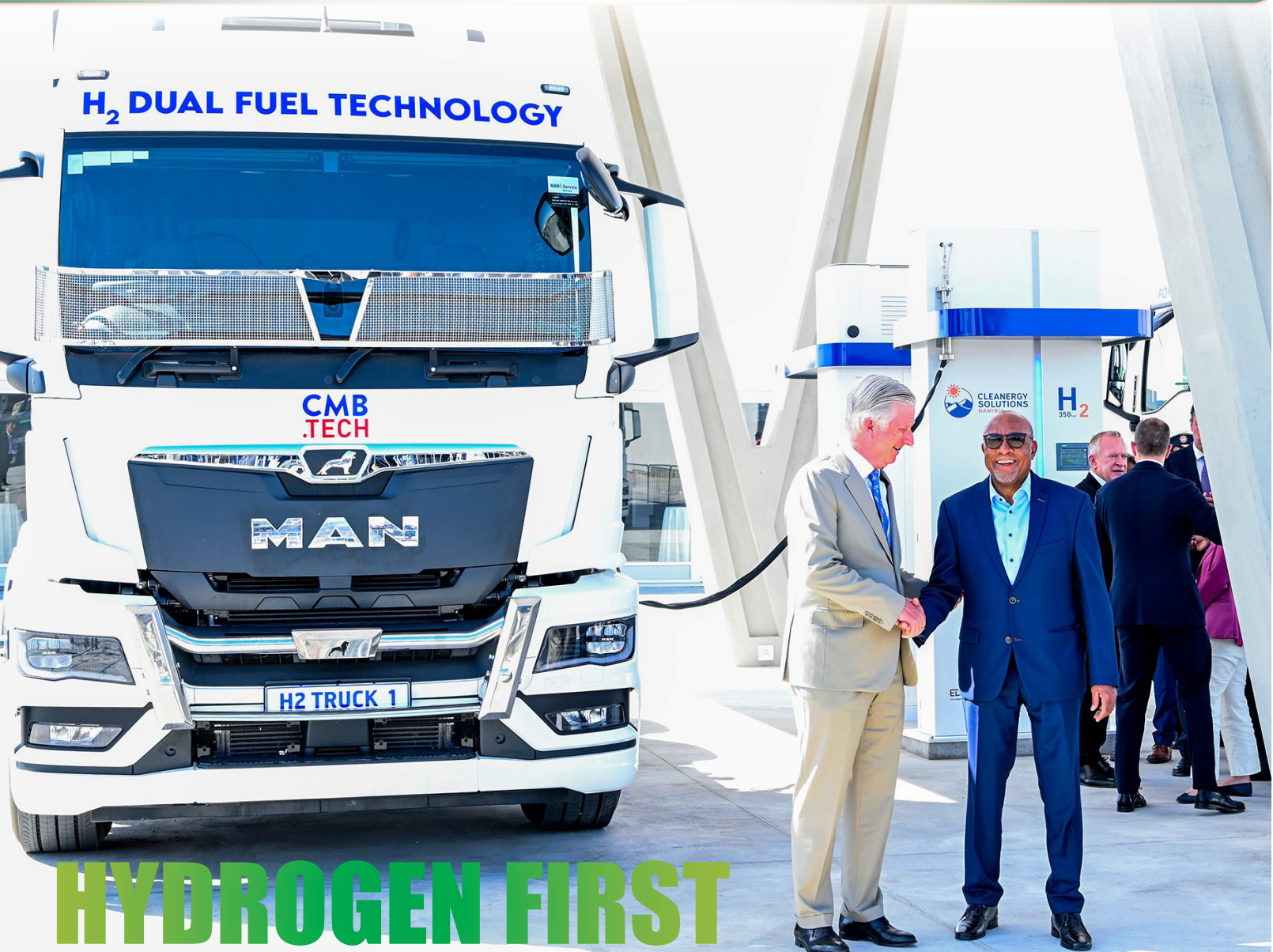


Etango

Namibia's Leading Renewable Energy Technologies
Magazine

JUNE-JULY 2024



Curtain Comes Down on Impactful GIZ Green People's Energy Project



Namibia Prepares to Host Global African Hydrogen Summit



World Bank N\$2.5bln Helps Namibia to Boost Grid Stability



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GIZ-GPE Project Sets Solid Foundation

The four-year German government-funded Green People's Energy (GPE) Project Namibia has come to an end. The project successfully implemented several activities including fostering local value creation through the productive use of energy, solar electrification of social institutions such as schools in remote areas, skills development, renewable energy policy advice, and the development of framework conditions for investments in renewable energy.

As one of the people who followed the activities of this initiative closely, it is without a doubt that it made an impact on some rural communities, some of which had never encountered electricity before. What stood out for me was the electrification of some rural schools and the empowerment of small remote small scale businesses through solar systems.

Most pupils at Okahozu Primary School, located some 40km outside Opuwo, in the Epupa Constituency of Kunene region, had never come into contact with

electricity until GPE's intervention. The impact that the solar system installed by this project has had has been immense – both for the learners and the teachers.

There are over a hundred remote schools in Namibia which do not have access to electricity. This makes both teaching and learning very difficult. The Government has acknowledged that it alone cannot bring electricity to all these schools. It needs help from development partners like GIZ.

Most of the schools are far from the grid that grid connection is not an option for now. Renewable solutions are the sensible solution to electrify them but these come at a price.

For Okahozu and a few other lucky schools that GPE was able to reach in its limited time of project implementation and budget, the learning experience has been transformed forever. Learners at this school now have access to the internet. They can watch satellite television and can study at night. Teachers can also prepare for their classes at night and also be able

to do presentations in class. All thanks to solar technology.

As Mines and Energy Deputy Minister Kornelia Shilunga put it: "With this solar system, we illuminate not just our classrooms but also the path towards a future where clean energy and education shape a world we can proudly pass on to future generations".

Still, there are over 150 off-grid schools in Namibia that need to be electrified. The GPE project has shown that this can be done. We need to pick up from where the project left off and electrify the remaining remote schools.

The GPE project has demonstrated how best we can proceed in rolling out the projects started under this initiative. It was a pilot project whose efforts should serve as a lesson for what is possible.

Happy Reading!

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HYDROGEN STATION ... The N\$3 billion Cleanergy Solutions Namibia green hydrogen station outside Walvis Bay was officially inaugurated on May 3 by President Nangolo Mbumba and King Philippe of Belgium. President Mumba and King Philippe carried out the first refuelling of a bi-fuel truck that had been transported by ferry from Belgium. **Photo: Cleanergy Solutions Namibia**

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MISSION ACCOMPLISHED... Mines and Energy Executive Director Penda Ithindi, Germany Ambassador to Namibia, Thorsten Hutter, GIZ Namibia Country Director Tobias Gerster and Director of Energy John Titus with the GPE team at the close of the project.

Curtain Comes Down on Impactful GIZ Green People's Energy Project

The German government-funded Green People's Energy (GPE) Project Namibia, an initiative which aimed to enable, expand and secure the supply of sustainable energy in rural areas, came to a close on 12 June, 2024.

Launched in June 2017 by the German Federal Ministry for Economic Cooperation and Development (BMZ), GPE was jointly implemented in Africa by Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH and KfW Development Bank.

In Namibia, the GPE project was implemented in partnership with the Ministry of Mines and Energy (MME) over a four-year period. The project successfully implemented several activities including fostering local value creation through the productive use of energy, solar electrification of social institutions such as schools in remote areas, skills development, renewable energy policy advice, and the development of framework conditions for investments in renewable energy.



We have learned a lot with this (GPE) project and we want to look at what we have learned and how we can continue into the future. GPE has paved the way for more collaborations with MME.-Tobias Gerster

The project also funded the Solar Revolving Fund (SRF) to the tune of 300 000 Euros (About N\$5,7 million) for a new funding window. The SRF is a credit facility created by MME with the aim of stimulating the demand for the utilisation of renewable energy technologies in off-grid areas.

Additionally, support was rendered by the GPE to the Renewable Energy Industry Association of Namibia (REIAoN) for the rollout of a countrywide Renewable Energy Rural Awareness campaign. The campaign aimed at helping improve access to information and strengthen advocacy for rural renewable energy product and service providers, through the creation of awareness and training.

Throughout the implementation phase of the GPE project in Namibia, there was active and broad participation by MME, Technical and Vocational Education and Training institutions, the Namibia Energy Institute (NEI), REIAoN and private sector players.

Speaking at the closing ceremony for the project, Director of Energy John Titus, described the GPE project interventions as "massive".

Titus said GPE had managed to successfully implement a complex multi-

stakeholder project which began in 2020. He said the project was complex as it involved both local and international development partners.

"We have learned valuable lessons from the implementation of the GPE project and on how best we can proceed in rolling out the projects started under this initiative," said Titus.

Tobias Gerster, GIZ Namibia Country Director, said he was sad that the project had come to an end, but acknowledged that all good things do come to an end at some point.

Gerster said Namibia has the best pre-conditions for producing solar energy in the world and therefore it made sense for the German government to support the GPE project in the country.

He said the GPE project was the first major collaboration between MME and GIZ in the energy sector.

"We hope to continue cooperating with MME in the coming years as there are lots of projects coming up in the energy sector. Over 50% of Namibia's population has no access to electricity and we are happy that GPE could contribute a little bit to make energy available to those without access," said Gerster.

He said energy access was crucial for Namibia's economic development – from a small trader who wants to cool his produce, to a farmer who needs to pump water, to a hairdresser needing energy to power his or her equipment.

"We have learned a lot with this (GPE) project and we want to look at what we have learned and how we can continue into the future. GPE has paved the way for more collaborations with MME," he said.

Germany Ambassador to Namibia, Thorsten Hutter, expressed gratitude over the collaboration between the two governments.

"Seeds of this cooperation have translated into new areas including of collaboration, such as green hydrogen. Germany has been involved in the Namibia energy sector for over 20 years and we have funded several projects such as the NamPower battery energy storage system and the 70MW solar project in Rosh Pinah. This shows our commitment to support Namibia's energy transition," he said.



Director of Energy John Titus



GIZ Namibia Head Tobias Gerster



MME ED Penda Ithindi



German Ambassador Thorsten Hutter



GPE Namibia Head Simon Inauen



GPE Coordinator Rodney Seibeb

He spoke about the challenges that Namibia faces to connect remote areas which are also sparsely populated, suggesting that Namibia will have to look to other off-grid electrification solutions, such as mini-grids.

Mines and Energy Executive Director Penda Ithindi, speaking on behalf of Minister Tom Alweendo, described the collaboration with Germany on the GPE project as "impactful".

"Energy is a critical factor enabling the socioeconomic advancement of a country. Energy generation capacity for Namibia is



GPE Technical Advisor Gabes Nghipandwa

still low at 45% of total energy demand for the country. We have to import the bulk of the electricity we need. Energy access is a particular challenge but also presents a lot of opportunities," said Ithindi.

He said urban access to electricity was around 70%, while rural access hovered around 25%.

"We need to close the access gap in the rural areas. This creates opportunities to generate jobs and improve the quality of life for our people," he said.

Ithindi emphasised that Namibia's primary objective was to achieve

energy independence, and that the National Renewable Energy Policy adopted on 2017 underscored Namibia's commitment to achieve this independence through clean energy.

"We need development partners in order to achieve our targets. We need partnerships with the private sector to translate our developmental ambitions into reality," said the Executive Director.

He said the GPE project collaboration set the standard in extending access of rural technologies.

"We have sown the seeds and it's now time to expand the area of coverage,"

said Ithindi.

Head of the GPE project in Namibia, Simon Inauen, said the project was implemented in Namibia at the right place at the right time.

He highlighted the various lessons that had been learned through the implementation of the project.

Solar energy is a job booster – He said the project had proven that solar energy was job booster and urged further investment in training on solar installers in order to fully realise this potential.

Let's not miss the green hydrogen opportunity – More training of solar technicians and installers was needed in order for Namibians to participate in the green hydrogen economy.

High demand for training of women solar technicians – As one of its closing project, GPE conducted a training for 40 female solar technicians. The training was over-subscribed attracting more than 1,000 applications countrywide, proving that there was a need to train more women.

Solar energy is the cheapest energy source under Namibian conditions – Although initial costs of installing solar systems are high, solar energy remains the cheapest source if energy in the country.

Maintenance remains a challenge – There is a need to maintain solar systems after installation and therefore maintenance budgets must be catered for right from the beginning.

Electrification needs new collaboration models – MME must work with stakeholders such as the regional electricity distribution (REDs) companies and the consumers to find a collaboration model suitable for all.

Move from diesel to solar an attractive investment – The migration from expensive diesel powered energy generation to solar had proven to be a logical solution and therefore access to finance for solar technologies was vital.

Partnerships are key – The GPE project had proven the significance of partnerships and how easily challenges can be resolved when stakeholders worked together.

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PIONEER... The Cleanergy hydrogen fuelling facility, which will be fully operational in the last quarter of the year, will be used to refuel trucks, as well as port vehicles, locomotives and small boats.

Namibia's First Green Hydrogen Station Inaugurated

The N\$3 billion green hydrogen station outside Walvis Bay was officially inaugurated on May 3 by President Nangolo Mbumba and King Philippe of Belgium.

The facility, located behind Dune 7, is developed by Cleanergy Solutions Namibia, a joint venture between Namibia's Oltthaver & List (O&L) Group and Belgium's CMBTech that started in 2021.

President Mumba and King Philippe carried out the first refuelling of a bi-fuel truck that had been transported by ferry from Belgium. The station, which will be fully operational in the last quarter of the year, will be used to refuel trucks, as well as port vehicles, locomotives and small boats.

The site also includes a plant for green hydrogen production, derived from solar energy. The hydrogen production plant is the first phase of a five-year plan with several projects at different locations, including ammonia bunkering, pipelines and large-scale production of hydrogen and ammonia. In fact, Namibia has strong ambitions in hydrogen and intends to become a major player in Africa.

"From independence, 34 years later, we are talking about things nobody could dream about — fuelling a truck, a bus, a train, and even ships with green hydrogen, and green ammonia," remarked President Mbumba.

King Philippe emphasised the



DREAM COME TRUE ... President Mumba and King Philippe carried out the first refuelling of a bi-fuel truck that had been transported by ferry from Belgium.

shared commitment to achieving climate neutrality by 2050 and ensuring that renewable energy sources are accessible to all citizens.

He described the Cleanergy project as a "groundbreaking demonstration of pioneering hydrogen production in Africa," showcasing how green hydrogen and ammonia can be efficiently produced using renewable energy sources.

Sven Thieme, O&L Executive Chairman highlighted the joint venture's ambitious

goals for the coming decade.

"Our dream is to significantly reduce the global carbon footprint," Thieme said, adding that the joint venture is part of O&L's broader vision, which includes projects like constructing the largest floating solar plant in Germany and various initiatives in Namibia.

Thieme emphasised the dual impact of Cleanergy's operations.

"We aim to decarbonise our businesses and leverage this technology to foster significant local development," he noted, adding that this includes the creation of the world's first hydrogen academy in Namibia, aiming to become a center of expertise and knowledge for Africa. The academy will focus on upskilling local youth by merging local talent with global expertise.

The ongoing operations will require a broad range of maintenance and management roles, further enhancing job opportunities. Infrastructure developments accompanying the plant, such as new roads and power lines, also promise to significantly benefit the local community.

The selection of Namibia for this venture was no coincidence, according to Alexander Saverys, CEO of CMB.

"Namibia offers political stability and an abundance of renewable resources, such as solar and wind, making it an ideal location for producing green hydrogen," Saverys stated.



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Namibia Prepares to Host Global African Hydrogen Summit

The Global African Hydrogen Summit (GAH2S) 2024, to take place in Windhoek from 3-5 September, was officially inaugurated by Mines and Energy Minister Tom Alweendo and marks a significant milestone in Africa's journey towards sustainable energy leadership.

Themed *"From Ambition to Action: Fuelling Africa's Green Industrial Revolution"*, the dynamic three-day summit will showcase pan-African project and investment opportunities across the hydrogen, renewables, power, infrastructure, transportation, and mobility sectors.

With representation from over 26 countries and stakeholders across the hydrogen sector value chain, this pioneering summit promises to be a catalyst for transformative change.

The summit is being organised by London-based DMG Events under the patronage of the Government of Namibia, and in partnership with the Namibia Investment Promotion and Development Board (NIPDB).

The summit aims to address challenges such as financing, investment, infrastructure development, policy, and technology, while emphasising the importance of collaboration to drive progress.

The Global African Hydrogen Summit has been born out of a deep necessity to solve these challenges by inclusively convening stakeholders to facilitate collaboration, shape policy, drive critical investment and financing, and broker deal and project closure.

Launching the summit, Alweendo said climate change and energy security were inevitable challenges, with climate innovation and decarbonisation being a critical response towards a more sustainable future. Hydrogen has emerged as a key solution to meet Africa's energy needs with Namibia poised to play a pivotal role in the acceleration towards net zero.

"We understand the importance of adopting a pan-African approach to engaging with the world, aiming to explore and capitalise on the value brought by the development and implementation of all carbon technologies contributing to the realisation of green industrialisation and sustainable growth for African economies," said Alweendo.

"On behalf of the Namibian Government, I hereby extend an invitation to our fellow African countries, and the rest of the world to join us at the Global Africa Hydrogen Summit in Windhoek, to exchange ideas and forge partnerships that will help us unlock the full potential of our renewable energy



We understand the importance of adopting a pan-African approach to engaging with the world, aiming to explore and capitalise on the value brought by the development and implementation of all carbon technologies contributing to the realisation of green industrialisation and sustainable growth for African economies. - Tom Alweendo

resources, enhance energy security on the continent and beyond," the Minister said.

Namibia is strategically poised to become the sustainable energy capital of Africa with the potential to produce green hydrogen at less than one and a half US dollars per kilogramme. Additional advantages include an abundance of solar and wind resources, 46.7 million tonnes of biomass that can be harvested sustainably and a vast, sparsely populated land mass.

NIPDB Chief Executive Officer Nangula Uaandja shared the Government's ambitions for green investments as well as the importance of local content, skills development, youth engagement and opportunities for the entire hydrogen value chain integration, including MSMEs.

Africa holds a key to decarbonising the global energy system and can become a leading player in hydrogen made from renewables. However, there are many challenges including financing, investment, infrastructure development, policy, regulation, standards, technology, demand generation and a fragmented financial market to trade. Therefore, partnerships and collaboration are fundamental to driving progress.



Namibia Secures N\$2.5 billion Lifeline to Boost Grid Stability

Namibia has secured funding worth US\$138.5 million (about N\$2.5 billion) from the World Bank for the expansion of the country's transmission network and integration of renewable energy into the grid.

The Transmission Expansion and Energy Storage (TEES) project, to be implemented by power utility NamPower, is the first ever World Bank-financed energy project in Namibia. The TEES project is intended to improve the reliability of the country's transmission network and enable increased integration of renewable energy into the country's electricity system.

The project is structured around three components: (i) development of the second Auas-Kokerboom transmission line, (ii) development of a utility scale Battery Energy Storage System (BESS) facility; and (iii) technical assistance activities to support NamPower to develop bankable renewable energy projects and enhance the socio-economic benefits of their projects.

The project will support the development of a systematic socio-economic framework to support job creation, skills development and female employment during design and implementation of utility-led projects.

NamPower Managing Director, Kahenge Simson Haulofu, welcomed the approval of the project which he said will serve as a major milestone in the development of the approximately 465km line, which will run from Auas transmission station outside of Windhoek until Kokerboom transmission station near Keetmanshoop.

The Auas-Kokerboom 400kV Transmission line will be the second 400kV line between these two substations which

serves to increase NamPower's north-south transmission capacity. The line will make use of the highly efficient 422 series of towers, utilising a compaction cross-delta conductor's arrangement.

"This is one of the major strategic and crucial investments towards the Namibian electricity transmission network. Once completed it will allow NamPower to maintain pace with the evolving and increasing electricity needs of the country.

"This transmission line will be key to unlocking increased access to variable renewable energy within Namibia, as well as facilitate regional electricity trading. Further, our second utility scale Battery Energy Storage System will be developed and integrated in our transmission network to support the development and uptake of renewable energy plants," said Haulofu.

The BESS which will form part of the TEES project will be connected to the Lithops Substation in the Erongo region. The envisaged size of the BESS will be a 45MW/90MWh. Lithops was chosen as the location for the project for two main reasons:

- It is located near to a key load centre which mainly consists of large mines. As such the BESS can reduce inrush currents seen by the transformers when heavy mining equipment is operated.
- The area surrounding Lithops is expected to be home to upcoming solar photovoltaic (PV) power plants with significant capacity. With this in mind, the BESS can store any excess energy produced by these plants with minimal grid losses.

The expansion of the electricity network and lines are

necessary to provide for the current and future national load requirements as the needs of an expanding Namibian population will require, including the needs of an economy that is growing. This will include not only an increase in capacity, but also having redundant capacity within the transmission system to ensure security of supply due to unforeseen circumstances.

World Bank Country Director for Namibia, Satu Kahkonen, said: "Namibia is a uniquely positioned regional leader in the transition towards a greener and

more sustainable future. The World Bank is delighted to support Namibia's commitment to expand domestic energy generation with renewable solutions, consistent with the country's Second Harambee Prosperity Plan (HPP2). This project will support the NamPower to develop future renewable energy projects".

Namibia's National Energy Policy and the Renewable Energy Policy are targeting to achieve 85% self-sufficiency and aim to source 70% of the country's energy needs from renewable energy sources, in future.

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FIRST OF ITS KIND ... NamPower Managing Director Kahenge Simson Haulofu (centre, front) poses for a photo with financiers, suppliers and implementers of the 40MW Otjikoto Biomass Power Project after the signing of agreements.

NamPower Seals N\$3 billion EPC Contract for 40MW Otjikoto Biomass Power Project

NamPower has concluded financing and supplier agreements and an engineering, procurement, and construction (EPC) contract with its financiers and suppliers for the planned 40MW Otjikoto Biomass Power Station (OBPS) project.

The EPC contractor for the first of its kind power generation project in Namibia is China's state-owned Dongfang Electric International Corporation. Dongfang will develop the biomass power station near the Otjikoto substation in Tsumeb.

The N\$2,963 billion project is funded by the French Development Agency (AFD), the Mitigation Action Facility, the French Fund for Global Environment and the Government of Namibia. The AFD facilitated a loan of up to 100 million EURO (about N\$2 billion) for the construction and bringing into operation of the power station. The Mitigation Action Facility is providing a grant of 25 million EURO (about N\$503 million) towards the capital costs of the power station and for capacity building of the local biomass value chain. The French Fund for Global Environment is contributing 3 million EURO (About N\$60

million) for environmental research and extending the project benefits to vulnerable communities.

The Namibian Government, through the Ministry of Finance and Public Enterprises, is contributing N\$400 million.

The 40MW Otjikoto Biomass Power Station will allow Namibia to generate base load electricity from its own indigenous resources sourced by local farmers and contractors. In addition, the project is an integral part of the National Strategy on the Sustainable Management of Bush Resources and the National Integrated Resource Plan for the electricity supply industry in Namibia.

NamPower Managing Director Kahenge Simson Haulofu said the signing of the agreements signalled the official kick-start of the execution phase of the 40 MW biomass power project.

"As we all know, energy from renewable energy sources such as wind and solar are not available around the clock compared to baseload supply thus, this will reduce Namibia's reliance on imported electricity. The OBPS project will be a game-changer and a transformative leap



in NamPower's plans for the expansion of generation capacity, aimed at ensuring energy security for Namibia.

"Once commissioned, the station will be used to facilitate, support, and preserve power quality in the electricity grid by providing ancillary services such as synchronising torque, grid inertia and reactive power control. This will strengthen the grid to allow further integration of intermittent renewable energy sources, such as solar and wind," Haulofu said.

The NamPower MD said the Otjikoto biomass power station will significantly contribute to reducing greenhouse gas emissions, by displacing high emission electricity imports and by enabling the integration of renewable energy sources, thereby reducing the utilisation of peaking plants and imports during peak times.

In addition, the project will make a lasting impact on the local farming and agricultural communities as Namibia is challenged by massive bush encroachment that affects over 26 million hectares of farmland, leading to billions of economic losses.

The 40MW OBPS and several other generation and transmission capital projects, currently at different stages of implementation, were born out of NamPower's Integrated Strategic Business Plan (ISBP) in which the company identified its strategic focus, application, and prioritisation of resources over the period 2020-2025. The ISBP is in line with the Ministry of Mines and Energy's determination on new generation capacities.

"The Otjikoto biomass power project is of great

national importance as it will contribute towards helping the government accomplish its goals as outlined in the national planning policies, including the 5th National Development Plan (NDP5) and the National Integrated Resource Plan (NIRP), by ensuring security of supply, cost-efficiency, and self-sufficiency.

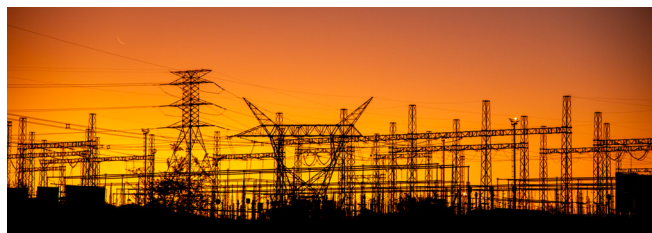
In addition, it will also aid in addressing and supporting the renewable energy commitments prescribed in the Renewable Energy Policy and National Energy Policy," said Haulofu.

Apart from Dongfang Electric International Corporation other companies involved in the Otjikoto biomass power project are Sactos Investment CC, PHP Interactive Information Technology Solutions CC, Forestry Plant and Equipment Sales CC, Nexus Civils (Pty) Ltd, Africa Biomass Company (Pty) Ltd, Ultra Trading CC, Special Supermarket (Pty) Ltd, Omuriro Biomass Investments (Pty) Ltd, and Transworld Cargo (Pty) Ltd.

Dongfang representative, Sun Zhenping, said his company was a pioneer in sustainable and green energy industry and had been involved in power projects with total capacity over 5GW.

"I firmly believe with our strong capabilities and full support from all parties involved in the project, we definitely can complete this project successfully," he said.

The Otjikoto biomass station will feature two 20MW plants with grate fired boiler technology. Encroacher bush wood chips to be used as fuel will be harvested within the 100km radius of the plant.



TRANSMISSION PROJECTS

NamPower has in place a Transmission Master Plan that provides for large transmission backbone developments across the country. The Transmission Master Plan is updated on an annual basis to ensure that the company maintains pace with the evolving electricity needs of the country. The plan involves the construction of new transmission lines, new substations and the upgrading of existing transmission infrastructure. New infrastructure is required due to existing internal supply limitations, to provide for future load growth, the integration of upcoming generation plants, and possible wheeling of electric power through the transmission grid to the Southern African Power Pool (SAPP) region.

Below are some major projects from the Transmission Master Plan, which are either under construction, bidding process or in planning phases:

PROJECT NAME: **AUAS–GERUS 400 KV TRANSMISSION LINE PROJECT**

The Auas–Gerus 400 kV transmission line project forms part of the Transmission Master Plan 400 kV development which is currently under implementation to ensure security of power supply for Namibia. The Auas–Gerus 400 kV line project will support the Auas-Van Eck-Omburu 220 kV network (providing for contingencies, benefit of improved losses and improved network stability) and strengthen the network to Gerus Substation. This will enable NamPower to accommodate increased electricity transfer and wheeling via the Gerus- Zambezi High Voltage Direct Current (HVDC) link.

This project comprises of a 290 km transmission line from Auas Substation near Windhoek to Gerus Substation near Otjiwarongo and associated works required at both substations to integrate the line into NamPower's existing network. Construction of line was completed and handed over to NamPower on 09 June 2023.

PROJECT NAME: **AUAS–KOKERBOOM 400 KV TRANSMISSION LINE**

The Auas–Kokerboom 400 kV transmission line and associated feeder bay project forms part of the Transmission Master Plan 400 kV development. The project comprises a 500 km transmission line from Auas Substation near Windhoek to Kokerboom Substation near Keetmanshoop and associated works required at both substations to integrate the line into the NamPower network.

PROJECT NAME: **330 (400) KV KUNENE AND OMATANDO SUBSTATION PROJECTS**

The 400 kV line from the Kunene Substation site to the 400 kV Omatando Substation site has been completed. Two substations have been built at each end of the line, one at Kunene near Ruacana and another one at Omatando near Ongwediva, for this line to commercially operate. The two Substations were completed and energised on 03 October 2023.

PROJECT NAME: **OBIB–ORANJEMOND 400 KV TRANSMISSION LINE**

A 400 kV transmission line will be constructed from Oranjemond Substation in South Africa to Obib Substation near Rosh Pinah. This project will improve the reliability of the existing transmission interconnection between Namibia and South Africa, allow for increased power trading with South Africa's Eskom, and improve the utilisation of the NamPower network for trading or wheeling of power between Southern African Power Pool (SAPP) member utilities.

PROJECT NAME: **132/66/33 KV SEKELDUIN SUBSTATION PROJECT**

The Sekelduin Substation project is a new 132/66/33 kV indoor substation in the vicinity of Swakopmund. The substation will become the main transmission supply to the Swakopmund and Tamarisk substations, NamWater's water supply scheme to Husab Uranium Mine and the Erongo RED 33 kV network. The Sekelduin Substation will be supplied with two 132 kV overhead lines from the Kuseib Substation.

The construction of the substation will allow for all high voltage equipment to be housed indoors in a purpose-suited building to protect it against the highly corrosive coastal and desert environment. The high voltage equipment that will be installed are compact gas-insulated mixed technology switchgear (MTS) for the 132 kV and 66 kV switching systems, as well as gas-insulated metal-enclosed switchgear (MES) for the 33 kV switching system. This development is planned to be commissioned in March 2025.

PROJECT NAME: **220/132 KV MASIVI AND 132/66/33 KV SHIYAMBI SUBSTATIONS**

Electricity demand in the Kavango area has surpassed the capability of the existing transmission infrastructure, hence these two projects to address the situation. The new 132 kV line between Masivi and Shiyambi substations, as well as parts of the 132/33 kV Shiyambi Substation, have been completed. Work on the substations commenced in May 2021 and completion is planned at the end of 2024.

GENERATION PROJECTS



OMBURU BESS PROJECT

LOCATION OF PROJECT: OMBURU SUBSTATION, 12 KM SOUTH-EAST OF OMARURU

The project entails a stand-alone grid connected 54MW / 54MWh Battery Energy Storage System (BESS) which is currently being implemented at the Omburu Substation. This project will be grant funded (€20 million) by the KfW Development Bank and approximately N\$ 100 million funded by NamPower for Transmission integration, Technical Advisory and Owner's engineer services, and Local taxes and Import duties.

The project will enable NamPower to cost effectively manage the energy demand and supply by performing energy arbitrage and supplying emergency energy. The project will also provide various grid stability services which will enable the grid to integrate additional intermittent renewable energy generation capacities, whilst ensuring security of supply.

TOTAL PROJECT ESTIMATE: ±N\$ 500 million (€/N\$ = 20)

Implementation period: The EPC Contract was signed on 13 December 2023 and the project is currently under execution.

The Projects expected to reach Commercial Operation Date (COD) by September 2025.



ROSH PINAH 70MW PV PROJECT

LOCATION OF PROJECT: 33 KM NORTH-WEST OF THE MINING TOWN OF ROSH PINAH

This project replaces the 40 MW Rosh Pinah Wind Project, which was discontinued because the wind resource at the Rosh Pinah site was found to be lower than anticipated in the prefeasibility stage.

An alternative was then considered to replace wind technology with solar photovoltaic (PV) technology at the same site. The Rosh Pinah site is favourable for solar PV technology and will yield significantly more electricity compared to the wind solution.

The Rosh Pinah 70MW PV Project will reduce the overall NamPower tariff to the end-customer by introducing an affordable "new-build" renewable energy generating plant to the Namibian grid; address and support the renewable energy commitments prescribed in the Renewable Energy Policy and National Energy Policy; and will be

implemented to be battery energy storage ready to include the possibility for future addition of a Battery Energy Storage System (BESS), once the market prices for BESS have reduced to an acceptable entry point.

The project completion is planned for 2025.



54MW FIRM (ANIXAS II) POWER STATION

LOCATION OF PROJECT: WALVIS BAY

The project entails a 54MW power plant utilizing Internal Combustion Reciprocating Engine (ICRE) technology which can either run on natural gas or liquid fuel (LFO/HFO). The power station will be owned and operated by NamPower, and the purpose of the power station will be to ensure that dispatchable power is available for the balancing of intermittent renewable energy sources and for emergency power to the Namibian grid during times of deficit within the Southern African Power Pool (SAPP) and to help minimize or avoid load shedding.

TOTAL PROJECT COST IN N\$ AND EURO VALUES: N\$1.27 BILLION / EUR\$74 MILLION (EUR / N\$ = 17)

Implementation period: Project construction is close to completion for the power plant to be commissioned in June / July 2024.



40 MW OTJIKOTO BIOMASS POWER PROJECT

LOCATION OF PROJECT: APPROXIMATELY 15 KM WEST OF TSUMEB

The project entails the development of a 40MWe Biomass Power Station utilizing encroacher bush biomass woodchips as the fuel source. Bush encroachment in Namibia currently affects 26 million hectares of potential agricultural land for livestock and food production. As a potential project of national importance, the power station will not only assist NamPower to strengthen its domestic local generation mix with a fully dispatchable energy source (which could provide baseload energy), but also benefit the greater Namibian economy with its significant macro- and microeconomic benefits from the value addition of harvesting encroacher bush as a local fuel source.

Project completion date for the power station is planned for 2026.

Mbumba Reassures World Leaders of Namibia's Commitment to Green Hydrogen

President Nangolo Mbumba assured global leaders attending the Hydrogen 2024 Summit and Exhibition held in Rotterdam, Netherlands, that the Namibian government, together with national and international stakeholders, will continue to work together to unlock the massive potential of Green Hydrogen.

"Over the past few years, government through the Green Hydrogen Council, has worked tirelessly to position Namibia as the primary leader in the global market for Green Hydrogen and we are now starting to see concrete visible results," Mbumba said.

The Hydrogen Summit, which took place from 13 to 15 May 2024, was organised by the Sustainable Energy Council in partnership with the Government of the Netherlands, the City of Rotterdam, and the Port of Rotterdam.

Mbumba said Namibia, like many African countries, views the 21st Century as a potentially transformative era for the continent, in which it can utilise new, greener and cleaner technologies to leapfrog towards industrialisation and subsequent economic transformation.

He said this will enable the continent to create jobs, greatly reduce poverty



WE'RE COMMITTED... President Nangolo Mbumba addressing global leaders at the Hydrogen 2024 Summit and Exhibition held in Rotterdam, Netherlands. Photo: NamPresidency

and build inclusive, peaceful and stable societies that will give rise to genuine and lasting progress.

Mbumba acknowledged that in Namibia the Green Hydrogen initiative was the brainchild of the late former president Dr Hage Geingob, who recognised in early 2021, the catalytic role the sector can play in reconstructing the Namibian economy.

"As a result of his tireless efforts, today Namibia hosts nine hydrogen projects, across two developing hydrogen valleys, with the potential for a third valley to be anchored by its abundant iron ore potential," Mbumba said.

The President said Green Hydrogen offers opportunities beyond just clean molecule production, it holds the potential to anchor new industries in emerging markets across the globe.

"Namibia has always harboured a desire to become an indispensable logistics hub to the Southern African region. To enhance this ambition, we are now developing an ammonia bunkering hub and a green hydrogen powered train to decarbonise shipping and long-haul logistics routes, ensuring that goods and commodities transported via our port infrastructure minimises both scope 2 and scope 3 emissions.

This will not only increase the competitiveness of Walvis Bay and Lüderitz as harbours of choice for key exporters and importers, but we believe it will increase the competitiveness of our regional goods, augment the African Continental Free Trade Area (AfCFTA), thereby boosting intra-African trade in the process," said Mbumba.

REIAoN Facilitates Japan Solar Training for Electrical Engineer

The Renewable Energy Industry Association of Namibia (REIAoN) has facilitated a seven-week solar training in Japan for an electrical engineer employed HopSol, a member of REIAoN.

Filipus Kamati, an electrical engineer, is attending the training, which focuses on solar photovoltaic systems. The training runs from June 16 to August 8, 2024.

The training, facilitated through the Japan International Cooperation Agency (JICA) office in Windhoek, seeks to effectively promote theoretical and effective solutions for renewable energy development especially solar power generation, towards a carbon neutral society.

The trainees will participate in field visits in Japan, visiting sites in Fukuoka,

Tokyo, Yamanashi as well as Saga, in order to gain first-hand experience of the operation of these solar systems.

Kamati is a solar engineer at HopSol responsible for implementing and overseeing solar projects of varying scales. He is also a certified Green Hydrogen Specialist in project development and economics, having acquired the certification from the Renewables Academy in Germany.

The JICA Knowledge Co-Creation Program provides comprehensive training on developing renewable energy policies, including the conditions necessary to promote photovoltaic technologies and corresponding policies.

"I look forward to gain insights into developing renewable energy policies, understand conditions to promote photovoltaic technologies and its policies and be in a position to approach renewable energy challenges from both technical and managerial/administrative perspectives," said Kamati.



Filipus Kamati

OPINION



PACE SETTER ... The 530MW/1140MWh Scatec complex near Kenhardt in South Africa. **Photo: Scatec**

Energising Namibia – BESS Should Be Owned By IPPs

BY CONRAD ROEDERN

Battery Energy Storage Systems (BESS) have come down in price and they have the potential to transform the fluctuating output of solar PV parks and wind parks into firm power.

The sizeable Scatec project near Kenhardt in South Africa is a good example with its 530MW of PV and 1140 MWh of battery storage. At a cost of roughly US\$1 billion (about N\$19 billion), the plant is set to deliver 150MW of firm power for 16.5 hours (i.e. between 5am until 9.30pm).

The investors are Scatec from Norway (51%) and H1 Holdings Plc from South Africa (49%). A 20-year power purchase agreement (PPA) governs the terms of sale and purchase of the electricity between the parties.

What I regard as a revolution is the fact that in South Africa even the utility Eskom allows private investors to establish large PV parks together with BESS storage, while NamPower tries to keep large storage very much under their own umbrella.

Since Namibia still imports some



70% of its electricity, and considering that NamPower is lending big scale money for their next BESS project at unknown lending conditions, the willingness of independent investors to finance and install should really be exploited. This would speed up our vital strife for autonomy without putting us into the risky dependency of World Bank-type loans.

Two of these Scatec-sized plants with storage would make Namibia energy independent. What a proposition for Namibia!

Obviously, we would distribute the plants throughout the country thus making them even more resilient

against possible cloud cover. At least any large new solar PV or wind installation should come – compulsory for better grid stability – with two hours of storage and the existing ones should be retrofitted.

NamPower will have to step from its monopolistic generation structure to be transformed into a “Smart Grid Operator” which is set to integrate the various generating sources. This task will include having joined control over managing the distributed BESS owned by the IPPs. In this way NamPower could retain its function of “supplier of the last resort”. We should not jeopardise the security of our electricity supply by procrastinating and run into the same tragedy we are currently facing in terms of water and food security.

Conrad Roedern is an electrical engineer and one of the pioneers of solar technologies in Namibia having founded Solar Age Namibia in 1989. He's also an electric vehicle pioneer and investor.



SOLAR THERMAL IN MOTION ... The experts, industry professionals and trainers from vocational training providers who attended the training which took place in Windhoek from 4 – 7 June.

Namibia Energy Institute Hosts Second Train the Trainer Course for Experts and Professionals under SOLTRAIN+

The Namibia University of Science and Technology (NUST), through the Namibia Energy Institute (NEI), hosted the second train the trainer course for solar thermal experts and professionals, under the Southern African Renewable Heating and Cooling Training and Demonstration Initiative project (SOLTRAIN+).

Over 30 experts and industry professionals, as well as trainers from vocational training providers, attended the training which took place in Windhoek from 4 – 7 June.

The experts and professionals courses of SOLTRAIN+ are focused on groups of participants as well as on the staff of direct project partners, who previously already attended SOLTRAIN courses. The aim is that the participants of these courses are then able to disseminate the gained knowledge in training for artisans from the private and public sector.

The training, which was conducted by Rudolf Moschik from the Austrian Institute for Sustainable Technologies (AEE-INTEC) which is the SOLTRAIN+ coordinating agency, aimed to provide the participants with deep understanding of designing and dimensioning of middle-sized solar thermal systems.

It also aimed to equip the participants to be able to carry out audits, come up with Renewable Heating and Cooling (RHC) concepts and prepare calls for tenders.

At the end of the training the participants had the opportunity to do site inspections of installed systems at the Katutura Hospital Maternity Ward and the NUST



We hope that the participants of this training can be able to put up demonstration systems that will demonstrate that solar thermal technology really works.-Helvi Ileka

Hotel School, where they had some practical training in rectifying the faults in the pumped systems.

Moschik helped the participants to consolidate the knowledge they had gained in previous SOLTRAIN trainings, such as going through the various applications for solar thermal systems, solar thermal system designs for pumped systems, solar collectors, types, quality and efficiency, as well as other components of a solar thermal system (such as storage, piping, expansion vessels and electronic control).

They then went into the designing and dimensioning of middle-sized solar thermal systems, taking into consideration the preliminary work that needs to be done first, such as data acquisition and preparation of case studies.

Moschik took the participants through the detailed designing of the solar collector area and storage tank size by hand calculation and by the use of a simulation program.

Considerable time was also spent taking the experts and

industry professionals through the designing of detailed collector hydraulic, hydraulic pressure drops, pump size, heat exchanger size and expansion vessels.

They also learned how to prepare applications for SOLTRAIN funding of demonstration systems.

NEI Acting Director Helvi Ileka said the focus on the designing and dimensioning of middle-sized solar thermal systems was aimed at addressing the real challenges that are faced with the installation of such systems.

"We hope that the participants of this training can be able to put up demonstration systems that will demonstrate that solar thermal technology really works," she said.

The SOLTRAIN project has been helping to partially finance (up to 50%) solar thermal systems for demonstration purposes in Namibia and other countries in the region where the project is being implemented.

Moschik said it was important for Namibia to increase the implementation of solar thermal systems in projects such as social housing, health facilities, tourism and hospitality, and others, in order to reduce the country's carbon emissions.

He said the increase in greenhouse gases in the atmosphere and the potential global warming and climatic change associated with it, represent one of the greatest environmental dangers of our time. A reduction of CO₂ emissions will require the conversion to a sustained supply of energy that is based on the use of renewable

energy with a high share of direct solar energy use.

Magdalena Kamati, an instructor from NamVoc Vocational Institute, who was one of the participants at the training, said there was an urgent need for Namibia to have more equipped trainers in order to train others.

"It is important for more trainers to learn new skills in order to train others to do these installations in a proper manner," she said.

Muzeu Kavari, from a private company, KBC solar, said Namibia was importing energy at very high costs and therefore there was a need to create more local capacity to be able to install solar systems and reduce the imports.

"Planners of tomorrow are now influenced heavily by the need to reduce costs of production by turning to renewable energy sources. We also need to enlighten every person on the benefits of using renewable energy," he said.

Courses offered under the SOLTRAIN+ project, are specifically oriented on medium-scale to large-scale pumped solar thermal systems. They are focused on different groups of participants as well as on the staff of direct project partners, who previously already attended SOLTRAIN courses.

The participants of these courses shall be able to use the knowledge in the daily activities and shall also be able to disseminate the gained knowledge in training for artisans from the private and public sector.



HANDS ON TRAINING ... At the end of the training the participants had the opportunity to do site inspections of installed systems at the Katutura Hospital Maternity Ward and the NUST Hotel School, where they had some practical training in rectifying the faults in the pumped systems.

PUTTING BRILLIANCE INTO VALUE ADDITION

With expert precision we avail Namibian sightholders with diamonds worthy of being in exceptional jewel pieces. Every consignment we sell to them helps generate jobs, income and development for our nation. We are proud of how each carat sold is allowing us to fulfil our mandate and add to the shine of our country's brilliance.



A NAMIBIA DE BEERS PARTNERSHIP



BATTERY STORAGE SKILLS ... Professor Peter Adelmann with the 50 technicians and engineers who attended the training focused on solar battery storage, inverters, and charge controllers.

NEI, ID-EEE & Megatech Host Advanced Training on Battery Storage, Inverters and Charge Controllers

The Namibia Energy Institute (NEI), at the Namibia University of Science and Technology (NUST), facilitated a week-long advanced training for 50 technicians and engineers focused on solar battery storage, inverters, and charge controllers.

The training, which took place from 21 to 25 May, was conducted by Professor Peter Adelmann, Director of the Institute for Decentralised Electrification, Entrepreneurship and Education GmbH (ID-EEE), with assistance from Pupkewitz Megatech Renewable Energy Solutions.

The objective of the training was to strengthen the technical skills and capacity of the trainers to be able to provide training to the students in the renewable energy sector, solar photovoltaic (PV) in particular, and to conduct research in battery, inverter and charge controller technologies.

The training was organised under the Japan-funded project titled: *Strengthening and Building Resilience of Namibia's Peri-Urban Communities to Climate Change through Climate-Smart Agricultural Production, Access to Solar Technologies, Climate Information and Early-Warning System*, implemented by United Nations Development Programme (UNDP).

A concept note, titled *"Skilling MSMEs, Including in the Informal Sector, for Effective Participation in the Renewable Energy and Green Hydrogen (GH) Value Chains"*, was developed through close collaboration between the UNDP Namibia, NEI, the International Labour Organisation (ILO), Kafue Gorge Regional Training Centre (KGRTC), ID-EEE Institute and the Namibia Training Authority (NTA).

The concept has three objectives:

Objective 1: Strengthened capacities of vocational training and higher education institutions in renewable energies starting with solar technology.

Objective 2: Strengthening the existing laboratory infrastructure development for simulation and dual training in renewable energy and power.

Objective 3: An enabling environment created by strengthening efficiencies in coordination, partnerships and financing between government, industry, and skills development institutions.

Acting Dean of the Department of Industrial Mechanical and Electrical Engineering at NUST, Dr Veikko Shalimba, said in 2023, NEI, together with the Renewable Energy Academy, a German-based training entity on renewable energy, conducted a Skills Needs and Gap Analysis in Namibia's PtX sector on behalf of GIZ. One of the main findings of the study was that there are minimal specialised courses on batteries, charger controllers, and inverters at both public and private vocational training institutions, as well as higher education institutions including the NUST.

The study also highlighted poor industry-driven curricula development as a barrier to hands-on skills development. This alone compromises the effective implementation of renewable energy systems in Namibia, particularly for the emerging PtX value chains.

Dr Shalimba commended efforts by NEI and partners in ensuring enhanced capacity and skills for instructors, lecturers, and renewable energy industry practitioners.

He also revealed that NEI was currently developing an advanced laboratory for practical training and procuring state-of-the-art equipment in collaboration with the UNDP, for NUST to start offering various short courses on solar technologies such as, off grid solar system design and installation, earthing bonding and lightning protection, safety health environment and quality management, distribution at low voltage and battery storage, inverters and charge controllers.



EMPOWERED ... The 40 female technicians who attended the training on the installation and maintenance of solar systems. Photo: Tabby Moyo

GLZ and Partners Empower Female Solar Technicians

As one of its closing activities in Namibia, the GIZ Green People's Energy project, in collaboration with its partners the Ministry of Mines and Energy (MME), the Namibia Energy Institute (NEI) and the Renewable Energy Industry Association of Namibia (REIAoN), hosted a training for 40 female technicians on the installation and maintenance of solar systems.

The GPE project aims to, among other things, develop professional skills in the solar industry, considering the critical role that solar technologies play in the electrification of remote areas and the role these technologies will play in Namibia's green hydrogen industry.

The training, which took place in Windhoek from 27-31 May, attracted a lot of interest from women involved in the Namibian solar industry as over 1000 applications were received for the week-long solar training.

The training was led by Hilde Amushembe from Rio Rita, assisted by Helvi Ileka from NEI and Paulus Mulunga from REIAoN who took the female technicians through the importance of the maintenance of solar systems.

Apart from helping capacitate women involved in the solar industry, the workshop aimed to create a network of women considering a career path in the renewable energy sector and to support solar professionals actively working in the industry who want to take their careers to the next level.

Head of the GPE project in Namibia, Simon Inauen, said the project believes that solar offers the best opportunity for electrification of remote areas.

"Solar energy is the cheapest source of energy you can have and Namibia has an abundant solar resource," he said.

He said the gender focus for the last training was based on the fact that women are often overlooked in the technical

field.

"There's a perception that women cannot climb the roof to do the installations. Sometimes there are also cultural limitations in allowing women to venture into solar. But we believe that it's largely a matter of capacity building," said Inauen.

Participants were taken through rigorous theoretical and practical training with a special focus on the design and installation of solar pumping systems and solar home systems.

One of the participants, Sondag Haluka-Kwedhi, an electronics technician at the Rössing Uranium mine, said the training was very valuable as it combined theoretical and practical lessons.

She said the training presented the women technicians with an opportunity to network and exchange ideas.

"I learned a lot from the training and I am currently planning to install my own solar system at home. I am also planning to start my own business in the solar industry," she said.

Haluka-Kwedhi said the training was inspirational and served as a morale booster for the women.

"We were all women, the trainers were women and that was inspirational. It was a matter of 'if she can do it I can also do it,'" she said.

She said there was need to have similar trainings countrywide and to include non-technical people with interest in starting businesses in the solar industry.

Another participant, Greqencia Tjazaamo, a plumber based at Okakarara, said the training enlightened her on the importance of sizing and designing of solar systems.

"Before we used to just buy solar panels, inverters and

batteries without first doing calculations to establish the clients' electricity needs. As result we were installing systems that did not meet the needs of clients," she said.

Tjazaamo said the GIZ training had also equipped her to be able to tackle plumbing systems for solar water pumps.

"We would like to have more similar trainings in order to deal with the different aspects of solar installations in detail. A short course is not enough to cover all the technical areas but it gave us an idea of what is required," she said.



The advertisement features a blue background with a sunburst in the top left corner. At the top right is the KBC logo, which includes a stylized sun and the text 'KBC Solar Systems & Drillings' with the tagline 'Renewable Energy = Greener Future'. Below the logo, contact information is provided: 'E-MAIL: SALES.KBCSOLAR@GMAIL.COM' and 'TEL: +264 81 250 0645'. The central text reads 'SOLAR SPECIAL!!' in large, glowing yellow letters. To the left of this text is a black silhouette of a house with solar panels on its roof. Below the house, there is a stack of three solar panels and two white batteries labeled '12.8V 100AH'. The text '5KW SOLAR SYSTEM' is prominently displayed in yellow and white, followed by 'N\$98,720.00 (request quote.)' in yellow. At the bottom right, a list of appliances and tools is provided in white text.

KBC
Solar Systems & Drillings
Renewable Energy = Greener Future

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SOLAR SPECIAL!!

5KW
SOLAR SYSTEM
N\$98,720.00 (request quote.)

For a normal standard house; 16 x 230-240/AC
, TV, ,Fridge,Deep freezer,Cell chargers ,Wifi router, Multi-funtional tools for home use.

Can Novel Decentralised Off-grid Solutions Overcome Mini-grid Challenges?

Insights from the PROCEED Project at Tsumkwe

BY BERTHA LWAKATARE
AND DR. KEDAR MEHTA

Off-grid electricity solutions, especially mini-grids, are becoming essential in the global energy landscape. In Namibia, mini-grids are actively used in communities like Tsumkwe, proving to be a viable option for providing power to rural and remote areas where traditional grid extension is impractical due to economic, geographic, or demographic challenges.

However, detailed data on their actual performance is limited. According to Sustainable Energy for All (SE4All), only 77% of the mini-grids recorded between October 2019 and February 2020 were operational, highlighting the need to address issues faced by the remaining 23%. Ensuring the sustainability of mini-grids is vital for achieving universal energy access, which requires thorough assessments of existing systems.

The Pathway to Renewable Off-Grid Community Energy for Development project (PROCEED), coordinated by Technische Hochschule Ingolstadt and funded by the German Federal Ministry of Education and Research, was completed in September 2023 in Windhoek. The main technical objective was to improve the operation and performance of existing mini-grids, focusing on case studies in Tsumkwe and Gam. The project consortium included four German partners (Technische Hochschule Ingolstadt, Universität Bayreuth, Hochschule Neu-Ulm, and IBC Solar AG) and seven Namibian partners (Ministry of Mines and Energy, CENORED, Namibia Energy Institute, Hanns Seidel Foundation, REIAoN, SACREE, and Alensy Energy Solutions). The project also collaborated with Asantys Systems GmbH, PineBerry, Namibia University of Science and Technology, and AMUSHA.

Within the framework of the project, TH Ingolstadt assessed the performance of the Tsumkwe mini-grid and the consumption behavior of its users. Common complaints from users included frequent power outages, load shedding affecting businesses, and a preference for



A 25.8 kWp solar PV decentralised system installed to complement the 300 kWp Tsumkwe Mini-grid. © TH Ingolstadt, Germany



The decentralised system at Tsumkwe Secondary School. © TH Ingolstadt, Germany

grid electricity over mini-grid electricity.

It's crucial for grid operators and technical experts to understand the performance of mini-grids, monitor data, and prevent failures that undermine reliability. TH Ingolstadt found that the Tsumkwe mini-grid, which consists of a 300kWp PV system with 3000kWh of battery storage and a 300kVA diesel generator, struggled to meet local demand. Increased reliance on costly diesel generators was a clear sign of this insufficiency.

Additionally, some batteries had degraded and no longer stored energy effectively, instead consuming power. Data monitoring and thermal imaging confirmed these issues. The challenges were compounded by the growing electricity demand of the Tsumkwe community, which had already pushed the mini-grid to its limits. Similar to the nearby off-grid community of Gam, Tsumkwe shows that as communities grow and acquire more electrical appliances, their electricity needs increase beyond basic levels.

Addressing electricity shortages in off-grid communities is complex and involves

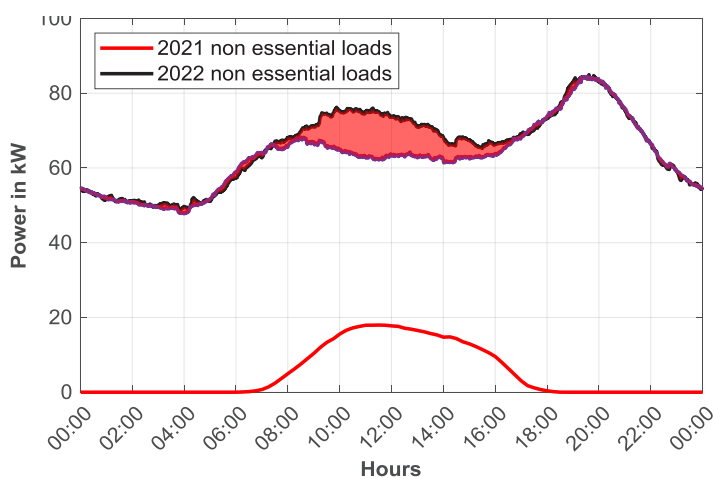


Energy stakeholders & panelists at the PROCEED Final Conference. © TH Ingolstadt, Germany

more than just increasing generation and injecting more power into the grid. TH Ingolstadt implemented a novel approach to complement the Tsumkwe mini-grid with a decentralised prosumer system. By analysing the anchor daytime electricity consumers, the 16kW peak demand of Tsumkwe Secondary School presented an ideal site location. A 25.8kWp solar PV system was installed with a 24kWh battery storage and monitored remotely to observe its performance. The main objective of the installation is to test the potential of decentralised systems in complementing a maxed-out mini-grid and doing so by considering the anchor consumers in the off-grid community.

Since the school's electricity usage fluctuates annually depending on the school calendar, the amount of electricity fed back to the main mini-grid also varied. However, over 55% of the electricity produced by the system was fed to the mini-grid, while the remaining 45% was consumed directly by the school and/or used to charge the batteries.

In 2022, a significant decrease ($\approx 20\text{kW}$) in the electricity consumption from the mini-grid during the daytime was observed. Comparing this decrease to the production of the decentralised system clearly indicated that the system effectively shaved the peak (see figure below).



The impact of the decentralised system on the mini-grid.
© TH Ingolstadt, Germany

The insights gathered from the decentralised system at Tsumkwe Secondary School highlight the potential of novel off-grid solutions in overcoming mini-grid challenges. While the traditional mini-grid setup at Tsumkwe has faced significant hurdles, the introduction of a decentralised prosumer system demonstrates a viable path forward.

By strategically installing a solar PV system with battery storage at a key consumption site, the project successfully reduced the daytime electricity demand on the central mini-grid, providing much-needed relief. This innovative approach underscores the importance of integrating decentralised renewable energy systems to support and augment existing mini-grids, especially in remote and rural areas. The positive results from Tsumkwe serve as a compelling case for broader adoption of such hybrid solutions, which can improve reliability, reduce operational costs, and ensure sustainable energy access for off-grid communities.

As the global energy landscape continues to evolve, these findings reinforce the crucial role that off-grid solutions will play in achieving Sustainable Development Goal 7 (SDG 7) and driving forward the vision of sustainable energy for all.

Professor Wilfried Zörner, the project lead, extends his heartfelt appreciation to all consortium members for their unwavering commitment and efforts in steering the five-year project towards the discovery of valuable insights. He eagerly anticipates the prospect of engaging in numerous future collaborations to further advance sustainable energy solutions.

For further details, please visit the project website:
PROCEED Project:

<https://www.thinknamibia.org.na/projects/proceed>



PROGRESS: Ministers Alweendo of Namibia and Borges of Angola sign agreements signaling progress on the long-awaited Baynes Hydro Power Project. Photo: New Era

Angola, Namibia Step Up Baynes Hydro Power Project Plans

The governments of Angola and Namibia are making concerted efforts to realise the long-standing Baynes Binational Hydro-Power Project.

The Baynes project, on the Cunene River, expected to add nearly 900 megawatts to electricity generation efforts by Angola and Namibia, has been on the drawing board since 2008 when the feasibility study was commissioned and completed in 2014. A follow-up study was initiated in 2021, and completed in 2023.

Namibia's Mines and Energy Minister Tom Alweendo met with the Angolan Minister for Energy and Water, Joao Baptista Borges, at Lauca Hydroelectric Dam in southern Angola on 3 June to review progress on the long-running project. This was a follow-up meeting on the bilateral virtual meeting they had on 20 November 2023.

Both ministers expressed their appreciation to the progress that has been accomplished by the officials and consultants assigned to the Baynes hydro power project, noting that all the key studies have been completed, with only few additional assessments still to be completed before the end of this year.

Government lawyers of the two countries have now been mandated to meet and finalise the legal review of the Baynes Binational Implementation Agreement, to be signed by July 2024.

The strategic importance of the Baynes project for Angola and Namibia, as well as for the entire SADC region, was reiterated as the project has now become of regional importance.

Considering that Angola is not yet connected to the regional transmission network of SADC, it has become crucial that the Angola-Namibia Transmission Interconnection (the ANNA Interconnection) is expedited

to ensure that Angola is connected to the regional power trading platform.

The investment planned for the transmission network to the Baynes Binational Hydro Power Project will further compliment the interconnectivity of Angola and Namibia to the rest of the region and provide additional export route for the excess power on the Kwanza and Cunene river basins.

Considering that the key studies have been completed, after careful considerations of the outcome of those studies and the recommendations thereof, Ministers Alweendo and Borges approved the transformation of the two Baynes project offices, into a Joint Baynes Implementation Unit, which will be situated either in Luanda or Windhoek, with a satellite office in either of the two cities.

A joint bank account in either Luanda or Windhoek will now be opened for the project, to be managed by the Joint Baynes Project Implementation Unit. Both governments will allocate annual budgets to the project implementation unit.

An additional regulating dam will be built about 12km downstream from the main dam, which will have an installed capacity of 21MW, and will also serve as a road corridor bridge.

Ministers Alweendo and Borges took note of the fact that the public model has been deemed as the most suitable implementation model for the Baynes Binational Hydro Power Project and it has been recommended to the two governments for final consideration and endorsement before September 2024.

The Baynes Transmission Interconnection feasibility study is at an advanced stage, and it is expected to be completed by mid-2025.



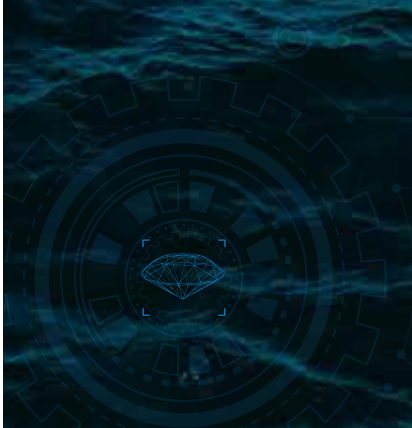
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