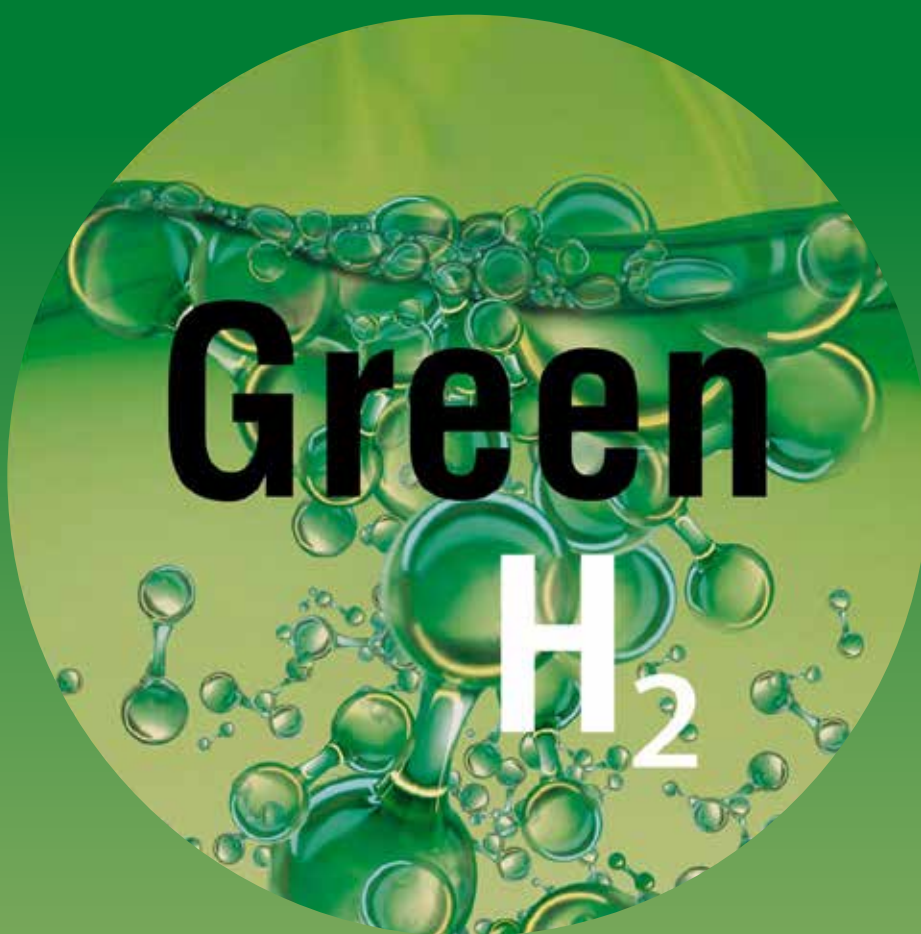




October-November 2020

THE FUTURE IS HERE!



Can Green Hydrogen be the game changer for SADC?



Namibia, Botswana fast-track solar megaproject



Solar module production facility planned for //Kharas



Wind, solar powered pilot desalination plants launched



Republic of Namibia

[COVID-19]

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Covid-19 lessons for the Energy Sector

The Covid-19 pandemic has had devastating effects on the world economy and Namibia has not been spared. The energy sector has endured a fair share of the turmoil brought about by the coronavirus.

Investments in the sector have been severely affected, more so shrinking the movement towards clean energy technologies. Prior to the crisis, Namibia had recorded some progress in the energy sector, particularly with renewable energy technologies. But, since the onset of the Covid-19 pandemic, several RE projects have been delayed or put on hold, with virtually no notable activity taking place in 2020.

Without a doubt, the Covid-19 pandemic will affect the pace of energy transition across the globe and weak international cooperation will impact negatively on fast-tracking and mainstreaming the low-carbon transition globally.

The biggest lesson that has come out of the global crisis for Namibia is to strive towards reducing imports of basic commodities and becoming more self-reliant. And this includes the energy sector. The renewable energy sector is by no doubt a crucial player in the fight against the disastrous effects of the pandemic. Access to reliable and sustainable energy is a crucial need, and is even more important

today for supporting essential services.

In a period of extreme crisis such as the one we are experiencing, ensuring a continuous flow of electricity is essential to keep the strategic infrastructure going. Through strategic investment in sustainable energy, stimulus measures to induce economic recovery will strengthen the foundation of sustainable development. Renewable energy investments at scale will contribute to support sustained economic growth, including by strengthening local value chains and supporting local jobs.

More investments in grid enhancement, interconnections, storage and flexibility solutions are urgently needed for an effective and accelerated deployment of renewables.

Could Green Hydrogen be a game changer?

Noting efforts to speed up the low-carbon energy transition, we are happy to observe that the green hydrogen economy concept is presenting new prospects for Namibia and the continent as a whole. Green hydrogen can play a significant role, not only to address energy access and security, but also in terms of industrialising the SADC region.

It can be stored, it can function as a carrier, it can be used directly for heating and cooling,

it can decarbonise production processes and will likely be made available at the same production cost as fossil or blue hydrogen within the next three years.

We applaud the SADC Centre for Renewable Energy and Energy Efficiency (SACREEE) for teaming up with the Southern African Science Service Centre for Climate Change and Adaptive Land Management (SASSCAL) to promote the development of a green hydrogen economy in the region.

In this edition of **Etango**, we bring you more exciting developments in the Namibian renewable energy sector.

Among these, we explore the green hydrogen economy prospects; we feature plans to fast-track the 5,000MW solar megaproject between Namibia and Botswana; we look at wind and solar-powered pilot water desalination projects at the southern settlements of Grünau and Bethanie. We also take a look at plans by a German technology company to build a production facility for Concentrator Photovoltaics (CPV) solar modules in Namibia.

Happy Reading!
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Contents

SADC's green hydrogen buy-in exceeding expectations	4-5
Namibia and Botswana fast-track solar megaproject.....	6-7
Renewable Energy Industry Association on the up	8-9
SOLNAM plans solar module facility at Keetmanshoop	11
RE powered pilot desalination plants for Grünau, Bethanie	12-13
SOLTRAIN trains VTC instructors on solar thermal systems.....	14-15
Soris Soris Conservancy gets 150kW solar plant boost	16
Windhoek forges ahead with 25MW solar power plants.....	17
O&L acquires majority stake in German-based CRONIMET	19
Green People's Energy Namibia springs into gear	20
Solar could power planned Walvis Bay desalination plant	21
The rise of grid-scale renewables in Africa	22
IFC study shows Africa onshore wind energy potential	24
List of approved solar installers and suppliers	25-27



Cover picture:

GREEN HYDROGEN IS HERE: The hype around 'Green Hydrogen' is growing worldwide. Can Namibia benefit from this new source of green energy?

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Southern Africa's green hydrogen buy-in exceeding expectations

Southern Africa's buy-in into the green hydrogen economy concept is exceeding expectations, SADC Centre for Renewable Energy & Energy Efficiency (SACREEE) Executive Director Kudakwashe Ndhlukula told *Mining Weekly*.

Green hydrogen is a clean form of hydrogen with a zero-carbon footprint.

"We have come in at the right moment and the buy-in from stakeholders, especially the governments, is huge," Ndhlukula said in a Zoom interview with *Mining Weekly*.

Some private sector companies want to sign memorandums of understanding (MOUs) and others are seeking guidance on how they can start developing into the green hydrogen sector. SACREEE sees much regional value in green hydrogen development.

The current Green Hydrogen Atlas-Africa initiative that it is helping to advance in the region is also highlighting the value of Southern Africa's huge platinum group metals (PGMs) endowment, which goes hand-in-hand with the green hydrogen economy, both in the electrolyzers that produce green hydrogen and in hydrogen fuel cells that provide mobility, stationary power generation, heating in steel plants and other ferrous and non-ferrous metals plants and a host of other industrial, commercial and residential applications.

"I see a lot of beneficiation coming out once we have analysed the competence we have as a region," Ndhlukula said.



**SACREEE Executive Director
Kudakwashe Ndhlukula**

'We see that green hydrogen can play a significant role, not only to address energy access and security, but it can also play a big role in terms of the industrialisation of the region'

Furthermore, SADC hosts a range of metals and minerals used in the hardware that provides the solar power and wind power used

to generate the clean electricity that guarantees the decarbonised nature of the hydrogen.

"We see that green hydrogen can play a significant role, not only to address energy access and security, but it can also play a big role in terms of the industrialisation of the region," said Ndhlukula.

Green hydrogen can be stored, it can function as a carrier, it can be used directly for heating and cooling, it can decarbonise production processes and will likely be available at the same production cost as fossil or blue hydrogen in the next two to three years.

"We're importing petroleum products mostly to drive our vehicles. Some of the mining companies are using imported heavy fuel oil for process heat. The same applies in other industrial applications. Then, if you look at the chemical industry, we are importing a lot of feedstock. If you look at the fertiliser industry, we're importing a lot of ammonia. We can now see a locally produced substitution coming in with the utilisation of green hydrogen," he said. Green ammonia and methanol are derivatives of green hydrogen.

"We're looking at the source of electricity for hydrogen production being renewable electricity. In this case, we're looking at wind, solar and other renewable resources that can be used to generate electricity and then split the water into hydrogen and oxygen.

"Water is a challenge. We know that quite a lot of SADC countries are water-stressed. If you look at Namibia, Botswana and South Africa these are water-stressed

countries. Of course, if you look at the whole region, there are some countries with an abundance of water, such as Zambia, the Democratic Republic of Congo, Congo, Malawi and some parts of Zimbabwe, but overall, the region is water-stressed.

SACREEE is working with the Southern African Science Service Centre for Climate Change and Adaptive Land Management (SASSCAL), a regional technical committee with high-level technical know-how in renewable energy, climate expertise, water resources and socioeconomics. On the horizon are:

- the introduction of a postgraduate course in green hydrogen to advance academic sustainability in the region; and
- a visit next year by 15 young scientists to Germany as part of a “seeing is believing” green hydrogen experience.

“We’ve also gone a step further to establish national teams, which are very active on the ground collecting data as well as liaising with national stakeholders. The green hydrogen economy, in our view, is going to be a game-changer. We see a lot of value in developing the green hydrogen economy in this region.

“We expect that by the end of 2021, we should have validated the hydrogen atlas that identifies the potentials and identifies requirements in terms of the infrastructure that needs to be developed.

It is on that basis that additional aspects of the green hydrogen economy can be developed, for instance the siting of electrolysis plants, the industries that can benefit from green hydrogen, the networks that need to be developed, as well as policies and regulations that need to be brought



in to support the green hydrogen economy. There is great potential, there is great will,” said Ndhlukula.

The Green Hydrogen Atlas-Africa project, to which the German Federal Ministry of Education and Research has allocated €5.7-million in funding, is placing Southern Africa on the road to contributing meaningfully to the global Sustainable Development Goals.

SASSCAL Executive Director Dr Jane Olwoch described the green hydrogen atlas project as the starting point of a process to firm up data and validate green hydrogen sweet spots. This is expected to be followed by the building of a pilot plant that is able to demonstrate the competitiveness of Southern African green hydrogen generation ahead of commercialisation.

The membership of the Hydrogen Council, a global CEO organisation, has rocketed and the intensity grew earlier this year when the companies Hatch, Anglo American, BHP and Fortescue formed the

Green Hydrogen Consortium to look at ways of using green hydrogen to accelerate decarbonisation within their operations globally.

The consortium aims to collectively help to eliminate the obstacles to the adoption of green hydrogen technologies and encourage innovative applications.

Some of the proposed activities include undertaking research, technology, and supply chain development, as well as piloting green hydrogen technologies that seek to de-risk and accelerate the technologies.

Green hydrogen in the region is poised to be inextricably linked to solar power, which the International Energy Agency (IEA) declared the “new king” of electricity, arguing that, while renewables technologies as a whole are poised for rapid growth over the coming several decades, solar will be “at the centre of this new constellation of electricity generation technologies”. – **Mining Weekly**

Namibia, Botswana seek to fast-track 5,000MW solar megaproject

Neighbours Namibia and Botswana are inching closer to formalising an agreement for a joint 5,000 MWp solar photovoltaic mega-project. A signed agreement to this effect is imminent, according to Mines and Energy Minister Tom Alweendo.

The project, which was first made public in September 2019, was mooted by Power Africa, an American initiative aimed at supporting economic growth and development by increasing access to reliable, affordable, and sustainable power in Africa. It is earmarked to be implemented over two decades.

“We should have already signed the agreement and there was a lot of progress in the negotiations in March, before Covid-19 disrupted things,” said Minister Alweendo, adding that the agreement to be signed by the two countries will facilitate a full feasibility study that will determine the size and location of the solar plants.

It is envisaged that most of the



The first phase of the mega project will see a 300 MWp to 500 MWp plant being built to meet domestic demand of the two countries

energy to be generated by this gigantic initiative will be sold to neighboring countries in southern Africa, as the energy consumption of the two countries is way below the generation capacity that has been mooted.

The first phase could be subject to a call for tenders of 300 MWp to 500 MWp to meet the domestic demand of the two countries. A second phase is planned to produce between 500 MWp and 1,000 MWp. A third and final phase will allow the construction of solar parks that will provide 1,000 MWp to 3,000 MWp.

The megaproject provides for building both photovoltaic (PV) and concentrated solar power (CSP) plants.

High-ranking officials from Namibia and Botswana, both countries currently relying heavily on power imports from the troubled Eskom in South Africa, met Power Africa on the sidelines of the US-Africa business summit held in Maputo, Mozambique last year to discuss the ambitious plan.

The Network of Global Future Councils, which is championing the megaproject, is one of the world's largest interdisciplinary



knowledge networks dedicated to promoting innovative thinking to shape a sustainable and inclusive future for all. Several financial institutions, such as the African Development Bank (AfDB), the World Bank and the International Renewable Energy Agency (IRENA) are members of the WEF Network.

Namibia has one of the best solar regimes in the world with an average high direct insolation of 2,200 kWh/m²/a and minimum cloud cover. Botswana has similar climatic conditions.

“The market for electricity

produced by the mega-solar projects in Botswana and Namibia includes 12 other countries in the region that could be connected via new and/or upgraded transmission infrastructure,” WEF said.

A senior Namibian government official said recently that “the investor is bringing money and technology and therefore they have certain expectations that we must consider.

We are treating this mega project as a matter of urgency as we would not want to lose the investment”.

Both countries are members of the Southern African Power Pool

(SAPP) which, among other things, aims to increase the accessibility of electricity to rural communities, develop sustainable development priorities, and to co-ordinate the planning of electric power. Only 5 percent of rural areas in Southern Africa have access to electricity.

Lack of electric power impedes their access to clean water, limits the availability of food, and constrains access to clean, sustainable sanitation.

WEF said members of the Global Future Council on Energy continue to meet with officials from Botswana and Namibia to advance this ambitious megaproject.

Both Namibia and Botswana are currently implementing their own independent solar plans, although at a more limited scale. Namibia’s power utility NamPower recently announced a Corporate Strategy and Business Plan (2019-2023) through which it intends to add 150 MW of new generation capacity to its portfolio by way of 20 MW of solar, 40 MW each of biomass and wind and 50 MW of guaranteed ‘firm’ electricity output.

NamPower Managing Director Kahenge Simson Haulofu said: “Namibia is benefiting from the global expansion of the solar market, which is reducing costs and improving the efficiency of photovoltaic solar panels and related equipment”.

The two countries want to reduce their dependence on power imports from South Africa, which is facing a power crisis due to the financial and operational troubles of state-owned utility Eskom.

The ambitious 5 GW solar project could conceivably see the tables turned, with Namibia and Botswana exporting power to their regional neighbours.

Renewable Energy Industry Association on the Up

In the Nov-Dec 2019 edition of *Etango*, the Renewable Energy Industry Association of Namibia (REIAoN) announced that it was undergoing restructuring to ensure its continued relevance, robustness and effectiveness, in the light of changes in this dynamic industry. Since then and despite the complexities brought on by Covid-19, the association has prevailed in its rejuvenation endeavors.

The newly elected REIAoN directors tackled the challenges by making key adjustments to the organisational structure to ensure that the group of motivated members collaborate effectively in the interest of the RE sector in Namibia. Various actions have been executed, while others have been delayed due to the pandemic. In summary, great effort has been made on the internal mechanisms, the Constitution and directional concept of the association.

A highlight of some of the tasks/activities carried out by the new board are explained below.

- **Constitution Finalisation**

A delicate, but essential component for any association, the Constitution was the first major effort to be concluded by the Board. In February 2020, the Constitution was concluded through signature by the five board members and the two non-executive board members. This Constitution includes a broader membership, technology and scope and better represents



The revamped REIAoN logo

the newly formed Independent Power Producer (IPP) sector in Namibia. It also introduces the two separate codes which will act as the main frameworks on critical organs of the association, the Code of Membership and the Code of Conduct.

- **Resolution on Association Funds**

REIAoN has established a new bank account with FNB and has had the necessary payment protocols enacted to secure and verify payments. All association funds previously administered were fully accounted for and transferred to this new account for future use.

- **Application for New Registration Name and Section 21 Company Status**

The name REIAoN EcoSolutions has been approved by BIPA and the final registration as a Section 21 company is in process. The association will still trade as REIAoN, as it is already recognised in the Namibian

energy sector.

- **Representation at the 2019 Renewable Energy Conference**

The association was represented by the Vice Chair, who had an opportunity to introduce REIAoN to the diverse audience and briefly discuss some of the key aspects of the sector's status, opportunities and concerns.

- **Paper on the opportunities of energy storage in the Namibian Grid**

A collaboration between the Economic Association of Namibia (EAN) and REIAoN has initiated work on a research paper related to the opportunities and viability of Energy Storage in Namibia, with a view of the current and short-term future. This is based on a direct request from the Minister of Mines and Energy and is an excellent opportunity to improve the visibility of the association on the ministerial level. This work is being financed through the Hans Seidel Foundation. Before the end of the year, these efforts will

result in a presentation by Dr Detlof von Oertzen on the findings of the research paper.

- Appointment of interim administrator to assist with the association's growing processes and offerings

The Board appointed a part time Administrator, Mariam Nel, from mid-June 2020, to the end of January 2021. She is available on the email address info@reiaon.com.na and has a temporary contract for 5 hours a week. Her principal responsibilities are around membership invoicing, membership communication, internal system creation and Board member support.

- Monthly Technical Chat Forum – Fireside chat

REIAoN has hosted two fireside chats in 2020.

-In July, **Louise Brown**, a consultant to Cape Town based RE Organisation, called **South South North (SSN)**, in conjunction with the **“Southern African Renewable Energy Investment and Growth” Project (SOARING)**, held a discussion aimed at assessing the needs, hurdles, gaps and opportunities around the financing of SMEs in the RE sector in Namibia. The inputs and insights from those actively involved in the sector resulted in really good idea sharing.

-In September, **Conrad Roedern** gave a presentation on the opportunities and misconceptions related to **Electric Vehicles** and **Smart Grids** and the possibility of adoption in the coming years.

- The new REIAoN Facebook Page and Website is Live

A new Facebook page was established and as of late August 2020, this page has been active.

The REIAoN website (<https://reiaon.com.na/>) is now live, but is still in



REIAoN was the theme partner for the Namibia Tourism EXPO hosted in Windhoek from 4 to 7 November

the process of being updated and streamlined.

- ECB Meetings

Regular engagement with the Electricity Control Board (ECB) is ongoing. The recent discussions in September focussed on Rooftop Solar Rental agreements and Grid Code discussions.

- Tourism Expo

REIAoN agreed to be the theme partner for the Namibia Tourism EXPO hosted in Windhoek from 4 to 7 November. The theme relates to RE in Tourism in Namibia, and is therefore a perfect

collaboration fit.

The Board of REIAoN is pleased that despite the complexities of renewing and reinjecting purpose into an association, especially due to an unprecedented time of global and local complexity, that significant progress has been made.

We look forward to the exciting future prospects of inter and intra- sector collaboration through and alongside REIAoN.

The Board thus invites both old and new members to please renew, apply and reengage with the association in order to reap the membership benefits.



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SOLNAM plans solar module production facility at Keetmanshoop

SOLNAM, in partnership with German company AZUR Space GmbH, plans to build a production facility for Concentrator Photovoltaics (CPV) solar modules in the //Kharas region.

The solar module production facility, which will be the first of its kind on the African continent, was announced during a visit to the City of Heilbronn in Germany by a delegation led by the Mayor of Keetmanshoop. The visit was part of the German-African Energy Excellence Initiative spearheaded by Namibian Ambassador to Germany, Andreas Guibeb.

The production facility will feature a sizeable solar power plant and will be at heart of the Solar Excellence City to be established around the Keetmanshoop Airport area. AZUR Space GmbH, a Heilbronn-based company which is a world leader in CPV solar modules, will be SOLNAM's principal technology

partner in this Namibian venture.

CPV, also known as concentration photovoltaics, is a photovoltaic technology that generates electricity from sunlight. Unlike conventional photovoltaic systems, it uses lenses or curved mirrors to focus sunlight onto small, highly efficient, multi-junction (MJ) solar cells. In addition, CPV systems often use solar trackers and sometimes a cooling system to further increase their efficiency. Ongoing research and development is rapidly improving their competitiveness in the utility-scale segment and in areas of high insolation.

Currently, CPV is far less common than conventional PV systems and has only recently been made available to the residential market. SOLNAM Managing Director, Saskia Breuer, the principal driver of the solar module manufacturing project, is excited about the venture which is expected to create

hundreds of jobs in the //Kharas region.

AZUR Space Managing Director, Jürgen Heizmann, described the SOLNAM partnership in the venture as an important step for the development of new markets in Africa for German solar companies.

Keetmanshoop Mayor, Gaudentia Kröhne, was humbled by the German solar technology company's decision to pioneer this project in Africa on Namibian soil, in particular in the //Kharas region.

"The project will be a significant first step in erecting a proverbial light tower in a region and country that will radiate light across the entire Africa," she said.

German Federal Ministry for Economic Cooperation and Development Parliamentary State Secretary, Norbert Barthle, endorsed the initiative, adding that it will further cement economic cooperation between Namibia and Germany.



The Pilot Groundwater Desalination Plant at Grünau, in the //Karas Region

Solar, wind powered pilot desalination plants for Grünau, Bethanie

NamWater has completed the construction of a Pilot Rural Brackish Water Desalination Plant at the settlement of Grünau, in the Karas Region, which is powered by hybrid renewable energy (solar and wind), while a second plant at Bethanie is now being constructed.

These will be the first rural pilot desalination plants in the country to be powered by hybrid renewable energy. The project aims to enhance Namibia's ability to adapt to the effects of climate change from a technological perspective and to address the negative social and health implications associated with the consumption of poor quality groundwater among many rural communities. If found successful, the technologies will be replicated in other small communities in Namibia facing similar water quality challenges.

The Grünau plant was constructed at a cost of N\$15, 5 million and was funded by the Adaptation Fund, an agency funding climate change adaptation projects. Construction of the plant commenced in February, 2020 and it was officially inaugurated by Agriculture, Water and Land Reform Minister Calle Schlettwein on 23 October, 2020.

The project proposal which was developed by Namibia Water Corporation (NamWater) as the executing entity was approved during the Adaptation Fund's 30th board meeting held on 12 and 13 October, 2017, in Bonn, Germany. The project was also endorsed by the Environment Commissioner of Namibia.

It is considered essential to pilot two plants in a rural setting, where the water demand of the communities differs by an order of magnitude. This would allow the opportunity to establish how plant size affected aspects such

as operation, management and maintenance requirements, the unit cost of water produced, the involvement of beneficiaries; and the interest of stakeholders.

The newly constructed Grünau desalination plant is designed for a maximum raw water feed of 47.3 m³/day and a design operating capacity of 36.0 m³/day at a recovery rate of 85%.

The objective of the project is to pilot the treatment by reverse osmosis (RO) of poor quality local groundwater to a level that complies with the national standards for drinking water, using the sun and wind energy to power the process. Execution of the project will yield a wide range of information and knowledge on both technical and social aspects of establishing and operating such treatment and power plants.

The acquired information, knowledge and skills will then be communicated to stakeholders in



New, low-cost solar-powered desalination technology holds out prospects of a “greener” future

the water supply sector in order that the applied technology could be mainstreamed and replicated elsewhere in the country. In addition, data and information collected from the pilot projects will be collated to inform future water, energy strategies, and decision-making.

Namibia relies heavily on groundwater for the supply of water, and the predicted increase in both temperature and rainfall variability due to climate change will increase this reliance. However, in many areas the

dissolved solids content of the locally available groundwater exceeds the approved threshold for human consumption. Decreased aquifer recharge due to periods of lower rainfall caused by climate change is likely to cause an increase in total dissolved solids in groundwater, which will exacerbate the water quality situation.

Pumping water over long distances from other water sources is not a feasible option for supplying small communities with good quality water. An

alternative is to improve the quality of locally abstracted groundwater by applying treatment techniques. These techniques require energy in the form of electricity, but many of the small communities are not coupled to the national electricity grid. It is also considered that the energy needs for treatment should be met by sustainable and environmentally sound resources.

Bethanie and Grünau are located in a very arid region where vegetation and surface freshwater are scarce. However, this is no exception in Namibia. Thousands of people in this region face difficulties in accessing safe drinking water. The locations of Bethanie and Grünau are therefore being used as a test site for the project, which was presented to the 2018 Conference of the Parties (COP 24) in Katowice, Poland.

The Adaptation Fund, which was established under the Kyoto Protocol of the UN Framework Convention on Climate Change, has committed US\$438 million in 67 countries since 2010 to climate adaptation and resilience activities. The Desert Research Foundation of Namibia (DRFN) is the implementation agency of the project.



Some of the Vocational Education Trainers who attended the training course on Thermosyphon Solar Water Heaters for small-scale residential systems in Namibia, with the two facilitators from NEI

VTC instructors introduced to simulation software for designing, optimisation and dimensioning of solar thermal systems

The Ministry of Mines and Energy, through the Namibia Energy Institute (NEI), recently held a training course for Vocational Education Trainers on Thermosyphon Solar Water Heaters for small-scale residential systems in Namibia.

The training was held on October 15, 16 & 22, under the framework of the Southern African Solar Thermal Training and Demonstration Initiative (SOLTRAIN) Project Phase 4. It was conducted by Rudolf Moschik and Monika Spörk Dür,

two solar thermal experts from AEE-Institute for Sustainable Technologies (AEE – INTEC), together with Helvi Ileka and Fenni Shidhika from the NEI at the Namibia University of Science and Technology (NUST), the local implementers of SOLTRAIN.

Due to the Covid-19 pandemic which limits large gatherings, the training was also held via virtual platforms to allow more VTC trainers to participate remotely.

The aim of the course was to increase the knowledge of Vocational Education Trainers on small-scale solar water heating

systems for the residential sector in Namibia. The trainers were introduced to different types of thermosyphon solar water heaters with a focus on both theory and practice. Participants learned about designing, installation, quality controls, quality of imported products, commissioning, quality checks, maintenance, monitoring of thermosyphon systems. They had an opportunity to design systems using the learned knowledge and were provided access to T*SOL simulation software.

T*SOL is a dynamic simulation

programme for the design, optimisation and dimensioning of solar thermal systems. With T*SOL you can optimally design your planned solar thermal system, sizing of the hot water storage and collector area. T*SOL software allows you to do economic calculations of the solar thermal systems in order to determine if the system is economically viable.

During the design, the programme supports you with dimensioning suggestions and can use a parameter variation to find the optimal combination, e.g. of hot water storage size and the size of the collector area.

After the simulation, the designer receives a comprehensive and appealing project report with all system data as well as detailed simulation and profitability results.

The VTC instructors were given the opportunity to prepare feasibility studies on various case studies, such as for a single family house, hotel, bed and breakfast, army base, school and a hospital, using the T*SOL software. The results of the feasibility studies were presented online on 22 October. The training ended with a written examination and only participants that obtained an average of 60% were awarded Certificates of Competence.

The residential sector in Namibia has seen a broad roll-out of programmes on small-scale solar water heating systems, which makes it very critical for the country to have more qualified developers and installers of these systems, Helvi Iлека, Centre Head for Renewable Energy and Energy Efficiency and Acting Director at NEI, said.

In order to achieve the goals set out in the Solar Thermal Roadmap and Implementation Plan for Namibia it is essential to have enough skilled experts to be able to design, install and



The aim of the course was to increase the knowledge of Vocational Education Trainers on small-scale solar water heating systems for the residential sector in Namibia.

to maintain these solar thermal systems. In addition, a deeper understanding of the future role and the possibilities of solar thermal systems in a sustainable energy supply is needed.

The curriculum for the Vocational Training Centers (VTCs) has been approved and the SOLTRAIN project will assist in strengthening the capacity of the trainers to ensure quality-training programmes for an effective mass rollout.

The Namibian government has said 54 MW of electric power will be replaced by solar water heating systems mainly in the residential sector and in addition 1 000 000 existing electrical geysers will be replaced.

In order to contribute to these programmes, training courses focusing on small-scale solar water heating systems are carried out in the framework of the SOLTRAIN

programme.

In order to apply the knowledge gained during the training course, and to increase the public awareness, 40-50 solar water heater demonstration systems of different types will be made available for installation at social institutions and at different roll-out programs in areas to be identified as flagship sites under SOLTRAIN IV.

Only those who have completed this training course and passed the examination will be eligible to qualify as installers for these subsidised demonstration systems.

SOLTRAIN IV focuses on increasing awareness, capacity building, policy support and roadmap implementation, monitoring and quality data acquisition, training and research and development (R&D), support of industry and demonstration projects.

A Solar Thermal Roadmap and Implementation Plan for Namibia was developed in close cooperation with the Ministry of Mines and Energy. This Roadmap and Implementation Plan was officially signed by the Minister of Mines and Energy, Hon. Tom Alweendo in July 2019.

SOLTRAIN is a regional initiative on capacity building and demonstration of solar thermal systems in the SADC region. It is funded by the Austrian Development Agency (ADA). The initiative started in 2009, with Botswana, Lesotho, Mozambique, Namibia, South Africa, Zimbabwe and recently the SADC Centre for Renewable Energy and Energy Efficiency (SACREEE) as partners.

It aims to support the target countries in transitioning from a largely fossil energy based supply systems to a sustainable energy based supply systems based on renewable energy in general, and on solar thermal in particular.



The 150-kilowatt solar plant erected at the Soris Soris Conservancy

Soris Soris Conservancy gets 150kW solar plant boost

The Soris Soris Conservancy in the Kunene Region, has become the latest beneficiary of the Environmental Investment Fund's (EIF) climate change agenda through a N\$5, 2 million, 150-kilowatt solar plant erected at the settlement.

Renewable energy such as solar off-grid technologies, will not only cushion Namibia from the adverse effects of climate change, but also act as a catalyst for enhancing rural development through the promotion of better conditions for women to access better education and health services, improved access to information, improved productivity and new employment opportunities.

The Soris Soris solar plant was financed by the EIF through Empower to Adapt (EDA) project and it has created 25 direct jobs while also benefitting more than 9 200 community members. The community-owned facility is generating an additional N\$40,000 each month for the conservancy, through an off take agreement with Namibia Exclusive Safari located in Soris Soris Conservancy.

Environment, Forestry and Tourism Minister Pohamba Shifeta, who officially handed over the project to the conservancy, said it was unfortunate that most promising community based establishments, especially those in very remote corners of the country, were closing down as a result of high operations cost related to diesel cost, due to the lack of basic energy service facilities.

He said the handover of the solar plant to the Soris Soris Conservancy had come at an opportune time, a time when Community Based Natural Resource Management in Namibia (CBNRM) communities were adapting to diversify livelihoods options in the face of severe climatic challenges.

"The Soris Soris Conservancy 150 kilowatt power

plant will greatly contribute to the government's achievements toward attaining the renewable energy and energy efficiency targets. The project further trained people from the community, including women, on solar plants operation, maintenance and administration," the Minister said.

The Governor of Kunene Region under which the Soris Soris Conservancy falls, Marius Sheya, said the new solar plant demonstrated the government's unparalleled support towards the empowerment of local communities to adapt to climate change.

"The Soris Soris solar plant wouldn't have come at a better time, especially since the Kunene Region has been affected by lengthy drought periods that have made it difficult for the communities adapt to the effects of climate change and to diversify their livelihoods," said Governor Sheya.



Environment, Forestry and Tourism Minister Pohamba Shifeta (with scissors) officially inaugurating the solar plant at the conservancy



Windhoek to forge ahead with plan to generate 25MW from solar

A long-standing plan by the City of Windhoek to generate at least 25 megawatts from solar plants around the city, seems to be gaining traction.

Windhoek plans to commission five, 5MW solar plants in the capital over the next three years, at an estimated cost N\$420 million (N\$84 million per plant).

The feasibility study for the solar farms, to be built adjacent to the Cimbebasia residential area next to the B1 highway, has been approved and the municipality will soon be inviting Independent Power Producers (IPPs) to submit expressions of interest to partner the city in the project.

The Public Private Partnership (PPP) Committee, chaired by James Mnyupe, established in November 2018 in line with Section 5 of the Public Private Partnership Act No. 4 of 2017, has already deliberated on the city's plan in order to develop best practice guidelines in relation to all aspects of project.

At a PPP conference held in Windhoek last year, Executive Director in the Ministry of Finance, Ericah Shafudah, said it was of paramount importance to explore opportunities in wind, solar and

biomass projects in various parts of Namibia and commended the City of Windhoek for pursuing the 25MW solar power plant.

Although the City of Windhoek's Renewable Energy Policy provides for the uptake of solar photovoltaic installations at customer level by means of net metering, a 25MW solar PV plant has been on the agenda for the last few years with the city having marked it as one of its key priority focus areas.

The City of Windhoek has identified the solar power generation plant as one of city's six top priority objectives. It says Namibia's abundant solar resource was a clear indicator that renewable energy represents a valuable economic resource which should be exploited for the benefit of the country.

Windhoek's renewable energy generation plan aims to reduce the city's reliance on NamPower generated electricity by allowing consumers to generate their own electricity through small-scale embedded generation, and for the city to invest in its renewable energy plant to generate electricity.

Electricity demand forecasts indicate that the existing

installed capacity at NamPower's single-supply point to Windhoek of 160 Megavolt amperes (MVA) and the Van Eck transmission substation of 220/66 kV, is expected to be surpassed by end of this year. In the meantime, due to the reduction of load fed from Van Eck by NamPower, the city has managed to secure an additional 30 MVA capacity from NamPower's existing Van Eck bulk supply point, therefore ensuring security of supply beyond 2020.

Windhoek is, therefore, under pressure to bring new capacity online.

The city thus intends to increase the existing capacity by an additional 50MVA, bringing the total available supply capacity to 210MVA. Additional capacity will also be made available by NamPower from a new second bulk supply point to be established in Windhoek.

Former Finance Minister Calle Schlettwein said he hoped to see PPP agreements that reflect market realities, ensure win-win opportunities for both parties, and avoid unnecessary disputes. Synonymously, City of Windhoek will look to a win-win solar power partnership to calm the fear of future power deficits.

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The WBCG Wellness project operates mobile wellness clinics that focus on the wellbeing of the Namibian trucking industry, by providing on-site biometric wellness screening services.

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For bookings of the WBCG mobile wellness clinics, contact the WBCG mobile wellness Service for request forms.

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GOING GLOBAL: Steffen Kammerer (right) and Bernd Walbaum, Directors of O&L Nexentury GmbH

Cronimet goes International

The Ohlthaver & List (O&L) Group - Namibia's largest private group - has acquired the majority stake in CRONIMET Mining Power Solutions GmbH - a German-based renewable energy project development, Engineering-Procurement-Construction (EPC), investment and asset management company, from the exiting shareholder CRONIMET Mining AG in Switzerland.

The deal took effect on 1 August 2020.

The merger comes after half a decade of successfully partnering with CRONIMET in Namibia through a joint venture. In cementing the corporate merger, the O&L Energy business and CRONIMET will henceforth adopt its new trade name and brand, "O&L Nexentury".

O&L Group Executive Chairman, Sven Thieme and Chief Executive Officer (CEO), Wessie van der Westhuizen welcomed the new member to the O&L family and portfolio, and said: "In line with our Vision 2025 Breakthrough Strategy of '*being a catalyst for positive change, creating new realities and fulfilling dreams*', we are excited to welcome on board

O&L Nexentury as we continue unlocking and maximizing synergies and value for renewable energy and long-term sustainable business for both the Group and our external customers."

The new partnership is a big leap in the O&L Group's quest to venture beyond Namibia's borders. The projects successfully completed by O&L Energy and its partners have proven that the company can compete with the best in the world.

Rollie Armstrong and Steffen Kammerer, co-founders and directors of O&L Nexentury GmbH, said they were thrilled to be part of the O&L family after many successful years as partners.

With this merger, the two companies have aligned their renewable energy and sustainable infrastructure business models to expand development and asset aggregation throughout Africa and into Europe. Capitalised with the O&L Group's rich Namibian history, its corporate culture and financial muscle and combined with what was CRONIMET's project development expertise, team diversity and track record, the new O&L Nexentury is set to

be a major international force.

"With this merger the O&L Energy Business enters into a new and very exciting era. By building an international business in Namibia, Africa and Europe we follow the O&L purpose '*Creating a future, enhancing life*,'" said Gunni Hanke, O&L Group Chief Operations Officer.

O&L Nexentury GmbH develops, builds, finances, owns and operates utility scale solar PV power plants across sub-Saharan Africa. In just a few years, O&L Nexentury GmbH has become one of the leading solar photovoltaic developers and independent power producers in Southern Africa, with operating PV plants and projects under development in Botswana, South Africa, Mozambique, Namibia, Zambia and several other African countries.

To date, Nexentury has completed, is constructing, or has achieved pre-financial close on 11 African projects representing more than 40 MW of power, and has a development pipeline consisting more than 500 MW of utility scale PV and PV-Energy Storage project throughout Africa and Europe

Green People's Energy Namibia springs into gear

The Green People's Energy Namibia initiative, which aims to enable, expand and secure the supply of sustainable energy in rural areas, is getting ready to begin its work and has started to search for key personnel to run the project.

The initiative, launched in June 2017 by the German Federal Ministry for Economic Cooperation and Development (BMZ), is jointly implemented in Africa by Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH and KfW Development Bank. The project is currently searching for a Technical Advisor: Productive Use of Energy, Technical Advisor: Social Institutions and a Senior Technical Advisor for Namibia.

German Development Minister Gerd Müller launched the Green People's Energy initiative, which contributes towards implementing the Marshall Plan with Africa. At the same time, it supports the national implementation of the 2030 Agenda by contributing towards achieving the SDGs that target 'Affordable and clean energy' and 'Climate action'.

Green People's Energy Namibia initiative focuses on four key objectives in its adaptation to Africa:

- * Encourage small and medium enterprises (SMEs) to generate and use green energy.
- * Partner with citizens and municipalities in Africa to foster green energy.
- * Create job opportunities in the energy sector; and
- * Mobilise investment at local level.

Apart from Namibia, the initiative is being implemented in Benin, Côte D'Ivoire, Ethiopia, Ghana, Mozambique, Senegal, Uganda and Zambia. It is estimated that 620 million people in sub-Saharan Africa have no access to modern energy technologies and services. Above all, power supplies are unreliable. With the technologies available locally, energy production tends to be expensive, inefficient and hazardous to health.

Current energy requirements in Africa will continue to increase disproportionately as a result of high population growth, increased economic activities in what are often dynamic markets, and a higher standard of living. Africa's energy demands are therefore set to increase by 80 percent by 2030. Having established the vision of a shared future worth living with the internationally recognised global 2030 Agenda for Sustainable Development, the international community therefore needs to take action here. The Agenda is addressing ecological, economic and social aspects of development together for the first time. With regard to the Sustainable Development Goals (SDGs), all members of the United Nations undertake



German Development Minister Gerd Müller launched the Green People's Energy initiative in June 2017

to implement 17 goals by 2030. Sustainable economic development and the SDG 'Ensure access to affordable, reliable, sustainable and modern energy for all' can only be achieved if sufficient energy is available.

With a view to climate change, the Paris Climate Agreement and the SDG 'Take urgent action to combat climate change and its impacts', renewable energies need to form the basis for the future power supply in Africa. Above all, this entails significantly improving access to modern, renewable energy in rural regions.

Conditions for supplying regions in rural Africa with decentralised renewable energy have improved, assisted by the involvement of citizens and the private sector.

The initiative supports the development of decentralised renewable energy systems in rural regions of Africa with the involvement of local stakeholders and private investors. Particular emphasis is placed on the participation of municipalities, cooperatives and local companies. In addition, the project promotes local value creation and the productive use of energy and social institutions, and also creates employment opportunities.

Special attention is paid to the promotion of local value creation through the supply of energy for businesses and social institutions such as schools or health centers, and the promotion of framework conditions for investments.



A massive seawater desalination plant at Walvis Bay could supply water to Windhoek and Gaborone, in Botswana

Solar could power planned Walvis Bay desalination plant

Namibia plans to accelerate the Walvis Bay seawater desalination project to supply water to Windhoek and probably Gaborone, in Botswana, and solar power could play a key role in the project.

A solar-powered desalination unit produces potable water from saline water through direct or indirect methods of desalination powered by sunlight. Solar energy is the most promising renewable energy source due to its ability to drive the more popular thermal desalination systems directly through solar collectors and to drive physical and chemical desalination systems indirectly through photovoltaic cells.

Direct solar desalination produces distillate directly in the solar collector. An example would be a solar still which traps the sun's energy to obtain freshwater through the process of evaporation and condensation. Indirect solar desalination incorporates solar energy collection systems with conventional desalination systems such as multi-stage flash distillation, multiple effect evaporation, freeze separation or reverse osmosis to produce freshwater.

The basic principles of solar water distillation are simple, yet effective, as distillation replicates the way nature

makes rain. The sun's energy heats water to the point of evaporation. As the water evaporates, water vapor rises, condensing on the glass surface for collection. This process removes impurities, such as salts and heavy metals, and eliminates microbiological organisms. The end result is water cleaner than the purest rainwater.

With the dire water situation, the Walvis Bay desalination project has become top priority for the government. The plan is to pump water from the Atlantic Ocean and carry out treatment via a large desalination plant built at the coastal town.

The water situation in Namibia and Botswana, which are prone to droughts, is expected to worsen further. By 2050, the deficit in the production of drinking water in Namibia's coastal areas will be of the order of 36 million m³ per year. The amount of additional water demand for Windhoek and surrounding communities during the same period will be in the order of 32 million cubic metres per year, while the projected demand for Gaborone in Botswana would be 20 million cubic metres per year.

The construction of a desalination plant at Walvis Bay could help to reduce the deficit in drinking water production.

The project is expected to require huge investments, in particular for the transport of water from Walvis Bay to Gaborone (via Windhoek). A distance of over 1490 km separates the two cities but they are already connected by a road.

The water pipeline could follow this route. Namibia and Botswana are expected to finance the future facility. The two governments reaffirmed their willingness to work together during the visit of former Botswana President Ian Khama to Windhoek in 2018.

The German government, through its development agency, Kreditanstalt für Wiederaufbau (KfW), has facilitated a feasibility study for the water supply to the central coast and central area of Namibia. The aim of the study is to provide a detailed analysis of water demand in the coastal and central regions, specifically the cities of Windhoek, Walvis Bay and Swakopmund.

The other objective of the study is to formulate proposals regarding, among others, the corresponding desalination option, the water transfer system and the necessary power infrastructure. The Namibian government is betting on solar power, a renewable energy source that is widely available in the country.

The rise of grid-scale renewables in Africa

The uptake for grid-scale renewable energy across Africa is uneven. Predictably, the larger economies that boast the most significant growth, as they seek to meet fast-growing demand and diversify away from fossil fuel at the same time. South Africa, Egypt and Morocco are among the leaders.

These countries also tend to have relatively sophisticated regulatory environments and financial markets, which enable Independent Power Producers to feel confident about investing

But the modular nature of solar and wind projects – and the speed with which they can be built – are also making them a more attractive proposition in countries with fewer financial resources, as these renewables allow them to expand generation through more manageable projects.

Hydropower is also firmly back in vogue in some parts of Africa, offering a relatively cheap way to produce a lot of electricity, if the reservoirs and rivers are full. Whether the effects of global warming on rainfall patterns in the region will be kind to hydropower producers remains to be seen.

In the East African Rift Valley, another option is open – Geothermal power. So far, it's Kenya taking the lead, but others, including Uganda, are keen to get involved.

Sub-Saharan African countries, in general, have been slower to embrace renewable energy than most of the rest of the world. But falling manufacturing and operating costs, coupled with greater design efficiency, have steadily eroded the levelised cost of energy (LCOE) for wind and solar power projects, making them increasingly attractive in comparison with more established power sources. As a result, grid-scale projects are being developed in an increasing number of African countries.

Wind and solar power have the big advantage over large hydro or thermal power plants in that capacity can be added incrementally when needed and often much more quickly. These



advantages seem to have driven investment in South Africa, despite the continued dominance of coal-dependent parastatal Eskom. Eight of the continent's 10 largest solar power projects are in South Africa, most of which have been developed under the Renewable Energy Independent Power Producers Procurement Programme (REIPPPP).

The largest of these is Solar Capital's 175 MW De Aar PV facility, which supplies Eskom with an average of 85,458 MWh/year under a 20-year PPA, plus four 100 MW CSP projects: KaXu Solar One, Xina Solar One, Ilanga 1 and Kathu Solar Park, all of which have the same long-term contract with Eskom. The first of these came on stream in 2015 and the most recent in 2019; the first two were developed by Abengoa and the last two by Sener Group.

All four are located in the Northern Cape, along with other big solar PV schemes, Jasper (96 MW), Mulilo-Sonnedix-Prieska and Kalkbult (both 86 MW). Northern Cape is about as far from the main centres of power consumption as it is possible to be in South Africa, but the gains from the province's superior solar resources make up for the additional



Wind and solar power have the big advantage over large hydro or thermal power plants in that capacity can be added incrementally when needed and often much more quickly

transmission costs.

Despite the growing attraction of solar, new wind farms are still being developed in South Africa. In March, the final turbines were installed at the 140 MW Kangnas project near Springbok in the Northern Cape, two weeks ahead of schedule and reportedly on budget. The US\$246m project, which has been developed by Sweden's Mainstream Renewable Power, comprises 140 MW spread over 61 2.3 MW Siemens Gamesa turbines.

Future development

Although wind, solar and geothermal power projects are being developed at a faster pace in Africa than ever before, the sector is starting from a very low base. Many countries have still made little progress in attracting investment to large-scale projects.

Cash-strapped governments lack the financial resources to help fund projects themselves – and indeed will struggle to do so even more as a result of the economic impact of the Covid-19 crisis – but they could do more to encourage development. Analysts say there is scope for some governments to

improve their regulatory environments and ensure that transmission utilities cooperate with IPPs, rather than protecting vested interests.

The renewables revolution offers the potential to promote greater competition in power generation, while falling costs are making wind and solar power an increasingly attractive economic option.

Mercè Labordena, senior policy advisor at SolarPower Europe, says that the growth of solar power in many African countries has been constrained by higher power prices and financing costs than in industrialised countries, which have more stable policy conditions and higher credit ratings. Apart from low-cost financing, technology-neutral tender designs that allow for combinations of different technologies, such as solar, wind and storage, “would allow for the growth of the utility-scale solar segment in a sustainable manner”, she says.

“The combination of the different technologies would allow for not only injecting power into the electricity grid, but also for the adoption of innovative business models to provide grid services.” – **African Business**



Africa has world-class wind potential which can play an important role in bringing clean, affordable electricity to millions on the continent

IFC study shows onshore wind energy potential can power Africa

The development of Africa's huge onshore wind energy potential can boost the continent's transition to affordable and reliable clean energy, a new study by the International Finance Corporation (IFC) indicates.

Africa possesses a stunning onshore wind potential of almost 180,000 Terawatt hours (TWh) per annum, enough to meet the entire continent's electricity demands 250 times over, the study by the IFC, a member of the World Bank Group, shows.

The analysis done in collaboration with Everoze, Vortex and GWEC, finds that 27 countries in Africa, including Namibia, have enough wind potential on their own to satisfy the entire continental electricity demand—estimated at 700 TWh annually. Algeria has the highest resource with a total potential of 7,700 Gigawatts (GW), equivalent to over 11 times current global installed wind capacity.

Fifteen other countries have technical wind potentials over 1,000GW, and these include Namibia, Mauritania, Mali, Egypt, South Africa, Ethiopia and Kenya.

Everoze drew on high-resolution mesoscale data from the Global Wind Atlas and applied basic constraints

for technical restrictions (i.e. slopes, elevation, minimum wind speed, land use cover) and basic environmental restrictions (i.e. population density, protected areas).

"This analysis has clearly shown that Africa has world-class wind potential and that wind can play an important role in bringing clean, affordable electricity to millions on the continent," said Linda Munyengeterwa, IFC's infrastructure director for the Middle East and Africa.

"Going forward, IFC is committed to working with the public and private sector to help realise Africa's remarkable, and largely untapped, wind potential."

The analysis also finds that over one-third of Africa's wind potential is in areas with very strong winds, averaging greater than 8.5 meters per second. Seventeen of the countries analysed have particularly strong wind potential, with average productivity (as measured by their "capacity factors") up to 46%, rivalling the most productive onshore wind sites in the world.

"What is surprising is how distributed the wind resource is," said Sean Whittaker, principal industry specialist at IFC. "By using high-resolution mesoscale wind

models and assuming the use of tall, large rotor, modern turbines we see great potential in countries not previously considered to be 'windy' places, including Ivory Coast, Nigeria, Botswana, Cameroon and Mozambique."

IFC noted that wind is one of the fastest-growing, cheapest sources of new power generation around the world with over 650GW of installed capacity.

However, installed wind capacity in Africa represents less than 1% of this capacity. The analysis reveals a total wind energy potential on the African continent of over 59,000GW—equivalent to 90 times the current global installed wind capacity.

Commenting on the outcome of the analysis, Ben Backwell, CEO of the Global Wind Energy Council (GWEC) said: "This important report demonstrates that the studies which have been published until now have significantly underestimated the opportunity that wind energy represents for Africa.

There is a clear need now for governments to enact policies to take advantage of the vast resource that the report identifies and enable large scale investment in wind as a key building block for green economic recovery post-COVID-19.

LIST OF APPROVED & REGISTERED INSTALLERS AND SUPPLIERS WITH NTCRE / TC1

As of September 2020

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6	Felix Kaurianga	Cell no: 0816820438, Tel: 061 215809/ 215792, Fax: 061 215793, 660 Fritz Kasuto str. Police Camp Windhoek, P.O Box 60777 Windhoek,		
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2	Namibian Engineering Corporation (NEC)	SWH, Photovoltaic, SHS, PVP,	Niko Brueckner	Telephone no: 061 236720, Fax no: 061 232673, 21 Joule Street Southern Industrial, Windhoek
3	Trinity Business Solutions (TBS)	SWH, Photovoltaic, SHS, Solar cookers/box, streetlights	Bernadette Simana	Telephone no: 061 258112, Fax no: 061 225667, Jacona Street, Hochland Park Erf. 1600B, Windhoek
4	Solsquare Energy	SWH, Photovoltaic	Leonhard Eins	Telephone no: 061 211675, Fax no: 061 210309, 38 Newcastle Str unit 3 Roschpark, Northern Industry, Windhoek
5	Solar Age cc	SWH, Photovoltaic, SHS	Rehab Kaavela	Tel: 065 240849, Cell: 081 3997154, P O Box 2873, Ondangwa, Olunkono Industrial Area (behind M & Z Motors), Email: solarage@iway.na
6	Alternative Energy System cc (Alensy)	SWH, Photovoltaic, SHS, Energy Efficient Appliances; wind.	Pieter Beckers	Telephone no: 061 400877, Fax no: 061 400870, 10 Diehl Street, Southern Industrial, Windhoek
7	Terrasol	Photovoltaic, Energy efficient stoves, Solar borehole pumps	Schultz Werner	Telephone no: 061 233608/239454, Fax no: 061 239454, 9 Nobel Street, Southern Industrial, Windhoek
8	Engineering Centre cc	Photovoltaic	Greiter Joern	Telephone no: 061 220696/221069, Fax no: 061 220703, 21 Schafer Street, Windhoek
9	Suntank Namibia	SWH	Kutz Udo	Telephone no: 064 401009, Fax no: 064 400009, 83 Strand Street, Swakopmund
10	Jonny Auto Elektries	Photovoltaic, SHS	Jan Hendrik Hanekom	Telephone no: 063 222442, Fax no: 063 223897, 83 Cathedra Street, Keetmanshoop
11	HPS Engineering	SWH, Photovoltaic, SHS, Energy Efficient appliance	Eduard C. Drotsche	Telephone no: 063 223399, Fax no: 063 223366, 101 Stapelia street, Keetmanshoop
12	ConServ Engineering Services CC	SWH, Photovoltaic, SHS, Energy Efficient appliance	Mark Riehmer	Telephone no: 061 236336, Fax no: 061 256726, 24 Parson Street, Southern Industrial Area, Windhoek, Email: info@conservcc.com
13	LED Lighting and Solar Warehouse	SWH, Photovoltaic, SHS, Energy Efficient appliance	Mark Anthony Walsh	Telephone no: 061 302516, 3 Mathem Street, Hochland Park Windhoek
14	SoITec	SWH, Photovoltaic, SHS, Energy Efficient appliance	Heinrich steuber	Telephone no: 061 235646, Fax no: 061 250460, 51 Marconi Str, South Industrial, Windhoek
15	Solar Plus Renewable. E	SWH, Photovoltaic, SHS, Energy Efficient Appliances, gas stoves, solar freezer	Leonard S. Sakaria	Cell: 0812809497, Fax: 065-260038, Onekwaya East, Ohangwena- Main Road, P. O. Box 449, Ohangwena.
16	Temako Green Energy (TGE)	SWH, Photovoltaic, SHS, Energy Efficient Appliances, streetlights & accessories	Ndilula Mwahafar	Tel: 220743, Fax: 255660, No. 2 Ruhr St, Northern Industrial Area, P. O. Box 24749 Windhoek.
17	Khomas Equipment & Appliances cc	SWH, Photovoltaics, SHS, EE appliances, torches, lanterns, chargers.	Sitali Stanley	Tel: 061 271590, Fax: 061 271591, 1264 Goudsnip St. Hochland Park, Windhoek.
18	Namibia Solar Solutions (Prop.) Ltd	SWH, Photovoltaics, SHS, EE appliances,	Letisia Shikokola	Tel: 065 230097, Fax: 065 230094, P.O. Box 90142, Ongwediva. Oshakati
19	FLA Trading cc	Photovoltaics, SHS, EE appliances	Lucky Namupolo	Tel: 061 222092 Cell: 0811290045 or 0811240882; P.O. Box 11554 Windhoek
20	SkyPower Namibia cc	All listed products, plus fridges and wind except stoves.	Chris King	Tel: 064-209952, cell: 0812720508, Fax: 064-209952, P.O.Box 1861 Walvis Bay.
21	Sunrise Solar Solutions cc	SWH, Photovoltaics, SHS, solar,	Mr. Wapale Kalla	Tel: 061-260338; Fax: 061-260338. P.O. Box 21410, Windhoek, solar@mweb.com.na
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25	NATWE Electric & Solar	Solar Water Heaters, Photovoltaic, solar Home Systems, Solar cookers/box, Energy Efficient Stoves, Solar pumps, Wind Turbines, Fridges & Freezers	Adriaan Olivier	Tel: 066 25635. Cell: 0811286018. P.O Box 1730 Rundul. Erf 536 Nkarapamwe Rundul. Email: rnawa@iway.na / adriaan@mweb.com.na

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30	Central Technical Supplies	Solar Water Heaters, Photovoltaic, Solar Home Systems	Mr. Erik Lund	Cell: 0811276771; Tel: 061 224238, Fax: 061 233254, E-mail: sales@ctsnam.com, P.O Box 6751 Windhoek, 13 Walter Street, Windhoek, Namibia
31	Maltahohe Auto & Electric cc	Solar Water Heaters, Solar home systems, Solar cookers/box, Energy efficient stoves	Mr. Verwey Handrikus Jacobus	Cell: 0811483062. Tel: 063 293313. P. O Box 62 Maltahohe Namibia. Email: PoDnp03@mweb.com.na
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54	Go Solar Investment cc	Solar Water Heaters, Photovoltaic, Solar Home Systems	Wikus Jacobs	Cell: 0811414107, gosolarcc@gmail.com, 67 Okavango Road Grootfontein.
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60	Northend Solar Solutions cc	Solar Home Systems, Photovoltaic, Solar Water Heaters	Martin Nambundunga	Cell: 0813719449 / Tel: 065 226226 (Oshakati), Erf 1148 Robert Mugabe Ave, Windhoek and Unit 4- 1638, Oshakati Complex, Main Road; Email: Info@northend-solar.com
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65	Atlantic Solar Namibia cc	Solar Water Heaters, Photovoltaic, Solar Home systems	Mr Barend Engelbrecht	Cell: +264812766806; Tel: +264406713; P O Box 3899 Vineta, Swakopmund; Fuchia Street, Ocean View Swakopmund. Email: barnie@solamamibia.com
66	Uluwew Energy Solution cc	Solar Water Heaters, Photovoltaic, Energy Efficient Fridges and Freezers	Mr Fillemon Weyulu J	Cell: +264812000068; Tel: +264855552111; P O Box 80011 Ongwediva; Erf 1045 Omatando, Ongwediva; Email: weyulufillemon37@gmail.com
67	Quantum Solar Investments	Solar Water Heaters, solar Water pumps, Solar Home Systems, Hybrid Systems, Solar Off-grid systems, Solar Grid tied systems, Wind turbine systems	Mr Andreas Tredoux	Cell: +264811288755; P O Box 31752 Pionierspark, Windhoek; 39 Von Bodenhausen Street, Pionierspark, Windhoek. Email: dtredoux@iway.na

KEY	
SWH	Solar Water Heaters
SHS	Solar Home Systems
PVP	Photovoltaic Water pumping

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