

The case for Photovoltaic Power

DFDN.org

Introducing our business

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About me

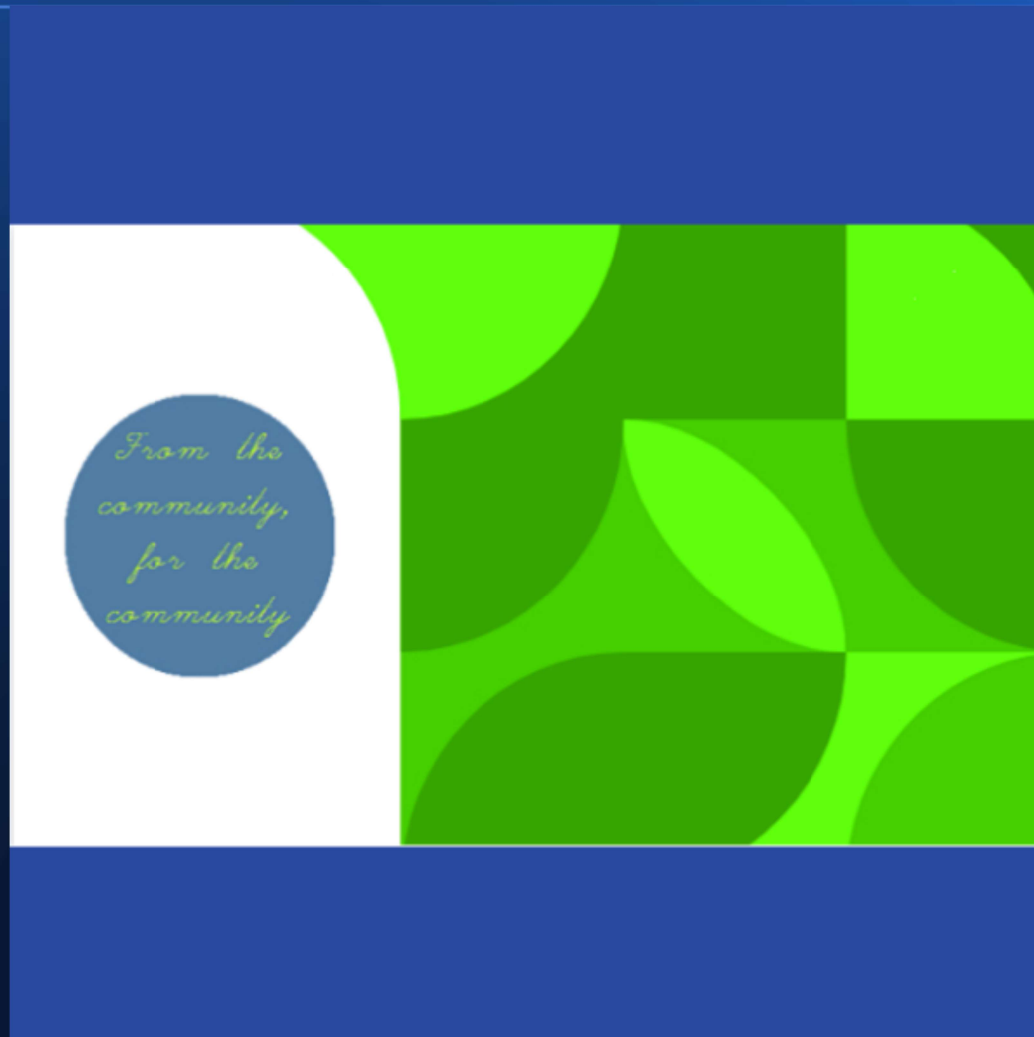
- I am a graduate of Anglia Ruskin University, Cambridge, United Kingdom
- I teach both English as a Foreign Language and Engineering
- I have taught engineering at
- Yancheng Institute of Technology, Jiangsu province, China
- See my website for further details.
- Gopher site for low bandwidth



鹽城工學院 纺织服装学院
YANCHENG INSTITUTE OF TECHNOLOGY



Our Business Cards



David Norris

Solar Power Specialist

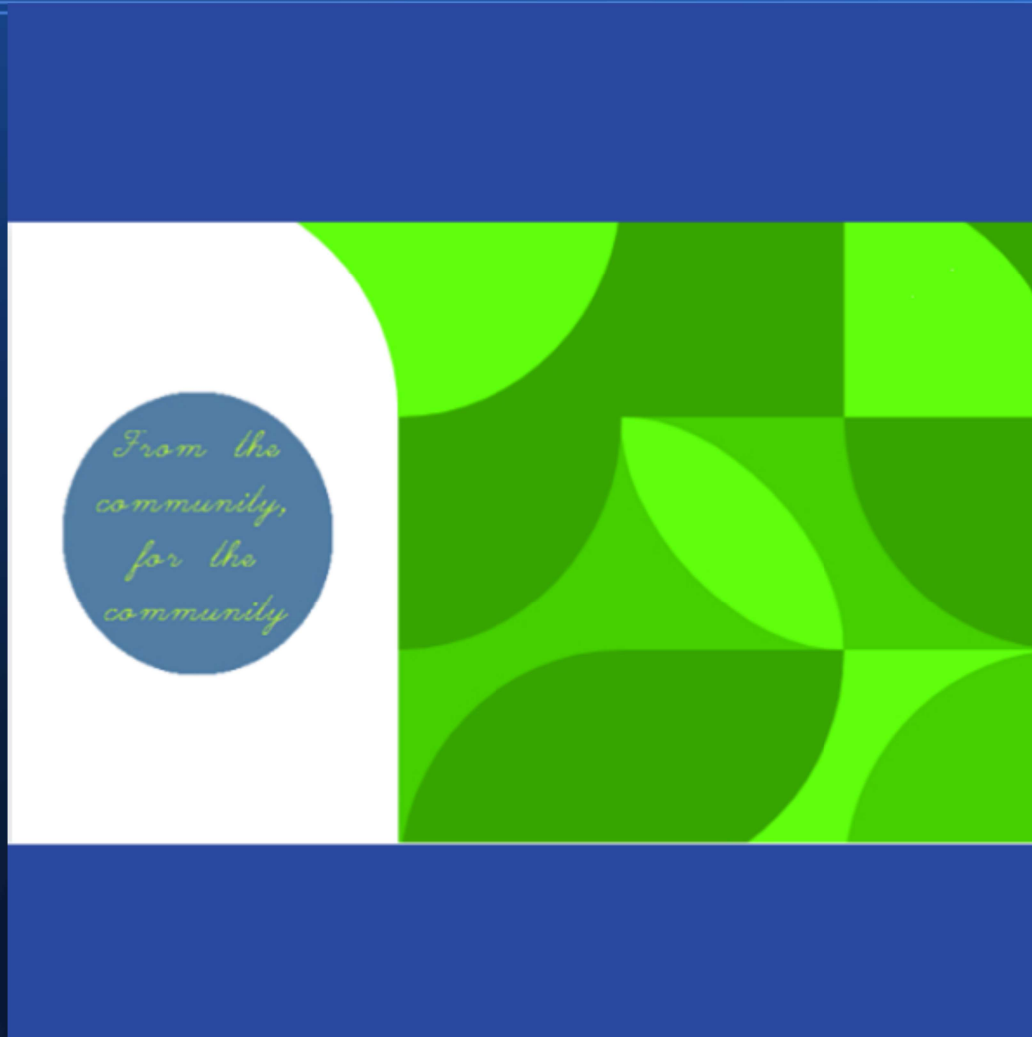
Tel. +447943055280

Email: norrisdavid998@gmail.com

Website: <http://dfd.n.info/africa>

Gopher: gopher://dfd.n.info:70/

Our Business Cards



JAMES IFEANYI EKWEM

Solar Power Specialist

Tel. +44 7443 397271

+233 59 963 0674

Email: jamesekwem5@gmail.com

Website: <http://dfdndn.info/africa>

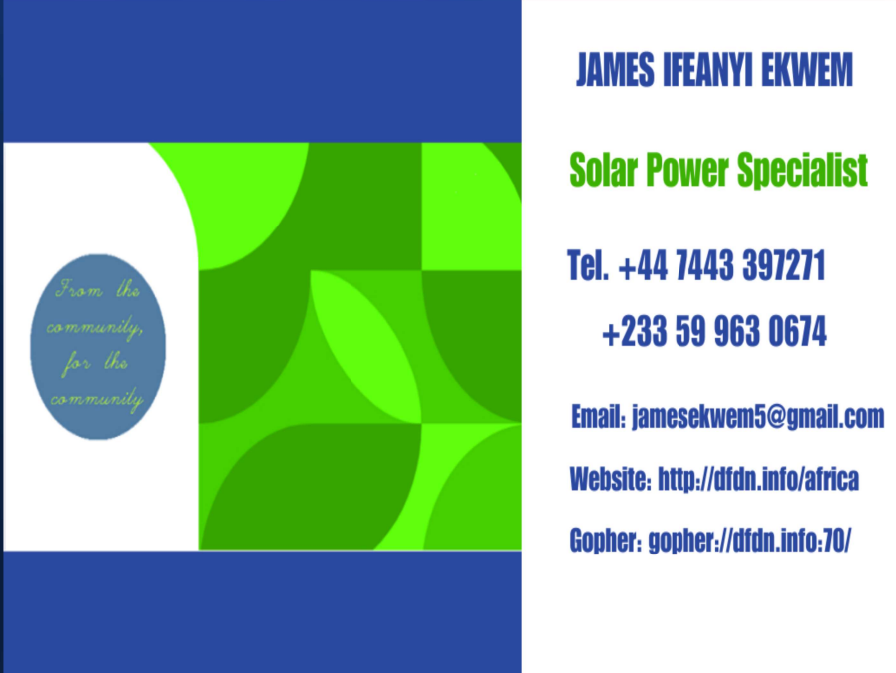
Gopher: <gopher://dfdndn.info:70/>

Graduation, 20/10/2000 at the Guildhall, Cambridge, United Kingdom



James Ifeanyi Ekwem

- Solar Power Specialist
- Security Consultant
- WhatsApp:
- 44 7443 397271 (UK) / +233 59 963 0674 (Ghana).



The image shows a business card for James Ifeanyi Ekwem. The card is divided into two main sections. The left section features a blue background with a white curved shape containing a blue circle with the text "From the community, for the community" in white. The right section has a white background with a green and blue geometric pattern. The text on the right section is as follows:

JAMES IFEANYI EKWEM

Solar Power Specialist

Tel. +44 7443 397271
+233 59 963 0674

Email: jamesekwem5@gmail.com

Website: <http://dfdinfo/africa>

Gopher: <gopher://dfdinfo:70/>

Long-term Goal

- To design and build devices which will allow the local population to charge their devices using the power of the sun, which will be indispensable when out of range of mains power supplies, or during times of power outage, which are safe in operation and usage, at the minimum feasible cost for the customer;
- To design and build equipment which may be charged in daylight for the purpose of providing night-time lighting during periods of power failure;
- To provide a means of supplying communications, entertainment and a means of allowing local people to continue to be productive and secure in times of power outage, or when out of reach of the mains supply;
- To reduce living costs where possible – for example photovoltaic (solar) power can in many cases provide a replacement for disposable batteries, which are an ongoing cost and harmful to the local environment (as they contain toxic chemicals which contaminate the environment for decades after disposal, unless recycled);
- To educate the local population in the development of electronic devices and their assembly;
- To later diversify into other areas of consumer electronics according to budget;
- To improve the quality of the lives of the local population.

Vision Statement

To facilitate the improvement of the lives of local people and make them more easily able to live, work and educate their children – in remote areas a low cost source of power is indispensable. To improve the security of their homes and the education of their children.

Value Statement:

To be respectful, accountable and open in all we do. To promote openness, honesty and integrity, and the uptake and development of new technologies. To promote an environment to meet challenges and to encourage collaboration. To promote awareness of environmental and safety issues. To comply with relevant safety standards (either those of the United Kingdom or those of the country of sale, whichever are the higher, particularly where high voltage is involved). To operate across cultural and language barriers and to promote technological awareness.

What is Photovoltaic Power?

- Photovoltaic solar energy is a clean, renewable source of energy that uses solar radiation to produce electricity. It is based on the so-called photoelectric effect, by which certain materials are able to absorb photons (light particles) and release electrons, generating an electric current.
- Photovoltaic solar energy is obtained by converting sunlight into electricity using a technology based on the photoelectric effect. It is a type of renewable, inexhaustible and non-polluting energy that can be produced in installations ranging from small generators for self-consumption to large photovoltaic plants.

Cost Analysis

- Research the demographics of the local population
- Provide Education in the benefits of Photovoltaic Power (PVP) to the local population and for the environment
- To address the issues of inertia and lack of education about sustainable development and the benefits at both personal and environmental level.

Strengths and Advantages

- Summarise the special features and advantages of the technology being introduced
- Educate the public about the benefits of photovoltaic power...
- No ongoing fuel costs
- Reduced air pollution
- Power available 24/7 from rechargeable solar inverters
- Potential for job creation
- Reduced environmental damage
- Greatly improved opportunities for communication, & education
- Improved health & quality of life
- Greater inclusiveness and reduced social isolation.

What benefits will the adoption of photovoltaic power (PVP) bring?

Social Benefits

Improvement in Public Health

Increased Environmental Awareness

Education in energy efficiency

Social equality and equality of energy availability

Lack of conflict for scarce resources (the sun does not discriminate!)

Potential for green job opportunities

Education in technological development and environmental Awareness

Environmental Benefits

Reduction of CO2 emissions

Reduction of local environmental pollution

Promotion of inexhaustible and clean energy

Improved air quality

Avoiding the loss of biodiversity and non-renewable resources

Promotion of greener technological Development

“Setting an example to others”

What is “energy transition”?

- The process of energy transition is not new. Other major changes have preceded the current one throughout history, such as the shift from wood to coal as a means of energy production in the 19th century and from coal to oil in the 20th century.
- However, what characterises this transition as compared to previous ones is the need to protect the Earth from the worst threat we have experienced so far: climate change. A defence for which we must prepare ourselves as quickly as possible. A necessary transformation in which we must all be participants and protagonists.
- The use of polluting fossil fuels has another serious consequence. Anyone who has visited, worked or lived in a city is all too familiar with the air pollution which we can all see, smell and taste. But what is less obvious in the short term is the harm this is causing to everyone's health.

Climate change: a major challenge for humanity

- Climate change is today's greatest environmental challenge. For years we have been experiencing unprecedented rapid global warming as a consequence of human activity, mainly due to the burning of fossil fuels that generate greenhouse gas emissions. In this sense, the electricity sector plays a key role in achieving the goal set by the historic Paris Agreement to limit the increase in global temperature to 1.5 °C and to halt the decarbonisation of the economy through the energy transition.
- One travesty of climate change is that nations which have contributed least to the problem (so far!) are often those most vulnerable. Take for example the extreme drought in the Horn of Africa and the devastating floods in Asia.
- Many countries in Africa are extremely vulnerable to the effects of climate change.
- Prolonged drought and resulting crop failures are the most obvious consequences. Whereas many locations have been historically prone to drought, climate change is making droughts more frequent, prolonged and severe.

Effects of air pollution on human health

- The World Health Organisation regards air pollution as a public health emergency.
- For many years, we thought that most of the diseases linked to exposure to air pollution were considered only to be affecting our respiratory system. And this is still true.
- Exposure to air pollution is responsible for chronic obstructive pulmonary diseases, Asthma, lung cancer, pneumonia, for a few examples.
- In addition to that, we know now that these toxic particles will come to our lungs and from there to the bloodstream will reach our cardiovascular system.
- They can then be responsible for ischemic heart diseases such as:
 - Neurological disorders
 - Stroke
 - Even reproductive system problems!
- So air pollution is one of the biggest public health issues we are confronting today.

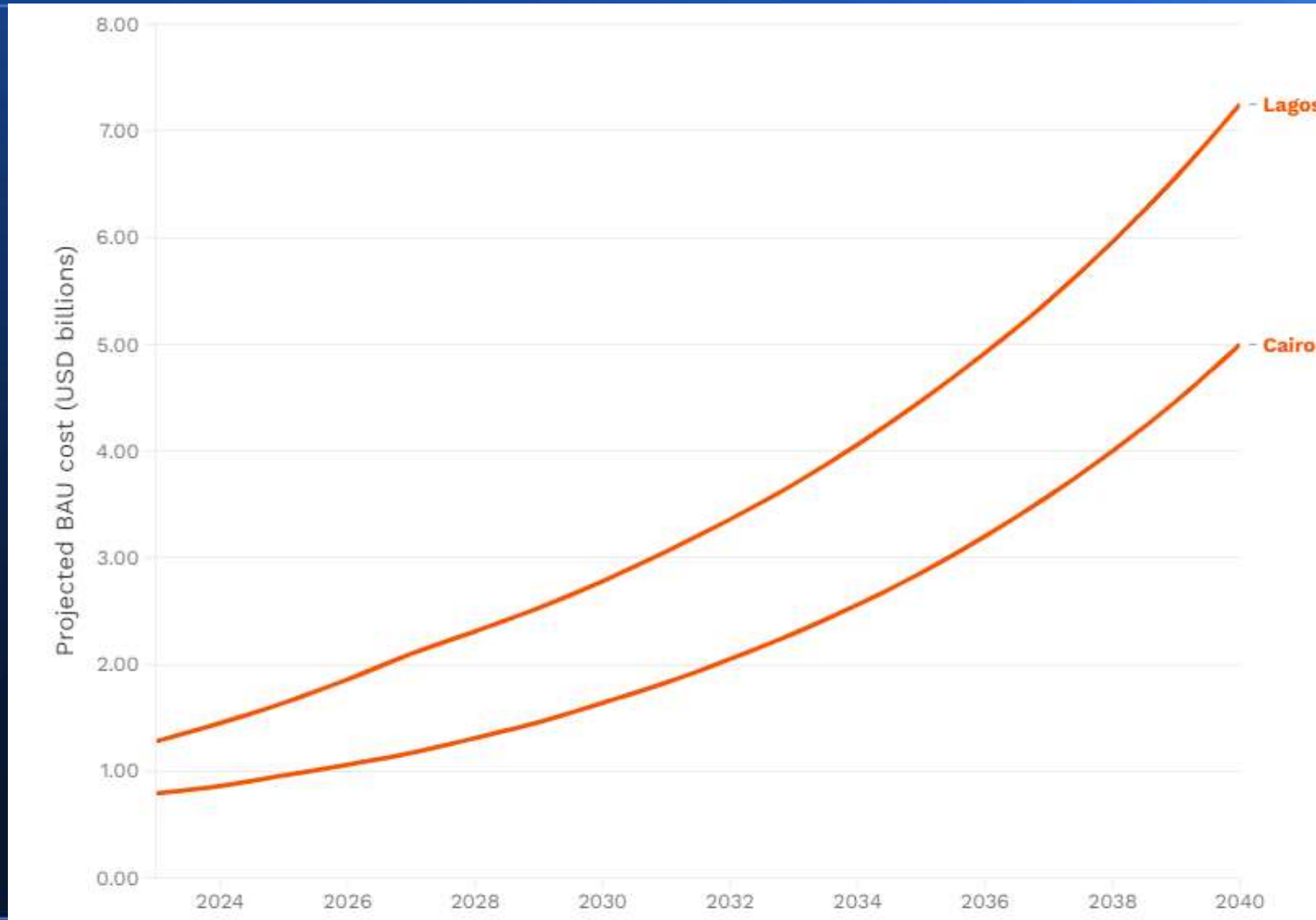
Lagos, a case in point

- Lagos has some very dirty air including dangerous levels of Nitrous Oxides, high levels of volatile organic compounds (VOCs) and small dust particles called particulate matter. These are both hazardous to human health and can cause things like asthma. The causes of this pollution are industry, ever increasing numbers of cars and construction dust.
- Electricity supply – the sheer size of Lagos has overwhelmed the grid, resulting in periods where the power cuts out. This makes it difficult for people to perform everyday tasks and for businesses to run properly. Many people have to rely on expensive diesel generators when the electricity goes off.

Lagos, a case in point

- Air pollution is already Africa's second biggest cause of death
- “The impact of air pollution affects us all, but not equally. With over 1 million deaths caused by polluted air in Africa in just 2019, our continent's great cities are at the frontlines of this often-overlooked health, economic and environmental crisis...To make the case for investing in fixing air pollution to their constituents, decision makers need credible and quality information like what this report presents.” Mohammed Adjei Sowah, former Mayor of Accra, Ghana
- The graph on the next page shows the projected economic impact on a business-as-usual path in USD billions for Cairo, Egypt and the more populous, Lagos, Nigeria.

Projected Economic impact of air pollution (USD)



Electrical challenges relevant to Africa...

- Solar energy provides regions with an opportunity of boosting their economies and minimise their global carbon footprint and greenhouse emissions. Exploiting Africa's solar energy-generating potential, on the other hand, is today more of a necessity than an opportunity as the continent is increasingly facing numerous electrical challenges which I have researched in detail. Despite this necessity, there are factors that can complicate the implementation of renewable energy projects. Major aspects that affect the renewable energy market in Africa will be discussed with an aim to combine different solutions and initiatives for all the challenges to allow the reader to get an overview of how the development could be achieved. The strategies proposed will help African governments develop their energy sector. In addition, it will help promote economic growth, reduce poverty, and achieve sustainable development.

Electrical challenges relevant to Africa...

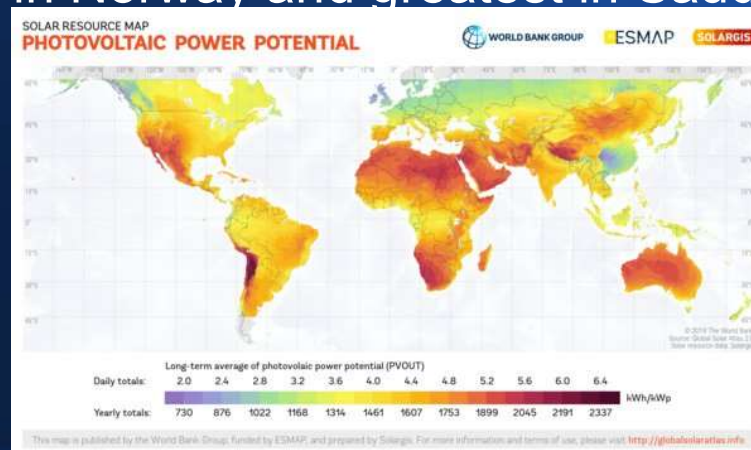
- Africa owns 40% of the globe's potential for solar power yet it only inhabits 1.48% of the total global capacity for electricity generation of solar energy.
- Africa as a continent generally faces major electricity issues, Sub-Saharan Africa is the one region that suffers most from these issues, as Sub-Saharan Africa is presently home to more than two-thirds of the world's population who do not have access to electricity.
- In comparison to other developing countries, inhabitants in Sub-Saharan Africa have the lowest per capita access to modern energy.
- It is estimated that in Sub-Saharan Africa 0.6 billion people (out of the 1.14 billion) do not have access to electricity
- **This represents about 53% of the total population.**
- **D**ue to inadequate maintenance, around 15% of the installed capacity in Sub-Saharan Africa is not functioning correctly. It is estimated that about 0.7 billion people of the entire African population still rely on traditional biomass for power generation since access to the national power grid can be costly.

Electrical challenges relevant to Africa...

- Another major issue is the expected population growth in Africa. Sub-Saharan Africa's population alone is predicted to reach 2.0 billion by 2050
- Influencing the increase of energy demands, which are expected to dramatically rise by 3% annually;
- Moreover, due to growing energy prices and the increased need for climate change mitigation measures, more challenges may arise;
- Using renewable energy resources and up-taking solar power generation to power Africa is a viable choice;
- The deployment of renewables provide solutions for the challenges facing Africa in terms of climate change, energy demands, and electricity issues, but also environmental, health and economic benefits will also be reinforced.
- In addition to an increase in job opportunities would be a useful side effect!

Electrical challenges relevant to Africa...

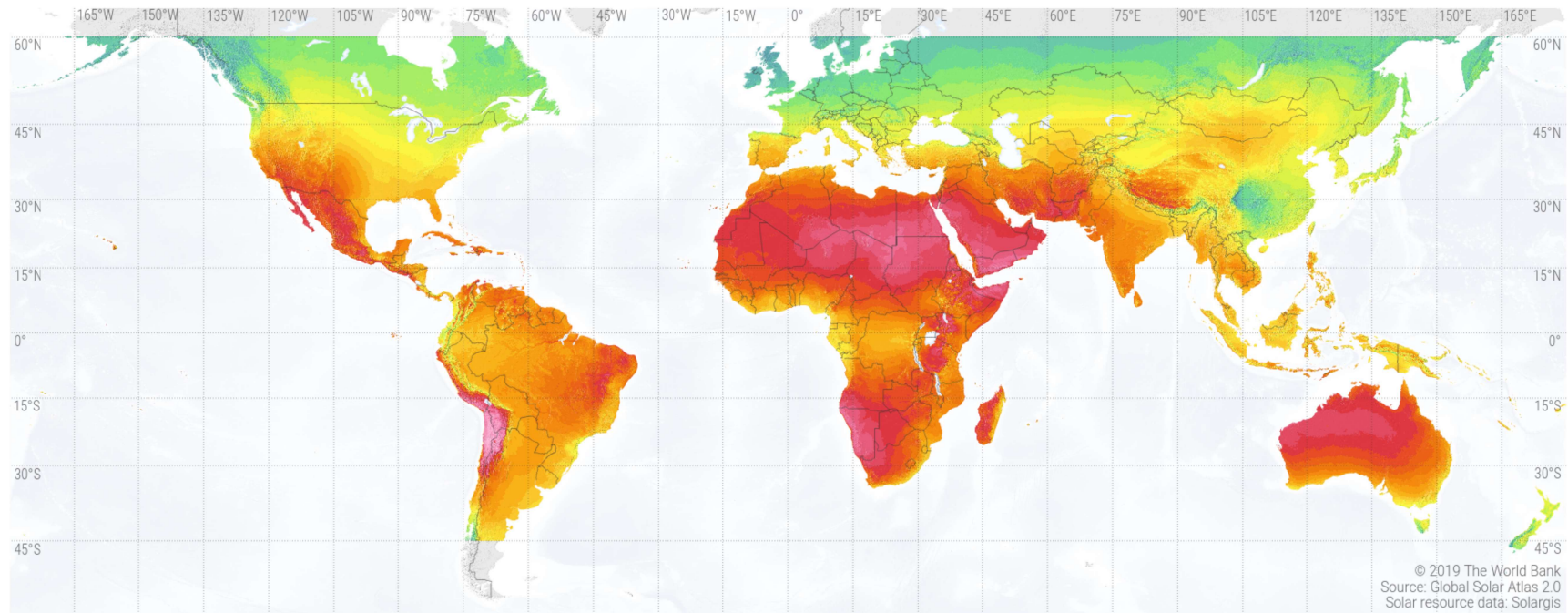
- The potential of solar energy is enormous all over Africa due to a variety of factors:
- Proximity to the equator;
- Frequent dry bright days (in contrast to the United Kingdom!);
- Solar potential tends to stand out in the North and South of Africa...
- Solar potential is lowest in Norway and greatest in Saudi Arabia – (large map on next page)...



Africa stands out for its solar potential...

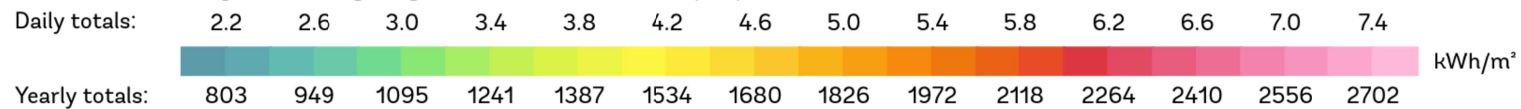
SOLAR RESOURCE MAP

GLOBAL HORIZONTAL IRRADIATION



© 2019 The World Bank
Source: Global Solar Atlas 2.0
Solar resource data: Solargis

Long-term average of global horizontal irradiation (GHI)



This map is published by the World Bank Group, funded by ESMAP, and prepared by Solargis. For more information and terms of use, please visit <http://globalsolaratlas.info>.

Electrical challenges relevant to Africa...

- With the huge potential for achieving significant change in the deployment of renewable resources and solar energy technologies across the continent, the need to analyse the complications as well as the current status of the energy market in Africa is a necessity.
- In the longer term I intend to establish a family business in Burkina Faso. See the later slides for details.

My contact details...

- Tel. +44 7943055280 (I have an unlocked dual sim phone; I anticipate having an international simcard and a country specific simcard for travel);
- Email: norrisdavid998@gmail.com
- Website: <http://dfdn.info>
- Gopher: <gopher://dfdn.info:70/>

Introducing our business

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Introducing our business

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- What will the family business look like?
- What will we sell?
- What will its mission statement be?
- And who will be involved?

Our Mission:

To design and build devices which will allow the local population to charge their devices using the power of the sun, which will be indispensable when out of range of mains power supplies, or during times of power outage, which are safe in operation and usage, at the minimum feasible cost for the customer;

To design and build equipment which may be charged in daylight for the purpose of providing night-time lighting during periods of power failure;

Our Mission:

To reduce living costs where possible – for example photovoltaic (solar) power can in many cases provide a replacement for disposable batteries, which are an ongoing cost and harmful to the local environment (as they contain toxic chemicals which contaminate the environment for decades after disposal, unless recycled);

To educate the local population in the development of electronic devices and their assembly;

To later diversify into other areas of consumer electronics according to budget;

To improve the quality of the lives of the local population.

Vision Statement:

To facilitate the improvement of the lives of local people and make them more easily able to live, work and educate their children – in remote areas a low cost source of power is indispensable. To improve the security of their homes and the education of their children.

To promote sustainable energy at the lowest possible cost, and make the local population aware of the benefits of sustainable energy, for themselves and the community as a whole.

Value Statement:

To be respectful, accountable and open in all we do. To promote openness, honesty and integrity, and the uptake and development of new technologies. To promote an environment to meet challenges and to encourage collaboration. To promote awareness of environmental and safety issues. To comply with relevant safety standards (either those of the United Kingdom or those of the country of sale, whichever are the higher, particularly where high voltage is involved). To operate across cultural and language barriers and to promote technological awareness.

Who may join?

- My ladies in the first instance
- Next other existing family, including my existing daughters (and later, further children!)
- Those who provide assistance
- Close friends
- And finally, third parties once we are established

Our Ethos

- We are fully committed to the principles of equal opportunities and inclusion
- We will not discriminate on the basis of nationality, disability, political, religious or cultural backgrounds
- We aim to be a family run business, and promote sustainable energy
- *“From the community, for the community”*

Our Products

"OUR VISION IS TO MAKE
RENEWABLE ENERGY TRULY
LOCAL, AFFORDABLE AND
VERSATILE, FOR THE BENEFIT
OF THE COMMUNITY"

My own Background?

- I come from a background of Science & Engineering...
- I am a British citizen, and hold a first degree (BSc Electronics, 2000) and a masters' degree (MSc Computer Science, 2004), both from Anglia Ruskin University, Cambridge.
- I am a licensed radio ham
- I have been interested in electronics since my teens
- I have some of the most advanced design and simulation software in the world.
- Any questions? You know where I am...
-

My Business Card



David Norris

Solar Power Specialist

Tel. +447943055280

Email: norrisdavid998@gmail.com

Website: <http://dfd.n.info/africa>

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