and food processing plants, among many others. The PowerKit VS range guarantees reliable operation with a simple, mechanical fuel injection system, facilitating ease of maintenance and resilience to varying fuel quality. Optimized for use between 1400 and 2200 RPM, these engines provide peace of mind through a best-in-class warranty of two years or 2500 working hours.

Meeting Emission Standards with Gas Engines

With increasing stringent emissions standards worldwide, Baudouin recognizes the need to create a power solution that facilitates compliance with these demands. Baudouin's gas generators emerge as an efficient solution, delivering both environmental and economic benefits.

Ranging from 63 kVA up to 1750 kVA,



Fabrizio Mozzi, Baudouin
Managing Director

the PowerKit Gas engines prioritize engine performance, fuel consumption, and service ability. These engines ensure a competitive total cost of ownership and can utilize waste gas generated by agricultural, wastewater treatment, and other industrial processes, thereby reducing fuel costs.

Critical power provision and energy security continue to be key trends in the power sector, Fabrizio Mozzi, Baudouin Managing Director explains, we are also addressing an increased focus on decarbonization and emissions reduction through the provision of regulated engines and alternative fuel options, such as biogas.

PowerKit Gas engines are especially suitable for co-generation and tri-generation applications that leverage heat recovery capabilities. This economically benefits large greenhouses, hospitals, and manufacturing facilities. With their growing popularity and availability worldwide, Baudouin's Gas engines serve as the perfect complement to greener, renewable energy generation.

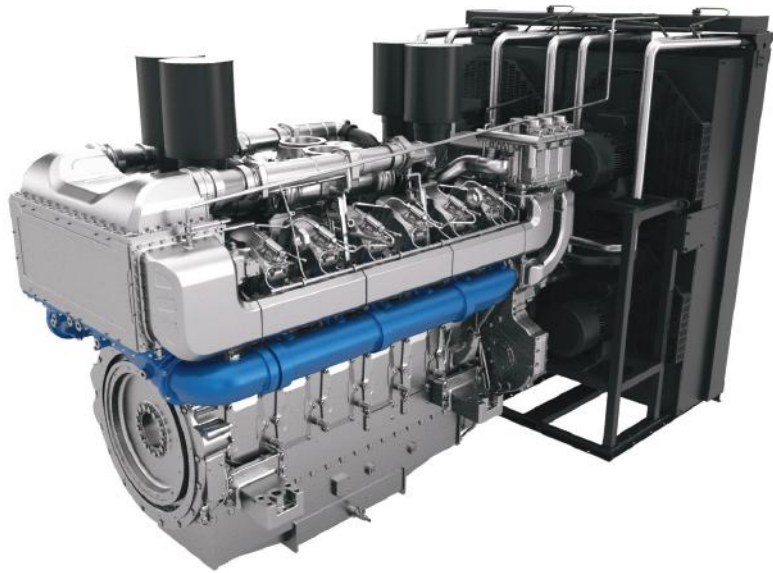
A Greener Future with HVO

For clients seeking even greener and cleaner power generation solutions, Baudouin offers engines compatible with Hydrotreated Vegetable Oil (HVO). HVO, derived from renewable sources, brings numerous advantages in terms of engine performance and environmental impact. By opting for HVO as a fuel option, clients can expect smoother consumption and lubrication due to the excellent combustion properties of HVO. This translates into improved performance, reduced component wear, and an extended engine life.

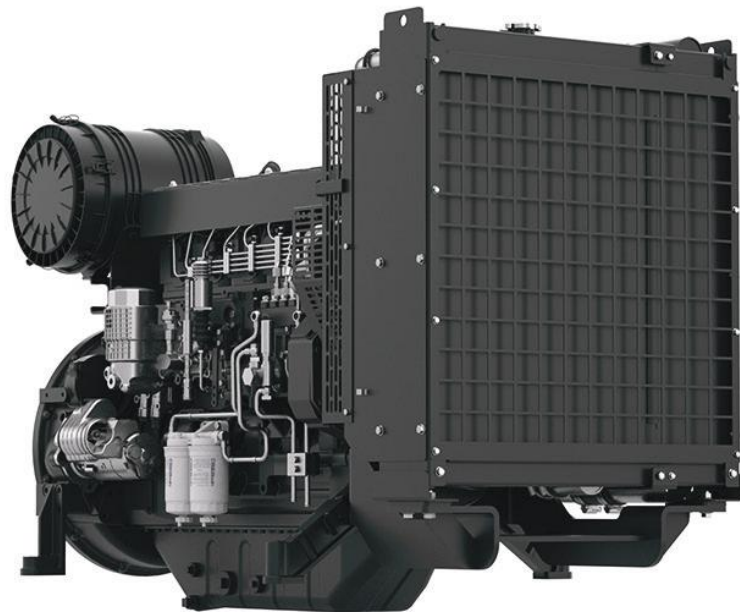
HVO generates significantly lower carbon emissions compared to conventional diesel. By burning HVO, the release of CO₂ into the atmosphere is substantially reduced, contributing to a cleaner environment and mitigating climate change.

Baudouin's incorporation of both gas and HVO across the PowerKit range demonstrates a clear commitment to embracing alternative fuels for a greener future. Clients can rely on the strong European quality standards upheld by Baudouin and gain access to global service and support. This includes factory-trained partners within an extensive international network and offering comprehensive aftercare.

"We consider the energy transition to be a significant opportunity for Baudouin, emphasizes Fabrizio Mozzi, we have the benefit of a parent company which is highly involved in all areas of the transition, from Battery Packs to Hydrogen Fuel Cells. We are discussing potential opportunities with our customers for the provision of several solutions incorporating 'New Energy' products, focusing on reduced emissions and increased efficiency. We already have the ability to operate with low carbon fuels, such as biogas, and consider the integration of alternative generation and storage technologies



Baudouin PowerKit Gas 12M55 Engine



Baudouin PowerKit VS 6M11 Engine

into our product line to be the next steps. We continue to monitor the emergence of alternative green technologies and through utilization of the large Weichai New Energy product portfolio, will enter relevant areas at the appropriate time."

A Commitment to Sustainability

Baudouin is setting new benchmarks in the power generation industry by aligning its innovations with global sustainability goals. With its versatile PowerKit range, focus on alternative fuels, and forward-looking approach to new energy, Baudouin is well-positioned to support industries worldwide in achieving reliable, efficient, and eco-friendly energy solutions.



"We consider the energy transition to be a significant opportunity for Baudouin".

-FABRIZIO MOZZI



AI'S ROLE IN TRANSFORMING CUSTOMER ENGAGEMENT FOR UTILITIES

ARTIFICIAL INTELLIGENCE IN CONTACT CENTERS HAS EMERGED AS A PIVOTAL INNOVATION, OFFERING A WAY TO REVOLUTIONIZE HOW UTILITY PROVIDERS MANAGE CUSTOMER INTERACTIONS AND COMMUNICATIONS DURING CRISES.

Chris Adomaitis,
Global Director of
Pre-Sales at Omilia



The increasing frequency and severity of natural disasters pose significant challenges for utility companies, particularly in maintaining effective communication with customers during critical service disruptions. These challenges are compounded by the dual pressures of managing the high costs associated with traditional contact center operations and adhering to government-set Key Performance Indicators (KPIs) aimed at ensuring quality customer service.

In this complex environment, Artificial Intelligence (AI) in contact centers has emerged as a pivotal innovation, offering a way to revolutionize how utility providers manage customer interactions and communications during such crises. With severe weather-related power outages costing the US economy about **\$33 billion annually**, integrating AI strategically presents an opportunity for utility companies to enhance their service reliability and operational efficiency, while also meeting the stringent KPIs

set by regulatory bodies.

Recent regulatory actions underscore the urgency of this transformation. In June 2023, NYSEG and Rochester Gas & Electric did not meet all four of their respective metric targets for customer service, resulting in **the state fining the companies \$8.72 million and \$5.9 million**, respectively. Similarly, in February 2024, under new powers given to the water regulator for England and Wales, **water companies could be fined up to a tenth of their turnover for poor**



customer service. These examples highlight the financial risks and reputational damage that can result from failing to meet established customer service standards, further emphasizing the need for utility companies to adopt innovative solutions like AI to enhance their customer service capabilities.

For technology purchasers and Generative AI enthusiasts eyeing the next frontier in customer service, the application of AI within utility companies' contact centers represents a transformative shift. It addresses both the operational inefficiencies plaguing traditional contact centers and the growing customer demand for real-time, reliable information during service disruptions. A typical utility provider, servicing two million customers, can receive upwards of two to three million calls annually. The cost of handling this volume through human agents alone traditionally ranges between **\$20 million and \$40 million**, spotlighting a significant opportunity for cost optimization and service improvement through AI integration.

Today's AI agents are a far cry from the basic automated systems of the past. They are capable of managing a wide array of tasks that were once the exclusive domain of human agents, including: initiating services, processing payments, and providing up-to-the-minute information on power outages. More importantly, since the AI can greet every caller, it can proactively offer information and solutions

to customers, pre-empting the flood of inbound calls that typically inundate human agents following a service disruption. This proactive communication strategy not only eases the burden on contact centers but also fosters trust and confidence among customers, assuring them that their utility provider is both aware of and addressing the situation.

What's more, the capabilities of AI extend beyond just customer service automation. Advancements in voice biometrics mean callers can be authenticated quickly and accurately. Voice biometrics authentication is the process of saving an audio sample of the customer's voice to a database so when they call again, their voice print can be verified quickly, reducing the need to incorporate passcodes for example. Finding ways to make authentication easier is a great way to reduce the risk of fraud and to drive the use of AI services. Likewise, advancements in AI models enable more customer service tasks to be successfully completed with automation, reducing wait times and freeing up human agents to tackle more complex or sensitive issues.

The benefits of implementing AI in utility contact centers go beyond immediate customer service improvements. AI-driven analytics offer deep insights into call patterns, customer concerns, and potential operational bottlenecks. These insights can enable utility companies to continuously refine their customer

interactions, ensuring high-quality service that can significantly reduce the risk of government-imposed fines for inadequate customer service.

As we look towards a future where natural disasters are likely to become more frequent, the adoption of AI in contact centers offers a resilient and scalable solution for utility companies. It's a pivot from the reactive, capacity-constrained models of the past to a proactive, efficient, and customer-centric approach. For those in the business of buying technology and Generative AI for contact centers, the message is clear: the time to digitally transform is now. Not only does it promise to enhance operational efficiency and reduce costs, but it also strengthens the bond between utilities and the communities they serve, building a foundation of trust that is invaluable in times of crisis.

Ultimately, the integration of AI into contact centers for utility companies is more than just an operational upgrade; it is a critical evolution in the face of changing global weather patterns and customer expectations. This shift not only empowers customers but also equips utility providers with the tools to navigate the challenges of modern-day service disruptions. As we move forward, the role of AI in fostering resilient, efficient, and customer-focused communication channels will undoubtedly become a cornerstone of the utility industry's strategy to mitigate the impact of natural disasters.

ENGEN

IS REVOLUTIONISING THE B2B LANDSCAPE IN AFRICA

Revolutionizing Mobility, Sustainability, and Economic Development Across Africa's B2B Landscape

In a rapidly evolving and the dynamic landscape of African business, adaptability and innovation are no longer optional, they're essential key drivers of success. Engen, a leading energy and solutions provider across Sub-Saharan Africa, has embarked on a pioneering, empowering and transformative journey with its "Always Moving" campaign, tailored specifically for the Business-to-Business (B2B) sector. This initiative represents a bold stride towards revolutionizing the way B2B enterprises approach their energy needs, offering technologically advanced fuels, lubricants, chemicals and dynamic services to keep businesses across the region, always moving forward.

The B2B sector in Africa faces a myriad of challenges, from remote locations to harsh environmental conditions to semi-standard mobility infrastructure. Traditional energy solutions often struggle to meet the demands of this dynamic landscape. Engen's "Always Moving" campaign is a commitment to sustainability that transcends traditional boundaries and recognizes the diverse needs of businesses spanning various industries and regions throughout Africa, whether it's agriculture in South Africa, manufacturing in Zambia, mining in DRC, construction in Mozambique or logistics in Namibia, thus not only addressing the continent's mobility needs, by embracing cutting-edge technologies to optimizing energy usage, enhancing efficiency and reducing operational costs for B2B clients, but also championing sustainability and social responsibility.

Speaking to African Power, Mining & Oil Review recently, Adnaan Emeran, Engen's Marketing and Business Development Manager for Commercial Fuels and Lubricants, acknowledged that, in an era where sustainability is no longer a choice but a mandate, where industry never stands still, with environmental concerns at the forefront of global discourse, Engen is committed to leading the charge in Sub-Saharan Africa. "Our 'Always Moving' campaign integrates sustainability into every aspect of our operations, offering eco-

friendly energy solutions that minimize environmental impact without compromising performance."

Reliability and safety are paramount in the African business landscape, where operational challenges are commonplace. Engen prioritizes these aspects by ensuring that its energy solutions are not only efficient but also safe and dependable. Through stringent quality control measures, collaborative partnerships, training programs and adherence to industry standards, Engen provides B2B clients with the assurance that they can rely on their energy partner to keep their operations running smoothly, unlock their full potential, overcome challenges, and seize opportunities for growth.

'Always Moving' is however more than a tagline, it's a promise, it's not just about providing energy, it's about empowering businesses with necessary tools and knowledge they need to thrive, grow and succeed. It's not just fuelling operations, its fuelling progress, its driving mutual prosperity in the B2B sectors across the continent, emphasised Adnaan.

Engen understands that true innovation and progress are achieved through collaboration. At the core of its "Always Moving" campaign lies a commitment to building sustainable relationships with its B2B clients across Sub-Saharan Africa. Through open communication, transparency, and a customer-centric approach, the leading energy and solutions partner strives to create long-lasting, value-driven partnerships that contribute to the growth and development of businesses across the continent and that stand the test of time.

The highlight of the campaign is a short film titled "The Sound of Moving," which portrays Engen as the conductor orchestrating an ensemble of industrial machinery. "This captures the essence of industry vitality and highlights Engen's collaborative approach in keeping industries in motion" Adnaan elaborates, because another key strength of Engen lies in its versatility and adaptability serving as a catalyst for progress. Whether through technological

innovation, promoting economic development, environmental stewardship, or community partnerships, it demonstrates Engen's holistic approach to addressing the evolving collective needs of mobility.

In a continent ripe with opportunities, Engen understands the importance of leveraging innovation and technology to drive progress, clarifies Adnaan, "We are committed to pushing the boundaries of what's possible. As a company that's 'Always Moving', we commit to embracing cutting-edge technologies and practices, enhancing energy efficiency, minimizing environmental impact, reducing operational costs, and improving overall business operational performance for the B2B sector, from smart monitoring systems to advanced fuel formulations.

ENGEN'S 'ALWAYS MOVING 'CAMPAIGN REPRESENTS A PARADIGM SHIFT IN THE B2B SECTOR.

As we navigate the challenges of the 21st century and as Africa continues on its journey towards prosperity, Adnaan explains, Engen's commitment to keeping Africa 'Always Moving' serves as a beacon of hope for a more sustainable tomorrow, a cleaner and a more connected future, not just for providing fuel but for African B2B industrial sectors as a whole. "This is because 'Always Moving' is testament to Engen's unwavering dedication to its customers, by understanding the importance of uptime and efficiency, Engen remains committed to ensuring that our customers thrive in their respective industries."

Engen's 'Always Moving' campaign represents a paradigm shift in the B2B sector, offering dynamic energy solutions tailored to the evolving needs of businesses in Africa. By embracing innovation, collaboration, sustainability, reliability, and customer empowerment, Engen is revolutionising the way B2B enterprises approach their energy needs, empowering B2B professionals to overcome challenges and seize opportunities, driving sustainable development and fostering prosperity for generations to come. As businesses continue to navigate the complexities of the modern marketplace, Engen stands ready to support them every step of the way, keeping them always moving forward.



▲
Adnaan Emeran, Engen's Marketing and Business Development Manager for Commercial Fuels and Lubricants



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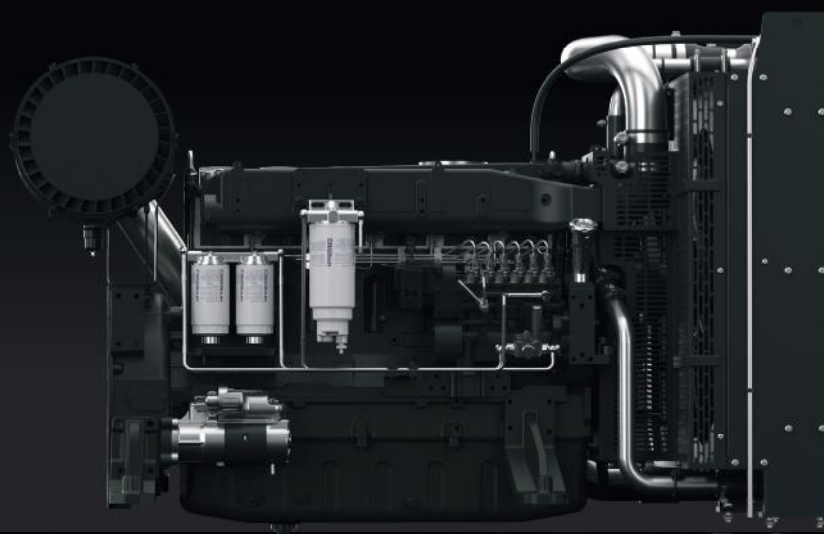
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A new energy pact for Africa

Governments and their international partners must commit to working toward universal energy access, accelerating the deployment of renewables, and boosting investment in green industries on the continent. Otherwise, Africa may be left out of the clean-energy future, writes William Ruto and Fatih Birol.

Many people associate technologies like solar and wind power with efforts to tackle climate change. But for the world's most vulnerable populations, they are much more than a clean-energy solution. By creating jobs, improving health, and increasing social mobility and gender equality, they build a path to a more prosperous future.

This is especially true for Africa. In terms of energy sources, the continent has immense potential that has gone largely untapped. Despite being home to 60% of the best solar resources globally, for example, Africa has roughly the same installed solar PV capacity as Belgium, a small country not known for its sunshine. There is also great potential for hydro, wind, and geothermal power in many African countries, and these energy sources can play an important role in diversifying and securing



William Ruto
President
of Kenya



Fatih Birol,
Executive
Director of the
International
Energy Agency

electricity supply. Leveraging the continent's natural endowments responsibly will be essential to its development.

The economic and social benefits of renewable energy could be huge. Throughout Africa, hundreds of millions of people still lack access to electricity – a major impediment to gaining an education, finding regular employment, and contributing to a productive economy. The global energy crisis has only exacerbated the situation, as mounting debt problems and rapid price increases have made it even harder to reach the United Nations' goal of universal energy access by 2030. Renewables are vital to address this, with solar, in particular, set to become the cheapest source of electricity nearly everywhere in Africa by 2030.

Electricity is not the only energy concern on the continent. Four out of five people in Sub-Saharan Africa still cook with wood and biomass, which, when burned, produces harmful smoke. In fact, nearly a half-million premature deaths per year in Sub-Saharan Africa are linked to household air pollution resulting from the lack of access to clean cooking facilities. This disproportionately affects women and children,



not only in terms of health but also in lost time and lack of opportunity. Clean cooking solutions could mean more children in the classroom, rather than out collecting firewood, and more women with the time to find work or start a business, which could provide a route to financial independence. The use of clean cooking fuels also reduces greenhouse-gas emissions.

Addressing Africa's energy challenges requires meaningful investment from both the public and private sector. Currently, only about 3% of energy investments worldwide are made in Africa, even though the continent is home to 17% of the world's population (over 1.2 billion people) – a figure that is expected to double in the next 30 years. International financial institutions should step up to mobilize private capital, acting as first movers to absorb risk and protect investments. Doing so would help promote projects that support vulnerable populations, lay the groundwork for sustainable economic growth, and ensure that Africa becomes an attractive destination for investment.

Investments in resilient and efficient power grids will be critical to meeting the growing energy needs of densely populated urban

centers and growing industries. At the same time, off-grid systems powered by solar and batteries have already revolutionized the way remote towns gain access to electricity. Both centralized and decentralized power systems will be important for expanding electricity access to all Africans.

Building reliable, modern energy systems can also help Africa develop its industrial base and manufacturing capacity, including for clean-energy technologies, whose market is set to grow rapidly this decade. The continent is already a major player in producing the raw materials needed for clean-energy technologies and is home to more than **40% of global reserves** of cobalt, manganese, and platinum – key minerals for batteries and hydrogen fuel-cells. These resources must be extracted and used in a way that benefits local populations and respects environmental and social standards. Beyond mining, African economies must focus on strengthening their refining and manufacturing capacity, as well as on constructing their export infrastructure. This will require a well-equipped labor force of trained engineers, technicians, and scientists.

As is well known, Africa has contributed

the least to global greenhouse-gas emissions and yet suffers some of the worst effects of climate change. To help ensure that it has an opportunity to play a central role in the emerging clean-energy economy, we are calling for a New Energy Pact.

The pact aims to foster deeper collaboration between African countries and their international partners to accelerate the continent's unacceptably slow progress toward universal energy access, to increase investments in renewables and energy-efficiency improvements in Africa, and to lay the groundwork for African countries to contribute to emerging clean-energy supply chains. Success would require African governments to work with international partners to develop more ambitious plans to finance and realize energy projects in Africa while addressing governance, environmental, and labor issues.

Done right, a New Energy Pact can generate lasting benefits for Africa, such as greater energy security and improved living standards, and help the world reach its climate goals. If Africa is left out of the clean-energy future, the entire planet stands to suffer.

(Courtesy of Project Syndicate)



EODEV, A NAME SYNONYMOUS WITH OFF GRID CLEAN POWER GENERATION

You may have seen images of Energy Observer, the vessel which circumnavigated the world from 2017 in complete energy autonomy and stopped over in Cape Town, South Africa, in 2023. While the adventure of this unique catamaran laboratory is now over, the objective of being able to supply clean power anywhere in the world, using hydrogen to store energy and fuel cells to generate electricity, has become a very concrete reality thanks to EODEV, an international leader in hydrogen-based power generation solutions.

Structuring a supporting ecosystem

EODEV, an innovative greentech industrial company, was launched in 2019, with the aim of accelerating the energy transition thanks to sustainable, reliable and affordable solutions using hydrogen. To grow the start-up, initial Energy Observer partners such as leading hotel chain Accor and Toyota Motor Europe became investors, then joined by the likes of world logistics leaders CMA-CGM, Caterpillar dealer Monnoyeur Group and some venture capitalists such as TILT partners, among others. These investors funded the project in several phases, with the total amount raised being around €100M, which allowed EODEV to quickly structure professional governance, R&D, engineering, production and sales, and its own manufacturing plant.

EODEV is now a world leader in the design, industrialization of zero-emission power generation systems and off-grid decarbonized energy supply thanks to its 110kVA GEH2® hydrogen fuel cell unit for stationary and mobile operations, intended to replace diesel gensets (a market worth \$40 billion per year), and REXH2® for marine applications. The young company is established in 27 countries across all continents, thanks to its distributorship, equipment rental and franchise networks.

Africa's clean energy objectives

The African market represents an opportunity for EODEV and regional operators aiming to provide customers with clean energy alternatives to diesel. The continent is blessed with some of the world's best solar and wind potential, much of which is currently undeveloped. The IEA (International Energy Agency) estimates that Africa has 60 percent of the world's solar resources, but so far accounts for only 1 percent of global solar generation capacity. Many African countries are thus keen on developing the continent's potential for the supply of green hydrogen: South Africa, for example, aims to provide up to 4% of all future green hydrogen worldwide, and the establishment in 2022 of the Africa Green

Hydrogen Alliance between Egypt, Kenya, Mauritania, Morocco, Namibia and South Africa (six of the key countries leading green hydrogen efforts on the continent) was coupled with the launch of the European Union's REPowerEU Plan.

The continent is also facing a massive energy gap. Approximately 600 million Africans currently lack access to electricity. By harnessing renewable energy resources for green hydrogen production, countries across the continent could fuel population and economic growth in an environmentally sustainable manner; which is also why it is important to develop green hydrogen usage through alternative solutions such as EODEV's GEH2® power generator.

In Africa, EODEV already has presence in Algeria, Tunisia and Nigeria, and looks forward to developing its presence further in many other African countries in collaboration with local players, entrepreneurs, rental companies, developers and energy providers.

Smart products

The GEH2® uses a PEM fuel cell, its beating heart, supplied by Toyota Motor Europe, and its own lithium iron phosphate battery (LiFePO4), reducing noise emissions and providing an instant start. This combination, relying on Toyota's proven fuel cell technology developed over the past 20 years, enables the GEH2® to deliver up to 110kVA without requiring any minimum load. Engineered to be easy to use, the GEH2® is equipped with rental-driven electrical outlets, standardized frequency and voltage levels, as well as remote monitoring and data acquisition. Aimed at providing virtually any energy ecosystem with instantaneous power, the GEH2® offers a silent solution without emissions of CO2, HC, NOx, or fine particles. It emits only warm water and filtered air, and is highly reliable since it does not incorporate any mechanical parts that wear out or may break down. With its plug-and-play approach, the GEH2® was developed to easily integrate into all industries and environments, and EODEV's range of solutions will soon be complemented with a BESS (Battery Energy Storage Systems) in order to bring additional flexibility in overall clean power supply.

Designed to meet environmental challenges without sacrificing efficiency, the GEH2® is suitable for all sites and sectors of activity, whether prospective customers need energy autonomy, are looking for a backup solution, or operate in a confined site or regulated zero-emissions zones. GEH2s® have been used for a wide range of power supply needs: for large scale events such as outdoor concerts, for fan zones at sports events like F1 Grand Prix and Le

Mans endurance race, to secure power supply for mobile telecommunications or when shooting films for Netflix, for temporary electricity supply during grid network maintenance operations, to recharge electric vehicles and equipment, and of course for industrial activities on remote construction and mining sites in many countries across Europe and the Middle-East, from cold countries such as Norway to hot ones such as Saudi Arabia, as well as in North America and all the way to Australia and New Zealand. With now over 250 units sold that operate in 20 countries, the GEH2® has therefore proven its efficiency and benefits from excellent customer feedback, including strong references such as Air Liquide, Engie or Bouygues.

Smart development

The rapid internationalization of EODEV is another indicator of the company's astute nature, through the development of a network of distributors and franchisees. As its products include heavy parts and weigh up to 3.5 tons, only the key components are manufactured and exported from France for distant markets, with the local partner being responsible for assembling them with other elements that are manufactured on site.

Australia thus quickly became EODEV's first offshore market, due to its significant mining industry and a policy of massive support for its decarbonization objectives. The relationships established allowed the signing of the first GEH2® assembly contract in the province of Victoria in October 2023, undertaken under the auspices of Toyota Australia and EODEV's distributor Blue Diamond Machinery, with the support of worldwide leader in mining services Thiess group. Toyota Australia thus aims for a production of around a hundred units per year, which will allow EODEV to quickly expand into the Asia Pacific region. Meanwhile, development projects abound in the rest of the world, with the possibility to establish a manufacturing plant in North America, further distribution in South America and Africa, and a widening of the product line with higher capacity electro-hydrogen power generators.

A wide range of applications

The high-power hydrogen fuel cell gensets developed and assembled in France by EODEV will be mainly intended to offer the construction, mining, events, transport, logistics and public electricity service markets zero-emission electricity in containerized and turnkey, easy to implement and simple to use solutions for off-grid operations. Adapted to a wider range of needs, with the possibility of operating several fuel

cells simultaneously to reach very high power, this new range will also minimize the associated Capex, thanks to a lifespan exceeding 30,000 hours — an important competitiveness asset compared to existing diesel-operated solutions. In addition, these could also, like the original GEH2®, be coupled with BESS solutions, and even operated as hybrid systems synchronized with diesel gensets to initiate a progressive shift to fully clean power supply solutions. EODev will thus be able to meet the needs of a wider number of end users in telecommunications, public institutions, hospitality, retail and agriculture, and for critical installations (industrial sites, ports and airports, hospitals, data centers, etc.).

Last but not least, beyond these “traditional” segments that usually operate diesel gensets, hydrogen powered generators can offer a clean alternative solution for the electric vehicles (EV) charging market, including construction equipment, and for ships, particularly merchant navy fleets. And they make sense when developing peak-shaving plants that are increasingly essential in the context of limited energy resources. Using solutions such as EODev’s GEH2® to replace diesel generators that, unfortunately, remain to this day the standard power supply solution on most construction and mining sites, is therefore both a pioneering approach and a demonstration that environmentally-friendly alternatives are already available, and reliable.



TOP TO BOTTOM

1. First event parallelization of 3GEH2 with a BESS to supply zero-emission electricity continuously and recharge all the electric equipment installed on an important construction site.
2. GEH2® provided clean and quiet power during the Formula 1® Australian Grand Prix
3. GEH2® - the zero-emission hydrogen power generator
4. GEH2® allows production of low carbon electricity for a variety of applications, including EV charging.



PROMOTING STEM CAREERS TO DRIVE AFRICA'S FUTURE

By Chege Moses Kasaija

Across Africa, there has been a growing recognition of the importance of Science, Technology, Engineering, and Mathematics (STEM) education in driving economic development and innovation. In a continent rich with potential but often hindered by educational inequality and limited resources, the STEMulator emerges as a powerful tool to bridge the gap, offering students in Africa access to transformative learning experiences in STEM. After introducing students to the, often invisible, world of STEM, the STEMulator goes on to play a crucial role in helping African students develop the skills and confidence they need to succeed in STEM fields, which are essential for the continent's progress. Thanks to generous companies and organisations, the STEMulator features are forever being enhanced.

Born from the vision of the National Science and Technology Forum of South Africa (NSTF) it encourages children of all ages to pursue STEM-related subjects and careers. The STEMulator is designed to operate on several platforms and devices to reach even the most remote areas – and the most sophisticated.

Addressing Educational Inequality

Africa faces significant challenges in providing equitable access to quality education, especially in rural and under-resourced areas. Many schools lack access to well-equipped labs, updated textbooks, or trained teachers, basic essentials for effective STEM education. The STEMulator offers a solution by delivering high-quality, interactive STEM learning experiences online, accessible from anywhere with an internet connection – and on memory-sticks for those in remote areas. This ensures that students, even in remote or underfunded schools, can access the same educational resources as those in more affluent areas. By breaking down geographic and economic barriers, the STEMulator democratizes access to STEM education across the continent.



Richard Gundersen, Chief Instigator at STEMulator and Director at BBE Projects

This platform is designed to make learning fun and engaging, says Richard Gundersen, Chief Instigator at STEMulator. Learners can interact with animated objects and explore clickable areas to gain deeper insights into various STEM concepts. This dynamic approach encourages curiosity and perseverance in subjects like math and science, fostering a lifelong love for learning.

Boosting Practical STEM Skills with Limited Resources

Many African schools lack the infrastructure and resources for hands-on experiments or advanced technology like robotics kits or 3D printers. This makes it difficult for students to gain practical experience in STEM subjects. The STEMulator aims to bridge this gap by providing virtual labs, simulations, and interactive models that allow students to observe experiments and tackle projects that would otherwise require costly equipment.

Africa faces unique challenges, from climate change and food security to healthcare and infrastructure development. The STEMulator empowers students to apply their knowledge to solve real-world problems that are

STEMulator.org
from childhood to career

Explore STEMulator's virtual landscape – for an inside view of all things STEM
Full of animated content – Free, on-line, interactive and digital
An initiative of NSTF/proSET professional societies, for the next STEM generation
Memory-stick versions available for remote and rural areas

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relevant to their local communities. By tackling challenges specific to their environment, students not only learn critical STEM skills but also gain the satisfaction of contributing to the development of their communities and countries.

One of the key issues in African education is the lack of exposure to STEM career opportunities. Many students, especially girls and those from marginalized communities, are unaware of the possibilities that STEM fields offer. The STEMulator helps address this by showcasing a wide range of STEM careers, with examples of African scientists, engineers, and innovators who have made significant contributions to global and local challenges. Through interviews with STEM professionals, students can visualize themselves in roles such as data scientists, renewable energy engineers, or biomedical researchers. By providing these role models and career pathways, the STEMulator inspires the next generation of African STEM leaders.

The STEMulator has been tailored to include culturally relevant content that resonates with African students. By incorporating examples, challenges, and case studies from global contexts, the platform makes STEM learning more relatable and meaningful. For instance, lessons on renewable energy focus on solar energy systems, which are crucial for many African countries. Agricultural science modules explore solutions to improve crop yields in African climates. By grounding STEM education in local contexts, the STEMulator makes learning more engaging and practical for students, connecting global scientific principles with African realities.

Fostering Innovation and Entrepreneurship

Africa is home to a growing community of innovators and entrepreneurs, particularly in the fields of technology and engineering. The STEMulator can nurture this spirit of innovation by encouraging students to think creatively and develop their own solutions to problems. Many of the platform's modules focus on stimulating innovation, entrepreneurship, and product development, allowing students to create prototypes and design solutions that could evolve into real-world products or businesses. By fostering an entrepreneurial mindset, the STEMulator prepares students to not only work in STEM industries but also to become leaders in Africa's emerging tech ecosystems, helping to drive economic growth.

Overcoming Gender Barriers in STEM

In many parts of Africa, gender disparities in education persist, particularly in STEM fields. The STEMulator offers an inclusive learning environment that encourages girls to explore and excel in STEM subjects without the societal pressures or biases they may face in traditional classrooms. By providing equal access to resources, role models, and opportunities, the platform helps break down gender stereotypes and promote greater participation of girls in STEM. Programs designed to highlight the achievements of African women in STEM can inspire girls to pursue careers in these fields, contributing to greater gender equality in the future workforce.

Supporting Lifelong Learning and Skills Development

Africa's rapidly evolving job market demands continuous learning and skills development, especially in STEM fields. The STEMulator fosters a culture of lifelong learning by offering a variety of modules that allow students to keep expanding their knowledge beyond formal education. With the ability to explore topics at their own pace, students can deepen their skills in areas like artificial intelligence, environmental science, or digital technology. This continuous learning approach is essential for equipping Africa's youth with the skills needed to thrive in the global economy and adapt to future technological advancements.

The STEMulator has the potential to inspire a new generation of STEM professionals. By fostering interest in these fields, communities can ensure a steady supply of skilled individuals who can contribute to local development and innovation.

Reducing the Digital Divide

Africa's digital divide poses a challenge to education, with many students lacking access to technology and the internet. While the STEMulator primarily operates online, students in low-connectivity areas

The STEMulator has been tailored to include culturally relevant content that resonates with African students.

can still benefit. Partnerships with governments, NGOs, and private companies can help expand access to the internet and digital devices, enabling more students to engage with platforms like the STEMulator. Additionally, memory-stick versions of the STEMulator are available to reach students in remote regions.

We are introducing this platform to potential contributors and users all over Africa and indeed the world. The playful exploration element of the platform makes it engaging and fun, ensuring that learners will spread the news to parents, teachers, and friends, Richard emphasised, in particular, we are ready to add content to the mine and the energy tiles on the landscape. We are inviting contributions from all members of the mining and energy communities – owners, miners, equipment suppliers, consultants, educators – anyone with informative graphics and animations, anything to get youngsters excited about careers in mining, energy and the greater STEM world.

The STEMulator has the potential to revolutionize STEM education across Africa by making it more accessible, interactive, and relevant to the continent's unique challenges and opportunities. By providing a platform where students can develop practical skills, explore career paths, and tackle real-world problems, the STEMulator empowers African students to become the innovators and problem-solvers of tomorrow. As Africa moves toward a more knowledge-driven and technology-based economy, platforms like the STEMulator will play a vital role in preparing the next generation of STEM leaders to shape the continent's future.

The NSTF envisions a future where every learner has access to the STEMulator, empowering them to make informed subject and career choices. Whether they pursue a career in STEM or another field, STEMulator equips them with critical thinking and problem-solving skills essential for success.



SUPPORTING RENEWABLE ENERGY TRANSITION

Menlo Electric South Africa is making waves as a new wholesale solar component distributor in the market. Having begun operations in January 2023, they are taking the market by storm and have already captured more than 10% of the market share. This achievement can be attributed to the company's unique product portfolio that offers innovative technologies, an experienced local sales team, and a keen purpose to support businesses and EPCs in their energy transition.

Renewable Energy Transition

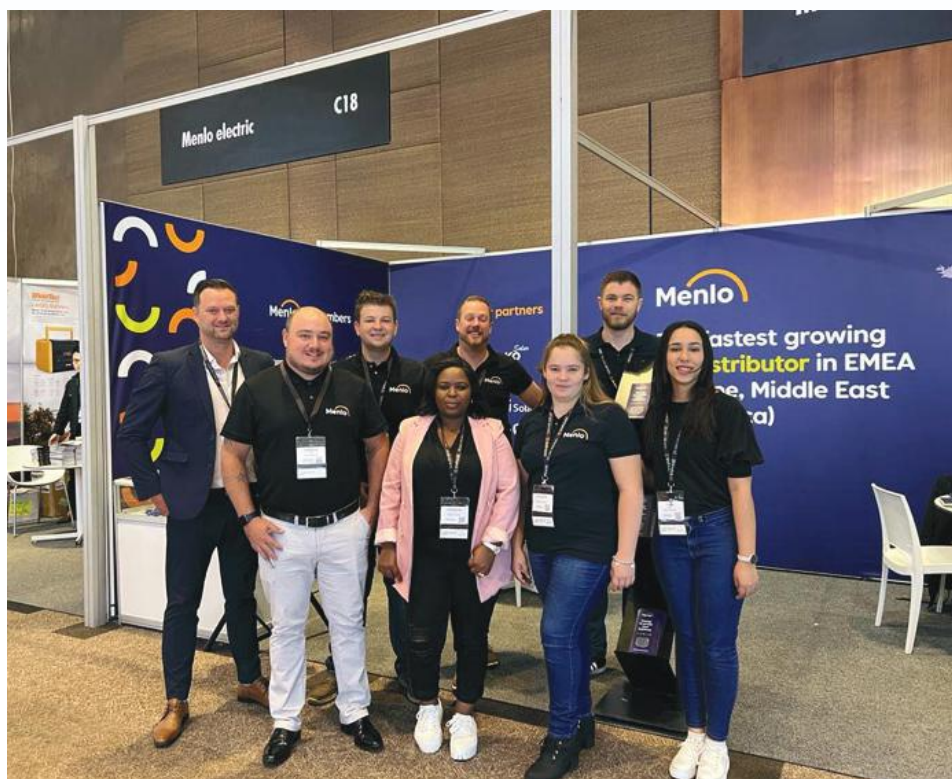
According to CSIR's annual report, renewables excluding hydro made up only 7% of South Africa's overall energy mix in 2022. This is better than the 4% average for the entire globe, yet we still lag far behind countries in Europe where renewables make up around 15.5% of their energy mix. In addition, South Africans need to find a reliable source of power as they continue to face load shedding.

Given this, Menlo Electric co-founders Bartosz Majewski and Marta Walendzewicz put South Africa near the top of their list when deciding which regions to enter when expanding their Polish company. To help them seize this opportunity and navigate the South African market, they enlisted Johannesburg-based, Heino Louw as General Manager in the country.

Bartosz Majewski, CEO at Menlo Electric noted, "South Africa can greatly benefit from a large-scale rollout of residential and business PV installations. Based on benchmarks from similar markets we're familiar with, home and business PV installations can add 10 GW to South Africa's power mix by 2026 and create hundreds of jobs. Menlo Electric's mission is to facilitate energy transition by improving access to top-quality components. Accordingly, we believe we can play a very positive role in the transformation happening here."

Heino Louw agreed and has been able to translate his decade of experience within the industry and project management to create a strong South African wing of the business. He has ensured they stay true to their tagline, as the fastest-growing distributor in Europe, the Middle East and Africa. Timing has undoubtedly played a role in their success too. Load-shedding levels reached extreme highs at the beginning of 2023 causing demand for solar components to skyrocket.

With its international network of warehouses



The Menlo Electric South African team in front of their booth at The Future Energy & Solar Show in Johannesburg.

and top-quality suppliers Menlo Electric is well positioned to fulfil this booming market. The company has the stock to supply both residential installers and large-scale EPC projects at competitive prices. Internationally they have 10 logistics hubs and deliver 50 MW of modules per month. Additionally, they have a team of experienced salespeople to support their clients.

One such client is EverSolar, they embarked on a project to create an installation that would support the energy needs of the wholesale nursery, TuberFlora. For the project, EverSolar aimed to optimize system performance, maximize energy production, and ensure seamless integration with existing power infrastructure. To achieve these goals, they selected Jinko Solar's 575W solar panels, supplied by Menlo Electric. These high-performance panels perform remarkably well in all weather conditions because they offer exceptional efficiency, durability, and maximum

power output. They also successfully integrated into a ground-mount system with an AC rating of 150kW and a DC rating of 155kWp for this project. This is only one example of Menlo Electric South Africa's innovative offering.

State of the Art Product Portfolio

The South African market currently has several favourite manufacturer brands. Menlo Electric's product portfolio is unique in that it has steered away from these popular manufacturers in favour of internationally renowned manufacturers. "Many of the brands we carry are currently either not present in South Africa or their presence does not reflect their global position. We will change that while providing clients with a broader choice" said Heino Louw.

Solar component manufacturers tend to specialize in one of two main categories, panels, and inverters and batteries, and Menlo Electric's portfolio covers both. The company is currently an official distributor of FoxESS and Sungrow,

with plans to add GoodWe to the list soon. These brands cover the inverter and battery category of the offering, in this list, you will find products suitable for residential and commercial and industrial products.

A wide array of products is important because each business has different needs and therefore you will want to work with a distributor that can support the unique needs of each project. For batteries, an important distinction that can be made between products are whether they create high-voltage (HV) or low-voltage (LV) systems. HV battery systems usually operate at voltages greater than 100V DC and are commonly used in systems with smaller wiring, such as electric vehicles. While LV battery system typically operates at voltages less than 60V DC are commonly used in smaller portable devices such as mobile phones, laptops, and handheld tools.

In the solar panels category, Menlo Electric carries brands JA Solar, Jinko Solar, Longi Solar and Tongwei. All four suppliers produce Tier 1 modules, meaning they meet the highest standards of production globally and their power production capacity and lifespan are longer.

Some of the advanced technologies Menlo Electric customers will have access to because their selected suppliers will include N-Type panels. Each of these manufacturers are acknowledged in the industry as at the forefront of the transition of N-type solar panels becoming mainstream. A solar energy system with N-type modules will benefit from higher efficiency, more stability, lower light-induced degradation, and a better temperature co-efficient when compared to P-type solar panels which are currently common.

It is not necessary for business owners to make all the decisions about a system on their own though. Menlo Electric team is full of salespeople and technical consultants with a wealth of knowledge about solar solutions. They can assist clients in making decisions when choosing between product options and enjoy sharing their knowledge to make sure a project is successful.

Menlo Academy for Solar Installers

The sharing spirit extends to solar installers through Menlo Academy. This is where technical knowledge is shared during in-person training sessions or webinars. Topics for the sessions revolve around new technologies and products. The sessions are free of charge and welcome service for both seasoned installers, who like to keep up to date on new products as well as those newer installers who are looking to up-skill themselves.

Menlo Electric South Africa is poised to continue making waves in the market with their progressive offering and keenness to enrich the industry around them through their academy. EPCs and installers alike should consider choosing them as a distributor for their next project.



Heino Louw, General
Manager Menlo Electric
South Africa ►



Why Green Hydrogen



By Dr Karen Surridge, Project Manager Renewable Energy and Cleaner Fossil Fuels, SANEDI

Hydrogen fuel cell technology was invented by Welsh scientist William Robert Grove in 1839 but had to wait until the 1960s for NASA to put it to commercial use to power its probes, satellites and space capsules. These days, much of the world is pinning its energy-transition hopes on green hydrogen as fuel source. Why is this important for South Africa? The reasons are many, varied and compelling.

In extremely simple terms, hydrogen is produced when an electric charge splits water molecule into hydrogen and oxygen in an electrolyser. Hydrogen is an energy carrier that can be used to generate electricity either indirectly by generating heat through combustion, or directly through an electrochemical process that takes place in a fuel cell. In both cases, water is the only by-product of the energy generation process.

Hydrogen is not in itself a green or renewable energy because the process to produce it is electricity intensive. Green hydrogen, therefore, is hydrogen produced using electricity from any renewable energy sources e.g. wind, solar, hydro etc.

The media and literature refer to multiple colours of hydrogen across the spectrum. This has nothing to do with the colour of hydrogen gas which is colourless,

it has to do with the source of energy used to produce the electricity for the water splitting process. Thus, depending on the type of energy used, different colour names are assigned to the hydrogen produced, for example hydrogen produced using steam reforming from natural gas (methane) is named “grey hydrogen”, this is currently the most common “colour” of hydrogen.

Hydrogen is a highly versatile energy carrier that can be used in a wide range of applications. It is also understood how to safely store and transport the gas. As such, it has the potential to decarbonise traditionally ‘hard-to-abate’ sectors such as heavy-duty transport, aviation and maritime, and industries like steel, cement and ammonia manufacturing that cannot be fully decarbonised through renewable energy and direct electrification or through renewable energy with battery storage.

Why should South Africa focus on green hydrogen?

Firstly, because it is technology that can help the country towards achieving net-zero carbon status by the 2050 target date, and because South Africa already has a well-developed expertise in the Fischer-Tropsch technology.

Secondly, and at least as important, are the opportunities to industrialise the economy that green hydrogen can create, given that South Africa is home to some of the most important raw materials needed to produce it. These are platinum group metals (PGMs) and

abundant sun- and wind-energy resource, along with the land on which to establish industrial-scale renewable energy (RE) plants. PGMs are used extensively in the manufacturing of the membranes and catalysts in electrolyzers – and South Africa has the world’s largest resources of these metals. South Africa can also be a major exporter of green ammonia (a carrier of green hydrogen) to Europe and the Far East.

The combination of these resources, as well as the anticipated local demand for green hydrogen created by carbon-intensive industries, makes the country an attractive base for OEMs (Original Equipment Manufacturers) to establish manufacturing plants for the components needed to build RE plants and produce green hydrogen. In addition, South Africa has an established manufacturing industry, expertise in the production of synthetic fuels and a vast labour force that is “completely trainable”, in the words of the country’s Green Hydrogen Commercialisation Strategy.

Local manufacturing creates jobs, energy self-sufficiency and security, and export opportunities, all of which are needed to ensure an energy transition that is not only just but delivers tangible socio-economic benefits to all South Africans.

Green hydrogen state of play

Global demand for hydrogen reached an estimated 90 million tonnes in 2020 and is expected to grow to between 500 million and



680 million tonnes by 2050. Of this, the export market will account for 100 million to 180 million tonnes. Given this potential, South Africa's nascent green hydrogen economy is being studied and structured from different angles.

In June 2021 the Minister of Trade, Industry and Competition established the Green Hydrogen (GH2) Commercialisation Panel, which is led by the Industrial Development Corporation (IDC). The panel has private and public sector members and, drawing on the Hydrogen South Africa (HySA) programme and the Hydrogen Society Road Map (HSRM), developed South Africa's Green Hydrogen Commercialisation Strategy and Action Plan that was approved by Cabinet in 2022.

Over the past few months, Infrastructure SA, a programme within the ministry of public works, identified a pipeline of 19 green hydrogen projects valued at more than R300 billion. The IDC also secured €23 million in grant funds from the German government to support the development of South Africa's green hydrogen economy and help accelerate the country's transition to renewable energy.

The notion that, in this process, we could grow into a significant supplier of the raw materials, technology and product the world needs to clean up its energy act, is an exciting and inspiring goal to unite behind for the nation.



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How IoT Is Revolutionizing the Energy Transition

The transition to sustainable energy systems is one of the most significant challenges of our time, requiring innovative technologies to optimize efficiency and integration at the enterprise level across numerous sectors. Among the most transformative technologies in this regard is the Internet of Things (IoT), which is continuously reshaping the landscape of energy management. By enabling more efficient monitoring, management, and optimization of energy, IoT technologies are pivotal in advancing the energy transition across multiple fronts by enabling more efficient monitoring, management, and optimization of energy.

Secure and Efficient Energy Systems with IoT

Secure connectivity is essential in today's energy systems, providing the backbone for reliable and resilient energy management. IoT technology augments this foundation by facilitating safe, real-time monitoring and data collection from various distributed energy resources. This secure data transit is crucial for protecting systems against cyber threats while ensuring that energy operations are efficient and adaptable to real-time conditions.

Furthermore, IoT's impact extends significantly to optimizing renewable energy sources such as solar power. Through IoT-enabled devices, energy providers can perform real-time monitoring and predictive maintenance, which are vital for minimizing downtime and improving grid stability. These systems utilize advanced analytics to forecast energy output and adjust grid operations dynamically,



By Justin Nichols

IOT PLAYS A MAJOR ROLE IN THE TRANSITION OF THE ENERGY INDUSTRY BY ENHANCING GRID STABILITY, OPTIMIZING RENEWABLE INTEGRATION, AND EMPOWERING CONSUMERS.

enhancing the integration of renewable resources like solar and wind. Despite the cybersecurity challenges and the complexity of achieving seamless interoperability among diverse technologies, the robust capabilities of IoT provide a solid foundation for overcoming these hurdles and maximizing the efficiency of solar energy solutions.

Empowering Consumer Engagement and Decentralized Systems

IoT-driven advancements in the energy space extend beyond industry-level operations; they also directly impact everyday consumers. These technologies revolutionize how energy providers operate and transform how consumers conceptualize, interact with, and manage their energy usage.

By delivering detailed consumption data directly to consumers, IoT devices empower individuals with the knowledge to make informed decisions about their energy use through real-time monitoring, personalized insights, and demand response capabilities. These factors drive behavioral changes and foster greater energy efficiency and sustainability at the consumer level.

Additionally, IoT plays a crucial role in facilitating the rise of decentralized energy systems. These systems allow for more localized management of energy resources, reducing dependencies on centralized grids and enhancing community resilience to energy disruptions. IoT enables efficient management and coordination of distributed energy resources (DERs), such as residential solar panels and community battery storage, providing a seamless flow of energy and real-time adjustments

based on local consumption and production patterns.

Navigating Challenges and Seizing Opportunities

While IoT introduces transformative potential for the energy sector, it also brings challenges, particularly in cybersecurity and data privacy. These concerns are paramount as energy systems become increasingly interconnected and reliant on digital infrastructures. However, the strategic implementation of IoT can address these challenges by enhancing system security and reliability through continuous monitoring and advanced cybersecurity protocols.

The opportunities for growth and improvement are vast. IoT technologies not only enhance operational efficiencies but also support crucial sustainability goals by more effectively integrating renewable energy sources into the grid. Moreover, they enable predictive maintenance capabilities that reduce downtime and operational costs, all while improving the reliability and lifespan of energy equipment.

As the energy sector continues to evolve, integrating IoT technologies will play an increasingly vital role in shaping a sustainable future. IoT is at the heart of the energy transition by enhancing grid stability, optimizing renewable integration, and empowering consumers. For energy stakeholders, investing in IoT is a technological upgrade and a strategic move towards a resilient, efficient, and sustainable energy framework, promising a brighter future for global energy systems.



Illustration by Yotij Isakawan from Pixabay

SOUTH AFRICA'S 36.1% ELECTRICITY PRICE HIKE FOR 2025

WHY ESKOM'S
REQUEST IS
UNREALISTIC

South Africa's state-owned electricity company, Eskom, has applied to the National Energy Regulator of South Africa to approve a 36.1% electricity price hike from April 2025, a 11.8% price increase in 2026 and an 9.1% increase in 2027. Dr. Steven Mathetsa teaches and researches sustainable energy systems at the University of the Witwatersrand's African Energy Leadership Centre. He explains some of the problems with the planned tariff increase.



◀ Dr. Steven Mathetsa, Senior Lecturer University of the Witwatersrand

Why such a big hike?

Eskom says the multi-year price increase is because of the need to move closer a cost-reflective tariff that reflects the actual costs of supplying electricity.

However, Eskom's electricity tariff increases have been exorbitant for several years - an 18% increase in 2023 and a 13% increase in 2024. This is a price increase far above inflation, which is currently at 4.4%.

Some companies have installed their own generation capacity, and individuals have moved to rooftop solar systems. As a result electricity sales have fallen by about 2% , resulting in a drop in revenue.

There's a knock on effect for municipalities, the biggest distributors of electricity, which have also been forced to hike tariffs in line with Eskom's increases.

All these costs are passed onto the consumers.

What will the impact be on South Africans?

If the hike is approved it will certainly worsen the economic difficulties facing South Africa. One of the most unequal countries in the world, South Africa has an extremely high

unemployment rate 33.5% at the last count.

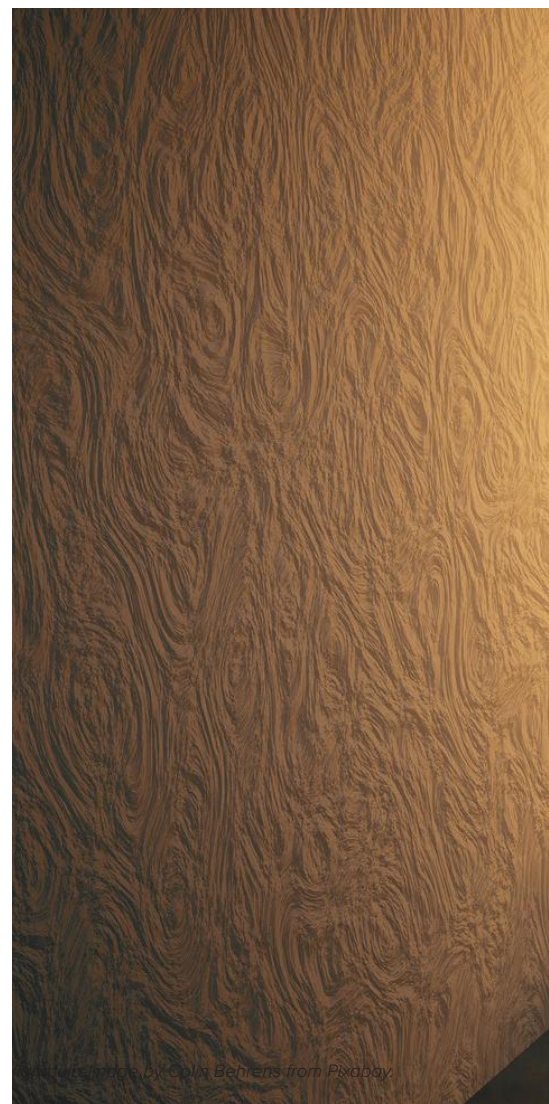
Economic growth is also very slow, at a mere 0.6% in 2023. The cost of living is high.

Exorbitant increases in electricity costs aggravate these problems.

South Africans and businesses in the country have little choice about where they source their energy. Eskom is still the sole supplier for nearly all the country's electricity needs. This means that ordinary citizens are likely to continue relying on electricity supplied by Eskom, irrespective of the costs.

The high costs affect businesses negatively. Large industrial and small, medium, and micro enterprises have all highlighted that costs associated with utilities, mainly electricity, are affecting their sustainability.

The Electricity Regulation Amendment Act implementation will make major changes to Eskom. The reforms establish an independent Transmission Systems Operator tasked with connecting renewable energy providers to the grid. This will allow the creation of a competitive market where renewable energy providers can sell power to the grid.



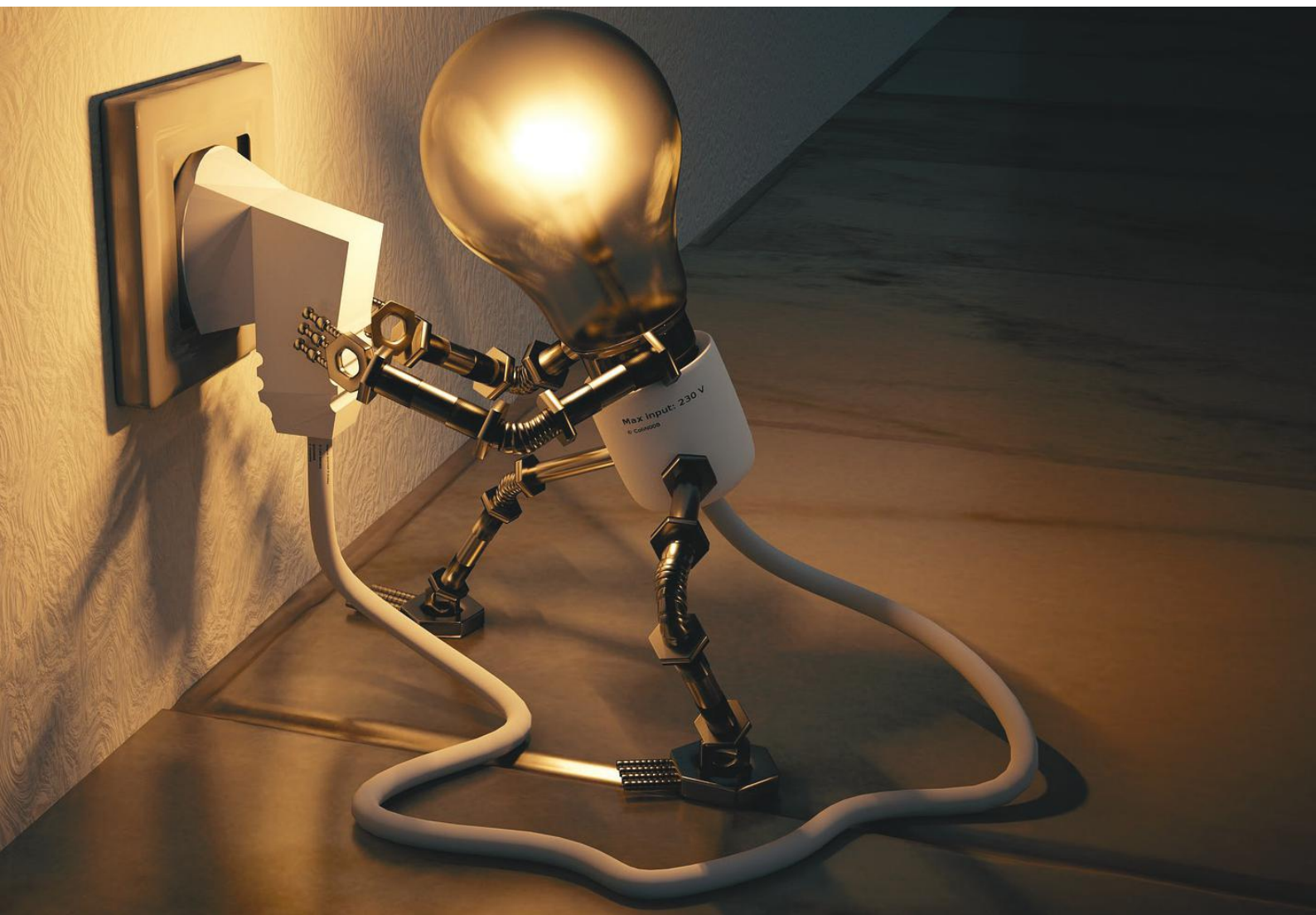
But it's not yet clear if these changes will address the issue of exorbitant electricity price rises.

What are the problems?

The country's energy frameworks are drafted on the basis of the **World Energy Trilemma Index**. The index promotes a balanced approach between energy security, affordability, and sustainability. In other words, countries must be able to provide environmentally friendly and reliable electricity that their residents can afford.

South Africa is currently unable to meet these goals because of different energy policies that do not align, a lack of investment in electricity and dependency on coal-fired power. Electricity is increasingly becoming unaffordable in the country. Although there's been a recent reprieve from power cuts, security of supply is still uncertain.

Furthermore, over 78% of the country's electricity is produced by burning coal. This means South Africa is also far from attaining



its 2015 Paris Agreement greenhouse gas reduction goals.

Compounding this problem is that Eskom is financially unstable - it needed **R78 billion from the government in debt relief** in 2024. For years, there was a **lack of effective maintenance** on the aging infrastructure.

The country has made some inroads into improving security of supply. To date, recent interventions have resulted in months without power cuts. This should be commended. The same focus must be placed on ensuring that electricity remains affordable while giving attention to meeting the goals of the Paris Agreement.

What needs to change?

South Africa's 1998 Energy Policy White Paper and the new Electricity Regulation Amendment Act promote access to affordable electricity. However, they've been implemented very slowly. Affordable electricity needs to be taken seriously.

The question is whether the country's

electricity tariff methodology is flexible enough to accommodate poor South Africans, especially during these challenging economic times.

In my view, it is not. In its current form, vulnerable communities continue to foot the bill for various challenges confronting Eskom, including financial mismanagement, operational inefficiencies, municipal non-payment, and corruption.

I believe the following steps should be taken.

Firstly, South Africa should revise its **tariff application methodologies** so that consumers, especially unemployed and impoverished people, are protected against exorbitant increases.

Secondly, the National Energy Regulator of South Africa should strengthen its regulations to ensure its compliance and enforcement systems are effective. For example, Eskom should be held accountable when it does not deliver efficient services or mismanages funds, and be transparent about costs associated with

its processes. Municipalities should also be held accountable for non-payment and other technical issues they regularly struggle with. Both affect the revenue of the power utility.

Thirdly, the government must make sure that price increases are affordable and don't hurt the broader economy. It can do this by adjusting its policies to make sure that increases in electricity tariffs are in line with the rate of inflation.

Fourthly, communities can play a vital role in saving electricity at a household level. This will reduce the country's overall energy consumption. Furthermore, both small and large businesses should continue to consider alternative energy technologies while implementing energy saving technologies.

Lastly, the level of **free-basic electricity** is not sufficient for poor households. Subsidy policies should also be reviewed to allow users access to affordable electricity as their financial situation changes negatively. (Courtesy of theconversation.com)

POWER FOR AFRICA – THE BOOM OF NUCLEAR ENERGY?

Many African countries are eyeing nuclear power to solve electrification challenges. Experts say this is the wrong direction, pointing to solar energy as a welcome alternative for the sunny continent.

Burkina Faso is one of the least electrified countries in the world. According to data from the International Atomic Energy Agency (IAEA), only about 20% of the population has access to electricity. Yet electricity is urgently needed and central to economic development.

The military government recently signed a declaration of intent aimed at increasing the country's electricity supply. As part of the agreement, Rosatom, a state-owned Russian company, will be responsible for constructing a nuclear power plant.

This development could significantly enhance Burkina Faso's electricity capacity within the next few years. But experts are skeptical about the viability of the project.

Ibrahim Traore has ruled the country since the military coup in the fall of 2022 and, aged 35, he is the youngest serving president in the world.

He has largely turned his back on France -- the former colonial power -- as a partner and instead, has set his sights on Vladimir Putin's Russia.

Solar power as a viable option

For critics like Adrien Poussou, former Central African Republic minister for national reconciliation, the construction of a nuclear power plant is merely a form of Russian propaganda. "It is absurd that the African continent, which has sun, can have problems with energy and electricity," the political analyst told DW.

Solar energy should be the solution, not an agreement to build a nuclear power plant, he stressed.



By Mimi Mefo
Newuh,
Journalist
with
Deutsche Welle

Burkina Faso is not the only African country **dabbling in nuclear energy** in collaboration with foreign partners. Rosatom also aims to assist Mali in harnessing civilian nuclear power.

In addition, Rosatom has been constructing Egypt's inaugural nuclear power plant in the city of El Dabaa on the Mediterranean coast. The project, initiated in 2022, is set to comprise four Russian power plant blocks, each generating 1,200 MW of power.

Other parts of Africa are also considering nuclear power as a viable, low-CO2 option for generating electricity, alongside renewable energy sources.

The Ugandan Ministry of Energy announced in March 2023 that nuclear energy would be utilized to generate more electricity in the country by 2031.

Preparations are reportedly underway to evaluate a site in eastern Uganda's Buyende District for the construction of the first nuclear power plant.

Along that vein, Uganda has signed an agreement with China's National Nuclear Corporation (CNNC) to jointly construct two reactor blocks located 120 kilometers (75 miles)

northeast of Kampala.

Kenya's nuclear plans

Neighboring Kenya has expressed its intention to begin building a nuclear power plant in the year 2027, with an estimated construction timeline of 10 years.

The districts of Kilifi and Kwale, which are located near the port metropolis of Mombasa, are currently being considered as potential locations.

The Kenyan nuclear authority, NuPEA, has stated that the power plant, once finished, will be able to meet the country's increasing energy demands by generating approximately 1,000 MW of power.

X.N. Iraki, an analyst from the University of Nairobi, expressed his skepticism to DW. "It's surprising that we're getting into nuclear power even though we have so much energy."

After all, Kenya is widely recognized as a trailblazer in Africa for its utilization of renewable energy sources such as solar, wind, and geothermal power, which collectively contribute to the generation of green electricity.

The country currently derives around 90% percent of its energy from renewable sources, primarily geothermal energy, hydro- and wind power.

The Kenyan government has established a target of fulfilling its entire energy requirements through renewable sources by the year 2030.

On a side note, Germany and Kenya reached an agreement on a climate and development partnership during the World Climate Conference (COP27) in Sharm el Sheikh, which took place in November 2022.

A mixed bag

Regarding the atomic energy issue, Iraki suspects that investors are primarily motivated by the potential financial gains associated with introducing nuclear power plants to Africa.

However, "they are being shut down in other places in the world because nuclear power is not very popular in many industrialized countries," he noted.

Iraki also issued a warning about the potential risks associated with reactor accidents, such as the incidents at Chernobyl in 1986 and Fukushima in 2011.

New approach?

The examples mentioned thus far involve reactor types that already exist dozens of times in other countries.

Rwanda is adopting a unique approach: Dual Fluid Energy Inc., a Canadian-German company, is set to construct a test reactor featuring a novel technology.

According to the Rwandan Atomic Energy Authority, the start-up has successfully created a groundbreaking liquid fuel and coolant using lead. This development has reportedly led to a reduction in radioactive waste.

Opportunity for investors, not Africa?

Experts like Iraki feel that the boom in nuclear energy in Africa is not to the continent's advantage. According to him, the growing interest among investors is fueled by the need to exploit a market.

Critics of nuclear energy point to countries such as Ghana, Nigeria, Sudan, Zambia, and Zimbabwe who have signed letters of intent with partners to explore potential uses of nuclear energy in the coming decade, but where many such projects in the past have dematerialized.

South Africa serves as an example. Currently, it is the only country in Africa that has successfully established and operated a nuclear power plant. The sole operational reactor on the continent is located in Koeberg, near Cape Town, operationalized in 1984.

South Africa has been contemplating the expansion of nuclear energy for years. At present, a significant portion of its electricity is generated from coal, which has a negative impact on the climate.

Additionally, the state electricity supplier, Eskom, is facing significant challenges in adequately meeting the electricity demands of both industries and the general population.

Setting accents

Princess Mthombeni, a South African activist, and co-founder of Africa4Nuclear, is looking to the future, and takes a twist on the developments. She told DW that "nuclear" is an opportunity for the continent.

"I see this as a great move because African nations finally need to prioritize industrialization in order to grow their economies and create much needed jobs for their people."

"It is time for us as an African continent not to reinvent the wheel, but rather to use the energy technologies that have proven themselves in developed countries," she told DW.

The young activist believes that focusing on industrialization in African countries is a crucial step toward boosting their economies and creating much-needed jobs. For her, it would be great if African countries adopted "baseload technologies such as nuclear energy, as well as the socioeconomically sensible and responsible mix of renewable energy sources such as wind and solar energy."

Mimi Mefo Newuh is a Cameroonian journalist and human rights activist





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Africa lays the groundwork for a future of electric vehicles

The fast-evolving emobility sector presents a significant opportunity for sustainable growth and job creation in Africa, but some constraints need to be overcome, writes Yael Shafrir.

Many South Africans who struggle every day to reach their places of work using minibus taxis or cars on congested motorways may find it hard to believe that an emobility revolution is about to happen. But there are a number of trends moving in that direction.

Emobility refers to electric vehicles, ideally powered by renewable energy sources, which may range from two- and three-wheeled vehicles to cars and buses.

Recent developments

Some recent developments are underway in South Africa which are laying the foundation of the future emobility revolution. This will help the country to meet its carbon reduction commitments under the Paris Agreement. Promising moves include the recent publication of the South African Renewable Energy Masterplan, which embraces battery storage and renewable energy. Work is underway on an EV Masterplan and a Critical Minerals Masterplan, which will have input from the Department of Trade, Industry and Competition and the Department of Mineral Resources and Energy, among others.

In the private sector, BMW announced in June 2023 that it would be manufacturing the BMW X3 as a plug-in hybrid for global export at its plant in Tshwane, South Africa. In the last couple of years, there has been a significant increase in the importation of electric and solar batteries into South Africa, as well as the growth of battery assembly in the country, especially in the Western Cape.

These local events are happening in parallel with Africa-wide initiatives. The African Continental Free Trade Agreement (AfCFTA) has prioritised the automotive sector and transport/logistics value chains. The African Association of Automotive Manufacturers (AAAM) is working with original equipment manufacturers (OEMs)



Yael Shafrir, Associate
Director at Webber Wentzel

on a continent-wide strategy. Afreximbank is supporting investments in the automotive sector with various programmes. Critical minerals and renewable energy are also likely to become priority sectors across the continent.

Certain African jurisdictions are incentivising electric vehicle and emobility development. Rwanda has plans to phase in electric buses, cars and motorcycles, while the recent steps taken by Kenya are particularly noteworthy. Kenya has established an Emobility Taskforce, whose main objective will be to develop a National Electric Mobility Policy covering all modes of transport (road, air, rail and maritime), and drive uptake of emobility, create an enabling environment, recommend fiscal and non-fiscal incentives to promote import, local manufacture and assembly, provide a framework for the end of life and disposal, a framework for the development of carbon credits, creation of standards and measurement of impact on the economy and the environment.

Likely development path for emobility in Africa

Initially, EVs or emobility are more likely to find traction in public transport and two- to three-wheelers before wide-scale adoption by the automotive sector. The evolution will be different in each African jurisdiction. For example, Kenya, Nigeria and Uganda have more two- and three-wheelers than South Africa, so they are likely to prioritise electrification of those modes of transport. In South Africa, there may be greater potential in starting emobility in the public transport sector/ delivery sector, to meet a significant gap in the market.

There is a real opportunity for SA to help lead the emobility revolution in Africa, for several reasons. The continent urgently needs affordable and sustainable mobility solutions. The market for lithium battery cells could be met through local manufacturing since the



continent possesses many of the necessary raw materials. South Africa has a mature automotive sector, including OEMs that export around the world, and it has signed various trade agreements that facilitate exports to Europe, such as the European Partnership Agreement (with the SADC) and the African Growth and Opportunity Act (Agoa). In creating an EV export industry, South Africa can take advantage of the AfCFTA's rules of origin, where 40% of local content from Africa is under discussion.

Implications for South Africa

By developing a multi-faceted emobility manufacturing sector, South Africa would help to speed its own transition to a greener future and meet its climate change goals; promote industrialization in line with Africa's Agenda 2063 (the continent's blueprint for achieving inclusive and sustainable development over a

Certain African jurisdictions are incentivising electric vehicle and emobility development. Rwanda has plans to phase in electric buses, cars and motorcycles, while the recent steps taken by Kenya are particularly noteworthy.

50-year period, with an emphasis on youth and women); and create jobs.

As South Africa transitions away from internal combustion engine (ICE) vehicles, it would be able to participate in other parts of the value chain beyond car manufacture. There is an opportunity to manufacture the cells or batteries needed for EVs, and battery factories can stimulate local and regional economic growth. Battery factories could help to develop skills in engineering and attract talent to different regions where manufacturing takes place.

Of course, there are constraints on these plans. The most obvious in South Africa is the lack of access to uninterrupted energy sources. Another constraint is that it is difficult to raise seed capital for projects related to Environmental, Social and Governance improvement. More funding is needed in South Africa to support innovative startups.

Virtual Wheeling 101

By Jason van der Poel & Hannah Milner

Eskom has run a successful pilot of virtual wheeling, which will enable companies with multiple offtake sites to connect to generators using the Eskom or municipal grids

Electricity wheeling mechanisms play a key role in facilitating the optimal integration of renewable energy resources into the grid. Wheeling across high and medium-voltage lines has been the focus of Eskom's wheeling strategies to date, but the proposed introduction of virtual wheeling, a new product offering by Eskom, opens opportunities for companies with multiple smaller and low-voltage loads scattered across various geographies in South Africa to participate in the market.

What is wheeling?

Wheeling is the delivery of energy from a generator of renewable energy to an end-user (the off-taker or buyer) situated in another area. This is achieved using Eskom's existing transmission or distribution networks, or existing municipal distribution networks.

In South Africa, wheeling arrangements have traditionally been concluded between larger generators and buyers of electricity connected at medium and high voltages (higher than 1kV). Under this approach, there is a direct relationship between the generator and the buyer. Eskom charges the generator and the buyer for the use of the Eskom grid and credits the buyer's bill for the electricity delivered to the buyer but not supplied by Eskom at the end of each month.

The traditional wheeling methodology works for larger buyers. However, it needs to be adapted for two primary reasons. The first is that the traditional wheeling mechanism is designed to service large consumers of electricity, typically one generator selling to one or two buyers. It does not adequately cater for several low



Jason van der Poel, Partner



Hannah Milner, Candidate Attorney at Webber Wentzel

to medium voltage consumers. The second reason is that traditional wheeling has been inaccessible to buyers in most municipal distribution networks. Many municipalities lack the necessary wheeling protocols, including use-of-system tariffs, and do not have the infrastructure to accommodate the necessary billing, metering and data processing systems for wheeling transactions using both Eskom and municipal distribution networks to a buyer supplied by the municipality.

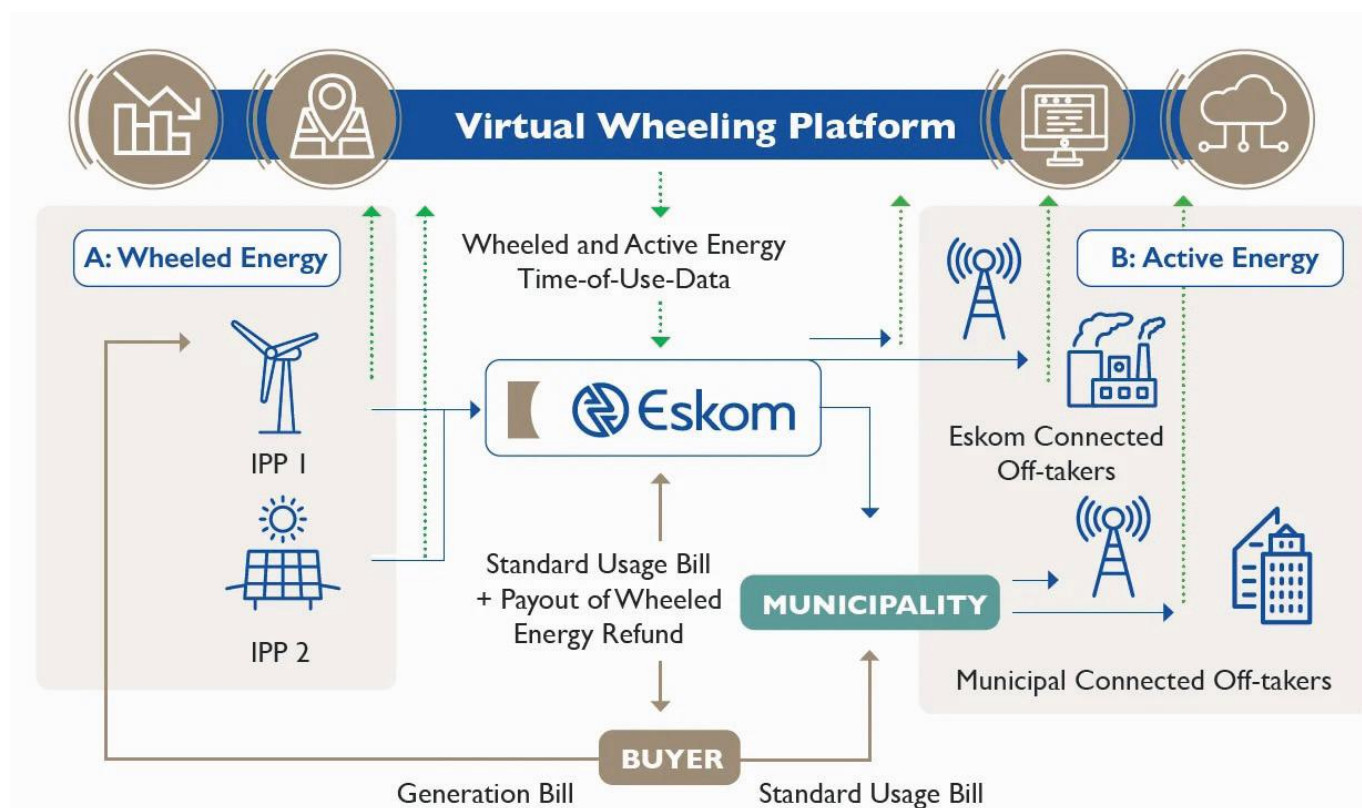
In an attempt to overcome these complexities, in July 2023, Eskom announced a new product, the virtual wheeling platform.

How will virtual wheeling work?

The virtual wheeling platform connects buyers that have multiple offtake sites to generators via Eskom or municipal grids. This requires an automated process to collect, aggregate, and report time-of-use data for energy generated and consumed by generators and buyers in order to provide a refund to the buyer for wheeled energy delivered to all of its offtake sites on a consolidated basis.

We have identified three key differences between the traditional wheeling mechanism currently being implemented and the virtual wheeling platform introduced by Eskom:

Instead of processing a credit to an account for each offtake site of a buyer for the electricity sold by a private generator, a buyer must settle its Eskom bill in full and at the end of the month a single refund will be processed to one account of the buyer. A consolidation exercise will be undertaken through Eskom's virtual wheeling platform to measure the energy produced by generators and used by buyers. The platform will enable Eskom to aggregate time-of-use energy generation and consumption data across multiple distributed offtaker sites for the purpose of calculating the monthly refund payable to the buyer. In summary,



it will facilitate access to wheeling for low to medium energy buyers and offtakers with a distributed consumption base.

The virtual wheeling platform will be able to aggregate energy generation and consumption data into Eskom time-of-use periods (standard, peak, and off-peak) in hourly intervals. Traditionally, energy generation and consumption data has been aggregated at monthly intervals. Eskom has stated that it is developing an API interface to generate hourly data which will be used for calculating refunds.

According to Eskom, to participate in virtual wheeling, buyers will be required to conclude a Virtual Wheeling Agreement and a back-to-back Virtual Wheeling Platform Agreement with a virtual wheeling platform vendor, who is appointed by the buyer and certified by Eskom to inter-operate with Eskom's systems. This differs from traditional wheeling, which requires an amendment to the buyer's Electricity Supply Agreement and the generator's Connection and Use of System Agreement to identify the generator and the buyer, and to provide for the tariff offset. Under virtual wheeling, these documents remain in place and are referenced in the Virtual Wheeling Agreements.

What requirements will the buyer be required to satisfy?

In addition to the Virtual Wheeling Agreements mentioned above, buyers will be required to establish meter access for Eskom and the virtual wheeling platform with generators under their existing power purchase agreements. Meters will need to be linked to the virtual wheeling platform via Eskom's meter

The virtual wheeling platform connects buyers that have multiple offtake sites to generators via Eskom or municipal grids.

vendor cloud. The buyer will be expected to run pre-production verification testing and produce a report for Eskom's approval. The report will be required to show that: (i) each consumption site has a live meter reading over a defined test period; and (ii) the existing business rules are aligned with the contracted business rules agreed with Eskom. Once approved, a production account will be activated and the virtual wheeling platform will automatically begin producing scheduled monthly reconciliation reports. These reports will decide the refund to be paid to the buyer at the end of the month.

When will virtual wheeling be rolled out by Eskom?

In August 2023, Vodacom signed Eskom's first Virtual Wheeling Agreement after a successful pilot phase and rigorous testing. Some of the issues that Eskom is still considering include municipal wheeling structures, the status of buyers and municipalities in debt to Eskom, tariff and use of system charges.

Why the shift?

The introduction of virtual wheeling will enable buyers with multiple smaller and low to medium voltage offtake sites across various geographies to benefit from wheeling mechanisms. IPPs will have greater opportunities to sell surplus generation which may otherwise go to waste. While Eskom will continue to offer traditional wheeling as a product, the addition of a virtual wheeling option has the potential to accelerate access to alternative energy sources and introduce much-needed additional capacity into the grid.

The rise of hybrid PPAs in the renewables industry

Leaders in renewable energy transitions around the world all face a similar challenge: how to maintain a stable grid when it is powered by intermittent renewables resources such as wind and solar.

It is because of this growing necessity in various energy markets that energy storage solutions have risen in importance and are now recognised as critical components of any successful plan to shift to renewables, writes Jack Rankin.

The rapid growth of the Battery and Energy Storage Systems (BESS) market, designed to store substantial energy volumes, has revolutionised the renewables landscape.

By capturing surplus energy generated by renewables during peak periods, energy storage enables power grids to access these reserves during periods of low generation, effectively mitigating the intermittent nature that has traditionally plagued renewable sources.

Following the widespread deployment of standalone storage assets that rapidly spring into action when the grid requires support, a new phase of renewables-plus-storage is now on the verge of becoming mainstream.

While the phrase 'renewables-plus-storage co-location' is now common in the industry, the convergence of these two distinct business models presents a series of intricate challenges that must be addressed – primarily, how co-located assets are monetised.

Power purchase agreements (PPAs) have grown significantly as the energy contracts of choice. However, in the dynamic landscape of renewable energy, the tide of innovation has ushered in a new era of energy procurement and investment strategies.

At the forefront of this transformation are hybrid Power Purchase Agreements (hPPAs), a new type of agreement that has gained substantial momentum due to its potential to both optimise value and address the multifaceted complexities inherent in the renewables market.

The benefits and challenges of hybrid PPAs Research has found significant potential in hybrid PPAs.

A notable prediction made in a recent European PPA Market Outlook 2023 report is the emergence of renewables-plus-storage projects, setting the stage for the ascendancy of hybrid PPAs.

The realization of this prediction is now evident, with hybrid PPAs starting to take centre stage as a powerful mechanism for harmonising



Jack Rankin,
Regional
Lead PPA
Transaction -
GB & Ireland,
Pexapark

the benefits of co-located energy assets. Much of the market, however, remains uninformed on the different possible types of hybrid PPAs.

The interest in hybrid PPAs was highlighted in a recent survey conducted by Pexapark on renewables-plus-storage co-location. The survey findings yielded crucial insights into the foremost challenges industry stakeholders are encountering.

Among these, over 50% of respondents identified revenue modeling as the most formidable challenge in co-located projects. The complexity of dissecting and quantifying revenue streams stemming from the interplay of multiple contracts has emerged as a significant obstacle.

As such, it is important to understand the various types of hybrid PPAs and how each scenario impacts pricing. Below, we look at three types of hybrid PPAs and the benefits and drawbacks of each.

Renewable PPA & Storage Capacity Agreement/Optimisation Agreement

This hybrid PPA scenario involves two separate contracts: The conventional renewable PPA for the generation asset and a separate agreement for the storage asset.

These assets function autonomously, driven by separate contractual frameworks while reaping the technical and financial benefits of being in the same location. This is beneficial as it makes identifying the value generated by each asset a much simpler task, which in turn makes financing of the assets more straightforward.

However, the route to harnessing these benefits is not free from challenges. Ensuring the harmonious coexistence of two independent

contracts requires extensive planning and execution. For instance, businesses must have the strategic foresight to be able to address scenarios where the generation asset impedes interconnection and affects the storage asset's export capabilities.

This hybrid PPA is also quite flexible regarding the separate contract for the storage asset, which can be either an 'optimisation agreement' or a 'storage capacity agreement'.

An Optimisation Agreement delegates the bidding strategy to storage optimization companies, harnessing grid services efficiently. Conversely, the Storage Capacity Agreement involves the buyer facilitating the readiness of the storage asset to meet his needs, akin to a rental service catering to third-party demands.

Shaped renewable PPAs

The 'shaped renewable PPA' stands as the second kind of hybrid arrangement. Under its umbrella, two assets converge with shared contractual agreements, creating a hybrid



shaped pay-as-produced (PAP) PPA. This distinctive structure is meticulously designed to mirror the demands of specific buyers, aligning with their preferences for profiles akin to fixed-hourly delivery or baseload output.

What sets shaped renewable PPAs apart is their potential for interoperability across various systems. This structure relies on using storage strategically, which not only mitigates profile and volume risks but also delivers a 'shaped' energy profile. As a result, the seller embraces the profile and volume risk while harnessing the prowess of storage to temper these uncertainties.

The intricacies of pricing in this model reflect its flexibility. Unlike traditional fixed pricing, the shaped renewable PPA leverages variable pricing, assigning distinct values to each delivered MWh based on timing. This dynamic pricing mechanism ensures that potentially, every hour could bear a different price tag contingent on energy delivery timing.

The allure of such a structure holds profound implications for potential buyers. Corporates with an interest in 24/7 energy delivery find value in the hourly matching of green energy throughout the day. Furthermore, the paradigm shift towards shaping portfolios with a blend of solar, wind, and storage holds the promise of delivering continuous power to corporates.

Shaped renewable PPAs offer a multitude of advantages. Sellers are able to command a premium for baseload delivery while strategically mitigating profile and volume risk. There are also different options for how the energy can be delivered – either physically, or through financial interaction with the spot market.

Despite these benefits, there are still downsides to this type of hybrid PPA structure.

The inherent volatility introduces an element of price risk, especially in settling open positions in the spot market. The dynamics between the two assets needs requires significant expertise. An additional negative for the asset owner is that extra arrangements may be needed to use the storage asset when the buyer does not need it.

Blended renewable and storage premium PPAs

Much like the aforementioned shaped renewable PPAs, blended renewable & storage premium PPAs adopt a Pay-as-Produced (PAP) volume structure and merge the contractual frameworks of two assets. Unlike its predecessors, however, this hybrid model introduces a premium rate for all the MWh to be delivered. For paying this premium, the buyer is given the liberty to tailor the charge/discharge schedule of the storage facility throughout the tenure of the PPA entirely to their own needs.

This type of hybrid PPA structure is beneficial for parties that seek dynamic control over energy delivery timings. Utilities, traders, and energy-intensive corporates are able to easily capitalise on the flexibility it offers.

For utilities and traders, access to the storage asset for trading purposes is of paramount interest. This hybrid model effectively emulates the benefits of a separate floor-price optimization agreement, eliminating the need for additional contractual complexities.

Energy-intensive corporates with time-sensitive energy needs would also benefit from this structure and be willing to pay a premium for the privilege of receiving an optimized shape.

This optimisation is especially useful for cost savings, as it gives corporates the option to avoid having to procure energy during peak

hours when prices surge.

For sellers, the benefit of blended renewable & storage premium PPAs reside in their inherent simplicity. It essentially amalgamates the essence of a Premium PAP, affording clarity and streamlined comprehension. Sellers shield themselves from price, volume, and profile risks, ensuring a harmonious amalgamation of revenue streams.

Hybrid PPAs – The path towards a resilient energy future

The increased focus on hybrid PPAs heralds a paradigm shift in the realm of **renewable energy** contracting. Beyond co-locating assets, these innovative structures represent a holistic approach to energy procurement, where transparency, collaboration, and tailored solutions merge to unlock maximum value.

As the insights from Pexapark's survey show, revenue modeling and contract relationships emerge as pivotal points of focus. Hybrid PPAs offer companies the tools to tailor their energy procurement strategies to match their unique preferences.

In a rapidly evolving energy landscape, it is imperative for the market to be educated on how to benefit the most from their co-located assets. By unlocking these benefits fully, hybrid PPAs solve the intermittency issues that have plagued renewable energy sources for so long.

As hybrid PPAs persist in driving transformation within the energy sphere, an educated market shapes a future characterized by increased sustainability, efficiency, and adaptability to the ever-evolving demands of the renewable energy sector.

(Courtesy www.powerengineeringint.com)



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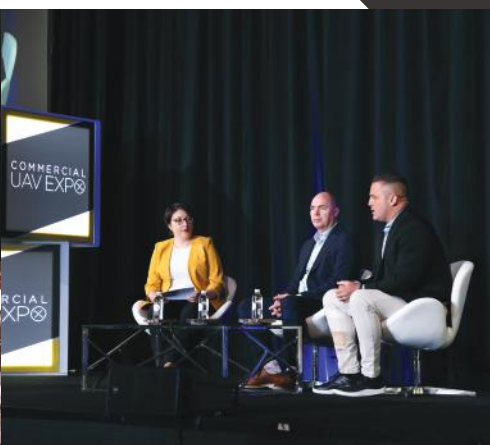


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Africa's energy sector will need to transform radically - these are the five biggest challenges

By Sebastian Sterl

The future of Africa's energy sector is getting increasing attention from policymakers and the private sector. As demand for energy rises, current energy systems must grow rapidly to meet it. This must be done in reliable, resilient and affordable ways – while “staying the course” of climate compatibility and ensuring access for all.

Internationally, the future of energy systems has been a hotly debated topic ever since the link between fossil fuel combustion and the negative impacts of climate change became widely known. Energy transitions - pathways to shift from fossil fuels to cleaner forms of energy - have long been debated in Europe and North America. One visible outcome, among many others, is the increased use of **electric vehicles**.

Most of the international and media attention for Africa's energy systems has focused on simply pointing out the size of the challenge – captured in statistics such as “**570 million people in Africa live without electricity**”.

This solemn narrative has changed in recent times. With renewed investor interest in **gas contracts** and exploitation of **solar, wind and hydrogen**, the “hot topic” of energy transition appears to have touched down in Africa. In many cases, it looks rather like a business opportunity rather than fundamentally a development goal or climate change commitment - but a positive change in narrative nonetheless.

Academia and international organisations have been working hard to provide a clear picture of potential energy pathways for African countries in recent years. It has been shown by academia and international organisations that the opportunity for growing African countries' energy systems in sustainable ways is promising.

The continent as a whole is enormously well-endowed with clean energy resources: solar, wind, hydropower, geothermal, and others. These are unevenly distributed across countries, but each and every country has promising resources.

I carry out research at the World Resources Institute as part of a team that is investigating African energy transitions. We start from the assumption that African countries should, and must, develop and industrialise. Our main task is to show how this could happen in

Sebastian Sterl, Assistant Professor, Energy Meteorology, Vrije Universiteit Brussel



clean and sustainable ways. Importantly, this work needs to be done at the country level to enable policymakers to access science-based information that can directly inform policy planning.

We have identified several key challenges that will require urgent investigation to allow proper planning and policy-making. We did so by scrutinising previous research for missing elements and “blind spots”. These are the five main challenges:

The real cost of renewables

We already know that, in many regions of the world, modern renewables like solar PV and wind power can produce electricity more cheaply than fossil fuel plants. Recently, solar was dubbed the “cheapest electricity source in history” by the International Energy Agency.

But is this really always true? The relatively high risks that investors assign to most African countries, as compared to the rest of the world, mean they demand a higher return to justify investments. This means power plants must charge customers a higher price per kilowatt hour to break even. A failure to take such trends into account tends to bias model predictions towards overestimating the role of solar and wind.

Thus, the main question is how to de-risk investments so as to make solar and wind power not only cheap on paper or as worldwide

average, but also on the ground in every single country.

Variable solar and wind power

We already know that modern electricity grids can function reliably while drawing on variable solar and wind power. However, the countries where it works well, such as Denmark, Germany and Uruguay, had achieved 100% access to electricity and had reliable and stable power grids to begin with when they started investing in solar and wind plants.

The same cannot currently be said for many countries in sub-Saharan Africa. Thus, the main question is what interventions would be needed to allow African countries to expand their underperforming power grids using solar PV and wind power.

Power system models have suggested that solar and wind power can be the cheapest way to provide electricity in the long term, but usually these models do not look at grid stability aspects in detail. Done wrong, solar and wind power may worsen this, rather than improve it.

Matching demand and supply

We already know that most power utilities in the world are kept afloat by a relatively small number of high-consuming customers. These are typically commercial and industrial. We find this trend across geographies: it is as true in the US as in, for instance, Kenya.

Many sub-Saharan African countries lack a strong industrial base. Meanwhile, utility companies need to connect a high number of low-consumption customers whose electricity bills will be low. All of this needs to happen while electricity prices remain affordable.

Therefore, any future outlook on increasing electricity access across Africa needs to take into account the “chicken and egg” problem of reliable demand and reliable supply. Investing in new power plants will not be profitable if there are no reliable customers. Utilities will not be able to afford grid expansion without reliable customers. But these customers will not trust the grid if it can't provide reliable services.

Electrification and fuel substitution

We already know that the main path towards global decarbonisation of energy systems would consist of electrifying end-use sectors (buildings,



transport, industry) to the extent possible, and using alternative green fuels in sectors where this is harder like steel-making and fertiliser production.

The reality is that energy use in households across sub-Saharan Africa is still mostly based on traditional biomass. Transport relies largely on imported second-hand vehicles. And industrialisation is only beginning. The transition towards electrification and fuel substitution will look different in most of these countries than in the global north.

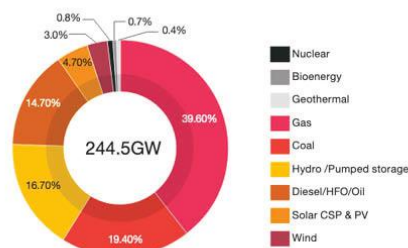
It is uncertain to what extent Africa can “leapfrog” fossil fuel use and go straight to clean energy, as is often claimed. What we need to find out is how fast fossil fuel use may grow across Africa, and when it might peak. This will shed light on the economic and environmental implications for African countries.

Opportunities and risks in oil and gas

We already know that the exploration of oil and gas for export can be an important boon for a country's national wealth. Several prominent African leaders insist on continued investment in exploring and exporting oil and gas to bolster government revenue and serve global demand. At the same time, the goals of the Paris Agreement have urged some investors to back out of funding further fossil fuel projects.

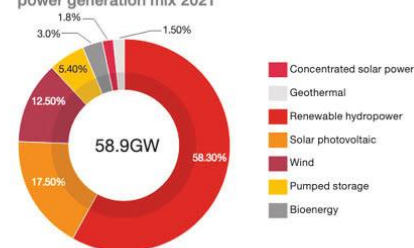
These mixed signals create uncertainty for investors and planners. Countries could be at risk of being left with stranded assets if they invested in new oil and gas infrastructure. And governments focused on fossil fuel

Africa's power generation mix 2021



Source: Irena 2020, IEA 2019 and usaid.gov/powerafrica

Africa's renewable installed capacity power generation mix 2021



The reality is that energy use in households across sub-Saharan Africa is still mostly based on traditional biomass. Transport relies largely on imported second-hand vehicles. And industrialisation is only beginning.

extraction might miss out on clean alternatives (like green e-fuels). More clarity is needed on the opportunities and risks involved in such investments.

Without addressing these challenges, debates on African energy transitions are likely to be oversimplified. Answering these questions will provide the objective facts needed as the basis of finance for energy.

The implied questions can be answered through targeted research at the country level. Existing modelling approaches must expand to consider current blind spots. Country coverage must expand. And funders should stimulate research on little-studied regions and sectors. Currently, most research focuses on a few “popular” countries - such as Nigeria, Ghana and Mauritius - but countries like Niger, Chad and South Sudan are just as deserving for their energy narratives to be charted. (Appreciation The Conversation Africa)

Is solar power the most promising net-zero technology?



Professor Andrew Blakers, 2023 winner of the Queen Elizabeth Prize for Engineering

*More new solar generation capacity is being built than everything else combined, compelling evidence that solar energy is the cheapest energy today, according to **Professor Andrew Blakers**.*

More new solar generation capacity is being built than everything else combined, compelling evidence that solar energy is the cheapest energy today, according to Professor Andrew Blakers.

Solar is growing much faster than any other energy technology in history, fast enough to completely displace fossil fuels from the global economy before 2050.

The rise and rise of cheap solar is the best hope for rapidly mitigating climate change, however, we need to get to zero fossil fuel use faster than 2050 to reduce the extent of climate damage.

Global solar capacity passed 1 Terawatt (1,000 Gigawatts) in 2022. At current growth rates, this will increase to 6 Terawatts around 2031, which is larger than the combined total of coal, gas, nuclear and hydro.

Relatively few new fossil-fuelled power stations are being built. This means that the global fleet is aging, and most will retire by mid-century.

The world will naturally move to a solar/wind energy system provided that we stop buying fossil fuel machines.

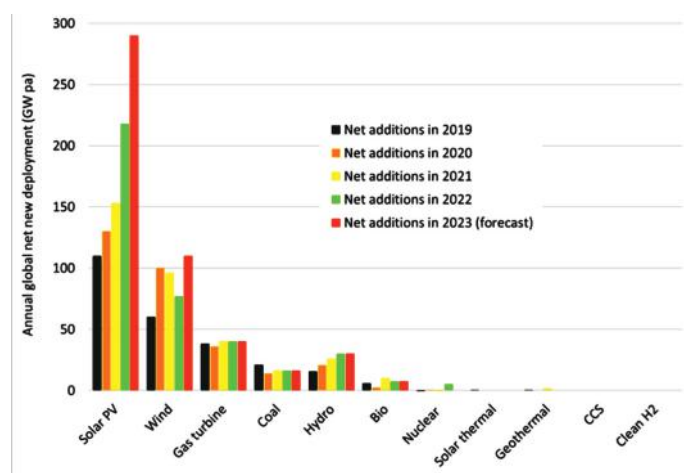
All the leading countries for per capita solar and wind generation are in Europe – except for Australia.

In Australia, 99% of new generation capacity is solar and wind because it is cheap. Unlike European countries, Australia cannot share electricity across national boundaries and therefore the country must cope alone with rapidly increasing levels of solar and wind and is finding it to be relatively straightforward.

Australia currently procures 40% of its electricity from renewables (mostly solar and wind) and has a highly credible pathway to reaching its 82% renewable electricity target by 2030.

Already, the Australian grid regularly passes 65% solar fraction. Grid stability is excellent, and more solar and wind in the grid produces lower (not higher) prices.

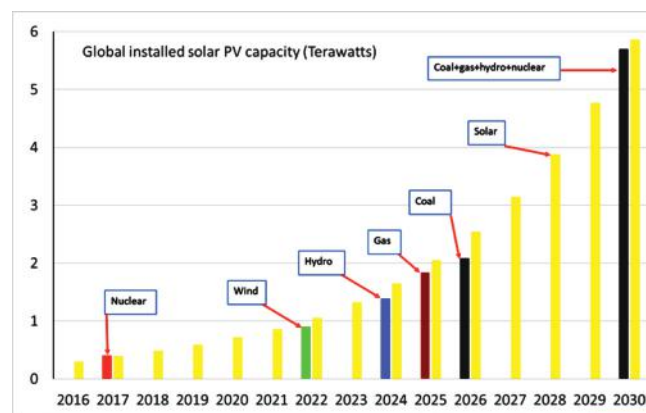
A key feature of Australia's energy transition is an open electricity market, which allowed companies and millions of households to discover that solar and wind are cheap. Australia's location at low-moderate latitude is similar to where 80% of the global population lives. Most of the world's population can readily follow the Australian pathway.



Global generation capacity additions (2018-2022)

Pathfinding

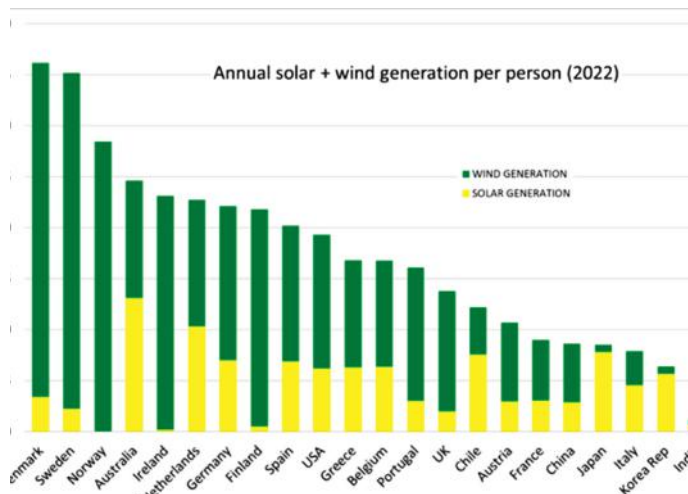
Most solar panels use PERC solar cell technology. The developers of this elegant technology were recently awarded the Queen Elizabeth Prize for Engineering.



Global solar generation capacity assuming continued 20% growth rate in annual deployment

Where will rapid growth take us?

Global solar capacity is growing at 20% per year. Where can this growth take us?



Per capita solar and wind generation in 2022.

Complete elimination of fossil fuels is straightforward – electrify everything using solar and wind:

1. Electric vehicles replace conventional vehicles;
2. Electric heat pumps replace gas space and water heating in buildings;
3. Electric furnaces replace gas burners in factories;
4. Electrolysis of water produces hydrogen atoms for the chemical industry: ammonia, metals, plastics, synthetic aviation fuel.

Most fossil fuel use will vanish 15 years after we stop buying fossil fuel machines – by replacing retiring fossil fuel machines with electric versions. We can start this right now.

Electricity production needs to double to service the first three items above. In countries with a significant chemical industry, electricity production might need to triple.

Electricity consumption is strongly correlated with affluence. Let's paint a desirable scenario. By mid-century:

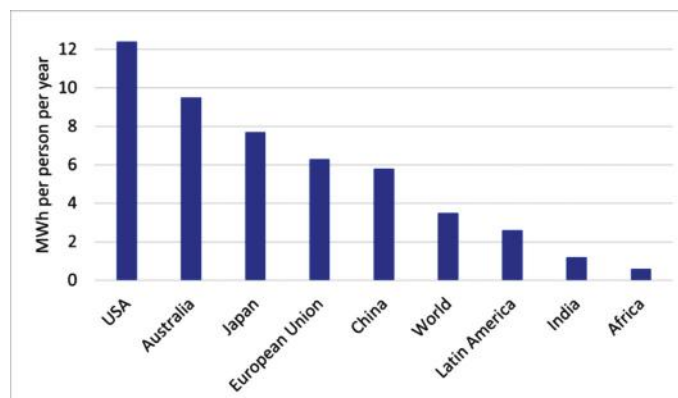
- Developing countries catch up with Europe for per capita energy consumption
- Full decarbonisation of energy occurs, causing global electricity consumption to reach 20MWh per person per year – double or triple the typical consumption of a developed country.

By mid-century, Earth will have a population of about ten billion people, and so we will need 200 billion MWh per year, which is much larger than current global consumption of 30 billion MWh per year.

Let's further assume that solar does most of the heavy lifting for decarbonisation, with support from wind.

Solar's current growth rate of 20% per year is easily fast enough to reach 80 Terawatts of installed capacity in 2050 – enough to decarbonise an affluent world. As well as eliminating most greenhouse emissions, we will also get rid of car exhausts, smokestacks, urban smog, coal mines, ash dumps, oil spills, oil-related warfare, and gas fracking. This sounds really good. But how realistic is this?

These climate conferences need to focus on opening up electricity markets. Getting rid of fossil fuels allows elimination of three quarters of global emissions through the substitution of electric machines for fossil fuel machines, with electricity coming from solar and wind.



Per capita electricity consumption

No constraints

There are practically no constraints on vast deployment of solar. Most of the global population will rapidly and hugely benefit from this energy transition.

Solar is cheap and getting cheaper. Solar's dominance of global energy deployment (figure1) is compelling market-based evidence of this.

The sun will shine for billions more years. We can never run out of raw materials for solar panels. There are no toxic metals, no critical materials, and panels are highly recyclable. Storage is a solved problem via batteries and pumped hydro. We will never go to war over access to sun and wind. Solar technology has low utility for warfare and terrorists.

Most countries have vastly more solar and wind resources than needed to be energy self-sufficient which confers resilience in the face of war and pandemics. Densely populated regions such as Japan, Europe and northeast USA have enormous offshore wind, while Indonesia and west Africa have enormous offshore solar resources in calm tropical seas.

We have plenty of space. Eighty Terawatts of solar translates to 8 kilowatts (kW) per person. This is the size of a typical Australian rooftop solar system, albeit the system is shared by a family rather than an individual. However, it is not hard to imagine 8kW of solar per person by 2050, plus a 2kW share of a wind turbine or 12kW of solar and no wind.

The required area of a solar panel is about 5m² per kW. Some of the panels will be on house roofs (which alienates no land). Others will be on ground-mounted solar trackers, in combination with agriculture, and floating on lakes and seas. These operate for 30 years and eliminate all fossil fuels from electricity, transport, heating, metals, chemicals, and jet fuel.

The solar revolution is clearly unprecedented: a cheap unlimited energy forever with minimal resource, environmental and social constraints. (Originally on www.powerengineeringint.com)

Unlocking AFRICA'S potential

– free trade can end continent's energy crisis

African manufacturers have a significant role to play in helping to remedy the continent's energy crises by developing innovative solutions for energy storage and access, writes Mervyn Naidoo.

With Africa in the throes of an energy crisis due to several different factors, African manufacturers have the potential to play an important role in helping to provide a solution. All this depends on whether the right environment is created to help them expand operations and pursue cross-border investment opportunities.

Underinvestment in infrastructure, a lack of access to affordable and reliable sources of electricity, a lack of investment in renewable energy and a lack of coordination between the public and private sectors have all contributed to the state of energy poverty that most nations on the continent find themselves in today.

Compounding the problem is the fact that many African countries face political and economic challenges. This has hindered the development of their energy resources, and has contributed to the brain drain, resulting in many African countries losing crucial skills and expertise for energy generation.

African manufacturers have a significant role to play in helping to remedy the continent's energy crises by developing innovative solutions for energy storage and access. By creating products that are tailored to the needs of the African context, manufacturers can help reduce energy poverty, increase energy efficiency, and spur economic growth.

Economies of scale

However, this can only be accomplished once manufacturers achieve economies of scale. Unfortunately, there is currently very little economic



Mervyn Naidoo, Group CEO ACTOM

growth across many parts of the continent due to a lack of investment in manufacturing capacity expansion.

Thus, Africa must leverage mechanisms such as the African Continental Free Trade Agreement that has given rise to the African Continental Free Trade Area (AfCFTA), which was established in 2018 and encompasses most of the continent.

Under the agreement, AfCFTA members commit to eliminating tariffs on most goods and services over several years, ultimately increasing socioeconomic development, reducing poverty, and making Africa more competitive in the global economy. Long-term objectives include creating a single, liberalised market, reducing barriers to capital and labour to facilitate investment, and developing regional infrastructure.

Along with many other countries on the continent, South Africa could greatly benefit from the African Continental Free Trade Agreement. While being part of the most industrialised economies in Africa, South African manufacturers have not ventured into other African countries on a significant scale, with companies in the retail space making up the lion's share of cross-border investments and expansion.

Huge scope for infrastructure building

The continent does however present huge scope for the construction of energy infrastructure, and an increase in investment in this space would drive local manufacturers to expand into various regions on the continent. It is expected that the African Continental Free Trade Agreement would accelerate this process and, for example, pave the way for the vertical integration of the mining of minerals such as vanadium and lithium into the manufacturing of energy storage products.

Quick Facts



54 out of
55 member states
of the AU have signed
the **AfCFTA** agreement



44 have **deposited** their
instrument of ratification



AfCFTA is the **largest free trade**
area in the world **measured by the**
number of countries participating



88% of rules of origin have
been **completed** with only
automotive and textile sectors
remaining, **41 countries**
have submitted their tariff offers



The **AfCFTA** has the potential
to lift **30 million** out of
extreme poverty



The AfCFTA connects **1.3 billion**
people across **55 countries**
with a combined GDP of
\$3.4 trillion



AfCFTA is expected to boost Africa's
income by **\$450 billion**
by 2035 a gain of 7 percent

while adding **\$76 billion** to the
income of the rest of the world



8 African countries already kick-started
trade in **96 products** under the Guided
Trade Initiative

In East Africa, some multinational companies are bringing their resources together to create manufacturing hubs as a way of expanding their operations and establishing a foothold in new markets. These industrial hubs are vehicles for technology transfer, job creation and a way for African companies to access and contribute to the economies in the region. Additionally, such projects will be able to bring the technical expertise and maintenance capabilities closer to their customers enabling the creation of tailor-made solutions for those specific regions.

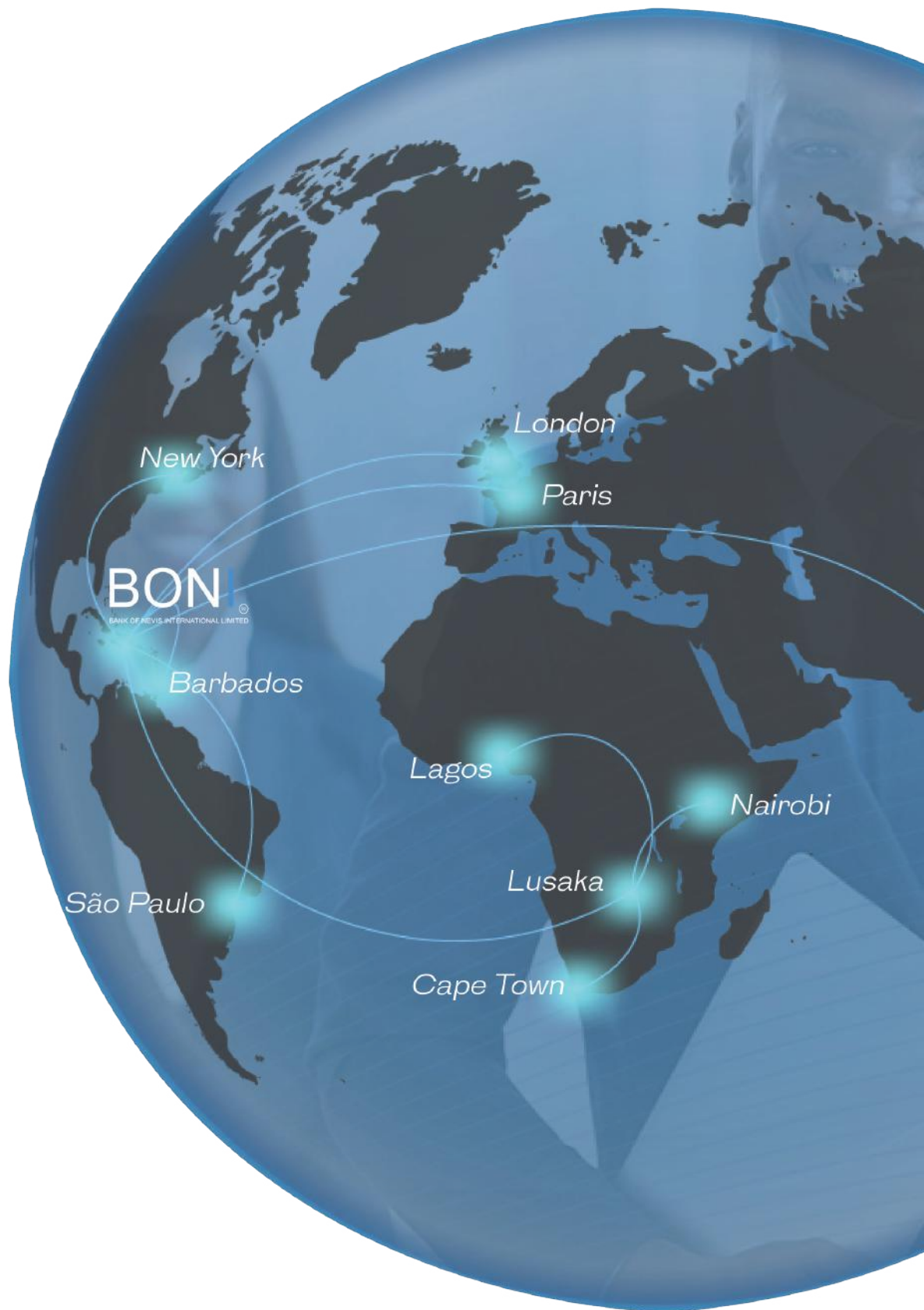
At the same time, solving Africa's energy crisis requires the collaboration of the public and private sectors. For instance, the government's Independent Renewable Energy Power Producers Procurement Programme (REIPPPP) has created a platform for private

sector investment by removing licencing requirements for up to 100MW of renewable energy production, which has increased the scope of public-private partnerships. However, the certainty of policy remains the key to encouraging the private sector to work with the public sector to address the energy crisis.

In conclusion, Africa's energy crisis can be tackled effectively only if the continent's manufacturers are empowered to exploit the depth of their manufacturing capability. Therefore, the African Continental Free Trade Agreement is a step in the right direction for South African manufacturers who have been reluctant to go beyond borders. Investment in manufacturing would not only solve the energy crisis but also create employment, especially as Africa has the youngest population in the world.

AFCTA

Largest
freetrade
area
in the
world



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BANK OF NEVIS INTERNATIONAL LIMITED
...because tomorrow's future begins today

Taking your Ambition



MINING

- > A Bold Innovation For Maximizing Heavy-Duty Performance
- > Taking your ambitions global because tomorrow's future begins today
- > The Epse™ Method Revolutionises hazardous Wastewater Treatment in Africa
- > Battling The Menace of Illegal Mining
- > State of Climate Change Disclosure for Southern Africa's Mining Houses
- > K-Tec joins forces with Ukwazi to revolutionise earthmoving and mining in Sub-Saharan Africa

A blue-tinted image of a globe showing the Eastern Hemisphere. A bright green light is positioned over Singapore, with a thin white line extending from it across the Pacific Ocean towards the Americas. The word 'Singapore' is written in white text near the light.

ns Global

A BOLD INNOVATION FOR MAXIMIZING HEAVY-DUTY PERFORMANCE



Champion 205L barrel

Champion Lubricants has continued its expansion in the Heavy-Duty Off-Road segment by launching Champion XRS (Extreme Off-road Solution), a concept of 5 products that addresses all the challenges that operators and machines face today.

A fully functional fleet is vital to the success of an enterprise, and advanced fluid management is key to achieving this. Champion has designed its XRS concept cutting-edge lubricants to give fleet owners and operators the best solution to enhance productivity, improve uptime and reduce overall costs. With a meticulous product selection, XRS easily manages challenges like severe loading, extended idling, low-quality fuel, prolonged drain intervals, and severe climatic conditions.

Within the concept, Champion presents two new products: XRS 10W-30 FE and XRS 15W-40. These are multi-functional fluids covering all applications for construction, agriculture and mining machines, engines, hydraulic systems, manual and powershift transmissions, gears, axles and brake systems. In a nutshell, one lubricant for all components, Julien Fakhreddine, Regional Sales Manager of Middle East & Africa, articulates.

Precisely formulated for versatility and quality in markets with cold to moderate climates, XRS 10W-30 FE offers a high-performance ACEA E11 / API CK-4 formulation guaranteeing outstanding fuel savings in low-emission diesel engines with and without particulate filter. In addition to its broad usability, XRS 10W-30 FE has strong anti-wear properties and oxidation stability. It also provides near-instant lubrication and protection at low temperatures.

Champion has also tailored a product specific to those markets where warm climates or fuel quality can be insidious for fleet owners. Under these conditions, it is highly recommended to use high viscosity lubricants that preserve their characteristics and ensure wear protection. Thanks to its high Total Base Number (TBN), XRS 15W-40 is well-suited for markets with lower-quality fuels with high sulfur content. It offers improved efficiency and is compatible with diesel engines without particulate filters: Euro II, Euro III, and some Euro IV engines.

These new innovations, together with 4



Julien Fakhreddine,
Regional Sales Manager
for Middle East and
Africa

additional products that are part of the XRS concept, allow fleet owners and operators to cover 90% of their market needs with only 5 Champion products.

HEAVY DUTY: YOUR CHALLENGES, OUR EXPERTISE

Heavy-duty engines produce high amounts of soot, are exposed to the harshest of climates and demand ultimate protection against wear and acids. You are putting your equipment to the test, every single day. In order to guarantee maximal output, you need the right lubricants to assist you. As a leading independent producer of performance lubricants with over 65 years of expertise, Champion Lubricants offers all you need when it comes to heavy-duty challenges.

When your equipment is not operating, it's costing you money. The key is to arm yourself with the right lubricant partner that can offer you reliable and high-quality products to keep you going and to push your boundaries, Julien Fakhreddine enlightens.

KEY BENEFITS OF HIGH-QUALITY LUBRICANT FOR A HEAVY DUTY ENGINE

Premium lubricants, particularly those produced at Champion Lubricants' sole plant located in Belgium, will assist you in addressing

all challenges that may result in additional costs, including extreme climates, high loads, evolving engine designs, low fuel quality, idling, and drain intervals with your machine engine.

WEAR PROTECTION

One of the main functions of lubricants is to protect your machine's engine. With high-quality lubricants, you offer robust and effective wear protection, critical for prolonging the life of engine components. By forming a protective barrier on parts, these lubricants reduce wear and tear from metal-to-metal contact, especially under heavy load conditions. This protection extends the service life of critical components such as pistons and cylinders, ensuring that machines can operate longer without the need for costly repairs or replacements.

EXTENDED DRAIN INTERVALS

The use of high-quality lubricants can lead to extended oil drain intervals, thereby reducing maintenance frequency and costs. Premium lubricants can safely remain in the engine for longer periods without losing their protective and performance characteristics, even in the most extreme conditions and climates. This lowers the overall maintenance burden, a key

economic benefit for fleet operators.

FUEL ECONOMY

High-quality lubricants are specifically formulated to reduce internal engine friction. This minimization of friction leads to substantial fuel savings. By decreasing the energy lost through friction, machines can achieve better mileage, a crucial advantage given the long distances involved and the continuous pressure to reduce operational costs.

ENGINE CLEANLINESS

In areas where fuel quality may be compromised and environmental conditions are dusty and sandy, engine cleanliness becomes paramount. High-quality lubricants contain agents that ensure the engine remains free from contaminants, which could impair its functionality and efficiency.

Champion Lubricants, has developed lubricants specifically dedicated to the MEA (Middle East and Africa) region, containing the highest TBN (Total Base Number) values in the industry to neutralize acid and sulfur present in fuel.

HIGH-TEMPERATURE PERFORMANCE

Quality lubricants are designed to maintain their viscosity and protective properties even under severe thermal conditions, preventing breakdowns and protecting engine components. This resilience ensures reliable engine performance, even when temperatures soar, thereby preventing downtime due to overheating issues.

Furthermore, Julien Fakhreddine emphasizes, our fluids are developed to boost engine performance, reduce downtime, decrease cost of ownership, increase fuel economy and extend equipment life – exactly what you need to face all these challenges.

Champion's commitment to innovation and technological advancement has led us to a revolutionary approach in the Heavy-Duty Off-Road sector. With the launch of our Extreme Off-Road Solution (XRS) concept, we are shifting the lubricant technology landscape. The development of this compact range has been a meticulous process, guided by our in-house R&D teams, Johan Van Hove, Senior Technical Training Manager, commented.

Champion is the lubricant brand of choice whenever outward performance relies on inner power. These heavy-duty products are formulated to protect the core structure of the oil and create more robust oil film strength. The technology within these products ensures Champion lubricants can do their job more effectively for longer, withstanding extreme forces, pressure and strain in every machine engine, even in the most extreme working conditions.

TAKING YOUR AMBITIONS GLOBAL

Because tomorrow's future begins today

In This Exclusive Interview, **Stephen A. Agbeyegbe**, Chief Operating Officer Of Bank Of Nevis International Ltd. (Boni) Explains How They Are Helping Clients Mitigate Future Financial Challenges, Embrace Technology And The New Pathways For Regional And African-Caribbean Trade.

What is BONI?

Stephen: Bank of Nevis International Ltd. (BONI) provides private banking and holistic wealth and portfolio management to clients from all over the world. We provide a highly personal service and have a truly global approach. From the beautiful Caribbean island of Nevis, we offer clients a global footprint by acting as an independent financial gateway connected to markets, be they in New York, London, Paris, Singapore, Hong Kong or Sydney, whilst maintaining our traditional gateway to the wider Caribbean, North and South America and the Continent of Africa. As a result, we are ideally suited to help our clients achieve their global ambitions, safeguard their future, and meet their exacting needs in an increasingly digital and financially inclusive world.

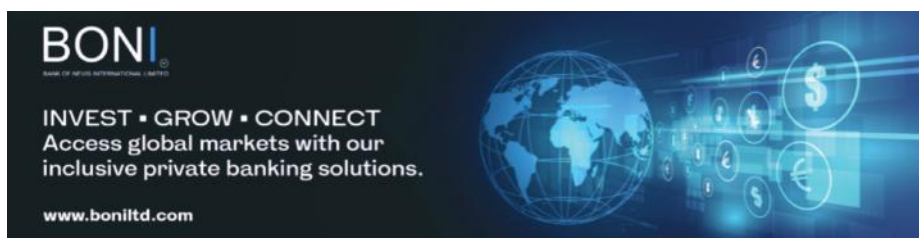
Who are your clients and what do you do for them?

Stephen: Our clients are diverse and come from all walks of life and all parts of the world. What they have in common is their ambition.

Our clients in sub-Saharan Africa, like our clients everywhere, want to take their ambitions global. We work closely with them to tailor their financial needs to deliver long-term, high-yield sustainable returns so they can build a lasting legacy. We are proud of our strong repeat client base which is the result of our team's human, inclusive and diverse approach at every level. Whatever your story, and wherever you're headed next, we want to be a part of it.

What are you doing to help your clients meet the challenges of the future?

Stephen: The unbanked and the underbanked outnumber those to whom banking was traditionally available to. Banking is no longer a brick and mortar proposition, and the challenge today is creating efficiencies on a day-to-day basis and offering technology products to a digitally savvy and digitally nomadic global customer pool. A world without borders. BONI is expanding its footprint in the digital space by recognizing the need to have technology partners that offer efficiency, coverage, and price transparency. Our partnerships with, Singapore-based, global payments giant, Thunes and global giant, Mastercard do exactly that. Through these fintech alliances our customers can send international payments anywhere in the world in a real-time, cost efficient way. Transfers can be made to businesses and individuals using their bank accounts, mobile wallets, cards, and cash agents, in more than 100 markets and over 60 currencies covering 90% of the world's



BONI
BANK OF NEVIS INTERNATIONAL LTD.

INVEST • GROW • CONNECT
Access global markets with our
inclusive private banking solutions.

www.boniltd.com

population.

Our Fintech drive underpins and supports the ambitions of our customers all around the world.

In addition, we are working to create new pathways for regional and African-Caribbean trade through a new strategic relationship with the African Export-Import Bank (Afreximbank). By leveraging the historical Caribbean links to Africa, we can foster and support trade, financial services, and financing to provide foreign direct investment in key sectors of both African and Caribbean economy. In doing so, creating high quality new job opportunities for young people and better financing outcomes to impact the lives of the Caribbean's 80 million people. In January 2023, BONI was proud to be at the forefront of an Afreximbank initiative that saw it approve US\$1.5 billion in funding for member states of the Caribbean Community (CARICOM).

In 2021, BONI acquired a strategic stake in Zambia's Investrust Bank. Investrust has national footprint in Zambia, a country of close to 20 million people and which sits at the centre of the Southern African Development Community (SADC) with a total population of 380 million. Through Investrust, we see a significant pipeline of commercial activity and intend to layer over the same with technology to support and underpin opportunities in Africa where there is space for infrastructure and essential services, such as healthcare, education, agrarian and aggro-related businesses, mining, oil and gas, retail and transport, to be completely reformed through flexible and meaningful capital investment. To take our vision forward, under a policy of supporting economic champions, we intend to better align ourselves to the mining sector in Zambia and wider Africa in particular. The mining sector in Africa could not be better positioned to support the future of global economic growth. Africa has abundant reserves of minerals, essential for the green energy transition and new battery technologies, and we are ready to support expansion in this sector.

What's next for BONI? Where is the private banking and wealth management sector headed next?

Stephen: Wealth management is global, by that we mean a wealth management product is needed in the Far East, in Africa, in South America and is not just the preserve of traditional actors in Europe, North America, United Kingdom to name a few. More than anything, the past ten to fifteen years has seen new younger demographic whose wealth is apparent and yet whose deployment touches on the creation of perhaps a new or newer world order. Banking is undergoing unprecedented disruption. New business models are being invented. New currencies are being introduced. New channels to market are being opened. All this makes the present an exciting time for our industry.

For more information about BONI and its services, please visit www.boniltd.com or email info@boniltd.com



Stephen A. Agbeyegbe, Chief
Operating Officer, Bank of
Nevis International Ltd.

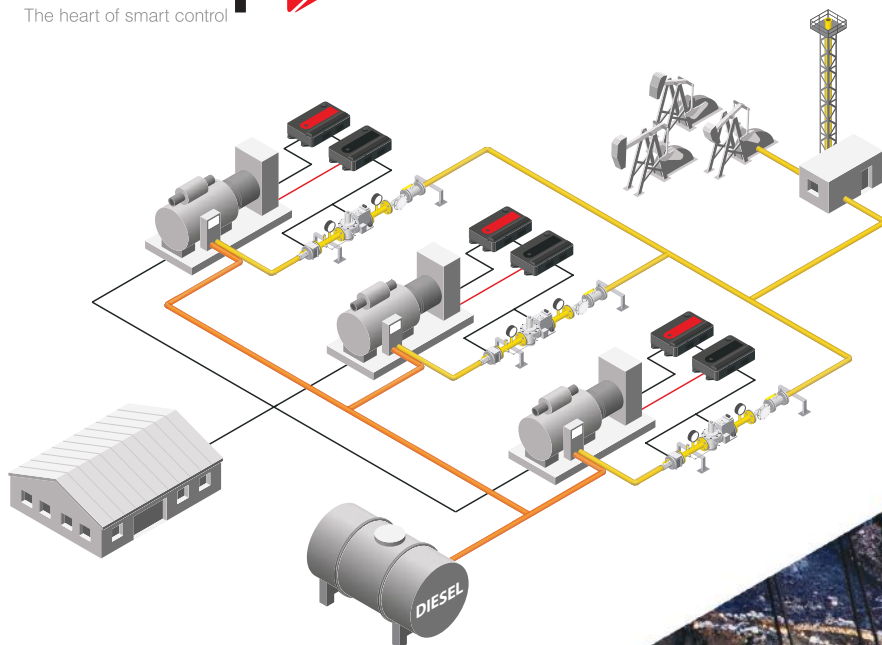
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Dual fuel
technology that
reduces costs
and lower
emissions

ComAp's simple bi-fuel conversion modifies your original diesel power generation engine so that it uses natural gas as the main fuel - substantially reducing operating costs. It works by introducing gas into the engine and then electronically controlling gas flow dependent on engine speed and output. All without compromising the engine's power output, running time or maintenance schedule.

THE EPSE™ METHOD REVOLUTIONISES HAZARDOUS WASTEWATER TREATMENT IN AFRICA

Hazardous wastewater treatment is essential for mining and heavy-duty industrial applications. Used in mineral processing to recover valuable metals from ore, water is critical to the mining industry. However, using water in this way causes mineral contaminants and other solids to accumulate in the process water supply. This leads to contaminated mining wastewater that without treatment cannot be reused or returned into the environment due to community health concerns and environmental regulations. As such, mining operations need to have a consistent and reliable source of clean water to keep business running.

While some mining operations may choose to pay an outside company to transport the wastewater, hauling waste sludge is inefficient and costly. Retention ponds are also an option, but they lose their effectiveness over time as they become dirtier, leading to a bad Return-on-Investment.

Instead, treating the water on-site with the latest available chemical technology and filtration methods can lead to several benefits, including significant cost savings, full control of the treatment process and long-term sustainability, the ability to reuse the water once treated and most importantly, the recovery of soluble metals, this is especially true now with the increase in demand for lithium and other metals used in electronics and energy storage.

EPSE Oy, a Finnish company specializing in the treatment of industrial and mining wastewater containing soluble metals has indeed revolutionised wastewater treatment processes by creating a water purification system using chemical treatment that effectively removes 99.99% of heavy metals.



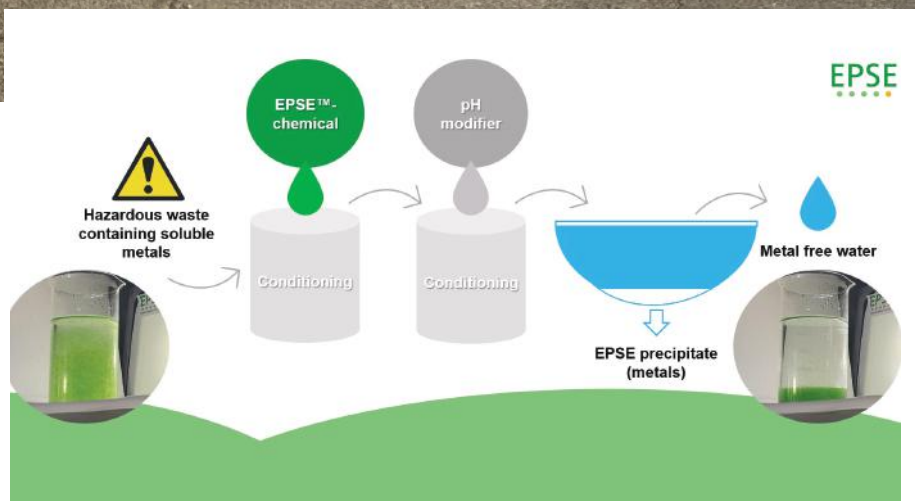
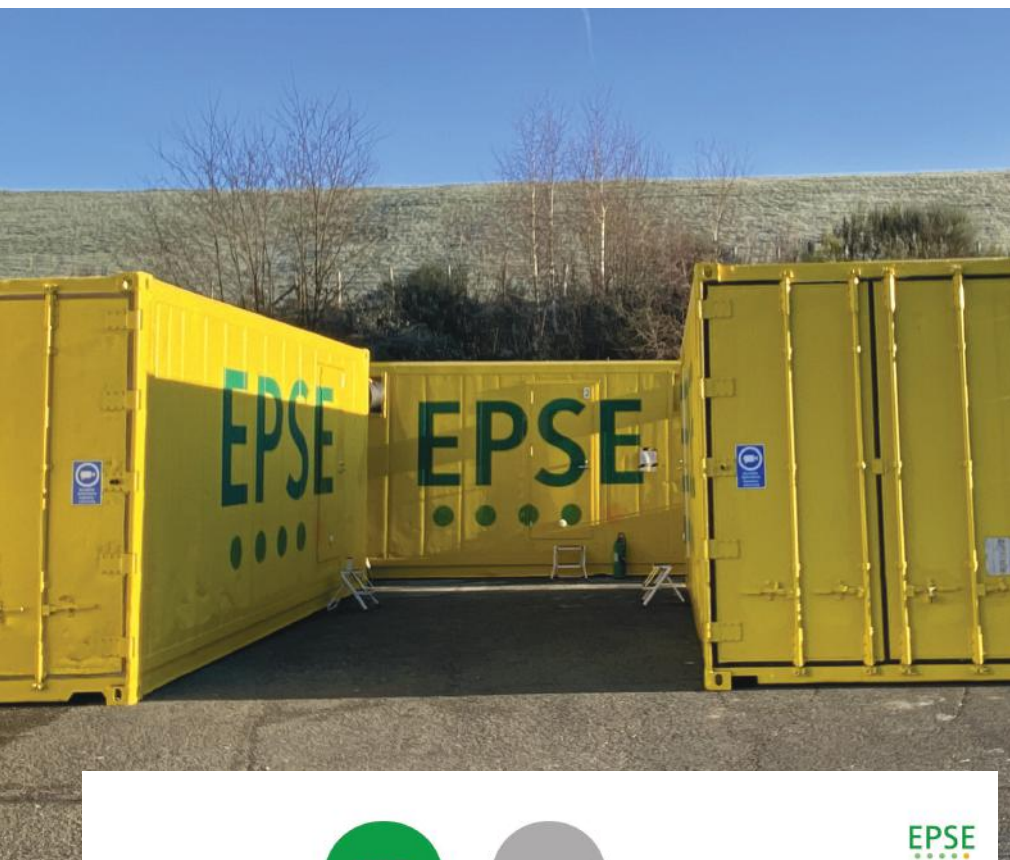
Jouni Jaaskelainen CEO EPSE OY (left) and Felix Fondem, Director of International Operations, EPSE OY (right)

EPSE's innovative patented new technology is not only a unique solution for rendering the precipitated metals irreversibly insoluble and environmentally harmless, but also turns hazardous waste into valuable raw material for various applications, up to 40x cheaper than existing alternatives, removes all metals in one single treatment step and enables water cycles.

An important advantage is that the EPSE technology can be integrated into existing water

treatment solutions to achieve cost savings of up to 20-40% compared to conventional treatment methods. However, substantially higher cost savings can be achieved by a partial or full replacement of existing conventional water treatment technologies.

The EPSE™ Method wastewater treatment process, Felix Fondem, Director of International Operations, EPSE OY explains, is based on the dosing of the EPSE™ chemical and the



adjustment of the pH level. The process forms a metal free overflow and an insoluble precipitate that can be classified as inert waste, which does not require special storage or special permits with associated costs like hazardous waste does. The EPSE™ Method's operating expenses and its' implementation does not typically require big investments, because it can be easily retrofitted into existing systems, isn't dependent on temperatures or metal concentrations, energy is conserved remarkably.

We invented and are marketing a system that will not require any major capital investment or necessitate the shutdown of existing water treatment plants, Felix Fondem clarifies, as this would be a very expensive procedure. We rather seek to integrate into and upgrade existing systems with the addition of our chemical at the

EPSE treatment + mobileEPSE

back- or front-end of the system or within the existing system.

Furthermore, The EPSE™ Method is non-selective and is proven to be effective with all of the processed metals even in small concentrations. The precipitate formed in the process settles rapidly and it can be used as raw material in many ways.

Without proper wastewater treatment, there are several water-related challenges that can ruin a mining site's efficacy. This is because mining wastewater and the tailings that the industry produces are often very acidic and high in suspended solids.

From both an environmental and operational standpoint, the best course of action is to prevent contamination to outside water sources and safely reuse mining wastewater as much as possible. Fortunately, through advanced wastewater treatment solutions like The EPSE™ Method, you can reuse mining wastewater for mining, irrigation and even drinking water, Felix Fondem emphasizes.

No matter which water source you're treating, the primary goals are to remove metals, solids, and other contaminants from the water, as well as restore the water to optimal pH levels. Treating your mining or industrial wastewater requires a combination of chemicals and mechanical filtration technologies.

The EPSE™ Method provides a unique and patented solution for the treatment of waste containing soluble metals. The method produces a metal-free overflow and a practically insoluble multi-metal precipitate. The EPSE™ Method suits particularly well for industrial and mining acidic wastewater and process water containing soluble metals and it has been tested for 51 metals.

EPSE offers their clients a comprehensive technical solution and its treatment process creates excellent results, besides it can be used for both continuous (24h) or batch run according to the customer's wishes and it can be integrated into existing equipment.

Additionally, Felix Fondem elaborates, reducing our own and customers' carbon footprint is also EPSE's goal in the long run and there is plenty of potential around the topic, treatment with the EPSE™ Method doesn't require extra heating and treating waste or process water where it's generated reduces especially the need for climate heavy waste transportation.

Last but not least, it is imperative to consider the water-energy-land nexus and pay attention to the land footprint of wastewater treatment with the rapid urbanization in Africa, particularly in the urban areas. Africa aims to move towards safer and sustainable wastewater treatment practices like other developed countries and will have to overcome region-specific challenges. One option is to consider new technologies such as The EPSE™ method.

Our objective is to further develop our network of relevant contacts in the mining sector, enhance the exposure, awareness and knowledge of EPSE technology, further gain valuable and relevant in-depth knowledge of the mining waste water treatment industry development and needs, and make targeted new contacts for the introduction of our technology in Southern Africa in particular and worldwide, Felix Fondem concluded.

In an industrial world struggling with environmental concerns, EPSE answered the call to enable a more circular economy and green transition.

This makes the EPSE™ method revolutionary.



K-Tec joins forces with Ukwazi to revolutionise earthmoving and mining in Sub-Saharan Africa

In a strategic move set to transform the landscape of earthmoving and mining operations in sub-Saharan Africa, K-Tec, a leading manufacturer of innovative earthmoving scrapers, has announced a partnership with Ukwazi, a prominent mining services provider in the region.

This collaboration aims to leverage the strengths of both companies to enhance efficiency, productivity, and sustainability in the mining and construction sectors.

K-Tec's cutting-edge technology

K-Tec, renowned for its advanced earthmoving scrapers, has consistently pushed the boundaries of innovation to provide equipment that offers superior performance, durability, and efficiency. Their product line includes scrapers designed for various applications, from large-scale mining operations to heavy construction projects. K-Tec's scrapers are known for their high load capacities, fuel efficiency, and the ability to handle tough terrains, making them an ideal choice for the demanding conditions often found in sub-Saharan Africa. The K-Tec pull-pan scrapers are towed behind high-horsepower tractors or articulated dump trucks for a solution that offers one operator and one engine running to pick up material, transport material, and evenly spread the material efficiently. K-Tec's scrapers have been effectively moving material on all seven continents of the world. K-Tec scrapers have been effective in the mining market with a proven track record of stripping overburden, mine reclamation, haul road smoothing, gold, salt, lithium, potash, aggregate, clay, bauxite, and gypsum rock transportation for processing.

Ukwazi's local expertise

Ukwazi, headquartered in South Africa, has established itself as a key player in the mining and construction sectors across sub-Saharan Africa. With a deep understanding of local market dynamics, regulatory environments, and operational challenges, Ukwazi brings invaluable insights and expertise to the partnership. Their extensive distribution network and strong relationships with mining companies and construction firms make them an excellent partner for K-Tec as they expand their footprint in the region.

For the K-Tec Direct Mount and ADT scraper products, Ukwazi will obtain sales exclusivity in sub-Saharan African countries including: Angola, Benin, Botswana, Burkina Faso, Burundi, Cameroon, Cape Verde, Central African Republic, Chad, Comoros, Congo (Democratic Republic), Côte d'Ivoire,



“

We have been searching for a knowledgeable and reputable distributor in the African region for quite some time and are confident that we have found the right partner in Ukwazi. Their representation, promotion, distribution, and servicing of our K-Tec brand of equipment to heavy construction contractors and mining operators in their region allows for a massive advantage in productivity.

”

Djibouti, Equatorial Guinea, Eritrea, Ethiopia, Gabon, The Gambia, Ghana, Guinea, Guinea-Bissau, Kenya, Lesotho, Liberia, Madagascar, Malawi, Mali, Mauritania, Mauritius, Mozambique, Namibia, Niger, Nigeria, Réunion, Rwanda, Sao Tome and Principe, Senegal, Seychelles, Sierra Leone, Somalia, South Africa, Sudan, Swaziland, Tanzania, Togo, Uganda, Western Sahara, Zambia and Zimbabwe.

K.A. Group's, International Business Development Manager, Allan Friesen explains: We have been searching for a knowledgeable and reputable distributor in the African region for quite some time and are confident that we have found the right partner in Ukwazi. Their representation, promotion, distribution, and servicing of our K-Tec brand of equipment to heavy construction contractors and mining operators in their region allows for a massive advantage in productivity.

This collaboration aims to achieve several strategic goals:

• Enhanced product availability:

By leveraging Ukwazi's extensive distribution network, K-Tec's advanced scrapers will become more accessible to mining and construction companies throughout sub-Saharan Africa. This increased availability is expected to drive significant improvements in project timelines and cost efficiencies.

• Local support and service:

Ukwazi's established presence in the region ensures that customers will receive prompt and reliable support, maintenance, and service for K-Tec equipment. This local support is crucial for minimising downtime and maximising the lifespan and performance of the machinery. This collaboration aims to achieve several strategic goals:

Synergies and strategic goals The partnership between K-Tec and Ukwazi is founded on the complementary strengths of both organisation. K-Tec's technological prowess and product innovation will be synergised with Ukwazi's market knowledge and distribution capabilities.



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**• Tailored solutions for regional challenges:**

Sub-Saharan Africa presents unique challenges, from harsh environmental conditions to logistical complexities. The combined expertise of K-Tec and Ukwazi will enable the development of customised solutions that address these specific challenges, ensuring that equipment performs optimally under varying conditions.

• Sustainable practices:

Both K-Tec and Ukwazi are committed to promoting sustainable practices within the industry. The use of K-Tec's fuel-efficient and environmentally friendly equipment will contribute to reducing the carbon footprint of mining and construction projects, aligning with global sustainability goals.

Impact on the industry

The partnership between K-Tec and Ukwazi is poised to have a significant impact on the earthmoving and mining sectors in sub-Saharan Africa. Companies in the region will benefit from access to state-of-the-art equipment and fit-for-purpose applications that enhance operational efficiency, reduce costs, and promote sustainable practices. Additionally, the collaboration will likely stimulate economic growth by supporting large-scale infrastructure projects and mining operations, which are critical to the development of the region.

Future prospects

Looking ahead, K-Tec and Ukwazi plan to explore further opportunities for collaboration, including the introduction of new technologies, partnership on major projects, and initiatives aimed at workforce development and training. By fostering innovation and sharing knowledge, both companies aim to drive progress and set new standards in the industry. In conclusion, the alliance between K-Tec and Ukwazi marks a pivotal moment for the earthmoving and mining sectors in sub-Saharan Africa. With a shared vision of excellence and a commitment to addressing the region's unique challenges, this partnership is set to pave the way for a more efficient, productive, and sustainable future.

About K-Tec

K-Tec is a manufacturer of pull-pan ejector earthmoving scrapers and accessories for the construction & mining industries. K-Tec's high-capacity, minimal maintenance, lightweight, & durable scrapers have proven to work in topsoil, clay, sand, gypsum rock, salt, and coal applications. K-Tec's scrapers efficiently complete 3 functions of earthmoving by picking up material in the cut zone, transporting the load down a haul road, and smoothly ejecting the material in the desired fill area on a jobsite. K-Tec scraper capacity ranges from approximately 20m³ - 48m³, pulled by Tractors or Articulated Dump Trucks (ADT's), resulting in the largest scrapers in the marketplace, allowing for greater production requiring less cycles per day to shrink the earthmoving carbon footprint compared to traditional methods of earthmoving. K-Tec scrapers have 2 daily grease points, to spend time more productively. K-Tec has an industry leading 3-year structural warranty and ISO 9001:2015 certification to stand behind the quality and workmanship of scrapers.

For more information, visit: www.ktec.com

Contact:

Shane Kroeker, Director of Strategic Initiatives

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Battling The Menace Of ILLEGAL MINING

The presence of illegal miners often coincides with rises in gang violence, prostitution, and human trafficking, exacerbating social decay in already vulnerable regions, writes Mandy Hattingh

For close to 150 years, mining has been the backbone of the South African economy, contributing approximately 7.5 percent of GDP and around 60 percent of total exports. However, this vital sector is now under siege from a formidable adversary: illegal mining. For years, illegal miners (colloquially known as Zama Zamas) have caused economic, environmental, and social upheaval, leaving a significant mark on the industry. Operating beyond regulation, illegal mining has evolved into a complex challenge, undermining both the stability of legal mining operations and the livelihoods of affected communities.

As of 2024, illegal mining is estimated to cost South Africa over R70 billion annually in lost revenue, taxes, and royalties, particularly in the gold sector. This figure represents a significant increase from earlier estimates and highlights the growing scale of illegal mining. These losses stem from both the direct theft of minerals, loss of royalties and the damage caused to mining infrastructure, which heightens the risks associated with investing in South Africa's mining sector. This economic drain not only compromises the integrity of legal mining but also deprives the South African economy of crucial revenue streams.

As illegal mining escalates, it becomes clear that more than just regulatory action is required to safeguard the industry's future. This article explores the far-reaching impacts of illegal mining and examines potential solutions to restore integrity to South Africa's mining sector.

Impact on communities

The effects of illegal mining extend beyond mine shafts, profoundly disrupting local communities. Many areas experience a sharp increase in violence and criminal activities, driven by syndicates controlling illegal mining operations. The presence of illegal miners often coincides with rises in gang violence, prostitution, and human trafficking, exacerbating social decay in already vulnerable regions. In some instances, syndicates collude with local officials and police, creating a culture of



◀ Mandy Hattingh,
Legal Practitioner,
Mining and
Environmental Law

dependency on the illicit economy. As a result, these communities become not only unsafe but also socially unstable, increasingly reliant on underground economies.

Impact on mining companies

Illegal mining poses a substantial threat to formal mining companies. Many have been forced to heavily invest in security, replace stolen equipment, or repair damage caused by sabotage. Although exact figures vary, it is estimated that mining companies lose approximately R7 billion annually due to illegal mining. These financial burdens affect profitability, hamper operations, and deter further investment.

Concerningly, illegal mining appears to be proliferating. For example, Sibanye-Stillwater recently reported a 241% increase in illegal mining incidents in the first quarter of 2024 compared to the previous year, with 581 cases and 247 arrests. These incidents, along with rising security costs, disrupt operations and increase production costs, reducing the sector's attractiveness to investors.

The additional costs associated with securing sites and addressing operational disruptions directly impact market confidence. Investors are deterred by the instability in high-risk environments, limiting essential activities such as exploration, development, and expansion, ultimately stunting sector growth.

Impacts on illegal miners

Illegal mining is perilous for the miners

themselves. Driven by economic desperation, many operate in abandoned shafts with substandard protective gear and little regard for safety. Accidents and fatalities are tragically common, demonstrated by two separate incidents which occurred 2023 resulting in the deaths of 20 miners following a fire that broke out in an unused mine in Orkney, North West Province, and the gas explosion in an abandoned mine in Welkom, Free State Province which claimed the lives of approximately 31 miners. These miners, often migrants from neighbouring countries, work under exploitative conditions controlled by criminal syndicates.

The dangers are compounded by the use of hazardous chemicals like mercury and cyanide to extract minerals, exposing miners to serious health risks. Illegal mining not only strips these workers of their dignity but also puts their lives in constant jeopardy.

Impact on the environment

Illegal mining wreaks havoc on the environment, with long-lasting consequences. It frequently flouts environmental laws, leading to severe contamination of water sources and damage to ecosystems. For instance, the use of mercury and cyanide in gold extraction poses serious risks to both human and ecological health. Illegal mining also contributes to soil erosion, deforestation, and the formation of sinkholes, while the lack of rehabilitation leaves ecosystems permanently scarred. This environmental degradation also undermines the sustainability of land for post-mining uses, such as agriculture.

Prevention Mechanisms

The South African government has frequently deployed police and military forces to combat illegal mining. Operation Prosper, launched in October 2023, involved the deployment of 3,300 SANDF personnel alongside SAPS. While this operation temporarily cleared 6,500 illegal miners from sites like Van Ryan, illegal mining quickly resumed after military forces withdrew in April 2024. This highlights the operation's short-term impact and underscores the need for

sustainable, long-term interventions.

Despite these challenges, policing efforts continue to show some success. Operations like Vala Umgodi in Mpumalanga have confiscated large quantities of illegal mining equipment, including 50 trucks, 200 phendukas (mineral processing equipment), and generators, with over 300 arrests made since March 2024.

The ongoing efforts of multi-disciplinary teams, including the SANDF and other government agencies, are crucial. However, the fight against illegal mining is far from over, as syndicates remain highly organised and quick to re-establish operations.

Private sector prevention

Mining companies have significantly increased investments in security measures and community engagement to combat illegal mining. Many companies now use drones, thermal cameras, and radar systems to monitor and detect illegal activities. Some are also implementing AI technologies to detect patterns and monitor large areas for unauthorised access.

Beyond security, companies are adopting a multi-stakeholder approach, collaborating with communities and local authorities to tackle the underlying causes of illegal mining. By offering educational programmes, employment opportunities, and alternative sources of income, these initiatives aim to reduce the economic desperation that drives illegal mining.

Legislative and policy initiatives

Tackling illegal mining in South Africa requires a comprehensive overhaul of the legislative framework, particularly when it comes to Artisanal and Small-Scale Mining (ASM). Currently, ASM operators may be pushed into illegal activity due to the high barriers to entry, such as complex licensing processes and high costs. By formalising ASM operations, South Africa could provide a legal pathway for these miners, reducing the prevalence of illegal mining while promoting compliance with environmental and safety standards. It is essential however, that any formalisation efforts take into account the realities on the ground. Formalising activities that exclude the main perpetrators of illegal mining, such as foreign nationals, would not meaningfully reduce these activities. A comprehensive approach that includes all key players is necessary to effectively address the issue.

Lessons from other African countries provide valuable insights into how ASM can be successfully regulated to combat illegal mining. In Ghana, the introduction of a simplified licensing system made it easier for ASMs to



Illegal Miners

operate legally, significantly reducing illegal mining and bringing miners into the formal economy through taxation and royalties. Similarly, Tanzania's Mineral Policy of 2009 designated specific areas for ASM and provided technical and financial support to ASMs. This formalisation not only improved safety standards but also enhanced environmental protections. Both countries demonstrate how legal frameworks tailored to the needs of ASMs can mitigate illegal mining while contributing to national economic growth.

Importantly, any regulatory reforms must also prioritise environmental protection. Formalised ASMs should adhere to strict environmental guidelines to prevent the damage often caused by illegal mining.

For South Africa, the combination of regulatory reforms, international best practices, and strengthened enforcement efforts offers a path forward in addressing the illegal mining

crisis. By adopting a comprehensive approach that supports both large and small-scale miners, the country can create a more sustainable and equitable future for its mining sector.

While enforcement efforts like Operation Prosper have shown that short-term successes are possible, the resurgence of illegal mining after the withdrawal of security forces highlights the need for more sustainable solutions. A comprehensive strategy, involving the formalisation of ASM and greater regulatory oversight, is crucial to addressing the root causes of illegal mining. By learning from successful examples in Africa, South Africa can create a legal pathway for ASM, reduce environmental harm, and improve the safety of miners and communities. Ultimately, a collaborative approach that integrates law enforcement, regulatory reform, and community engagement is key to curbing illegal mining and ensuring the future sustainability of the mining sector.



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Africa's Critical Minerals Can Fuel World's Energy Transition



◀ Dr Richard Munang,
Award-Winning
Environmental
Thought
Leader

The exploitation of critical minerals will raise many challenges, both new and familiar, and Africa's policymakers will have to navigate fierce geopolitical competition,
writes Dr Richard Munang.

Africa is a continent teeming with untapped riches, a veritable treasure trove of critical minerals that hold the key to the world's transition to a low-carbon energy future.

Like a seed waiting to sprout, Africa's vast reserves of transition metals - cobalt, nickel, manganese, and chromium - are ready to burst forth and unleash their full potential, powering wind turbines, solar panels, and electric vehicles, and paving the way for a sustainable energy future.

With Morocco holding 70% of the world's phosphate reserves, DRC having 50% of the world's cobalt, Gabon having up to 15% of the world's manganese, and South Africa having 91% of the world's platinum, 46% of its yttrium, 22% of its manganese, 35% of its chromium, and 16% of its vanadium, Africa has at least a fifth of the world's reserves in a dozen minerals that are critical for the energy transition, according to the Natural Resource Governance Institute (NRGI) Triple Win report.

The wider southern African region is home to substantial untapped lithium resources, used primarily in the construction of lithium-ion batteries for electric vehicles and grid-scale storage.

The World Bank has found that production of graphite, lithium, and cobalt will need to be ramped up to 3.1 billion tons by 2050, up more than 450% from 2019 levels, to meet the demand from energy and energy storage technologies, in order to keep global heating below 2°C by mid-century.

The exploitation of these critical minerals will raise many challenges, both new and familiar, and Africa's policymakers will have to

navigate fierce geopolitical competition, drive a hard bargain with miners over investment and royalties, and support domestic industries to ensure that value is captured on the continent. They will also need to manage environmental risks, develop regulation, and ensure that projects commence in time for the crucial phase of the energy transition.

However, the "resource curse" that has defined Africa's relationship with the extractive industries in the post-colonial era has ensured that value is more often shipped abroad than retained at home. To ensure that value is captured on the continent, Africa must develop sustainable value chains for critical minerals, which are defined as value chains that are economically, socially, and environmentally sustainable.

To achieve sustainable value chains for critical minerals in Africa, the following recommendations are urgently needed:

Education and training

Governments can invest in education and training programmes to provide the workforce with the necessary skills and knowledge to exploit critical minerals in a sustainable manner. Governments could establish vocational training programmes or partner with universities to offer specialised courses in critical minerals extraction and processing. These programmes could also focus on developing new technologies and sustainable practices, such as the use of renewable energy sources and environmentally-friendly extraction methods. This will ensure that the workforce is equipped with the necessary skills and knowledge to drive the critical minerals

industry forward in a sustainable manner.

Supporting local businesses

Governments can support local businesses by providing financing and other incentives, as well as promoting sustainable practices that protect the environment. Governments could establish a loan programme specifically for local businesses involved in the critical minerals industry, or offer tax incentives for companies that adopt environmentally-friendly practices. This will help to create a supportive environment for local businesses, which will in turn lead to the development of a sustainable critical minerals industry.

Technological Innovation

The private sector should play a key role in driving technological innovation in the critical minerals industry. Companies could invest in research and development to develop new extraction and processing methods that are more efficient and environmentally-friendly. Additionally, companies could adopt new technologies, such as automation and robotics, to improve the efficiency and sustainability of critical minerals extraction and processing. This will help to ensure that the critical minerals industry remains competitive and sustainable in the long term.

Policymaker engagement

Youth, communities, civil society organizations (CSOs), non-governmental organizations (NGOs), and individual citizens can help to raise awareness about the importance of critical minerals and the need for a sustainable energy future by engaging with policymakers.

Youth and communities could organize public events and workshops to raise awareness about the importance of critical minerals and the need for sustainable practices. CSOs, NGOs, and individual citizens could engage with policymakers through written submissions, public meetings, and other forms of advocacy to encourage the adoption of clean energy technologies and other sustainable practices in the critical minerals industry.

Sustainability

The private sector should take the lead in promoting sustainable practices in the critical minerals industry. Companies could adopt clean energy technologies, such as solar or wind power, to reduce their carbon footprint and minimise their impact on the environment. Companies could also support local businesses by purchasing inputs from them and engaging with communities to ensure that their interests are taken into account. This will help to ensure that the critical minerals industry remains sustainable in the long term, and that communities and the environment are protected.

Community participation

Communities can benefit from the exploitation of critical minerals by participating in sustainable value chains. Communities could receive training and education to understand the opportunities and challenges associated with critical minerals, and how they can contribute to a sustainable critical minerals industry. Communities could also participate in the development of sustainable value chains by providing inputs, such as labour and land, and receiving a share of the profits generated by the critical minerals industry. This will help to ensure that communities are fully engaged and benefit from the exploitation of critical minerals in a sustainable manner.

Youth opportunities

Governments and the private sector should work together to create opportunities for young people in the sustainable value chain of critical minerals. This will help to drive wealth and employment for youth in Africa and ensure the long-term sustainability of the critical minerals industry. Governments could establish youth-focused training and education programmes to equip young people with the skills and knowledge necessary to participate in the critical minerals industry. The private sector could also play a role by providing internships, apprenticeships, and job opportunities for young people in the industry. In addition, the private sector could invest in youth-led startups and small businesses in the critical minerals sector, providing them with the support and resources they need to succeed. This will help to foster a new generation of entrepreneurs and business leaders who are committed to sustainable practices and the responsible exploitation of critical minerals. By creating opportunities for youth in the sustainable value chain of critical minerals,



governments and the private sector can drive wealth and employment for young people in Africa, and ensure the long-term sustainability of the critical minerals industry.

The exploitation of Africa's vast reserves of critical minerals is a treasure trove waiting to be unlocked, a veritable goldmine of opportunities for the continent and the world. By developing sustainable value chains, Africa can harness its mineral wealth to power the world's transition to a low-carbon energy future, while reaping the benefits of sustainable economic growth, job creation, and environmental protection.

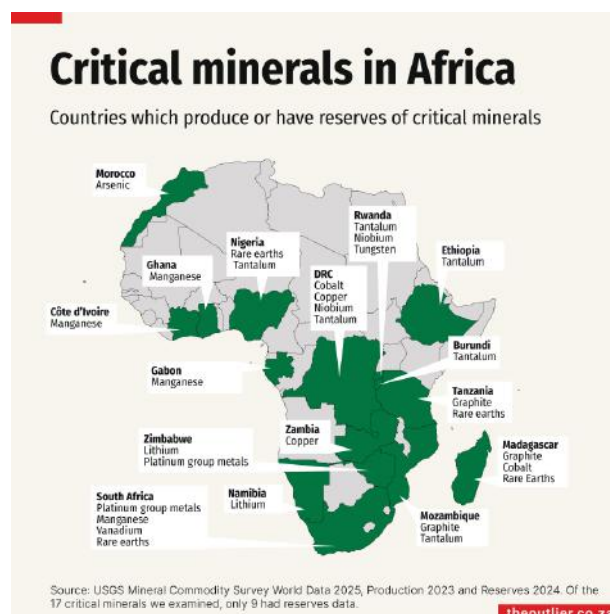
Like a tree that starts as a small seed and grows into a mighty oak, Africa's critical minerals has the potential to transform the

continent, providing a foundation for sustainable development and a bright future for generations to come. It is up to Africa's policymakers, the private sector, youth, communities, CSOs, NGOs, and individual citizens to take advantage of this unique opportunity and cultivate a sustainable energy future for all.

In the words of an African proverb, **If you want to go fast, go alone.** If you want to go far, go together. It is time for Africa to come together and unlock its treasure trove of critical minerals, embarking on a journey towards a sustainable energy future for all.

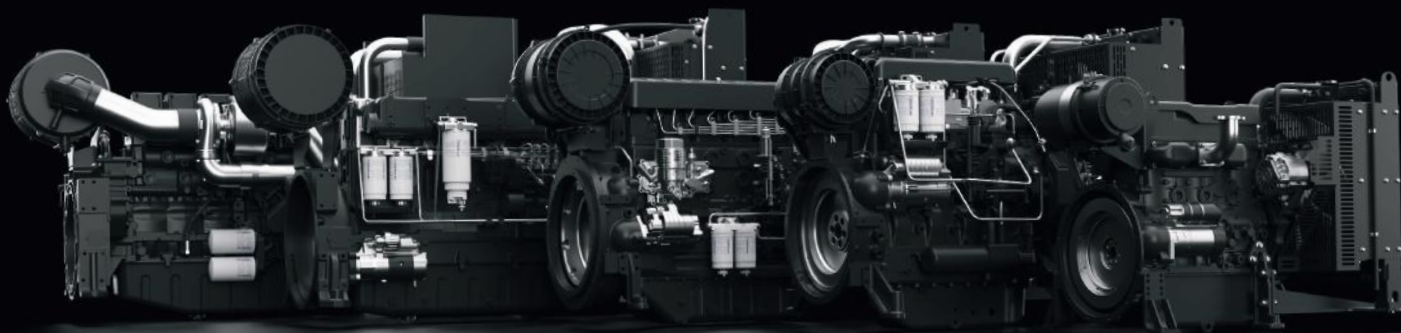


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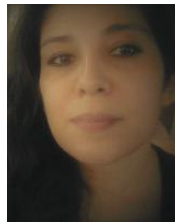
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A Mine in the Middle of Paradise



Ilhem Rachidi,
freelance
journalist in
Morocco and
Algeria

The Tebboune government is brutally suppressing any protest against a lead-and-zinc mine being built in a RAMSAR protected area, writes Ilhem Rachidi.

The region surrounding the Soummam river has long been renowned for its agriculture. It is home to centuries' old olive trees and a diverse and rich flora and fauna with several protected species. It is the core of a major agro food center, which supplies the country and produces several brands of mineral water as well as a local beer, Albrau.

But a government project launched recently is about to radically disturb its ecosystem and landscape. Algiers is speeding up the exploitation of a lead and zinc mine which had been planned - and feared - for almost two decades. It will be developed by the joint venture company Western Mediterranean Zinc (WMZ), a partnership between state-owned mining firm, Sonarem, which has majority shareholding, and the Australian mining firm, Terramin.

The government insists that the project is national, and consistent with its ambitions to become a major actor in the mining industry. Meanwhile, there have been calls from scientists and activists to investigate Terramin, the Australian miner's lack of international expertise and scarce information about the agreement with Algerian authorities being issues of concern.

Many local residents worry the mine's development could destroy their livelihoods

and even push them out. Two villages, Amizour and Tala Hamza, with respectively 45 000 and 15000 inhabitants, will bear the brunt of this decision. If the mine project moves forward, dozens of families will be forced to leave their homes. The region's historical and intangible heritage will be threatened as well, as martyrs of the Algerian revolution are buried there. So are the loved ones of many inhabitants.

"This is a mine in the middle of paradise," a native of the region laments. "The inhabitants are not only afraid of harmful effects on the environment and their health but they do not want to be relocated. They have a special attachment to their land. It is a beautiful region where they lead a quiet life and many of them live from mountain agriculture. Their parents, grandparents and great grandparents are buried there. If the area is destroyed, they will lose everything."

In July, Algerian authorities released an executive decree concerning the **downgrading of a plot of agricultural land** which will be used as a logistical base to access the mine. Unsurprisingly, the debate over the exploitation and its environmental consequences has been stifled by local authorities and more importantly, decision-makers in Algiers. The project has been pushed forward as a presidential priority, which makes it more opaque and difficult to

oppose, especially given the current repressive context. Regrettably, the local population hasn't been officially consulted prior to the July announcement, even though their health and that of future generations is at stake.

What civil society actors and experts are requesting is a transparent and open debate with government officials. According to activists, local residents, especially in Ait Bouzid and Ibazghichen, two neighboring villages in the exploitation area, are largely opposed to the project and expressed their concerns through several petitions sent to the government. They remain unanswered and the government hasn't reached out to local associations or political actors.

On May 13, 2022, a group of associations from Amizour and Tala Hamza **organised a hike on the site of the mine** to raise awareness about the dangers of the extraction of minerals and to call for the preservation of the region. It drew over 200 people although it took place during a wave of repression aimed at silencing the **Hirak protest** movement and other forms of dissent. According to several people who attended the event, the participants were held at a roadblock and had their personal details and that of their vehicles registered by security forces. A team from Radio M, which was known for its independent coverage and was shut down in

December 2022 after the jailing of its editor, Ihsane El Kadi, was stopped for an hour and interrogated. In an interview, an activist claimed several people had been intimidated and even threatened by not only security forces but also local representatives of political parties close to the regime.

Kamel Aissat, a scientist, university professor and activist of the Socialist Workers' Party (PST), an opposition party banned in 2022, who lives in the area, has been vocal in his opposition to the project. In July, he was arrested as he was about to travel outside Algeria. He was later summoned and interrogated only to be placed under judicial supervision a few days later by court decision, which means his movements and encounters will be closely monitored and consequently hampered. He's been charged with harming national unity and publication of information which could harm the national interest. His prosecution redoubles the pressure on local activists. Several people I contacted refused to speak on the record for fear of retribution or due to ongoing judicial procedures due to their involvement in the Hirak.

"The pouvoir [powers-that-be] has sown a climate of terror," a local inhabitant told me.

"[The project] will impact the entire Soummam valley. Everyone and all the neighboring towns will be affected, [all the way to] the Mediterranean sea," warns Samir Larbi, a PST activist from the neighbouring city of El Kseur.

Other civil society actors share his concerns over the propagation of heavy metals in the groundwater and the air. "It will have a disastrous impact on agriculture, especially since the region is known for its fertile land. The water table will be contaminated, which in turn, will contaminate all the region of Bejaia," stresses an activist.

Critics say the environmental damage outweighs the economic and social benefits. There's already a great mistrust in the ability of authorities to tackle environmental issues. A recent example is their poor response in 2021 and this summer to the **deadly fires in the Bejaia region**. Another has been concerns about poor waste management treatment which raises fears over the handling of the toxic waste from the mine.

The plan, they argue, is in contradiction with the mining legislation passed in 2014, which states that mines in protected areas shouldn't be developed. The **Soummam valley has been classified as a wetland** protected by the international Ramsar convention, which Algeria ratified in 1984. Moreover, they point out that



there hasn't been any in-depth public impact study. Furthermore, they mistrust the evaluation of the environmental feasibility of the extraction put forward by the government, which they say should have been performed by an independent organisation. Among the few political actors to speak up against the opacity surrounding the project, members of the opposition party **Rally of Culture and Democracy (RCD)** in Tala Hamza as well as the party's regional bureau demanded a genuine and publicly accessible impact study.

"The expanding of the extraction of underground resources to other natural resources than hydrocarbons does not hide the economic breakdown that is taking hold in the country and must never be done on the sly and by prohibiting debate and advice from experts in the field," declared the RCD bureau.

In an interview with the state agency Algeria Press Service in July, the Director General of Mines at the Ministry of Energy and Mines, Nadjiba Bourenane claimed that "all the studies necessary for the realization of this strategic project have been carried out, in particular the detailed feasibility study comprising several technical components, namely exploration, exploitation, treatment, mining planning, environmental impact, as well as the technical-economic study with economic modeling, in

addition to the development of a market study to be able to prove the profitability of this investment."

According to the government, the mine is expected to last about 20 years and directly employ 700 people and 4000 overall. However, in a region where the state has generally been absent, opponents to the project believe it will not lead to sustainable development but is merely a **short-term financial opportunity for Terramin** and their Algerian counterparts. They stress that the jobs that will be created are non-specialist ones and that the extraction of the mine cannot improve the local economy. The recent history of the country supports their scepticism. Over the last decades, the Algerian population hasn't generally reaped the benefits of its immense oil and gas resources. The economic policy of the state, which relied on their export, hasn't led to the development of the regions concerned, only favouring the southern part of the country, perpetuating a rentier economy.

As the PST activist Larabi argues, these are old government orientations that have accelerated under President Tebboune. "The current policy is based on extractivism and the unbridled use of resources," he said. [Courtesy of African Arguments]



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State of Climate Change Disclosure for Southern Africa's Mining Houses

Mining companies in the region face a multitude of risks - from physical and transition climate-related risks, to supply chain disruptions and stringent regulatory requirements linked to sustainability, **Pascal Snyman** and **Lodewijk Nell** elaborate.

The Southern African mining industry is particularly vulnerable to climate change-related impacts. Local mining companies that actively consider climate-related risks and opportunities stand to benefit in various ways. However, a scoping review of publicly available reports of 29 JSE-listed South African and 12 Southern African mining operations recently conducted by Brundtland Consulting, revealed that concerning numbers of mining companies do not report in alignment with leading international climate disclosure frameworks and are not considering climate change in operational risk management.

Due to its geographical location and socio-economic development state, Southern Africa is significantly vulnerable to the impacts of climate change. Already classified as arid, future climate projections indicate that the region will become drier and warmer, and simultaneously more prone to irregular and extreme rainfall, increasing the potential for floods.

Mining companies in the region face a multitude of risks - from physical and transition climate-related risks, to supply chain disruptions and stringent regulatory requirements linked to sustainability.

Physical climate-related risks include increased frequency and severity of droughts, heat waves and extreme precipitation. Water availability - a critical component in mining operations - is already limited in Southern Africa, and there is a higher risk of decreased overall rainfall due to the projected poleward shifts of frontal climate systems.

Transition risks associated with the move towards a low-carbon economy include policy changes such as carbon tax and regulatory reporting requirements, as well as technological



(L) Pascal Snyman, Sustainability Consultant, Brundtland Consulting



(R) Lodewijk Nell, Partner, Brundtland Consulting

advancements, such as renewable energy and low-carbon technology.

Additionally, shifts in consumer and investor preferences can significantly impact the demand and pricing for certain minerals and metals, and how these are mined and processed. The mining industry is facing growing pressure from civil society organisations, local communities, and other stakeholders to operate in a socially responsible and sustainable manner.

Furthermore, the mining industry forms part of a global supply chain that is vulnerable to climate-related disruptions and should work with suppliers and customers to build more resilient and sustainable supply chains. This will reduce the risk of disruptions and create new business opportunities.

Managing Risks with Climate Change Disclosure

Due to the range of risks faced, the need for companies to understand, consider and publicly report climate-related risks and opportunities is increasing. Failure to do so means that mines

are not fully aware of their climate-related risks and opportunities, and that climate change is not considered in operational management and strategic planning.

On the other hand, mining companies that actively consider climate-related risks and opportunities stand to benefit in various ways.

Benefits of Proactive Management of Climate-related Risks

- Improved ability to navigate physical and transition risks of climate change
- Increased potential for long-term value creation
- Improved sustainability and endurance of mining operations
- Improved business resilience
- Increased access to capital from investors assured of future climate change resilience
- Improved financial performance
- Improved stakeholder relationships
- Reduced regulatory scrutiny
- Contributing to a more sustainable future

Current State of Climate Change Disclosure
From a governance perspective, good climate change disclosure performance includes transparent, accurate and timely identification and reporting of climate risks, effective management of these risks, and active engagement with stakeholders to inform climate-related decisions.

To determine the current state of climate change disclosure in the Southern African mining sector, Brundtland Consulting recently conducted a scoping review, focusing on reporting in line with international climate disclosure frameworks, which is increasingly important to investors and other stakeholders, and on climate change risk assessments that are essential for risk identification and mitigation.

Publicly available reports of 29 JSE-listed South African mining companies were compared to 12 Southern African mining operations in Namibia, Botswana, Zimbabwe and Mozambique. This review aimed to determine alignment with the Task Force on Climate-related Financial Disclosures (TCFD) and the Carbon Disclosure Project (CDP), both leading international climate disclosure frameworks that govern the assessment and disclosure of climate-related risks and opportunities. Additionally, the review aimed to determine the extent to which climate risk assessments with detailed scenario analysis are conducted.

Although this high-level assessment did not cover the entire mining sector in Southern Africa, some interesting observations could be made.

Climate-related Reporting Performance

The data collected shows that a higher percentage of South African mining companies (59%) are reporting in alignment with TCFD recommendations, compared to Southern African mining operations (25%). Similarly, a higher percentage of South African mining companies (28%) completed CDP climate change responses compared to Southern African mining operations (8%).

Climate Change Risk Assessment and Scenario Analysis

South African mining companies have also conducted climate change risk assessments at a higher rate (62%) than those in Southern Africa (25%).

Furthermore, as recommended by TCFD, informing climate risk assessments with detailed scenario analysis that considers three emissions pathways enables mining companies to evaluate their resilience and long-term viability in different climate-related scenarios. However, only 34% of South African mining companies informed their climate-related risk assessments with scenario analysis, compared to just 8% in Southern Africa.

Measuring and Managing Climate Change-related Risks

While the JSE-listed South African mining companies – guided by the JSE's Sustainability and Climate Disclosure requirements – are expected to perform better on climate change disclosure, it is imperative that more mining companies, both in South Africa and the wider Southern African region, measure and manage their climate change-related risks, to

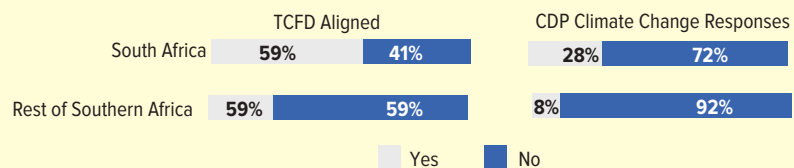
proactively mitigate potential impacts and seize opportunities for long-term value creation. As the saying goes, “you cannot manage what you do not measure.”

Awareness of future climate-related risks informs strategies to improve the resilience of our regional mining community, and create new

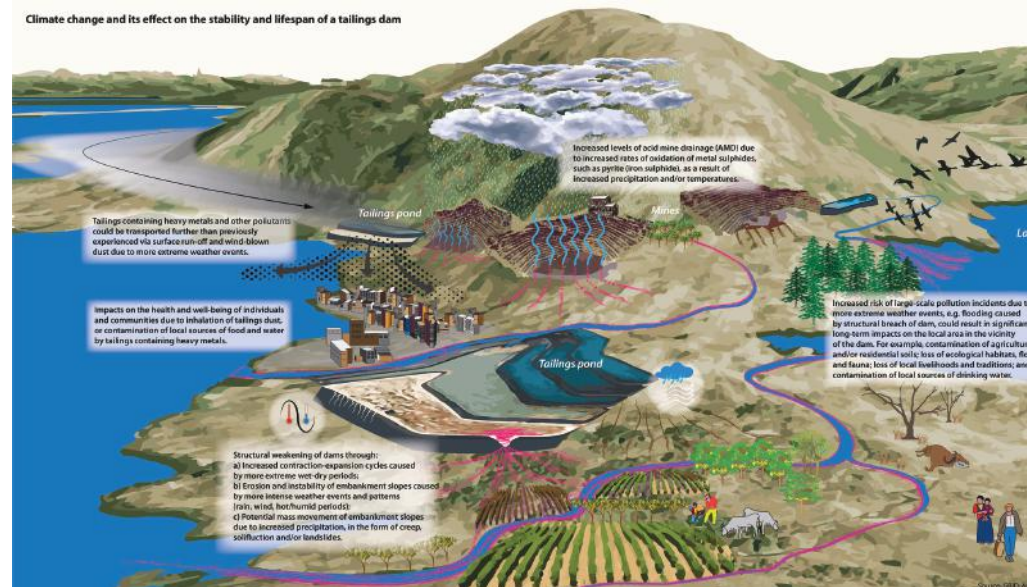
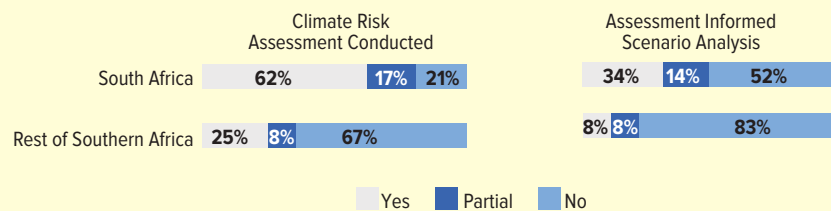
and exciting opportunities. An urgent shift from a compliance-based approach to a more proactive and strategic approach is crucial for enhancing long-term resilience and creating new business opportunities for mining companies in Southern Africa.



Climate-related Reporting Performance



Climate Risk Considerations



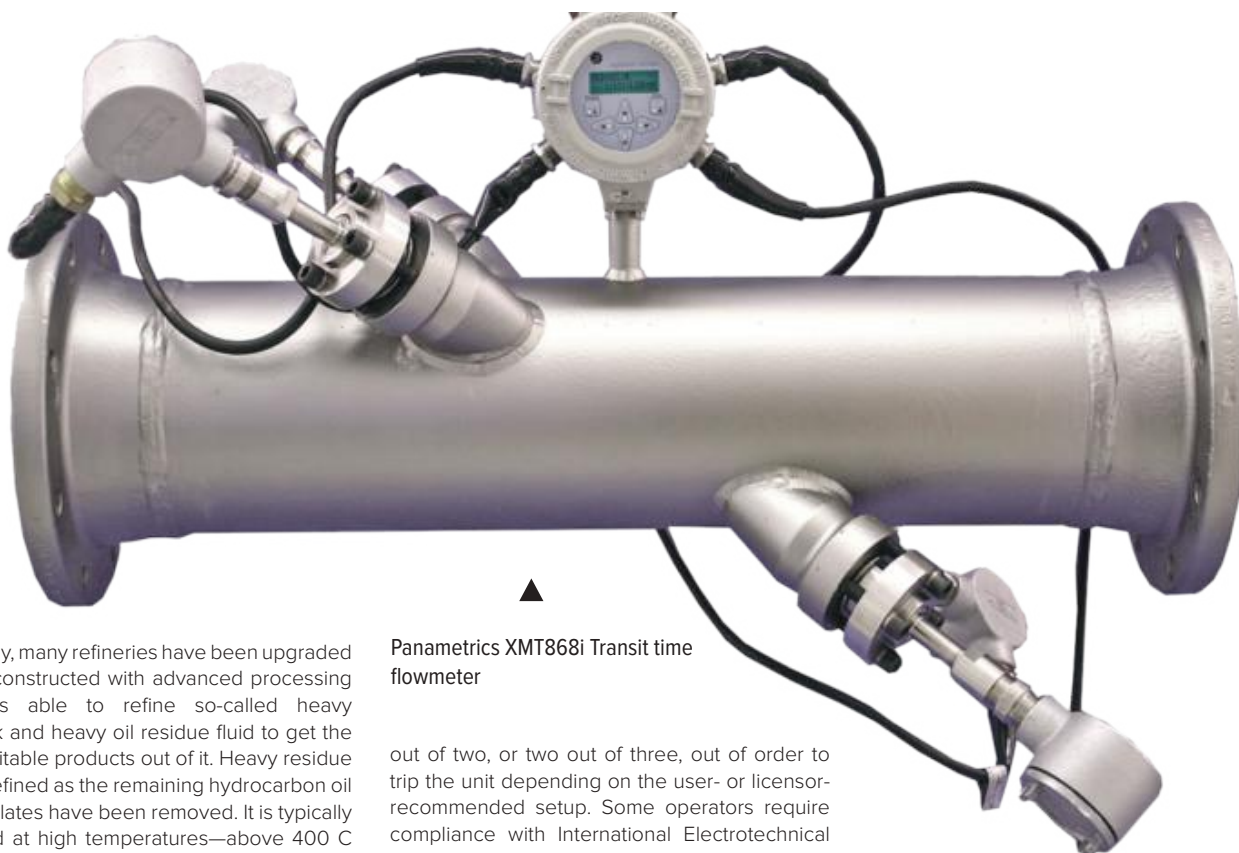




OIL

- Creating intelligence in oil and gas
- How Nigeria's fuel subsidy shock jolted Cameroon's economy
- Flow Measurement In Safety-Critical Heavy Residue Applications
- Redefining Energy Transitions
- An unexpected future for oil and gas

FLOW MEASUREMENT IN SAFETY-CRITICAL HEAVY RESIDUE APPLICATIONS



Panametrics XMT868i Transit time flowmeter

Today, many refineries have been upgraded or constructed with advanced processing units able to refine so-called heavy feedstock and heavy oil residue fluid to get the most profitable products out of it. Heavy residue can be defined as the remaining hydrocarbon oil after distillates have been removed. It is typically measured at high temperatures—above 400 C or 750 F—to break the long-chain molecules. It often contains asphaltene and fines (particles) that are abrasive. Plus, heavy residue is prone to clog, which is a problem for operators.

Processing units that use furnace feed lines include crude and vacuum distillation, coker and other cracking processes. These are safety-critical flow measurements. If an operator experiences line blockage due to heavy residue clogging, there must be an alarm. If there is no alarm, the furnace feed rate could decrease too much compared to the furnace capacity to such an extent that it triggers a blast risk.

The flow measurements on these lines are often redundant and broken down between control (with one flow transmitter connected to the plant digital control system [DCS] for control purposes) and safety with up to three flow transmitters connected to the emergency shutdown (ESD). The safety logic is often one

out of two, or two out of three, out of order to trip the unit depending on the user- or licensor-recommended setup. Some operators require compliance with International Electrotechnical Commission (IEC) 61508, also known as the safety integrity level (SIL) standard. Irrespective, all operators require the same safety voting logic.

There are several technical options for flow measurement on these applications. One of them uses ultrasonic transit time technology, which has gained traction over the last couple of decades.

Transit time ultrasonic flow measurement principle

The transit time ultrasonic flow measurement principle calculates the acoustic signal time of flight difference. This time is shorter when going with the flow. The flight difference time is longer in the opposite direction as it is decelerated when going against the flow. This time difference is proportional to the velocity of the measured fluid, whether it is a liquid or a gas.

The primary measurement is about time,

which will determine the velocity of the fluid based on the distance between the transducers and the angle needed to generate this time shift. Once the velocity is known, it is then multiplied by the crosssectional area of the pipe to get to the volumetric flow as per the equation below.

$$T_{UP \rightarrow DOWN} = \frac{P}{C + V * \sin \theta}$$

$$T_{DOWN \rightarrow UP} = \frac{P}{C - V * \sin \theta}$$

$$V = \frac{P}{2 \sin \theta} * \frac{T_{DOWN \rightarrow UP} - T_{UP \rightarrow DOWN}}{T_{DOWN \rightarrow UP} * T_{UP \rightarrow DOWN}}$$

$$Q = V * A$$

Why this technology is popular in critical measurement environments

- It is not prone to clogging the feed lines as there is no flow restriction nor obstruction thanks to its full-bore design.
- It is not prone to drift as the primary measurement is time.
- There is full and actual redundancy of the measurement since each transmitter is connected to an independent pair (or pairs) of sensors to the ESD, meaning the redundancy is on the flow transmitter and the flow sensor(s). This is unlike alternative technologies as when the primary element is drifting or out of order: all the flow transmitters linked to it become irrelevant.
- SIL certification is typically SIL2, but up to SIL3 with hardware failure test above zero, which depends on the ESD setup (like for one out of two or two out of three examples). Their safe failure fraction is > 97% and their diagnostic coverage > 94.5% for a single channel flow meter.
- There are low operational expenditures and even more so when there are purging lines that are no longer required.
- It is easy to maintain with safe sensor (transducer) online retraction capability without needing to shut down the line.

This technology has helped users improve their process units' safety, reliability and increased availability. And more users are opting for this technology based on the positive outcomes it has delivered to users who have drastically reduced their operational expenditure.

The flip side is that this solution represents a slightly higher initial investment than traditional technologies even if the payback can be achieved in less than 12 months in some instances. Also, during the turnaround, it is strongly recommended to clean up the meter line and the meter buffers so they can be restarted for another production cycle.

Based on successful experiences in delivering positive user outcomes on these heavy residue applications, this design has been expanded for other challenging applications. Some still relate to refineries with molten sulfur measurement that require permanent steam heating to keep the temperature constant and get the sulfur to freely flow with no obstruction nor restriction, or for viscous fluid such as asphaltene on solvent de-asphalting units.

At the opposite end of the temperature spectrum, one case study example is a large install base using this solution on liquefied natural gas (LNG) handled at cryogenic conditions (-160 C/-256 F) and close to its vapor pressure point thanks to the absence of pressure drop. This setup can be used on relatively easy-to-measure applications like cooling water lines. In the example, these lines were safety-critical, and the users were aiming to protect critical assets like compressors from unexpectedly tripping. The setup required a fully redundant system



◀ Panametrics ultrasonic flow meter

with a safety logic of two out of three to stop the compressor.

Whether customers use them or not, ultrasonic flow meters have many useful diagnostics to assess performance. For example, velocity of sound, signal to noise ratio, signal quality, gain, etc. Some of the diagnostics have upper and lower thresholds that when going outside the preset limits can trigger alarms to let the user know that something is not going as expected, enabling early intervention.

In many industries, process control relies on knowing exactly how much fluid flows through the pipelines to optimize efficiency, maximize profit, and remain in regulatory compliance. In a direct way, flowmeters measure the flow rate,

or quantity, of liquids, gases, and steam using a variety of technologies, while improving plant safety, efficiency, and profitability through accurate and reliable flow measurement.

Panametrics, a Baker Hughes business since 2002, first entered the ultrasonic flowmeter and flow measurement instrument market more than 50 years ago by introducing its state-of-the-art **gas flowmeter**. It currently offers a wide range of flow measurement instruments from **in-line**, wetted, and **clamp-on**, to **portable** and insertion flowmeter solutions for all flow measurement needs, which not only enables processes optimization but also aids in achieving environmental and performance goals.





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Natural Gas

Is Key to a Just African Energy Transition



NJ Ayuk, Executive
Chairman, African
Energy Chamber

If natural gas is a good option for wealthy countries like America, why shouldn't developing nations reap the same benefits? writes NJ Ayuk.

It would be an understatement to say Tanzania's Songo Songo gas field has been good for the country and its citizens. Since 2004, the project's output has been put to work to benefit the Tanzanian economy, its domestic energy supply, energy costs, employment numbers, and the environment.

With wells and a processing plant on Songo Songo Island, the public/private effort puts domestic needs first, using output to fuel the Ubungo gas-to-power operation as well as a major cement company and a village electrification program. Excess gas is sold to industrial customers across a range of industries.

Songo Songo production now generates about 45% of Tanzania's electricity, reducing the need for higher-priced imported fuel. Another important benefit? When the country's supply of hydroelectric energy wanes because of droughts, gas-to-electric generation can be counted on to fill the gap.

The development has directly created 190 jobs and made 113,809 more jobs possible.

It is also significantly decreasing carbon emissions (at the Tanzania Portland Cement Company alone, CO₂ emissions have been reduced by about 80,000 tons per year) and

is providing a cleaner energy source at Dar es Salaam power plants by replacing diesel and heavy fuel oil (HFO).

This project is just one example of what natural gas can do to boost African economies, workforces, energy supplies, and the health of both the environment and residents.

Because of its great potential for replicating success stories like this across the continent, I remain convinced that natural gas is the key to a prosperous future and a just energy transition for Africa.

As leaders from around the globe gather for COP28—and discussions turn to zero-emissions goals and renewable energy, I would like to respectfully point out that natural gas is clean energy. We must not, in our zeal to achieve our climate goals, dismiss the tremendous good that gas can deliver.

Natural Gas and Gas Products are Clean, Assist Emissions Targets

We've already seen natural gas' positive impact on other regions of the globe. In America, for instance, natural gas is used more than any other fuel for generating both residential and industrial power, as feedstock to produce

petrochemicals and fertilizers, and as a fuel of choice for generating electrical power. The U.S. uses roughly one-third of the natural gas produced globally, and demand for it there is growing.

There are good reasons for this, beginning with the fact that natural gas is the cleanest fossil fuel. It emits 50% to 60% less carbon dioxide than coal when burned and emits up to 30% less CO₂ than crude oil.

If natural gas is a good option for wealthy countries like America, why shouldn't developing nations reap the same benefits?

Gas can provide readily available, clean energy for sub-Saharan African countries while their renewable energy infrastructure and technology are "catching up" to that of wealthy, highly industrialized nations. And when supplies from renewable sources like solar and wind are intermittent (as on cloudy days and when the air is still), gas can fill the gap.

Natural Gas is Needed Domestically to Address Energy Poverty

Wealthy countries should not be attempting to set deadlines for Africa's transition to renewables, but that is happening. Organizations

from the World Bank to the European Investment Bank are pressuring Africa to quickly phase out fossil fuels. Even *African* lobbyists from Kenya are calling for a 30-year phase-out.

African governments and energy industry stakeholders must push back.

Investors who know Africa understand the hardships that accompany the electricity deprivation that more than two-thirds, or over 620 million, sub-Saharan Africans live with. These investors should stay the course rather than distancing themselves from African fossil fuels.

As I stated in my 2019 book, "Billions at Play: The Future of African Energy and Doing Deals," lack of electricity is much more than inconvenient. It deprives people of modern healthcare and exposes them to toxins in their homes from primitive fuels. It prevents progress across economic segments from business to industry to education.

The picture is a dire one and is expected to get worse due to projected population growth. Residents need electricity now, and fossil fuels can give it to them much more quickly, while green energy continues to evolve and become more prevalent.

Natural gas has a critical part to play in the energy mix needed for the continent to meet its current and growing energy needs. Let's make eliminating energy poverty a higher priority than adherence to an arbitrary, one-size-fits-all transition calendar.

Natural Gas Monetization Can Finance Energy Transitions

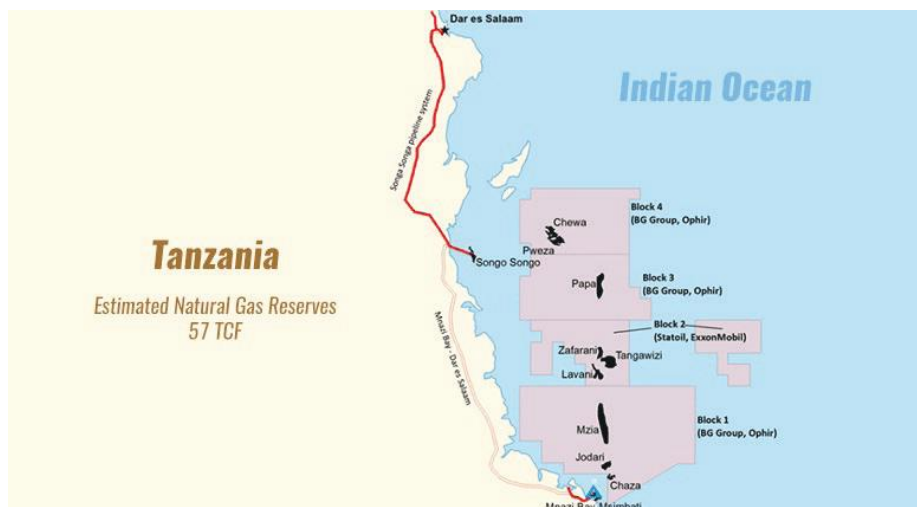
A just energy transition for Africa requires using our oil and gas resources as part of the process. The transition to renewables has begun, and there is more to come. In the meantime, however, Africa needs gas-to-electricity production and the monetization of its oil and gas resources. Capital from these resources can progressively fund the infrastructure and development needed to transition to renewables.

Reaching energy transition goals will require a major influx of investment capital into African economies. As one example, for Nigeria to reach the goals of its Energy Transition Plan (ETP) it will require about USD410 billion by 2060.

Overall, Africa has no shortage of natural gas reserves. A recent investment platform statistic totals them at 800 trillion cubic feet, distributed among nearly half of all African nations.

What is urgently needed are strategies to attract investment, enabling this gas to be removed from its underground and undersea reservoirs, transported, and stored. Local content will always play an important part in this process.

Creativity is also needed to provide solutions for inadequate production, transport, and storage infrastructure such as building



downsized, modular LNG plants and using compressed natural gas (CNG) that shrinks methane to less than 1% of its normal volume for transport and storage.

In closing, I'll repeat a vital point: Natural gas is increasingly in demand globally. This presents an opportunity that Africa should take advantage of now. We must monetize our natural gas resources for the good of our economies, the health of our residents, and to grow green energy initiatives at a pace that is good for Africa.



800 Trillion
cubic feet, overall
Arica natural gas
reserves

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Redefining Energy TRANSITIONS



HE Haitham
Al Ghais,
OPEC
Secretary
General

*It is important to take on board our energy past to help better understand our energy futures. What is clear is that our energy past has been series of energy additions, not energy replacements, as economies grew, populations expanded, and energy demand increased. **Haitham Al Ghais, OPEC Secretary General**, digs further into this, and provides context to how our energy futures are likely to evolve.*

For some, our energy future is simple. It is a world where renewables dominate, or as some have spoken of an 'Age of Electricity' – a transition from one energy source to another, or in literal terms, the replacement of 80 per cent of today's energy mix that comes from oil, gas and coal.

It is perhaps easy to be taken in by this. The term energy transition has become a 'catch-all phrase' for an intangible vision, and one that makes a radically different future seem normal. We move from a to b, and do not worry, the world will get there, just as it has supposedly transitioned in the past. It is a narrative some believe is set in stone, and one that should not be questioned.

This is wrong. We need to appreciate that today's energy transition journey is not built on the real history of energy and is not a realistic future for all countries and peoples around the world. It could also lead to major challenges for energy security, energy availability and reducing

emissions, and necessary investments not being made.

This has been evident in recent years on the back of ambitious and unrealistic net-zero policy agendas. It has led to populations pushing back on these proposals, as they comprehend the implications of them on their energy supply and their pockets.

Much of the transition narrative we hear is based on an assumption about our energy past; that energy sources are locked in a never-ending competition and have constantly replaced each other: coal replaced wood, which was replaced by oil, which apparently will be replaced by renewables.

This is also wrong. Energy sources have not disappeared, in fact, they continue to complement and even depend on each other. Our energy past has not been a series of replacement events, and nor will our energy future.

Over centuries, as economies grew,

populations expanded, and energy demand increased, it has been about energy additions. The huge expansion in coal consumption from around 1850 onwards saw demand for other materials multiply exponentially too. Coal drove the industrial revolution, and wood, specifically timber, was essential for constructing a multitude of buildings and products. Wood was also crucial for the early oil industry's infrastructure of derricks, tanks and barrels. The reality today is that global wood consumption continues to rise year-on-year.

The expanding importance of oil from the late 1950s onwards also led to increasing demand for coal, which is vital for steel production. Steel is a key material for oil exploration, production and transportation. The world consumes more than three times the amount of coal it did in 1960. In fact, today, global coal consumption continues to rise year-on-year.

So, what of renewables? It is important to stress that OPEC sees renewables as a core

component of our energy future, and significant investments are being made by Member Countries to increase capacity.

However, we also recognize that renewables are only a part of the future energy jigsaw. Is it realistic to think renewables can meet current global energy demand and the expected global energy expansion alone, particularly given that wind and solar currently only supply around four per cent of the world's energy?

We need to appreciate that the development of renewables requires other energy sources. Oil products, such as fibreglass, resin and plastic are used in wind turbines and ethylene is used in the production of solar panels. Oil is vital to the mining vehicles that are necessary to extract critical minerals upon which the production of renewables depend. And when it comes to wind farms, they would not exist without steel, which brings us back to the importance of coal.

Today, global oil consumption is rising year-on-year and the petroleum products derived from it continue to provide immense benefits to billions.

Without them, cars, buses, trucks and lorries would be stranded, airplanes would be grounded, the construction sector would all but grind to a halt, food production would be devastated, and health products such as medical syringes, hand sanitizers, artificial heart valves, resuscitation masks and stethoscopes would be difficult to produce.

Despite reports of imminent peak oil demand, the world continues to consume more oil year after year. It is a trend we have seen from energies in the past, and we have no doubt this trend will continue in the future, given population expansion in the developing world, urbanization and economic growth.

It means we need investment, investment and more investment. At OPEC, we see global oil industry investment requirements of \$17.4 trillion out to 2050; nearly \$650 billion per year.

Given all this, is it perhaps time to rethink how we view the term 'energy transition'? The past has shown us that our future has never been about replacing sources of energy, it has been about embracing new ones, and continually finding new uses for energy. This has been driven by industrial, and perhaps most importantly, technological development. It has been about adding new energies and technologies, not taking them away.

It is clear we need all energies to deliver the energy security and energy availability we all desire, and all technologies to achieve the emissions reduction we all require. This seems a more prudent approach as we chart appropriate future energy pathways for nations and peoples around the world.



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Creating intelligence in oil and gas

By Hennie Colyn

The oil and gas industry plays a major role in the global economy and has in recent years come under increasing pressure to meet sustainability targets while still maintaining high levels of operations and lowering the end-to-end lifecycle costs of its assets.

It's a tall order which has seen owners, operators and engineers looking at strategies that will realise the above. Fortunately, thanks to advances in connectivity and digital analytics, companies can move towards a posture that allows them to enter the next phase of advanced



Hennie Colyn,
Direct Sales
Executive
Process
Automation
Schneider
Electric

organisational and process management in tandem with sustainability goals.

Traditionally, oil and gas processes were designed and operated independently across a plant's lifecycle. However, it had in recent years become apparent that managing processes holistically can offer dramatic resiliency and efficiency that operations and decision making.

Generally, processes have for example been operating in silos due to technical hurdles that separate various engineering domains. Digitisation can remove these barriers, ensuring that processes work in an integrated and optimised manner.

Drilling down

To realise the above advantages, it's important that we take one step back. The oil and gas industry generally features old infrastructure, managing large data sets of data (both structured and unstructured) which is generated from well production, refining, commodity transport, scheduling, logistics and so forth.

Technology allows organisations to collect, process and distribute this data. It can then be used for simulation of reservoir models and visualisation of results, input on drilling locations well operations and wells and how to optimise refinery settings.

But to reap the above benefits, oil and gas companies must link OT (operational technology) to IT control centres and to other facilities, which may be located across the globe. In these environments the connected systems and IT control centres must be available and resilient to ensure the consistent and continuous flow of data.

And this brings us to the next challenge. Oil and gas facilities are often located in inhospitable and remote settings with limited

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connectivity such as deserts or offshore platforms.

Moreover, these offshore operations produce huge amount of data - an offshore platform, for instance, can produce more than a terabyte of data a day, and may not be linked by cabling to IT facilities on land. This means a terabyte of information would have to be relayed via a remote processing centre or satellite; this is a costly exercise and can result in delays that directly impact vital decision making.

Oil and gas on the edge

The solution is to place datacentres and infrastructure (as a whole) as close as possible to the edge of the network which will yield predictable, future-proofed performance.

Edge computing needs to be always-on and available which then requires backup plans such as power backup (like UPS and generator equipment), especially in situations where power is generated on-site, as is the case for offshore platforms.

As mentioned, IT systems also need to be harmonised. An integrated IT architecture can enable information and control loops between system edge applications and centralised analytics and services.

Also, field devices such as circuit breakers, meters, variable speed drives (VSD) and process instrumentation embedded with sensors are able to gather data and link to central repositories of data where analytics engines can enable higher-level control and more accurate and timely decision-making.

Technology support for critical applications begins by ensuring that the required IT capability is available and resilient. Edge computing and reliable power can be critical to accomplishing these goals.

Improved IT performance enables the optimisation of the data generated by oil and gas facility infrastructure which can then be leveraged to improve production and asset performance.

Lastly, there is no doubt that streamlining oil and gas' processes to allow for visible, reliable and accessible operations does have a number of obstacles to overcome. However, by using vendor-neutral solutions to consolidate the data that comes from equipment, manufacturing by various vendors, half the battle might already be won.

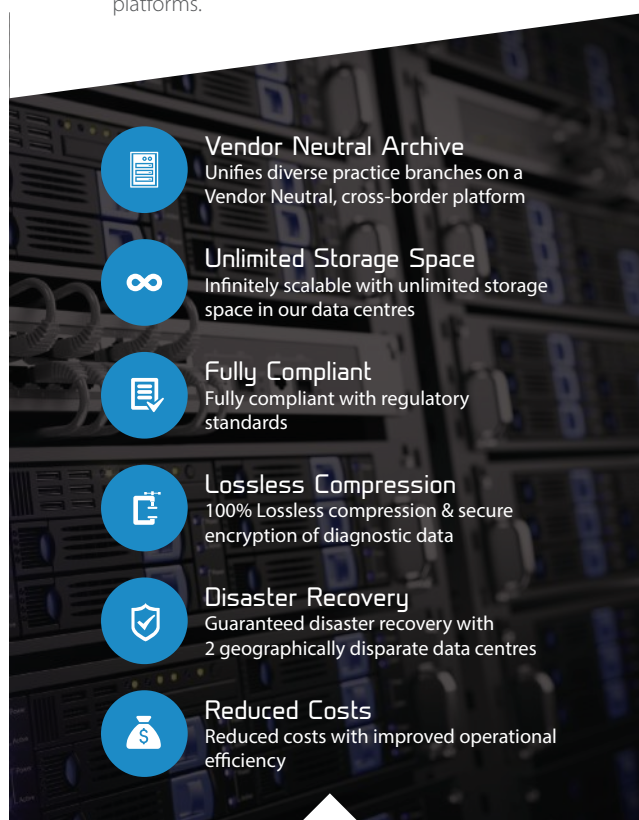
Schneider Electric's EcoStruxure Advanced Automation is a cloud-based IIoT environment that supports organisations' digitisation transformation. It provides access to data across complex, multi-vendor systems in one environment while enabling oil and gas organisations to extract value, build advanced analytics and speed up IIoT deployment across multiple sites.

**Schneider Electric's
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An unexpected future

OIL AND GAS

*The crisis in Ukraine has driven up energy prices, obscuring a dilemma that we're likely to face in the near future: if many countries are increasingly able to generate energy without using oil and natural gas, the price of these commodities will fall. This means that the use of fossil fuels will become more attractive again for countries that cannot afford or do not want to make the transition to renewable energies. Against this backdrop, **Professor Kai A. Konrad** advocates speeding up the search for alternative uses, starting now.*

Around the world, there are huge gas and oil reserves that – if burned – will produce large quantities of greenhouse gases. If global warming is to be kept within manageable limits, the energy industry must therefore wean itself off fossil fuels. In light of the climate targets that have been set, recent studies indicate that 60 percent of oil and gas reserves should not be burned – not to mention coal deposits. But how can this be accomplished?

When it comes to decarbonization, current national and international climate policy relies on suppressing demand for fossil fuels – for example, by means of internationally tradable carbon emission certificates, taxes on CO₂ emissions, an announced ban on oil heating systems, or the phasing out of combustion engines. At the same time, subsidies for climate-neutral forms of energy are intended to kick-start the substitution processes to move away from oil and gas. The problem is that demand for fossil fuels must be suppressed at the global level, and this objective cannot be achieved by non-binding agreements or by trusting all countries to do the right thing. Rather, we would need an agreement with binding commitments between sovereign states that not only defines the total reduction in emissions but also regulates how this is divided up. An agreement like this is not only grueling to negotiate, but also very difficult to enforce and monitor. There have been some constructive approaches – as well as more than



Professor Kai A. Konrad, Director at Max Planck Institute for Tax Law and Public Finance

25 annual UN Climate Change Conferences that have provided a forum for negotiations. However, the progress made so far gives little cause for optimism.

If global demand dries up, the remaining reserves would become largely worthless

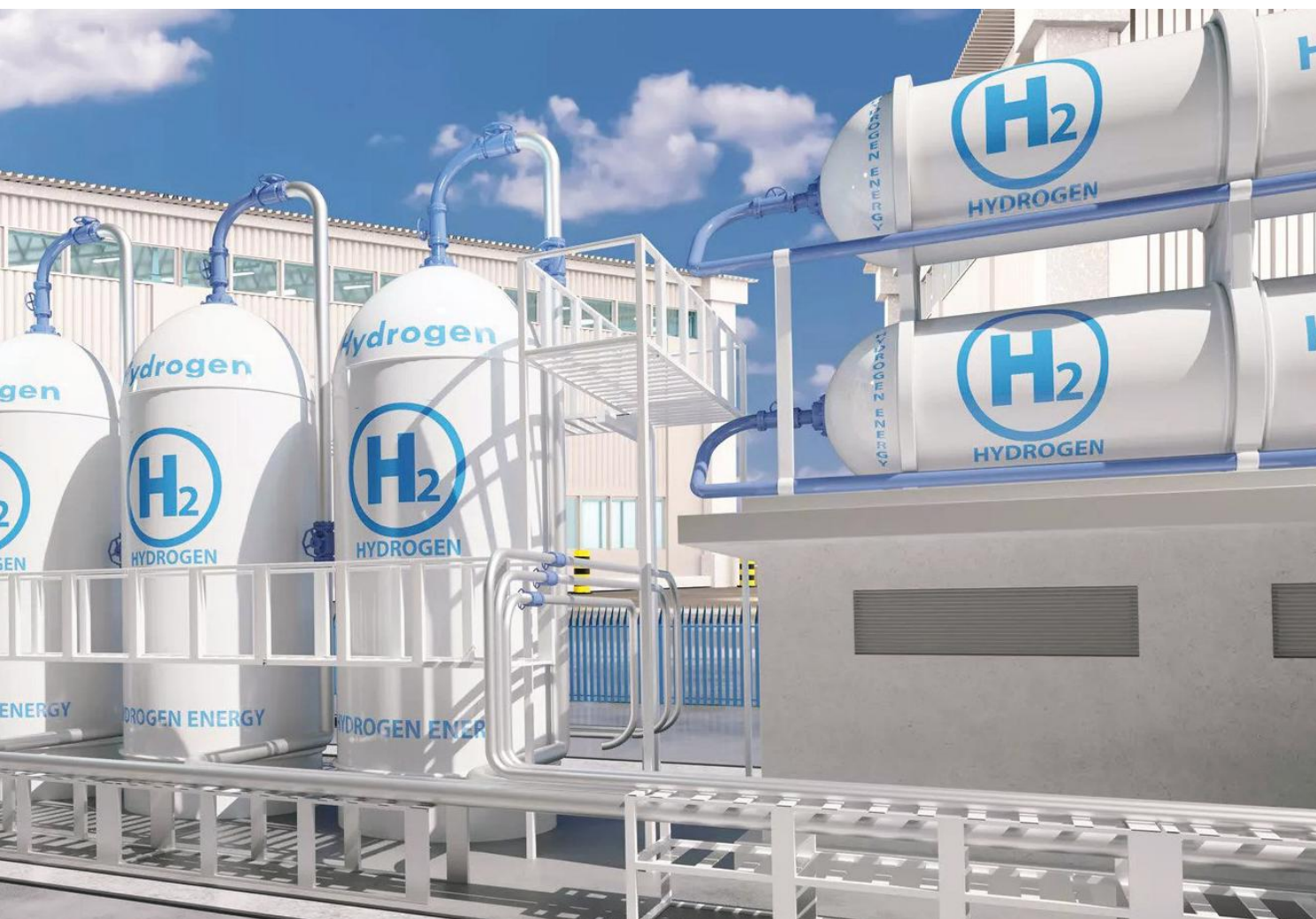
Moreover, even if these collective efforts were to succeed in reducing global demand for oil and gas, a second problem would arise. The world's oil and natural gas reserves will not simply disappear when demand for them collapses. For example, the deposits under the desert sands of Saudi Arabia still hold billions of barrels of fossil fuels – with a value of billions upon billions of euros at today's market prices. But what would it mean for Saudi Arabia if global demand for oil and gas were to dry up within a few decades? The remaining reserves would become largely worthless, and so it's better for Saudi Arabia – and any other country with large oil and gas deposits – to pump its own reserves out of the ground quickly and sell them before they lose their value.

From an economic perspective, these



considerations can be understood via intertemporal equilibrium models for exhaustible natural resources, and are consistent with fundamental scientific insights in the field of resource economics. Market logic dictates that falling demand in the future will lead to a rapidly increasing supply of oil and gas in the present and hence to a fall in prices. As prices fall, the use of oil and gas will increase, and so will CO₂ emissions in countries that are not party to a climate agreement – and elsewhere – until the demand restrictions imposed by such an agreement take effect. The drop in prices will also make it difficult for alternative energy sources to assert themselves in a market flooded with cheap oil and gas. Moreover, there will be a decrease in the natural incentives for innovation in green technologies.

The impact of war and sanctions has meant that gas and oil prices have not followed this pattern in recent weeks. Although it will take a while to compensate for disruptions in the supply coming from Russia, these disruptions do not affect the total quantity of oil and gas available for extraction over time. In this respect,



this price volatility does not contradict the supply decisions outlined here – and these decisions are likely to be taken in the coming years and decades should a binding and effective global climate agreement be adopted.

Scientists, refer to this problem commonly as “rush to burn” or “green paradox.” Though it may sound paradoxical, the increasing severity of political measures seeking to restrict the future use of fossil hydrocarbons in energy production actually counteracts the desired policy impacts of a climate agreement in the present day. These risks have been highlighted in extensive theoretical literature relating to the green paradox. The literature has also provided empirical evidence of market responses in line with the theory predictions. In 2009, the economist Hans-Werner Sinn received the “Dinosaur of the Year” award for delivering this bad news. Since then, word of the compelling logic of this correlation has gotten around – at least among climate economists.

Using oil and gas for climate-neutral or climate-friendly products

A few years ago, in light of these problems,

it was suggested that countries with oil and gas reserves should be paid not to extract them and instead to leave these resources in the ground forever. This approach does not offer a compelling solution however, for it would quickly require unimaginably large annual compensation payments to the resource owning countries. Moreover, international negotiations regarding financing by the international community would be just as challenging as the ongoing climate negotiations aimed at securing measures to address demand.

It would be better to extract oil and gas and put them to good use, albeit not in a way that is harmful to the climate but rather for climate-neutral or climate-friendly products. This would usher in a radical transformation of the market. Oil and gas – as raw materials for products – would be more valuable than they are today, putting an end to the rush to burn. Resource-rich countries would not need to extract their stocks as quickly as possible or sell them at dumping prices. Rather, they could take their time to extract and commercialize the reserves over decades. As a result, oil and gas would already

be in shorter supply today, and prices would be higher. Higher prices would stimulate the energy transition by making alternative, climate-friendly energy concepts more competitive on the market and their innovation economically more attractive. Ideally, oil and gas would become too valuable and expensive to burn – and there would be no need for an international climate agreement, carbon taxes or prohibitions on the use of oil and gas for combustion.

Although some of these economically attractive climate-neutral products made from oil and gas may not be ready for the market for years or decades to come, equilibrium-theory considerations show that they would have an immediate effect on the market. This is because of a special feature of markets for exhaustible natural resources: as oil and gas reserves are known and finite quantities, those who squander their reserves today will have nothing to sell tomorrow. Just as the impending worthlessness of oil and gas spurs on faster extraction, the prospect of a more economically attractive future application leads resource owners to withhold supply today. It makes sense for them

to preserve their stocks and sell them at a later stage. This intuitive conclusion is also backed up by the results of economic-theoretical models.

These considerations would be purely academic wishful thinking in the absence of clear, climate-friendly alternative uses of oil and gas. But what might these climate-neutral applications actually be? Perhaps one of the most interesting ideas is to produce hydrogen from methane, which is the main constituent of natural gas and accounts for approximately 75 to 99 percent of the mixture. This is also the subject of research at some institutes inside the Max Planck Society. So far, insights relate primarily to the production of “grey” or “blue hydrogen,” in which methane is broken down and at least some CO₂ results as a byproduct. More elegant solutions lie in processes such as catalytic pyrolysis, which avoids the release of CO₂ and produces not only hydrogen but also carbon, that can take the form of valuable nanomaterials. Lively publication activity stands as a testament to advances in the production of this “turquoise hydrogen.” Although catalytic decomposition requires an input of energy, it only needs about an eighth of that used to produce the “green hydrogen” that everyone is talking about nowadays.

As a climate-friendly and carbon-neutral energy carrier, hydrogen will be a key energy input to the economy following the energy transition. And the carbon nanomaterials – e.g., carbon nanotubes (CNTs) – produced during pyrolysis might actually be even more important than the hydrogen. Products made from carbon nanomaterials have potential applications in areas like construction, the automotive industry and aerospace engineering, where they could replace traditional materials such as steel, aluminum or concrete. As the production of these materials usually carries a considerable

carbon footprint, replacing them could also lead to major reductions in CO₂ emissions.

Potential future applications sufficient to prevent resources selling

It may be some time before we see the large-scale application of CO₂ emission-free catalytic pyrolysis, but the theoretical analysis of intertemporal relationships in markets for exhaustible natural resources shows that an effective reversal of the rush to burn does not depend on the immediate availability of climate-friendly uses of oil and gas. Rather, the mere promise of these potential future applications is sufficient to prevent the resources from being sold off.

Climate-friendly uses of hydrocarbons needn't be limited to the decomposition of methane. Indeed, such uses already exist for oil today – examples include synthetic fibers, insulating materials for the construction industry, and products made of plastic. In quantitative terms, these applications still play something of a subordinate role, although that may change. For many people, mentioning plastic will immediately raise concerns about the pollution of our oceans by plastic waste, the biological impact of microplastic particles in fish, animals and humans, and the fact that the plastic that doesn't drift into the oceans via rivers all too often ends up in thermal power plants, where it's burned in a manner that's harmful to the climate. However, that is not an argument against using oil to produce useful plastics per se. Rather, the problem is the way that plastics are handled in our current economy and society – after all, it's not a law of nature that products made of plastic have to end up in oceans or have to be burned. For example, if plastic is buried deep in the soil at the end of its useful life – in other words, if it ends up where the raw material for plastic originally comes from, the use of plastics doesn't

have a negative impact on the environment or the climate. Plastics would then become an application that made crude oil valuable, that withdrew it from carbon-intensive use in energy production, and that could bind fossil hydrocarbons in a climate-neutral manner for long periods of time.

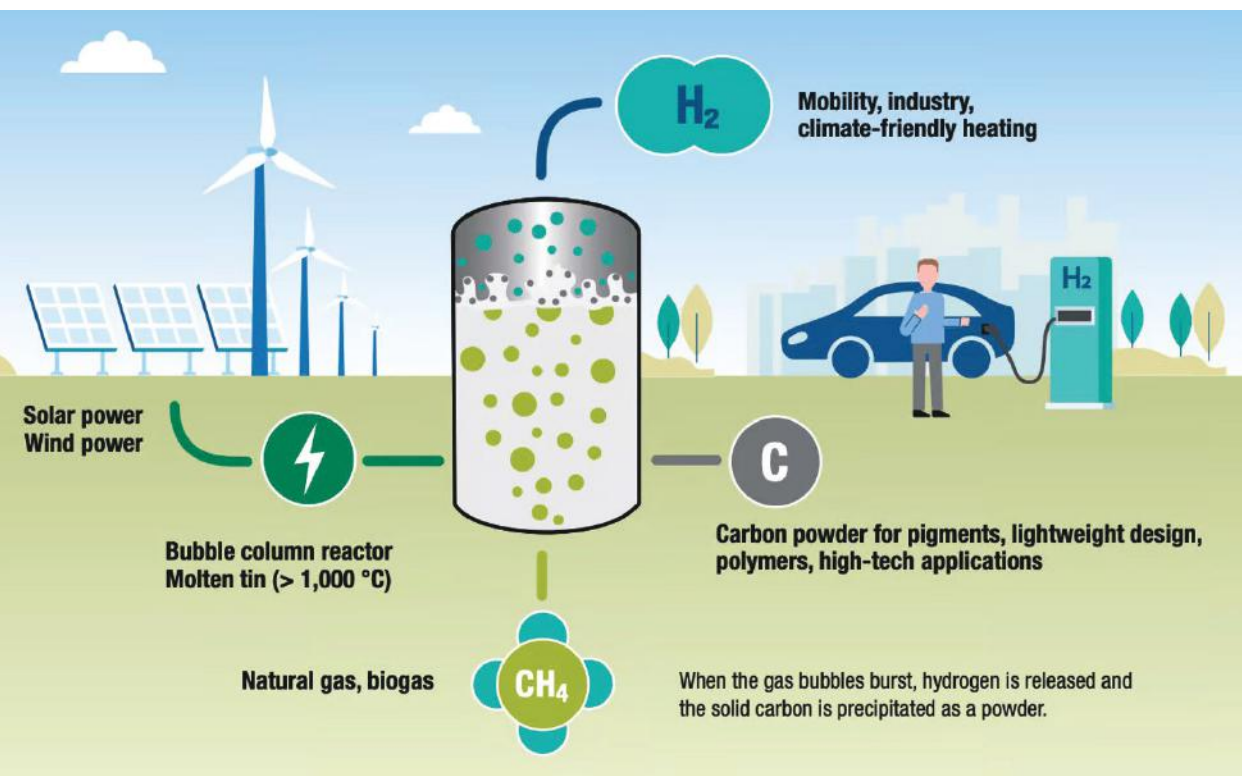
Turquoise hydrogen, carbon fibers, plastics and other oil products would be a good first step toward combating the rush to burn. Perhaps even more important than the oil and gas products named here, however, are the products that don't yet exist but might be invented over the coming years. The right government policies can help set these processes in motion by setting a clear course forward and creating stable, long-term framework conditions.

Substitute products derived from sustainable resources

The key thing when it comes to reversing the rush to burn will be to make natural gas and oil a scarce and valuable resource for climate-neutral uses. With this in mind, it is not very helpful to promote new substitute products derived from sustainable resources like wood or renewable plants. Such substitutes can reduce the demand for climate-neutral applications of fossil fuels. Paradoxically, these products and their promotion are actually more likely to encourage the rush to burn.

Instead, it would be more expedient to adopt policies that encourage innovation in climate-friendly products made from oil and gas. Instead of relying on building materials from the Middle Ages, the construction industry should accelerate the replacement of steel, aluminum and concrete with carbon-based building materials. In the automotive or aviation sectors, carbon-based construction materials produced in a climate-neutral manner could probably replace building materials from carbon-

intensive production processes – potentially even having a positive effect on the limits of technical feasibility. And if this approach succeeds in making gas and oil sufficiently attractive and therefore expensive, it can also pave the way for a successful energy transition that is in accordance with a free market economy and actually relies on market mechanisms rather than on large subsidies.



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How Nigeria's fuel subsidy shock jolted Cameroon's economy



, Francis
Tim Mbom,
correspondent
for The Post,
Cameroon

In Cameroon, the unintended consequences of Nigeria's fuel subsidy withdrawal ripple across the beleaguered Anglophone region, writes Francis Tim Mbo.

On the night of 29 May, 2019, the lone petroleum refinery in Cameroon was struck by a massive explosion that damaged four of its 13 production units.

The incident at the 42,000 barrel-per-day SONARA refinery in Limbe, southwest Cameroon, abruptly stopped petroleum refining in Cameroon. To mitigate the effects of the damage, the government immediately accorded the National Oil Refining Company, SONARA, and other licensed agents, the right to import and market refined petroleum products across the country.

Wary of inflation, the government subsidised the prices of the various imported fuel products. The price of a litre of petrol was thus fixed at FCFA 630 (approx. \$ 1.4)

On 1 February, 2023, with the refinery still not restored almost four years after the explosion, the government increased fuel prices. Petrol and diesel rose by 15.87 percent and 25.2 percent, respectively; a litre of petrol rose from FCFA 630 (approx. \$ 1.2) to FCFA 730 (approx. \$ 1.4).

According to President Biya during his 2022 end-of-year address to the nation, the government increased fuel prices after spending a whopping FCFA 700 billion (\$ 1.158 billion) in 2022 in fuel price subsidies.

The cost of rehabilitating the damage incurred was estimated at FCFA 250 billion (US\$

428 million).

Until now the government has not disclosed when the reconstruction might begin. In 2022, it voted FCFA 200 billion of the national budget to commence the rehabilitation of the refinery. At the end of 2022, Finance minister, three cabinet ministers, amongst them the ministers of Water, Energy and that of Finance, Louis Paul Motaze, raised hopes about the start of the reconstruction when he accompanied two of his cabinet colleagues on a visit to the refinery. No public statement has been made as to why the reconstruction has still not commenced.

The February price hike didn't have the inflationary effects many anticipated. For over 50 years, communities living in the towns bordering Nigeria, have depended on cheap refined petroleum flowing across the border. Mostly smuggled into the country, it has been the main source of livelihood for millions of ordinary Cameroonians.

This is why the 29 May, 2023 inauguration announcement by Nigeria's Bola Ahmed Tinubu to end fuel subsidies in his country was such a blow to so many Cameroonians, illicit beneficiaries of Nigeria's decades-old fuel subsidy programme. This was a drama of the illicit and the invisible playing out at the border outposts of a region in the thick of a

six-year bloody, separatist war. To heighten the surrealism, in the northern town of Garoua thousands of angry motorbike riders took to the streets in protest, aggrieved by a decision taken by another country's government to which they had no part.

The price of Nigerian fuel in Cameroon shot up from FCFA 400 (approx. \$ 0.66) a litre to FCFA 700 (approx. \$ 1.16), slightly lower than the official price. In some areas, such as Idenau in the Southwest, the price has been fluctuating from FCFA 700 (approx. \$ 1.16) to FCFA 800 (approx. \$ 1.32).

Over 50 percent of Cameroon's population of 28 million lives below the poverty line, the World Food Programme estimates. With the cost-of-living crisis and chronically high unemployment, pre-May 29th subsidised Nigerian fuel was an economic lifeline. Many youngsters especially in the rural areas engage in the motorbike taxi business; with low barriers to entry in the sector, and cheap Nigerian fuel, there was some money to be made.

When fuel previously retailed at FCFA 400 or \$ 0.66 a litre, the riders and cab drivers were able to make a daily profit. In border towns such as Limbe, Idenau, Bamenda in the Southwest and Northwest Regions, motorbike taxis were very affordable for the common man.

"The increase in fuel prices has really



Long ques for fuel in Cameroon

affected our motorbike business. When the price of fuel from Nigeria was cheap, with FCFA 2000 (\$ 3.30) we could afford 5 litres and would make a good profit. But today with this same amount, we can only buy about two-and-a-half litres. Our passengers, too, are not willing to pay high," Jean Pascal, a motorbike taxi rider in Limbe says.

Thomas Engenu of the Limbe Motorbike Taxi riders' union: "We are having difficulties because our passengers don't want to accept that the price of Nigerian fuel has increased. We can't make any real profits now."

African Arguments interviewed imported goods traders from Nigeria to Idenau, the port town on the southwestern coast closest to Nigeria. Idenau is an entrepôt serving the hinterland between Limbe and Douala. Motorbikes are the only means of transportation within the township. Since there are no filling stations in the town, it is completely dependent on Nigerian fuel.

"We at Idenau have decided to increase the price for a motorbike drop from FCFA 100 (\$ 0.16) to FCFA 150 (approx. \$ 0.25)," Kiko Ernest, a rider, said.

The increase in the price of Nigerian fuel drastically reduces traders' already limited profit margins, given that they still have to pinch from their own profits to bribe security officials and other bureaucrats who have criminalised the trade.

"We are finding it difficult to make any profit. Car owners and bike riders, our major

customers, are complaining about the increase in the price. Some of our fellow traders have had to fold," says an Idenau trader. "We used to buy a 200-litre container of fuel from Nigeria at FCFA 95,000 (\$ 157.225). With the increase we now buy a 200-litre container for FCFA 200,000 (\$ 331).

The Southwest Regional Delegate in charge of Trade and Commerce, Mr Denis Bepano, said that imported fuel from Nigeria was previously treated as contraband. The higher prices, he said, would work in the government's favour; vehicle owners would now buy from government licensed petrol stations, which in turn pay taxes to the state. He did not remark on the total absence of fuel stations in towns such as Idenau, entirely dependent as they are on contraband fuel.

Prof. Ernest Molua, an Applied Economist and the Deputy Vice Chancellor of the University of Bamenda, Cameroon, was hopeful that the current shock was only temporary; trade union officials in Nigeria were in talks with the new government in a bid to mitigate the situation. He argues that despite Tinubu's Inauguration Day fuel subsidy withdrawal, it would be very difficult for him to eliminate subsidies completely.

After this current price hike, Nigerian fuel is still going to be relatively cheaper than fuel in the neighbouring countries such as Cameroon, Benin, Niger and the others.

As to what the Cameroon government can possibly do to mitigate the dismal situation, especially in the border regions, Professor

Molua said that, "It is now possible for the government to establish filling stations under the Tradex scheme in the border towns where private entrepreneurs have not been able to go."

Dr Nick Ngwanyam, another university don and a social critic, said that the Cameroon government, like many others in Africa, must now fully invest in the process to refine its own crude and wean itself from the hassles of imported petroleum products which can only be sold when subsidized.

"African governments have a lot of problems when it comes to fuel and that problem has to do with technology. Many African countries have crude oil deposits but lack the skills or manpower to refine it. So they sell the crude at very low prices and buy finished petroleum products at higher prices. They end up with the burden of paying subsidies.

"And when it comes to financial management in African countries, it is very hazy. So there is a lot of theft, corruption and mismanagement."

If it has to resolve the current crisis and free Cameroonians from the double May shocks – the destruction of its lone oil refinery on 31 May, 2019 and Tinubu's subsidies removal on 29 May 2023 – the government must quickly resurrect its refinery, plant filling stations in border towns and work towards reducing the high prices of its own fuel products for the benefit of its 28 million inhabitants. After all, Cameroon is an oil producing nation ranked 55th in the world with a total of 200 million barrels of proven oil reserves.

[Courtesy of African Arguments]

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