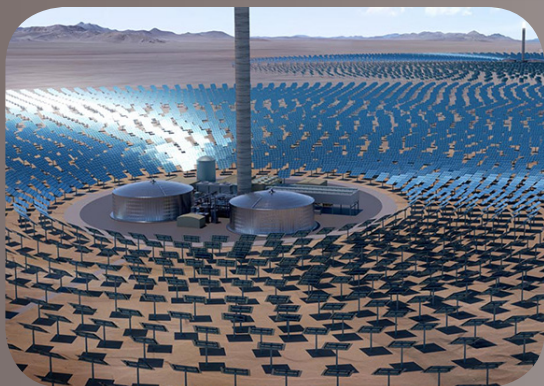
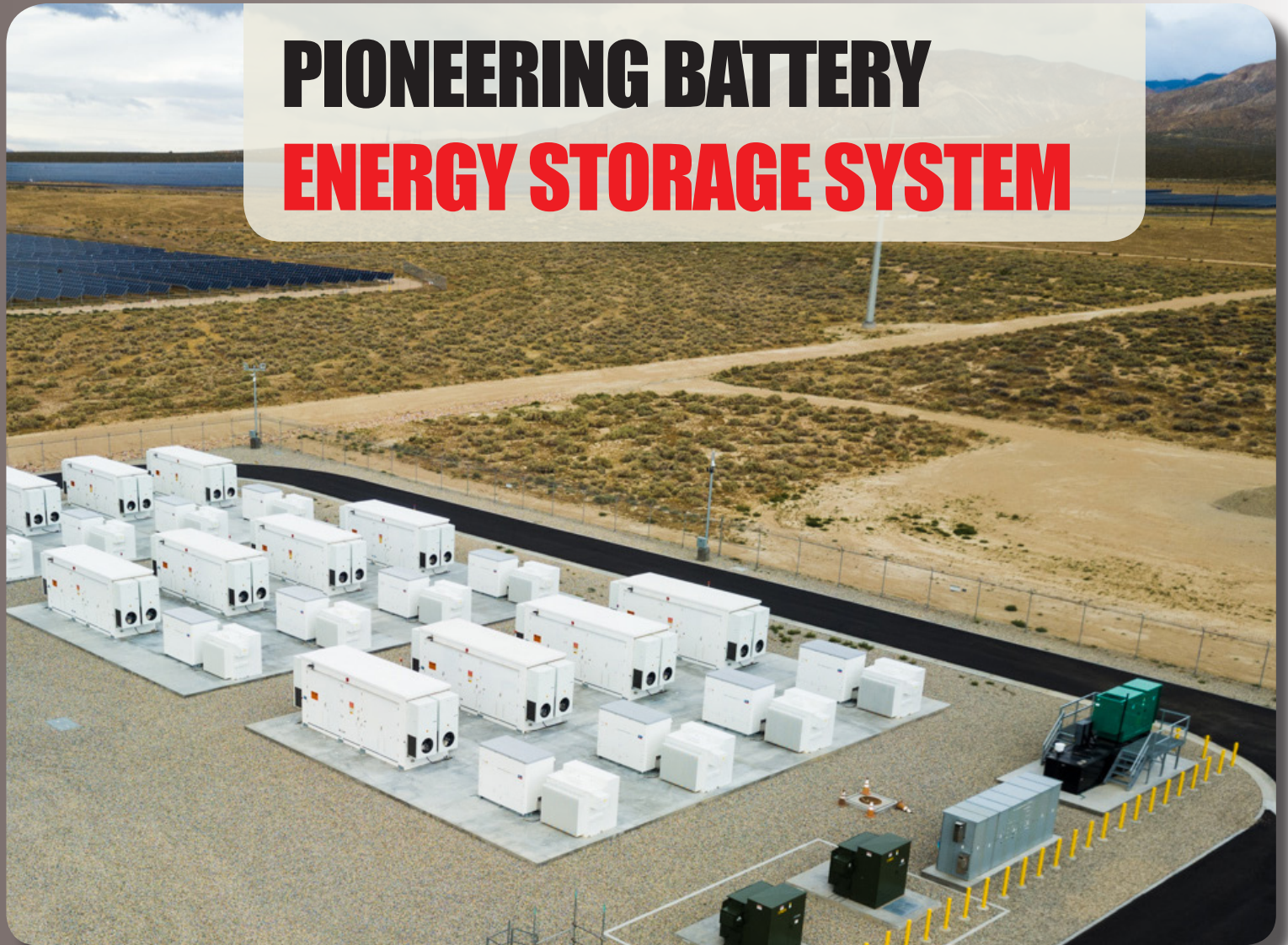


Etango

Namibia's Leading Renewable Energy Technologies
Magazine

JANUARY-FEBRUARY 2022

PIONEERING BATTERY ENERGY STORAGE SYSTEM



NamPower eyes gigantic
50MW-130MW CSP Plant



ECB Finalises Energy
Storage Regulations



First public charging system for
electric vehicles commissioned



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WE are proud to finally announce that your favourite Renewable Energy magazine is now available online. www.etangonam.com

Distributing printed copies of **Etango** has presented us with a lot of logistical challenges as we live in a vast country. Since we are a FREE publication, it has not been feasible for us to reach all corners of the country, the Southern Africa region and beyond. In addition, reaching the bulk of our readers through email has not been convenient and effective.

Many of our readers, in particular those beyond borders, have been requesting us to go online in order for them to remain up to date with developments in Namibia's RE sector. Finally, with kind assistance of Green People's Energy (GPE) Namibia, a project of the German Cooperation and the Ministry of Mines and Energy, we have been able to set up a comprehensive website for **Etango**, equipped with an archive of most back issues, a search engine, as well as our social media channels.

The website is still being improved on day by day and we will count on your input to make it

easier for you to access the publication online.

GPE Namibia, supports the development of decentralised Renewable Energy systems in rural areas of the country with the involvement of citizens, municipal structures, cooperatives and companies. The aim of the project is to improve the conditions for the application of Renewable Energies in rural areas. The project believes that to achieve its goals, it is vital to raise awareness in the rural areas of Namibia, a role that **Etango** well suited to play.

Etango will continue as a bi-monthly publication, with our publication months being January-February, March-April, May-June, July-Aug, September-October and November-December. However, we will have regular news updates on our website and online platforms.

The publication will continue to explore pressing issues of energy generation capacity in Namibia and the Southern African region, with special focus on Renewable Energy as the preferred energy source.

We will also be broadening our horizons to cover a wider scope of climate adaptation and mitigation issues, of which RE and energy efficiency are part of. Namibia is on the

frontline in facing the impact of climate change and measures to be taken to adapt our lives to these changes so as to reduce the negative impacts.

These need to be in the public domain more as it is imperative for the greater public to be aware of the climate change implications, the reasons and measures that should be taken to mitigate the adverse effects of our changing environment.

In this first edition of **Etango** for 2022, we bring you more exciting developments in the local and regional RE sector. We bring you news on Namibia's first ever utility scale Battery Energy Storage System (BESS), soon to be constructed at the Omburu substation. We update you on the new Energy Storage Regulations which will soon come into effect in the country, and also dissect plans by NamPower set up a gigantic Concentrated Solar Power (CSP) plant.

Happy Reading!

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Cover picture:

MODEL PROJECT ... Namibia will soon begin to construct its first ever utility scale Battery Energy Storage System (BESS) at a cost of N\$350 million. The 58 MW BESS plant will be situated at the Omburu substation, 12 km south-east of Omaruru.

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MEGA PROJECT ... NamPower Managing Director Kahenge Haulofu, Director General of the National Planning Commission Obeth Kandjoze and KfW Country Director Barbara Pirich putting their signatures to the grant agreement. Photo: KfW

Namibia's first ever utility scale Battery Energy Storage System

NAMIBIA will soon begin to construct its first ever utility scale Battery Energy Storage System (BESS), thanks to a 20 million Euro (about N\$350 million) grant availed by Germany.

A BESS is a device that enables generated electricity to be stored and dispatched when required. The 58 MW BESS plant will be situated at the Omburu substation, located 12 km south-east of Omaruru, in Erongo region. The energy storage system will be the first of its kind in the Southern African region at large and will be implemented through the German KfW Development Bank.

A bilateral co-operation agreement between Namibia and Germany was signed on December 7, 2021 by NamPower Managing Director Kahenge Simson Haulofu, National Planning Commission Director General Obeth Kandjoze and KfW's Country Director for Namibia Barbara Pirich.

A company to construct the plant will be identified via a public bidding process and construction is expected to commence already by mid-2022. Commissioning of the BESS plant is ambitiously earmarked for March 2023.

As part of the agreement, NamPower has committed to contribute approximately 20% of the total

project costs, to be used for the construction of the transmission interconnection as well as for the local taxes and duties (which are not included in the grant funds). Once commissioned, NamPower will be able to utilise a combination of various applications which were identified for the Omburu BESS, namely peak shifting, energy arbitrage, provision of emergency energy, ramp-rate control and reactive power control.

It is envisaged that the Omburu BESS will contribute to the expansion of renewable energy in the region by storing locally generated renewable power as well as electricity imported from the Southern African Power Pool (SAPP), which can charge the battery at cheaper, off-peak times, and then the energy can be discharged during peak times.

This would also offset the use of energy from the 120 MW Van Eck Power Station, Namibia's only coal-fired power plant, which is now ageing, having been built in the early 1970s.

The BESS will also be used to load-follow local renewable energy generation, helping to stabilise the grid as it accepts the variable output of solar or wind plants.

Additionally, the system will enable Namibia to increase its participation in energy trading with the

11 other member states of the SAPP, helping to lower overall emissions across the pool.

“As one of the first utility-scale storage projects in Southern Africa, the Namibia battery storage project can be described as a flagship project. As the project is the first of its kind in Southern Africa, it fulfils a pioneering function – it is expected that subsequent projects in the same field will benefit substantially from the experience gained from his project,” Pirich said at a signing ceremony.

NamPower MD Haulofu said Namibia's National Energy Policy has a target of sourcing 80% of energy from local sources by 2023, while the Renewable Energy (RE) Policy targets to have 70% of energy generated from renewables by 2030. The BESS will contribute to meeting both of these targets, as well as helping lower overall cost of energy that consumers pay, he said.

The BESS project also fits perfectly in line with Namibia's national climate change targets specified in the Harambee Prosperity Plan, the National Integrated Resource Plan (NIRP) and the Nationally Determined Contributions (NDCs), which explicitly mention battery storage solutions as a means to improve flexibility and stability of the transmission grid as a condition for continued RE expansion. The improvement of grid conditions thus allows the country to invite new investors for RE projects in the future. Thus, the implementation of the BESS project will have a

positive impact on the investment climate for Independent Power Producers (IPPs) as well as green hydrogen and contribute to creating new income and employment opportunities.

NamPower plans to extend its own renewable electricity generation by approximately 100 MW and tender a further 70 MW of wind and solar PV projects to Independent Power Producers (IPPs) by 2025. In addition, the liberalisation of the country's electricity market is already attracting private sector investments in solar and wind power plants, making use of Namibia's extraordinarily good solar and wind resources.

It is anticipated that the liberalisation of the market could add 300 MW PV and 200 MW wind plants to the Namibian grid. These factors all contribute to a climate-friendly development of

the Namibian economy and make Namibia less vulnerable with regard to future constraints of the main electricity suppliers within the SAPP.

The rapid expansion of renewable energy is highly appreciated, but it also poses new challenges and problems for the Namibian electricity sector. The fluctuating energy generation from renewable energy sources - sun and wind which are not consistently available - is a permanent challenge for grid stability and control. Furthermore, excessive fluctuations can cause damage to the grid and, in the worst case scenario, lead to grid failure.

For the sustainable and smooth integration of RE into the electricity grid, complimentary and efficient solutions such as regional electricity market integration, improved access to baseload capable energy sources, and local storage facilities must be developed and implemented.



MODEL ... A simulation of the BESS project



GAME CHANGER? ... Energy storage presents a great opportunity for power to be captured when it is available and released on demand, and it is believed that it will unlock the limitation of using intermittent renewable energy.

ECB Finalises Energy Storage Regulations

The Electricity Control Board (ECB) has finalised the development of new Energy Storage Regulations for Namibia.

The ECB is now in the process of following the governance structures regarding the final approval, which will pave the way for implementation.

The new regulations will be submitted to the ECB Board for approval during the first week of March 2022, thereafter a formal submission will be made to the Minister of Mines and Energy for endorsement.



Energy Storage Technologies convert energy into a form that can be stored and subsequently converted into useful energy as and when required. The energy can be stored in any form, including as electrical energy, thermal energy and gravitational potential energy.

Implementation of the Energy Storage Regulations is expected to start in April 2022.

The new regulations were developed following wide consultations with energy stakeholders. The development of the energy storage regulations was led by a consortium of consultants made up of Emcon Consulting Group, Africa Power Ventures and Suntrace.

The intermittent nature of renewable energy resources prevents the larger uptake of renewables in Namibia. Energy Storage thus presents a great opportunity for power to be captured when it is available and released on demand. It is widely believed that cost-effective Energy Storage can potentially unlock the limitation of using intermittent renewable generation which will create additional avenues for the integration of intermittent generation sources into the generation mix.

Energy Storage Technologies convert energy into a form that can be stored and subsequently converted into useful energy as and when required. The energy can be stored in any form, including as electrical energy, thermal energy and gravitational potential energy.

Namibia has experienced a renewable energy revolution over the past few years, with more developments in the sector envisaged to follow soon. Energy Storage is thus expected to play a significant role in the successful integration of renewable energy into the national grid in the foreseeable future.

It is believed that Energy Storage costs are expected to decline over the next few years therefore making the technology more viable.

According to the International Renewable Energy Agency, battery storage systems are emerging as one of the key solutions to effectively integrating high shares of solar and wind power within global energy systems. In addition to increasing installed power generation capacity, developing systems that offer a consistent and reliable power supply is a top priority for African nations. Accordingly, Energy Storage has a significant role to play in supporting stable electricity grids by augmenting generation capacity, facilitating a continent-wide energy transition and spurring growth within the renewable sector and beyond.

Energy Storage developments offer a vital solution for the security of renewable energy supply. However, one of the key challenges regarding renewable power generation concerns reliability of supply, in which natural disruptions, such as drought or lack of wind, are known to cause supply disruptions. The utilisation

of Energy Storage technologies, therefore, presents an opportunity for capturing and storing energy that can be released to meet demand on an as-needed basis. Energy Storage provides a continuous flow of clean energy during periods of high demand or when renewable energy is unavailable.

Additionally, Energy Storage offers enhanced power accessibility for the majority of Africa's population that lives in remote locations with limited access to national grids. The development of these storage technologies can enable the storage of vast amounts of electricity both on- and off-grid, offering improved methods for storing and dispatching power.

The Economic Association of Namibia (EAN), together with Renewable Energy Industry Association of Namibia (REIAoN), recently launched a study on the utilisation of Energy Storage Technologies in Namibia.

EAN and REIAoN believe that Namibia must prepare for the arrival of cost-competitive storage technology, including the legal, regulatory and statutory provision. Energy Storage is expected to affect the business models of all electricity utilities. While Namibia's storage market is small, solutions that reduce the cost of energy hold further potentials.

A variety of energy storage systems exist. Typical applications include electrical storage in consumer products, thermal storage in solar water heaters and building materials, electrical storage used in solar home systems and uninterruptable power supplies, large-scale battery storage systems supporting transmission and distribution grids, pumped storage facilities used to generate electricity, storage uses in large thermal power stations and numerous others.

The main energy storage types include:

1. mechanical storage, such as pumped hydro-electric storage, compressed air storage, flywheels, gravitational energy storage systems and others;
2. electro-chemical storage, such as found in batteries, for example lead-acid, lithium-ion, sodium-sulphur and flow battery energy storage systems;
3. electrical storage, such as capacitors and superconducting magnets;
4. thermal energy storage, such as heat storage systems; as well as;
5. thermo-chemical and chemical energy storage, including fuels such as biomass, coal, hydrogen, liquid petroleum and its gases and many others.

SCHEDULE OF THE APPROVED ELECTRICITY TARIFFS FOR THE FINANCIAL YEAR 2021/2022



The Electricity Control Board (ECB) has recently approved NamPower's request for the NamPower Distribution Tariffs to increase with 1.9% for the financial year 2021/2022. The ECB Levy and NEF levy will remain at 2.12 cents per kWh and 1.6 cents per kWh, respectively. Kindly note that the Net Metering Avoided Cost has increased to N\$1.1200 per kWh.

In accordance with section 27, subsection (2) of the Electricity Act 4 of 2007, 'The Board may from time to time, upon application by a licensee, revise the schedule of approved tariffs of the licensee concerned and may require the licensee to submit such information as the Board may require for that purpose'.

SCHEDULE OF APPROVED DISTRIBUTION TARIFFS FOR THE FINANCIAL YEAR 2021/22 (N\$) Excluding VAT

SMALL POWER USERS	TARIFF 2020/21	TARIFF 2021/22	LARGE POWER USERS	TARIFF 2020/21	TARIFF 2021/22
NET METERING avoided cost - c/kWh	107.57	112.00	NET METERING avoided cost - c/kWh	107.57	112.00

PREPAID RATES

DOMESTIC			COMMERCIAL		
Charge per unit - c/kWh	221.00	229.00	Charge per unit - c/kWh	221.00	229.00
ECB Levy	2.120	2.120	ECB Levy	2.120	2.120
NEF Levy	1.600	1.600	NEF Levy	1.600	1.600

VILLAGE TARIFFS

DOMESTIC			BUSINESS		
Charge per unit - c/kWh	199.00	204.00	Charge per unit - c/kWh	199.00	204.00
Capacity Charge - N\$/Amp/month	5.60	5.60	Capacity Charge - N\$/Amp/month	5.60	5.60
ECB Levy	2.120	2.120	ECB Levy	2.120	2.120
NEF Levy	1.600	1.600	NEF Levy	1.600	1.600

POSTPAID - RE-DISTRIBUTORS, COMMERCIAL, WATER PUMPING, MINING, FARMERS, FARMS ADDITIONAL, AGRICULTURE, PLOTS & MISCELLANEOUS

SMALL POWER USERS			LARGE POWER USERS		
Charge per unit - c/kWh	219.00	219.00	Charge per unit - c/kWh	122.00	129.00
Service Charge - N\$/month	541.00	541.00	Maximum Demand - N\$/kW per month	267.00	267.00
Capacity Charge - N\$5.60/Amp/month			Maximum Demand - N\$/kVA per month	244.00	244.00
11.5 kVA - 1 x 50 Amps	280.00	280.00	Capacity Charge - N\$5.60/Amp/month	5.60	5.60
16 kVA - 1 x 70 Amps	392.00	392.00	Rental - N\$/month	Customer specific	Customer specific
23 kVA - 2 x 50 Amps	560.00	560.00	Tariff Rebate (N\$/kW or N\$/kVA)	2.00	2.00
32 kVA - 2 x 70 Amps	784.00	784.00	Service Charge - N\$/month	1351.00	1351.00
25 kVA - 3 x 40 Amps	672.00	672.00			
50 kVA - 3 x 80 Amps	1344.00	1344.00	ECB Levy - c/kWh	2.120	2.120
75 kVA - 3 x 120 Amps	2016.00	2016.00	NEF Levy - c/kWh	1.600	1.600
125 kVA - 1 x 541 Amps	3029.60	3029.60			
Rental - N\$/month	Customer specific	Customer specific			
ECB Levy - c/kWh	2.120	2.120			
NEF Levy - c/kWh	1.600	1.600			

POSTPAID - EXPORT

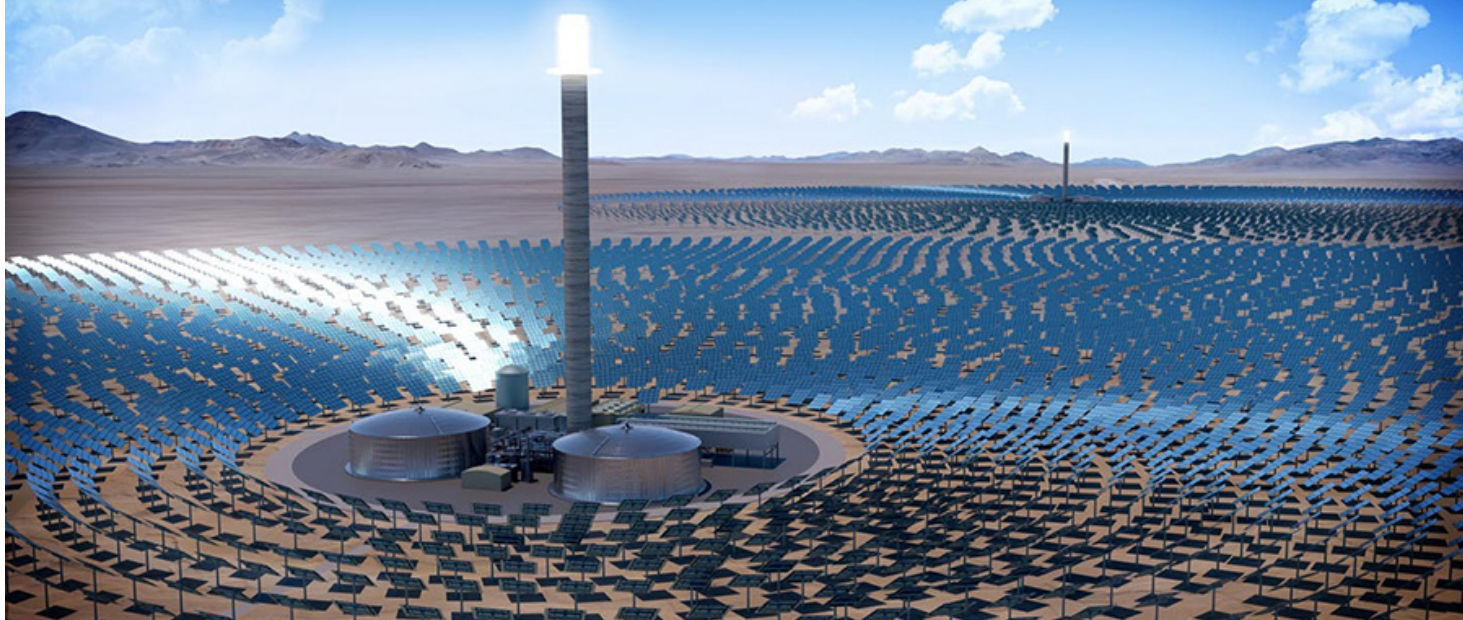
SMALL POWER USERS			LARGE POWER USERS		
Charge per unit - c/kWh	228.00	-	Charge per unit - c/kWh	128.00	134.00
Service Charge - N\$/month	541.00	-	Maximum Demand - N\$/kVA per month	248.00	248.00
Capacity Charge - N\$5.60/Amp/month			Capacity Charge - N\$5.60/Amp/month	5.60	5.60
11.5 kVA - 1 x 50 Amps	280.00	-	Rental - N\$/month	Customer specific	Customer specific
16 kVA - 1 x 70 Amps	392.00	-	Tariff Rebate (N\$/kW or N\$/kVA)	2.00	2.00
23 kVA - 2 x 50 Amps	560.00	-	Service Charge - N\$/month	1351.00	1351.00
32 kVA - 2 x 70 Amps	784.00	-			
25 kVA - 3 x 40 Amps	672.00	-	ECB Levy - c/kWh	2.120	2.120
50 kVA - 3 x 80 Amps	1344.00	-	NEF Levy - c/kWh	1.600	1.600
75 kVA - 3 x 120 Amps	2016.00	-			
Rental - N\$/month	Customer specific	-			
ECB Levy - c/kWh	2.120	-			
NEF Levy - c/kWh	1.600	-			

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BOLD STEP ... The CSP plant planned by NamPower will target peak times of need to provide the best complementarity to daytime solar PV, and during hydropower's dry season, which is from April to October.

NamPower Prepares to go on Tender for 50MW-130MW CSP Plant

NamPower will soon go on tender to seek a suitable partner for the development of a gigantic Concentrated Solar Power (CSP) plant with a capacity of up to 130 megawatts.

The project, which will require an investment of between US\$600 million (about N\$9, 3 billion) and US\$1 billion (about N\$15, 5 billion) is earmarked to be commissioned by 2025, and will have storage.

Head of NamPower generation projects, Grant Muller, revealed the plan during a recent SolarPACES online conference.

He said the project was planned to be developed under a build, own, operate, transfer (BOOT) model under Namibia's new Public Private Partnership (PPP) Act.

The selected developer will develop the plant and then sign a 25-year offtake agreement.

Namibia enjoys one of the best solar resource in the world with Direct Normal Irradiance (DNI) ranging up to 3214 kWh per square meter annually (3,214 kWh/m²a) and has wide open spaces, ideal for the development of CSP plants.

Muller said Namibia has conducted a lot of work preparing for CSP since 2015 and that NamPower was now readying a site that's in an area chosen for its outstanding solar resource west of Windhoek. The utility is in the process of finalising the purchase of the site as part of a plan to reduce uncertainty for any potential CSP developer in Namibia.

NamPower believes that providing a purchased site to the developer will help reduce risk and expedite the construction of the CSP plant.

Namibia still faces power deficit and imports, mostly

from South Africa's Eskom, to meet the deficit. The country now aims to lessen dependence on imports and coal and increase resilience in its renewable grid.

The CSP plant planned by NamPower will target peak times of need to provide the best complementarity to daytime solar PV, and during hydropower's dry season, which is from April to October.

NamPower believes that the de-risking of the project by acquiring the land on which the plant will be built, coupled with solar resource assessments and environmental permitting, will considerably reduce development costs and subsequently the energy price paid by the consumer.

The NamPower board is understood to have bought onto the idea of approving a CSP plant, especially after being convinced that the cost of CSP technology was coming down.

In 2015-2016, the Concentrating Solar Power Technology Transfer for Electricity Generation in Namibia Project (CSP TT NAM), helped to develop the necessary technological framework and conditions for the successful transfer and deployment of CSP technology for on-grid power generation in Namibia.

The CSP TT NAM project was implemented by the Ministry of Mines and Energy, supported by the United Nations Development Programme (UNDP) and the Global Environment Facility (GEF).

Namibia believes that the development of clean energy generation technologies, such as CSP, would go a long way in reducing Namibia's carbon footprint. CSP will also go a long way in boosting efforts to achieve energy goals set out in President Hage Geingob's Harambee Prosperity Plans (HPPs).



REALITY CHECK ... Energy expert Detlof von Oertzen, with KAS Resident Representative Natalie Russmann, during the launch of a paper entitled “Issues, Challenges and Opportunities to Develop Green Hydrogen in Namibia”.

Energy Expert Cautions Over Green Hydrogen Expectations

AS the hype around Namibia’s green hydrogen potential continues to grow, a local energy expert has warned against raising expectations that cannot be met.

Detlof von Oertzen recently released a paper entitled “*Issues, Challenges and Opportunities to Develop Green Hydrogen in Namibia*”. The paper, facilitated by the Konrad Adenauer Stiftung (KAS), gives a critical view of Namibia’s green hydrogen potential and the challenges the country is likely to face in developing this “fuel of the future”.

Von Oertzen cautions that while the potential for a green hydrogen economy in Namibia is immense, the irrational exuberance over the resource may be misplaced.

“Despite recent exuberant pronouncements, celebrations that green hydrogen is set to transform Namibia’s economy remain premature. Realism is needed to change Namibia’s notoriously slow delivery on promises that are essential for expansionary programmes. Unshackling bureaucratic hurdles, fast-tracking the delivery of suitable land for development, creating access to water and many others are examples of issues that must be urgently addressed,” he states.

He emphasises the need to balance the agendas of international players with Namibia’s own local imperatives.

Namibia recently appointed a consortium called HYPHEN to implement the country’s gigantic green hydrogen project. The green hydrogen

economy is being unlocked as part of the broader Southern Corridor Development Initiative (SCDI), which is earmarked to attract more than US\$12 billion in foreign direct investment.

“Outsourcing our development pathway to commercial developers is unlikely to result in optimal local outcomes. There is need to have fact-based and systematic planning, as well as active integration with other national development priorities,” von Oertzen says.

“Today, Namibia produces what it does not need, while procuring what it requires. Producing green hydrogen, in the absence of a local market, could be seen as doing more of the same,” he adds.

In its endeavours to create climate-neutral growth and development opportunities, Namibia has been advised to avoid making available its resources merely to enable industrialised nations to meet their clean energy needs.

“Local green hydrogen ventures must allow Namibia to meet its own development aspirations too. Engaging others to drive local development, rather than setting our own agenda, direction and pace of development is a cardinal risk,” von Oertzen cautions.

Outsourcing the planning, development, and implementation of Namibia’s pathway to the future, for example to entities from industrial nations, cannot possibly be a credible option for a country that has just recently gained its independence from foreign domination. At the same time, for a developing nation, fast-tracking the roll-out of infrastructure to produce hydrogen holds many risks, he states.

“Committing to infrastructure developments that are several orders of magnitude larger than any similar developments made in the past is a strategy that bets the country’s future on one specific development trajectory, with little or no leverage to guide their direction and viability. Giga-scale power production and associated transmission capacities do not exist in Namibia,” von Oertzen says in his paper.

Concern has also been raised in the paper over the fact that none of the legal and regulatory provisions needed to facilitate Namibia becoming “a green hydrogen hub” are in place yet, while suitable processing facilities for green hydrogen, as well as new storage, transport, and export facilities will have to be built as none of the existing facilities adequate to enable Namibia to

enter the arena where global energy players are active.

Von Oertzen recommends the development of a National Hydrogen Policy, informed by southern African and international trends, focusing on the creation of transparent institutional, governance and regulatory provisions to guide the further development of green hydrogen initiatives and their synchronisation with Namibia’s other development needs.

He further proposes that a National Hydrogen Strategy and Action Plan be developed in tandem with the policy, to map out realistic goals and establish objectives to guide the country’s actions relating to green hydrogen developments, to inform and align the expectations of key public and private stakeholders, including a strategic assessment to identify and rank approaches to be taken to maximally benefit from international, regional and local hydrogen production, processing, storage, transport and market opportunities.

He says it is necessary to undertake a cost-benefit assessment on the main approaches and actions as identified in the above-mentioned strategy, to quantify the implications of Namibia’s entry into green hydrogen initiatives, including a macro- and micro-economic assessment of the overall risks, gains and losses towards the establishment of local green hydrogen capacities.

In addition, the expert proposes pragmatic regulations and standards to be developed to guide hydrogen-related initiatives, while ensuring that such efforts are maximally integrated with provisions governing related sectors in Namibia’s economy, and informed by best international practice.

There’s need to do an assessment of local supply chain requirements to enhance their ability to support and benefit from emerging hydrogen-related activities, specifically those relating to the supply of goods and services for green hydrogen production and processing of its derivatives, as well as those related to transport, storage and the export of such products.

Local research, development and tertiary education efforts need to be strengthened to improve Namibia’s overall education and training outcomes by creating and deepening linkages between the country’s productive sectors, including those emerging because of hydrogen-related developments.

GLZ's Green People's Energy Conducts Training of TVET Trainers on Solar Photovoltaic System Design, Installation and Maintenance

Green People's Energy (GPE) Namibia, a project of the German Cooperation and the Ministry of Mines and Energy, recently conducted a training session for Technical and Vocational Education and Training (TVET) instructors, covering aspects of solar photovoltaic system design, installation and maintenance.

Twelve trainers from public and private Vocational Training Centres (VTCs) attended the training which took place at Eenhana VTC over a two-week period at the end of January and early February.

The training was aimed at equipping the participants with the relevant skills and knowledge and improve their competencies in photovoltaic design, installation and maintenance, including solar water pumping and solar water heaters.

The train-the-trainer programme was conducted as part of the GPE's main focal areas of Training and Education, aimed at developing capacities in RE. Further training sessions for 60 professionals in the Namibian RE sector will be conducted.

The theoretical and practical training was conducted by two renewable energy experts, Dr Zivayi Chiguvare and Mr Harald Olk from Germany.

The VTC trainers were introduced to different energy systems and their components, solar radiation and efficiencies with solar PV cells, difference between off-grid and on grid solar systems, general design of PV systems, operation and maintenance and fault detection of assembled systems, battery storage systems and working principles and functions of PV water pumping systems, among others.

Dr Chiguvare and Mr Olk said the training was aimed at building capacities in Namibia in the installation and maintenance of solar PV systems.

"The aim is to capacitate the trainers to be able to give relevant training to the VTC trainees, as well as installers in the private sector," said Dr Chiguvare.

The two experts said that there was huge potential for employment creation in the solar sector and that it was



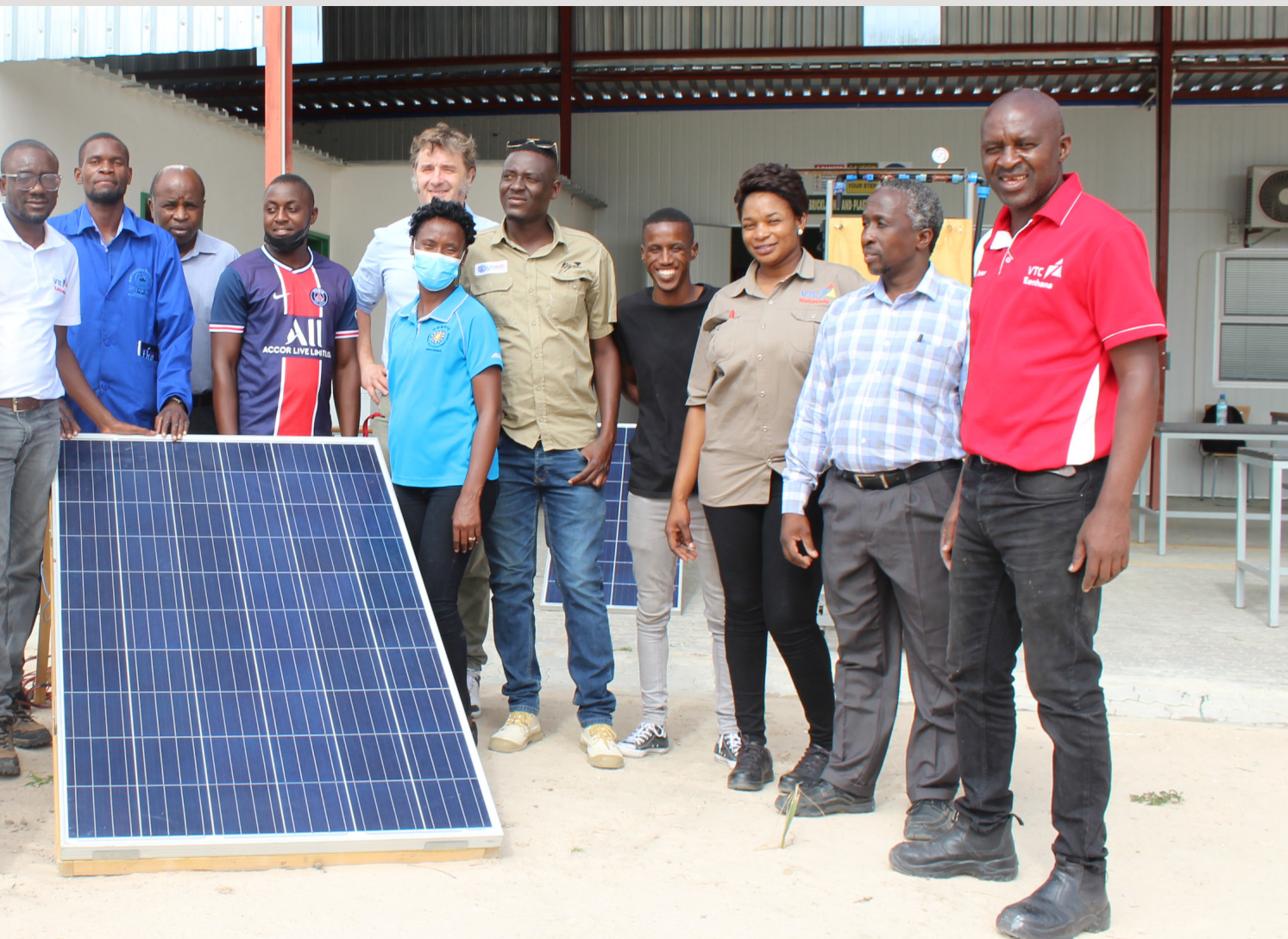
of vital necessity to create the much-needed skills in the sector.

The Eenhana VTC, which offers training in solar technologies, has been identified as one the vocational centres where a "centre of excellence" in solar photovoltaics can be established. The institution already offers solar training.

During the practical training session, the two experts took the VTC trainers through eight stages of learning. The areas covered were;

- Measurement of irradiation at different angles of inclination
- PV module cell voltage, module voltage and standard test conditions
- Battering capacity test and specifications
- Charge controller and inverter specifications
- Connection of a DC solar fridge
- Solar water pumping systems
- Solar water heaters (SWHs)
- Solar thermal - solar cooker.

Some of the VTC trainers who attended the GPE training told **Etango** that they had been equipped with new, vital



DEVELOPING RE CAPACITIES ... *The trainers from public and private Vocational Training Centres who attended the GPE solar training at Eenhana VTC with their instructors.*

knowledge on solar technologies which they are eager to pass on to their trainees.

Elias Siteketa an electrical trainer at the Rundu VC and Haingura Raphael Netho a trainer in plumbing at the same centre, both described the training as of “national benefit” as it will help to increase electricity access by rural communities.

“The knowledge we have gained here will be passed on to our trainees and other installers of solar systems. We have learned that the correct installation of solar systems is key in order to derive maximum benefit from the installed unit,” said Siteketa.

However, both trainers emphasised the need to sensitize regional councillors on the advantages of solar technologies in order to help speed up the uptake of these systems in remote areas of the country.

Hilma Panduleni Shikongo, a trainer at the Nakayale VTC commended the organisers of the training for combining the theoretical training with practicals.

“We need to have more of such training in Namibia in order to equip more solar installers in the country,” she

said.

Beata Martin, a trainer from COSDEF Ondangwa, said it was the first time that she had been exposed to the different types of solar water heaters and solar water pumps.

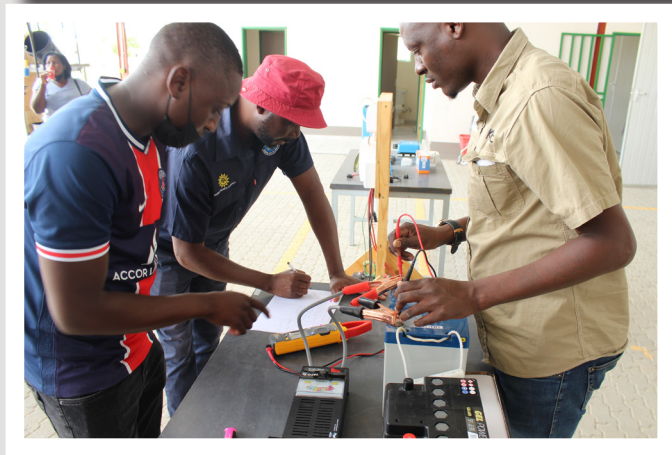
“We will build on the knowledge we have acquired in these few days. There is a need for more practical training. It is important to learn how to properly install and maintain these systems,” said Martin.

Faustinus Faustinus, another trainer from Nakayale VTC, said as Namibia was moving towards the implementation of more renewable energy technologies, there was need to have more skilled people with the knowledge of how to install the right systems and how to maintain them.

He said at the moment most people in rural areas were not getting the right systems for their intended purposes as they were wrongly advised by installers.

“A lot of consumers end up with the wrong systems and this results in frustration. In addition most installers do not include maintenance costs and this has resulted in many systems failing in the rural areas,” said Faustinus. **(See more photos on next page)**

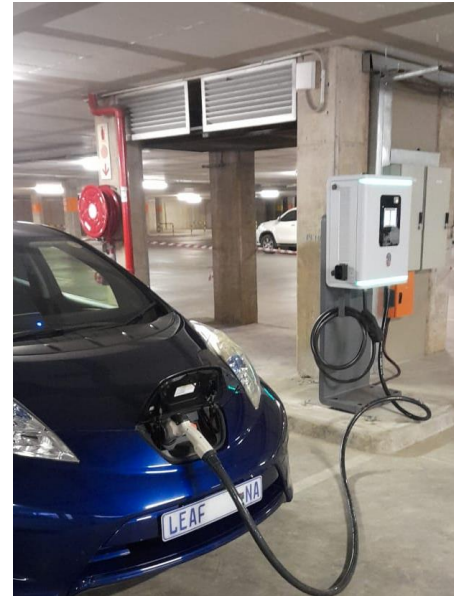
GPE Eenhana VTC Solar Training in Pictures





Conrad Roedern, one of the EVs Namibia partners, speaking during the launch of the fast charger at Grove Mall.

Photos: EVs Namibia CC



Nissan Leaf test charging at the Grove Mall

EVs Namibia, Grove Mall Launch First DC Fast Charger for Electric Vehicles

EVs Namibia cc and the Grove Mall have pioneered the first public DC (direct current) fast charging station to enhance versatility of the growing Namibian electric vehicle fleet.

Direct current is the type of electricity stored in the traction battery of an EV.

The launch of the first fast-charger took place on 29 January at Grove Mall's lower-level parking deck.

There are about 45 electric vehicles in Namibia and a survey with current EV owners pointed to Grove Mall as the preferred fast-charging site in Windhoek. The mall has a 2.8 megawatt-sized Solar PV generator on its roof, thus true green electrons are utilised during daytime charging.

The DC fast charger has a power of 40 kW and has two charging "nozzles". When charging two cars simultaneously power will be split 50/50. Nissan Leaf and Nissan eNV-200 EVs connect via their CHADEMO-standard fast-charging ports fitted on these EVs.

The CCS standard of the second nozzle allows to fast-charge most cars of European origin, such as the BMW i3 and Volkswagen's ID3 and ID4 models. More standards can be accommodated using plug-adaptors. The charging process is easy: you take the nozzle off the hook and insert it into the DC port.

For a 12-month period fast-charging will be free of charge for EV owners. After that a soft payment

method via electronic funds transaction (EFT) from a client's bank account will be instituted.

The charging station is then activated by swiping a RFID card or via QR-code and App. Each EV owner will receive a RFID card on request. The price per kWh fast-charged will then be around N\$5.50 which would bring the typical "top-up over a coffee" for a Nissan Leaf costing below N\$50.

While all EVs can be slow-charged at home over night at any 15 Amp SABS 3-pin socket outlet, this initiative by EVs Namibia cc and Grove Mall aims to further E-mobility in Namibia by addressing hampering issues like "range-anxiety", the "missing-infrastructure argument", while giving EV drivers a chance to top up while shopping.

It enables those with no possibility to charge at home with a charging solution. Extending the daily driving range will allow even EVs with limited driving range to be used in taxi or request-taxi services.

Going electric in transportation is a true milestone to further Namibia's energy independence since green electricity can be generated in abundance (the solar roof on the Grove Mall creates fuel to run 2300 EVs for 40km per day!).

Climate change, on the other hand, is real and the quest for ultrafast decarbonisation is a matter of survival. We all can turn a leaf and facilitate our mobility with a lighter footprint.



SOLTRAIN 2021 Conference delegates

SOLTRAIN Partners Review Progress of Project

AFTER a two-year break due to the Covid-19 pandemic, the 5th SOLTRAIN conference took place on November 25 in the Zimbabwe capital, Harare.

About 90 solar thermal experts, representatives of solar companies from seven countries involved in the SOLTRAIN programme, including Namibia, political and economic stakeholders, as well as finance experts met in Harare for the conference.

They were joined by about 20 other people who participated online.

The conference was opened by Birgit Weyss, from the Austrian Development Agency and Soda Zhemu, Zimbabwe's Minister of Energy and Power Development.

The conference provided a comprehensive overview of the many activities of the SOLTRAIN programme. Some of the highlights that were presented included the following:

- Since the beginning of the project, about 4 500 people have participated in 180 training



The 5th SOLTRAIN Conference was held in Harare, Zimbabwe

courses.

- The partner companies have applied the knowledge gained in 560 solar thermal demonstration plants built in the six partner countries.
- Students have been supported in the preparation of their theses and a dual training concept with apprentices was implemented successfully.

One of the main topics of the conference was how to mobilise international funds to enable the implementation of the solar thermal roadmaps that have been developed for each of the SOLTRAIN participating countries.

Sosten Ziuku from the Zimbabwe Ministry of Energy and Power Development, Bernard De Schrevel from the EU delegation, Chai Musoni and Patrick Makanza from GET Invest presented the different funding possibilities for financing of single projects, and also for the implementation of the solar thermal roadmaps of the partner countries.

In addition to the technical presentations, the conference offered the opportunity for personal exchange and for the further development of ideas for the continuation of the successful cooperation.

Helvi Iлека, acting centre head of the Namibia Energy Institute (NEI), represented Namibia at the conference. NEI, at the Namibia University of Science and Technology (NUST), is the implementer of SOLTRAIN programmes in Namibia.

Iлека presented some of Namibia's success stories in the implementation of the SOLTRAIN project - Solar Water Heating systems (SWHs) at the National Housing Enterprises (NHE) houses in Windhoek and the Osona Village outside Okahandja.

Sixty-two (62) Solar Water Heaters were installed as demonstration systems at the low cost NHE houses in Otjomuise, Windhoek.

SOLTRAIN contributed 50% towards the cost of the units, the government, through the Ministry of Mines and Energy, (25%) and the homeowners contributed 25% through soft loans obtained from the NHE.

The monitoring of systems installed at NHE houses showed solar yields of between 130 – 150 kWh/month, while the solar fraction was between 80 and 100%. On average a house with a SWH used between 3.4% and 20% on backup, depending on behaviour.

The homeowners that had SWHs installed experienced monthly saving on their electricity bill of between N\$94.40 and N\$229, demonstrating that SWHs can be a viable option that



Helvi Iлека with a SWH installation at one of the NHE houses



The Osona housing development

can reduce electricity costs for homeowners.

For the Osona housing development, an agreement was signed with the developer through which SOLTRAIN assisted with quality assurance in the selection and installation of SWHs, to ensure adherence to quality standards.

Through the agreement, installers were trained and the installation was monitored by SOLTRAIN technicians.

The involvement of SOLTRAIN in the Osona project resulted in improvements in the installations following the training.

Tshwane University's Sunchaser 4 Brings Solar Lessons to Namibia

THE Sunchaser 4, a fourth generation solar car built by students and staff from Tshwane University of Technology, recently embarked on a Namibian tour.

Travelling from Pretoria to Swakopmund, the energy efficient, high-technology solar powered vehicle covered a distance of more than 2 153km, going from town to town and educating schoolchildren about renewable energy.

The Sunchaser is a single-seater made of lightweight carbon fibre. It has a two kilowatt in-wheel electric motor and one kilowatt roof-mounted solar panels. The solar car, the TUT's most technologically advanced vehicle, was designed, built and is driven by a team of staff members and students from the university.

The car can reach a speed of 120km/h. At a mass of about 200kg and a rolling resistance (tyre to road friction) about three times less than a regular vehicle, the Sunchaser 4 has a range of around 550km on a flat road during clear sky conditions.

Team leader Tiaan Oosthuizen said the car was simply a test vehicle and not meant to be mass produced. He said the journey allowed technologies that were designed by the TUT team in-house to be tested.

"We tested the battery, steering, battery management, and safety systems, as well as the solar system we developed in-house. We are doing this to make automotive manufacturers understand the technology does exist, it works, and it is local," Oosthuizen said.

Ryan van Greunen, a masters in mechanical engineering student and one of two drivers on the Namibian tour, said driving the solar-powered vehicle presented its own challenges as it was different from other regular cars.

"It is not like any other car, it does not have hard steering, which makes it difficult to drive. It is also very hot in there, because the sun basically bakes it. There is a fan inside, but it's not aircon," Van Greunen said.

In 2018, the Sunchaser3 was ranked number one in the Sasol Solar Challenge, and achieved a fourth place internationally.

The Sunchaser is the fourth solar electric car that the university has developed since 2014.

Designing and simulating the car took almost a year, while the procurement of parts and manufacturing can take up to three years, depending on the vehicle type, said Oosthuizen.

"What is so significant about the car is that there are probably only two or three in Africa, and



SOLAR IN MOTION ... TUT's solar car, Sunchaser 4, was designed, built and is driven by staff members and students from the university.

we are the top performing team on the continent. What top performing means is that we can travel the furthest distance with the least amount of energy," he said.

The car collected data for the duration of the seven-day trip on state-of-the art sensors and, according to Oosthuizen, taught students about valuable field experiment techniques.

Renewables to Expedite Namibia's Energy Independence

Namibia has earmarked to generate up to 80% of the energy it uses locally in the next five years, with renewables, mostly solar and wind, playing a key role in increasing local generation.

The country currently has an installed capacity of 680MW, with 517MW of this coming from renewable energy resources (mostly hydro and solar) and 122MW from coal-fired generation. The shortfall is imported from South Africa's Eskom and from the Southern Africa Power Pool.

Mines and Energy Minister Tom Alweendo, in a message delivered to the Namibia Renewable Energy Business Summit 2020 in Dubai, in the United Arab Emirates, where Namibia is taking part in the ongoing Expo 2020, said: "Recognising the inevitability of the energy transition, we accept that fossil fuel is no longer the fuel of the future, and that the world is transitioning to renewable energy."

Alweendo said Namibia had abundant renewable energy resources and that the potential for green electricity production in the country was way above the country's domestic electricity needs.

"As a demonstration of our commitment to the transition from fossil fuel energy, renewable energy features prominently in our economic recovery plan that president Hage Geingob recently launched," the Minister said. As part of the recovery plan, Namibia aims to be a green-hydrogen hub in Africa.

Namibia's energy sector is premised on a diverse energy mix. In view of the critical role energy plays in the country's economy, the ministry has developed the National Integrated Resource Plan (NIRP).

"The updated NIRP will target a minimum of 70% share of energy supplied from renewable energy by 2030, as envisioned in the Renewable Energy Policy, and that by 2028, 80% of primary energy used will be locally generated," Alweendo said.

To fully industrialise, energy is a primary enabler in driving Namibia's economic development activities. The country is investing N\$8, 7 billion (about US\$575 million) in energy generation and transmission between 2020 and 2022 for the provision of affordable and reliable solar and wind power generation.

The Namibia Renewable Energy Business Summit gave an overview of investment opportunities in the renewable energy sector and processes to be followed by potential investors. It focused on key outcomes and case studies of Namibia's journey towards becoming a green economy by 2030.



Mines and Energy Minister Tom Alweendo

The Namibia Investment Promotion and Development Board (NIPDB) reported that the country was making positive progress at Expo 2020 Dubai, as far as attracting investment was concerned.

"Three months after joining 191 other nations as a participant at the Expo 2020 Dubai hosted in the United Arab Emirates, Namibia is well on her way to achieving the ambitious goals set for the expo," said NIPDB Senior Manager for Marketing, Branding and Communications, Catherine Shipushu.

She said adequate light had been shone on the country's unique investment opportunities, highlighting priority sectors such as renewable energy, marine diamonds and mining, tourism and conservation, and cultural heritage.

"The expo offers a wealth of opportunities for Namibia to galvanise investment opportunities and explore areas of economic cooperation for mutual benefit with other participating nations," the investment board said.

NIPDB reported that most of the investor interest has been in the area of Green Hydrogen.

Customisable e-mobility and Solar Recharge Solutions

EBIKES4AFRICA provides commuters access to affordable, future-friendly transport and renewable energy alternatives through customisable e-mobility and solar recharge solutions that are fast, affordable and reliable.

Since the onset of Covid-19 E-Bikes added deliveries as part of its services, and has been taking Windhoek by storm. Through the delivery service job opportunities have been created, while also catering to the logistics needs of customers.

E-Bikes, which has been operating from the Bokamoso Entrepreneurial Centre in Katutura, recently expanded its services by opening an office in the Windhoek central business district (CBD) area, which will be the main hub for the company's delivery services.

The E-Bikes use electric power and the rider does not have to do a lot of pedaling. The lithium-ion batteries, which power the bikes, are supplied to clients through a swooping system and the use of solar to charge the batteries and power other services at e-hubs, allows for 100% free energy consumption.

E-Bikes currently employs 18 Namibians, and focuses on creating eco-friendly alternatives for peri-urban commuting, short business trips, sight-seeing tours and inner city logistics.

The company is boosted by the fact that the City of Windhoek is currently introducing cycle lanes in the city which will allow more bikers to take to the streets as they will feel safer.



SUN-POWERED BIKES ... EBikes4Africa has introduced electric bicycles that use solar batteries and could revolutionise the transport sector in the country.

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Solar Technology Helps Rangers Track Rhinos

For the last four decades, the Save the Rhino Trust (SRT) has been working alongside communal conservancies, local and international NGOs, and other agencies to protect the desert-adapted black rhino and their efforts have been paying off.

In the areas they work, poaching has significantly declined. In fact, across Namibia, rhino poaching has reduced. Thirty rhinos were poached during 2020, compared to higher figures recorded in previous years - figures 50 rhinos in 2019, and 79 in 2018.

So far this year, only nine rhinos have been reported poached, as law enforcement operations continue to close the net on wildlife crime in the country.

So how do rangers at SRT work to protect and monitor their rhinos? Collection of high-quality data on rhino movement, body condition and threats are one of their top priorities.

Recently, the team shifted to the exclusive use of SMART (Spatial Monitoring and Reporting Tool) devices to collect data. SMART devices are an innovative conservation management tool that enables rangers to collect and input data remotely while on patrol across the Conservancy. It's certainly more efficient than paper records that could get damaged in the field.

The use of these devices means that every remote camp must now have a reliable power source. Therefore, Save the Rhino Trust purchased four new, custom-built solar power systems. Solar systems provide much-needed electricity to SRT's field camps, enabling rangers to charge the devices they use during their 20-day patrols.

These custom-built systems have been specially designed to withstand the harsh, arid environment in the Kunene Region, as well as being tough enough to endure the bumpy trip from SRT's field base to the respective patrol camps.

Adding new technology in the field is critical for rangers at SRT, acting as a force multiplier, meaning that rangers can protect more of the precious black rhinos that call Namibia home. - **SRT**



PROTECTING THE RHINO ... Save the Rhino Trust protects the largest free-ranging population of black rhinos in the world. With no fences and no national park status, the rhinos rely on SRT's team to keep them safe.

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3

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Top Five Energy Sectors Poised for Growth in 2022

Matthew Goosen

Serving as the most significant driver of industrial growth and economic activity, the energy sector comprises the complex and intricate system of activities and companies involved in the production and distribution of various types of power.

With continent wide objectives to expand energy access, enhance investment competitiveness and drive economic growth, several sectors are poised to experience accelerated growth in 2022.

RENEWABLE ENERGY

Likely to become an inexorably critical component of Africa's energy sector in the future, renewable energy has gained traction and investment in recent years.

Despite the continent's energy mix comprising almost entirely of fossil fuel and biomass sources, it is forecasted that renewable energy will account for 40% of all power generation capacity in sub-Saharan Africa by 2040. This capacity will vary in scale and will be comprised of various sources of clean energy, such as hydro, sun, wind, and others, with solar projected to be the dominant source.

Technological advances and falling costs are key drivers for Africa's renewable energy development, as, over the next three decades, it is expected that two-thirds of the continent's mini- and off-grid systems will be powered by solar photovoltaics, small hydropower, or wind. In 2022, Egypt has committed to the goal of generating 20% of its electricity from renewable sources, with the 1,650 MW Benban Solar Park and the upcoming US\$37 million solar-plus-storage project currently being developed to diversify the country's energy mix.

Meanwhile, the Grand Ethiopian Renaissance Dam is expected to contribute an additional 6.45 GW of installed capacity to Ethiopia's national grid, and in South Africa, the country's Renewable Energy Independent Power Producer Procurement Program is



GAINING TRACTION ... Likely to become an inexorably critical component of Africa's energy sector in the future, renewable energy has gained traction and investment in recent years.

expected to close its commercial and financial concessions by March 2022 from a list of bids proposed the year before.

TRANSMISSION

The transmission of energy is a critical component of the African energy sector, serving as a requisite for increasing energy access across the continent.

Accordingly, the sector has been gaining traction in recent years, particularly as the continent has become more focused on expanding cross-border transmission lines for regional and international trade.

Notable developments in this area include the development of a 200 kV transmission line between Masaka, in eastern-Uganda, and the Mwanza region of Tanzania, which would facilitate direct interregional trade. Discussions for this project are currently underway between the Governments of Tanzania and Uganda. Meanwhile, with a goal of universal electrification in Ethiopia by 2030, the 500 kV Sodo-Moyale-



Suswa transmission line is expected to revolutionize the power supply situation in the east-African country along with Kenya.

In addition to domestic supply increases, the project will also provide Kenya with a source of low-carbon, renewable electricity from Ethiopia. Given the insurmountable energy developments set to be implemented in Africa in the coming years, the energy transmission sector is particularly important for the electrification of the continent, and will serve as a means to spur socio-economic growth and industrialization.

OIL AND NATURAL GAS

The need to increase access to modern energy to spur economic development in Africa has never been greater. Currently, fossil fuels represent approximately 40% of the overall energy mix in sub-Saharan Africa, and this figure is expected to increase with the accelerated exploration of oil

and continent-wide uptake of natural gas.

Between 2021 and 2025, an estimated 428 oil and gas projects are expected to start operations on the continent.

The most notable include Shell's \$30 billion Tanzania Liquefied Natural Gas (LNG) Liquefaction Project – expected to commence construction in 2023, with completion aimed for 2028; Mozambique's US\$30-billion Rovuma LNG Terminal and US\$20 billion Mozambique LNG facility – expected to begin production in 2025 and 2024, respectively –; and Nigeria's US\$20 billion Ogidigben Gas Revolution Industrial Park – a planned downstream refinery and petrochemical complex set for construction in the west-African country's Delta Region. This region is also where the development of the Etan and Zabazaba oil fields are taking place.

Accordingly, as projects come online and new investments secured, Africa's hydrocarbon sector is set to experience significant growth in 2022 and beyond.

NATURAL GAS PIPELINES

Another sub-sector poised for growth in 2022 is rooted in the midstream sector, specifically, natural gas pipelines. Natural gas pipelines transport gas from gas wells or import/export facilities to various sites, such as homes or export facilities. With several large-scale gas developments underway across the continent, and government objectives to increase the exportation of gas to international markets, the construction of gas pipelines is expected to increase.

Notable pipelines coming into production in Africa soon include the proposed US\$6 billion African Renaissance Pipeline Project, which will link Mozambique's gas-rich Rovuma Basin to Gauteng Province in South Africa; the proposed 1,800km Tanzania-Uganda Natural Gas Pipeline Project that will transport LNG from Dar es Salaam in Tanzania to Kampala, Uganda; and the planned Ajaokuta-Kaduna-Kano Natural Gas Pipeline, that will serve as part of the wider Trans Nigeria Pipeline Project.

These pipeline projects will not only boost gas exports from Africa, but will enable an increase in intra-African gas trade.

MINING

Endowed with bountiful reserves of gold, diamonds, cobalt, bauxite, iron ore, coal, and copper, Africa is already a major producer of key minerals critical for the renewable energy sector. With the ongoing climate crisis and associated global energy transition motivating the uptake of renewable energies, Africa's mining sector is set to play a key role in the transition to a clean energy future. Countries such as Namibia, Ghana, Zimbabwe, the DRC, and Mali, all of which are rich with lithium, are well-positioned to spur socio-economic growth through the development of the mineral resource.

Accordingly, in 2022, Africa's mining sector is projected to undergo significant growth, owing to the global energy transition.



*New device gilds the offshore renewable energy lily with wind, solar, and wave power all in one.
Image: SINN Power.*

Floating All-In-One Renewable Energy System Has Everybody Talking

When the German company SINN Power first introduced its floating hybrid renewable energy platform last year, the news caused barely a ripple. Now suddenly everyone is talking about the company's Ocean Hybrid Platform.

The platform is dubbed the Swiss Army Knife of clean power because it combines wind, solar, and wave energy all in one delicate-looking package.

SINN Power notes that the idea of floating solar arrays on freshwater bodies has taken off like a rocket in recent years, but is not so easily transferred to the ocean environment, which can be somewhat more hostile.

"While freshwater floating PV is being installed in more than 40 countries worldwide, seawater floating PV is a new market. In contrast to freshwater floating PV, providers of seawater floating PV are confronted with harsh environments, where the widely known conventional systems will fail," the company says.

Still, the oceangoing solar array is a tantalizing prize compared to the potential offered by freshwater resources. For example, hydropower reservoirs represent one low-hanging, freshwater fruit targeted by floating solar developers.

SINN takes note of a study by the US Energy Department's National Renewable Energy Laboratory, indicating that the global potential of floating solar in that scenario is 7.6 terrawatts. That sounds impressive but the potential for offshore solar development in the seven seas is even more impressive.

However, as SINN points out, the technology used on

freshwater bodies does not require hardening against waves and other stormy conditions typical of ocean environments or, for that matter, large lakes.

"As the possibility of extreme weather events rises, these systems are in danger of failing.

Depending on the extent of damage, consequences will range from loss of revenue up to a complete loss of investment.

Therefore, current freshwater solutions face restrictions in deployments at sea, partly even in protected coastal areas and big lakes," SINN emphasizes.

The solution SINN offers is a flexible design that can accommodate wave heights of up to 12 meters and winds speeds of 27 meters per second. SINN also claims that the skeleton of the structure can take on wind speeds of up to 60 meters per second.

That's not exactly hurricane strength, but it does open up the potential to plumb offshore waters in bays and other sheltered areas for renewable energy.

It's also possible that SINN's offshore platform could be shuttered or towed to safety when extreme weather threatens, considering that it provides for small and medium-sized deployment as well as large-scale arrays.

As for use cases, SINN is casting a wide net.

"Potential use cases for project developers include the complementation of offshore wind parks to increase baseload capacity, providing RE to aquacultures, the hydrogen production, or simply producing electricity for coastal areas, remote islands and many more," says Dr. Philipp Sinn, the company's CEO.

SA turns to Renewables to ease load shedding

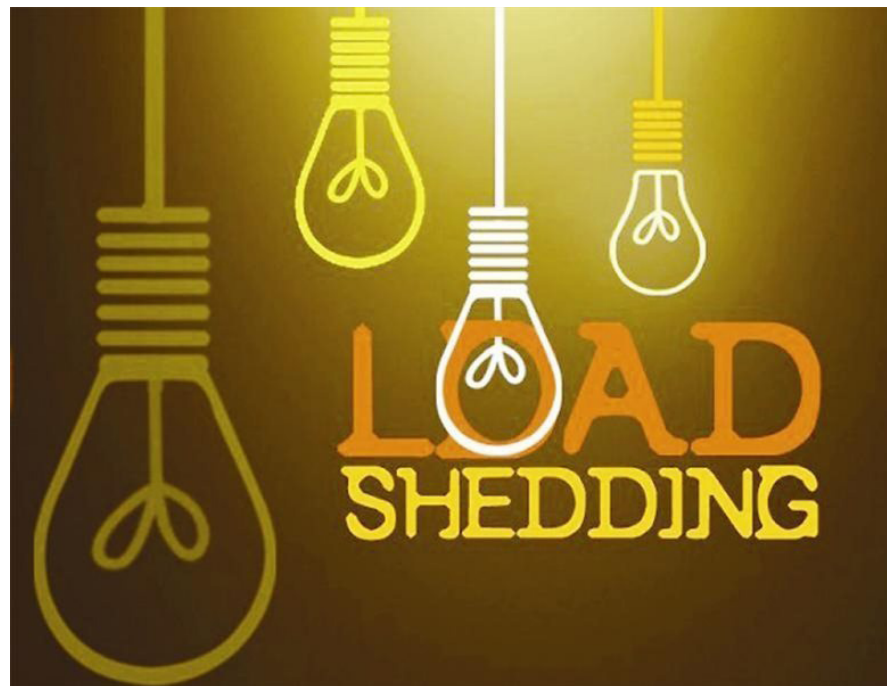
With coal providing 80% of its electricity, South Africa, the continent's most industrialised nation, is now banking on solar power.

The South African government has awarded 25 contracts for renewable energy projects, worth a total of 50 billion rand, to reduce the country's heavy dependence on coal. The 25 projects (12 wind farms and 13 photovoltaic plants), awarded to the private sector, will increase the country's electricity generation capacity to 2,583 megawatts (MW), or 4.5 percent more than at present, said Energy Minister Gwede Mantashe.

Indeed, the country is living with load shedding and the South African electricity company Eskom, which supplies 90% of households, is sinking under a debt of several billion dollars. As a result, several companies are turning to solar energy with the aim of being 100% dependent on this source by 2025.

"For Africa, we have already made some progress in this regard. We have on-site solar installations in all our breweries in South Africa. We have solar installations in Nigeria and Tanzania. Basically, we've gone back to our original mission of wanting to be around for the next 100+ years, and this is one of the best ways to do that. We have four major pillars that are all aligned with sustainability goals. We know we can get there by 2025 for Africa. For South Africa in particular, we think we can get there by 2024," says Conor Ruff, vice president of purchasing and sustainability at AB InBev.

South Africa's largest township, Soweto, is not only facing power cuts, but also reduced load, a consequence of the US\$1 billion owed to the country's power producer, Eskom. For businesses, the lack of electricity leads to increased operating costs and reduced productivity and profitability. Power outages in South Africa cost the country's economy more than



IN THE DARK ... South Africa has been experiencing load shedding since 2007.

US\$30 million a day.

South Africa has been experiencing load shedding since 2007 because the country has failed to build new power plants to achieve greater economic growth.



MASSIVE ... Windpark Fryslân, the world's largest freshwater wind farm on Netherlands' Lake IJssel

World's Largest Freshwater Wind Farm Now Online

Windpark Fryslân, the world's largest freshwater wind farm that sits in the Netherlands' Lake IJssel, is now fully commissioned.

The 382.7 megawatt (MW) Windpark Fryslân is around 6 kilometers off the Frisian coast, in the north of the Netherlands and parts of northwestern Germany. It features 89 Siemens Gamesa 4.3 MW wind turbines that have been in operation since November.

Lake IJssel, which is shallow, is the Netherlands' largest lake. It's fed by several rivers, including the Amstel, the Rhine, the Vecht, and the IJssel, and closed off to the Wadden Sea by a manmade dike.

"The wind farm is open to everyone."

The freshwater wind farm was built by the

Zuiderzeewind consortium of Dutch maritime contracting company Royal Van Oord and renewable energy company Siemens Gamesa. Renewable energy company Ventolines is the wind farm's owner and developer.

Construction began on Windpark Fryslân in 2019, and was expected to be completed in June, but launch was pushed back to the third quarter as a result of the pandemic, adverse weather, and logistical challenges. It's expected to produce around 1.5 TWh of electricity per year.

That's around 1.2% of Dutch electricity consumption, or enough power for around 500,000 households in the Netherlands.

Eswatini seals deal for mega solar-storage project

The Kingdom of Eswatini (formerly Swaziland) has signed a 40-year contract with Frazium Energy for a 100 million Euros (about N\$1, 7 billion) solar battery power project.

With an initial capacity of 100 MW, the solar farm which will comprise 75,000 panels covering 45 hectares, will supply more than 100 million kWh a year to countries in the Southern African Development Community (SADC) region, helping to reduce load shedding by providing much needed power at peak times.

The developer, Frazium Energy is part of the Australian-German Frazer Solar group.

"We are so grateful to the government of Eswatini for their support, confidence, and belief in our vision for this project, and we are so excited for the role we can play in Eswatini's and Africa's green energy future," said Frazium Energy director Robert

Frazer.

The Eswatini plant will be Africa's largest battery storage facility.

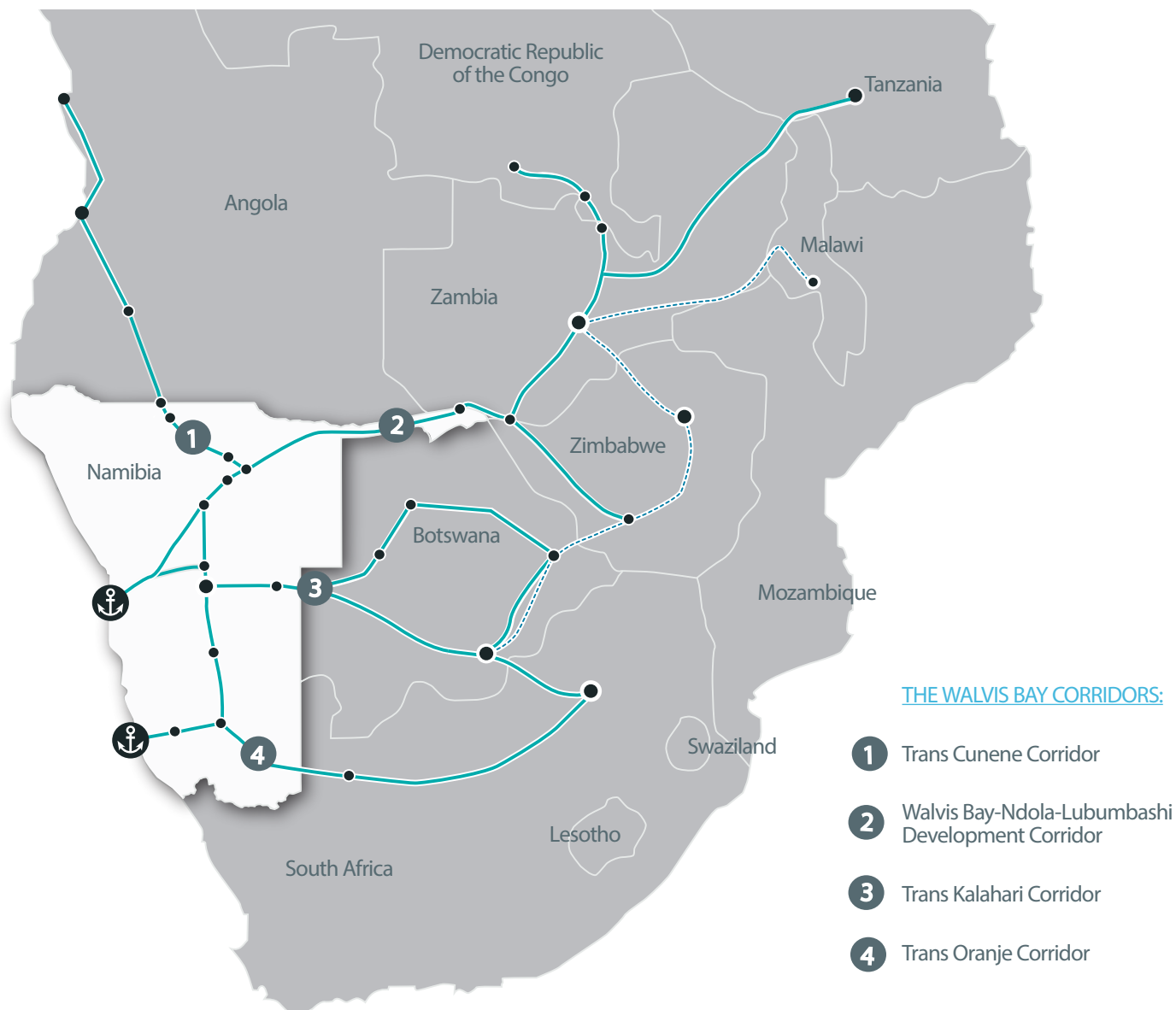
Eswatini's minister of commerce, industry and trade, Manqoba Khumalo, said the mega solar-storage project will provide a real and tangible benefit to the kingdom, both in the creation employment and in the provision of green, solar power.

Frazium Energy chose the Kingdom of Eswatini to host the project after considering 11 countries. The company had planned a similar project in the Kingdom of Lesotho in 2018 but it was canceled following a dispute with the government.

The large-scale solar-storage project follows Frazium Energy's completion of a solar healthcare project in the Kingdom of Eswatini earlier this year.

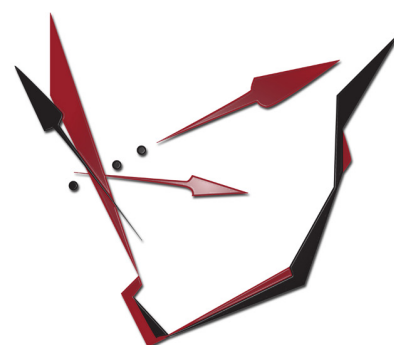
"Responding to the acute healthcare needs exposed by the Covid-19 pandemic, the company delivered 92 solar-powered hot water units to every governmental medical clinic nationwide, providing free hot running water for medical staff and patients' use," stated Frazium Energy.

That project was funded by Frazer Solar with assistance from the German Development Finance Institution (DEG), a subsidiary of the KfW development bank, and delivered by Frazium Energy.



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