Department for International Trade

DIT Webinar with Renewable Energy Authority Libya:

Opportunities for UK companies in Libyan energy transition

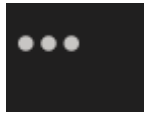
Housekeeping

Please:

Keep your microphone off during the session.

Use the chat area  (visible to all participants) to put forward questions for the Q&A.

We will select questions to answer during the Q&A session.

Turn on subtitles in English: 

Agenda

Segment	Speaker
Introduction to the webinar	Prime Minister's Trade Envoy Damien Moore MP
Presentation by the Renewable Energy Authority of Libya (REAOL)	Dr Hamid Sherwali, Chairman
Presentation by DIT	Ola Sorunke, Energy Sector Director for Africa DIT
Q&A with REAOL	Dr Hamid Sherwali, Chairman
Closing	Lydie Sheehan, Libya Country Director DIT

Department for International Trade

REAOL
Renewable Energy Authority of Libya

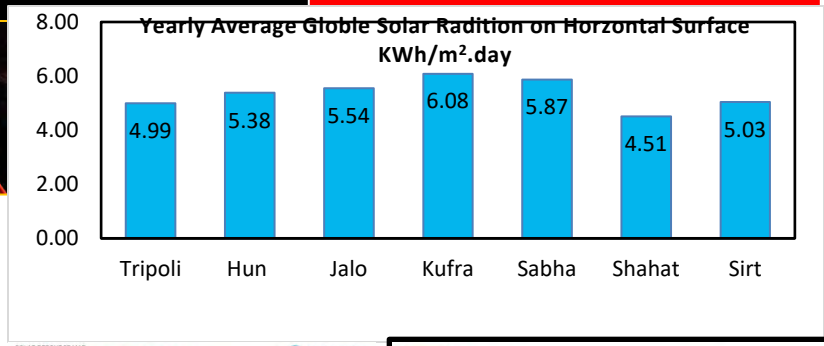
Opening intervention:
Prime Minister's Trade Envoy, Damien Moore

Department for International Trade

Presentation by the Renewable Energy Authority of Libya

STATE Of LIBYA

Government of National Unity



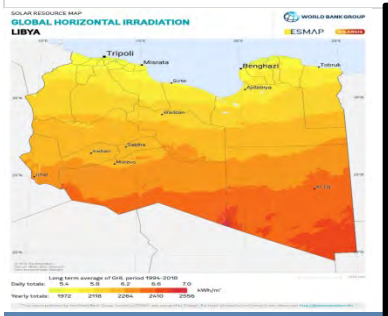
Renewable Energy Authority of Libya

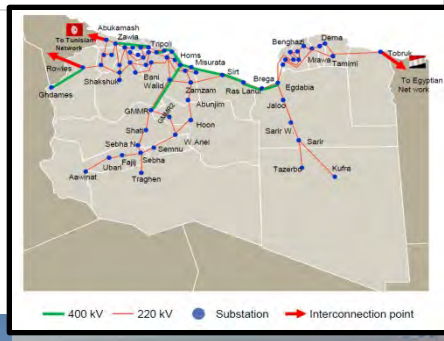
Renewable Energy Authority of Libya, UK Department for International Trade Webinar

Developing Renewable Energy in Libya.

Dr. Hamid H. Sherwali

July, 27 th. 2021





Contents,,,

- Renewable Energy Authority of Libya;
- The Electricity Sector in Libya
- Current Renewable Energy Situation in Libya;
- Strategic Plan
- Public Private Partnership;
- Example of Sites for Solar Parks;

Renewable Energy Authority of Libya, (REAoL).

is a governmental Authority,

established in 2007.

The main objective

All activities in RE ,i.e.

✓Comprehensive mapping of renewable energy sources in Libya and implement the studies to determine the current and future market.

✓Implement of renewable energy projects in various forms.

✓ Increase the contribution of RE in the national energy mix.

✓ Encourage and support the industries related to renewable energy.

✓ Propose the legislation needed to support renewable energy.

✓Implementation of the programs related to the energy efficiency.

The electricity sector in Libya

The electricity sector in Libya is suffering from:-

1. **Severe electricity shortage,**
2. **High demand,**

Current demand for electricity in Libya is about 7000 MW, with a shortfall of about 2000 MW, results in power cuts of nearly 3-5 hours per day. 10-12 hours were experienced in summer and winter. During this period there is a significant use of small diesel generators by ordinary consumers.

The problem is further compounded by lack of RE in its energy mix.

The electricity sector in Libya

GECOL as an entity fully owned by the Government of Libya, GECOL is not a commercial entity and does not have a clear profit objective. While collections are a critical challenge, the prevailing tariffs do not cover the costs of supply by far.

Cost of electricity is high as generation using fossil fuels.

Government subsidy is at two levels – direct tariff subsidy and fuel subsidy.

Subsidy for fuel can be managed if fuel consumption can be reduced and fuel mix improved.

Thus, reduced fuel costs through an appropriate fuel mix can help reduce fuel subsidies.

The current renewable energy situation in Libya.

Unfortunately, No electrical current produced from renewable energy is being injected to the grid.

Following activities has been made:-

- More than 350 small off grid units were put in operation to electrify rural area.
- More than 20 small off grid units used to provide electricity to health centers.
- With the aid of UNDP program, 10 medium size off grid units were put in operation over hospitals top roofs.
- Several MWs standalone systems have been installed for different applications such as Telecom companies.

- Several wind and solar measurement units were installed;
- Several studies and comprehensive engineering documents were made by credible entities;
- Call for tenders, bidding and contractor selection were done.

More important that....

A Strategic Plan for Renewable Energies covers the period between 2018 – 2030 was completed and ready to be implemented.

- **The plan aims to reduce the use of traditional energy sources and increase the renewable energy penetration rate to the energy mix.**
- **5000 MW (mainly PV and wind) expected to be implemented in different locations to meet the national target.**

Strategic Plan

Energy Mix Assessment and Renewable Resource Assessment

•Review renewable energy resource availability in Libya.

•Development/Review of a Least cost expansion plan.

•Develop renewable energy scenarios that confirm the economically optimal level of mix of renewable.

Strategic Plan for Development of Renewable Energy

•Suggest a suitable sector structure for development of renewable energy.

•Suggest institutional mechanism, procedures and processes for selection and licensing of RE projects.

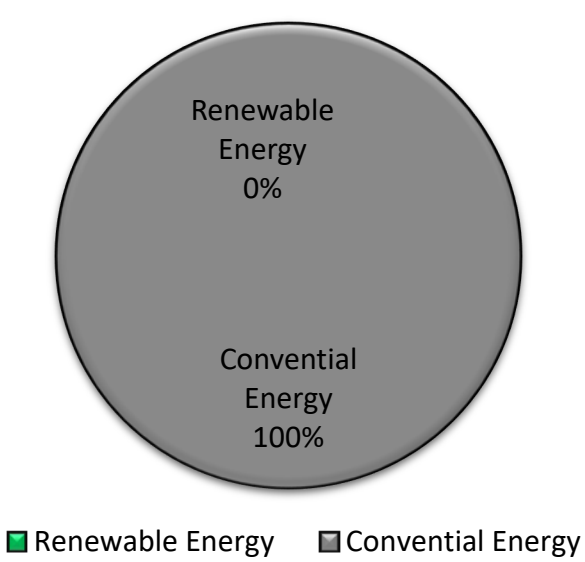
•Develop a road map for RE development until 2030 and estimate the size of investments required.

Renewable energy strategic plane should be updated

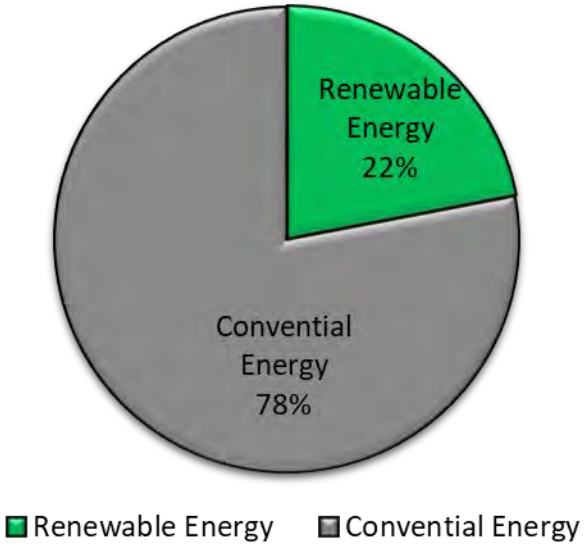
Long term goal: transparent tendering

More important that....

An existence of Strategic Plan for Renewable Energies covers the period between 2018 – 2030 is approved.



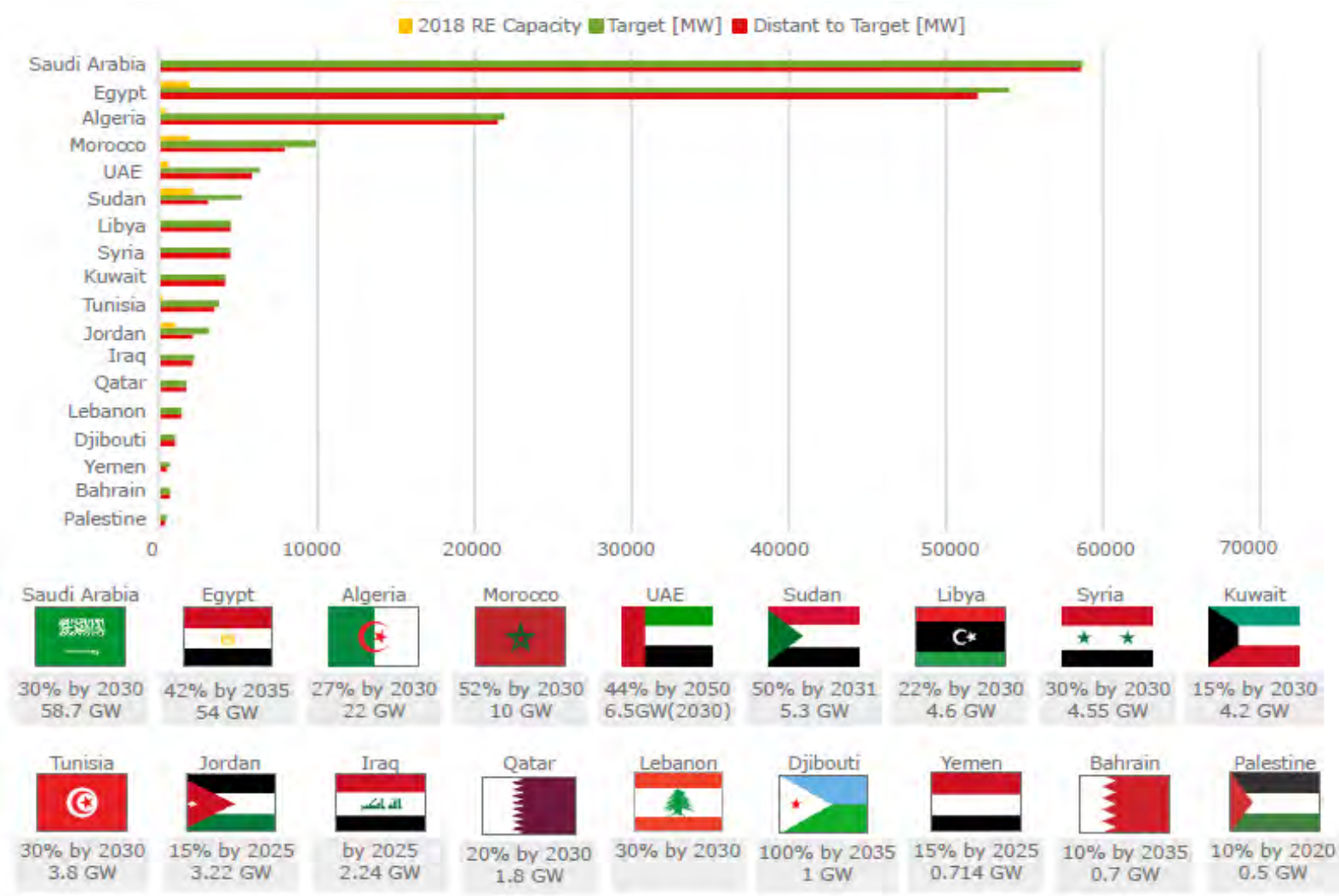
2018



2030

Electricity mixture produced by the end of 2030

Distance between Achieved and ambitions in RE national targets in Arab World



Public Private Partnership

Public-private partnerships (PPPs) -:

A mechanism for government to procure and implement public infrastructure and/or services using the resources and expertise of the private sector.

Independent Power Producer –IPP

Special Purpose Vehicle-SPV - SPC

Build-Operate-Transfer, (B.O.T) -OR- Build- Own – Operate, (B.O.O)

It is concluded in the strategic plan that creation of government company working under the umbrella of the commercial law.

Public Private Partnership

Major step towards de-centralizing the electricity sector
"Establishment of REDEVCO"

It is concluded in the strategic plan that creation of government company working under the umbrella of the commercial laws would the best option forward.

Principal role: To manage investment projects in renewable energies.

Primary task: To form right joint ventures and partnerships engaging the private sector initially to rely on state fund to finance development of projects.

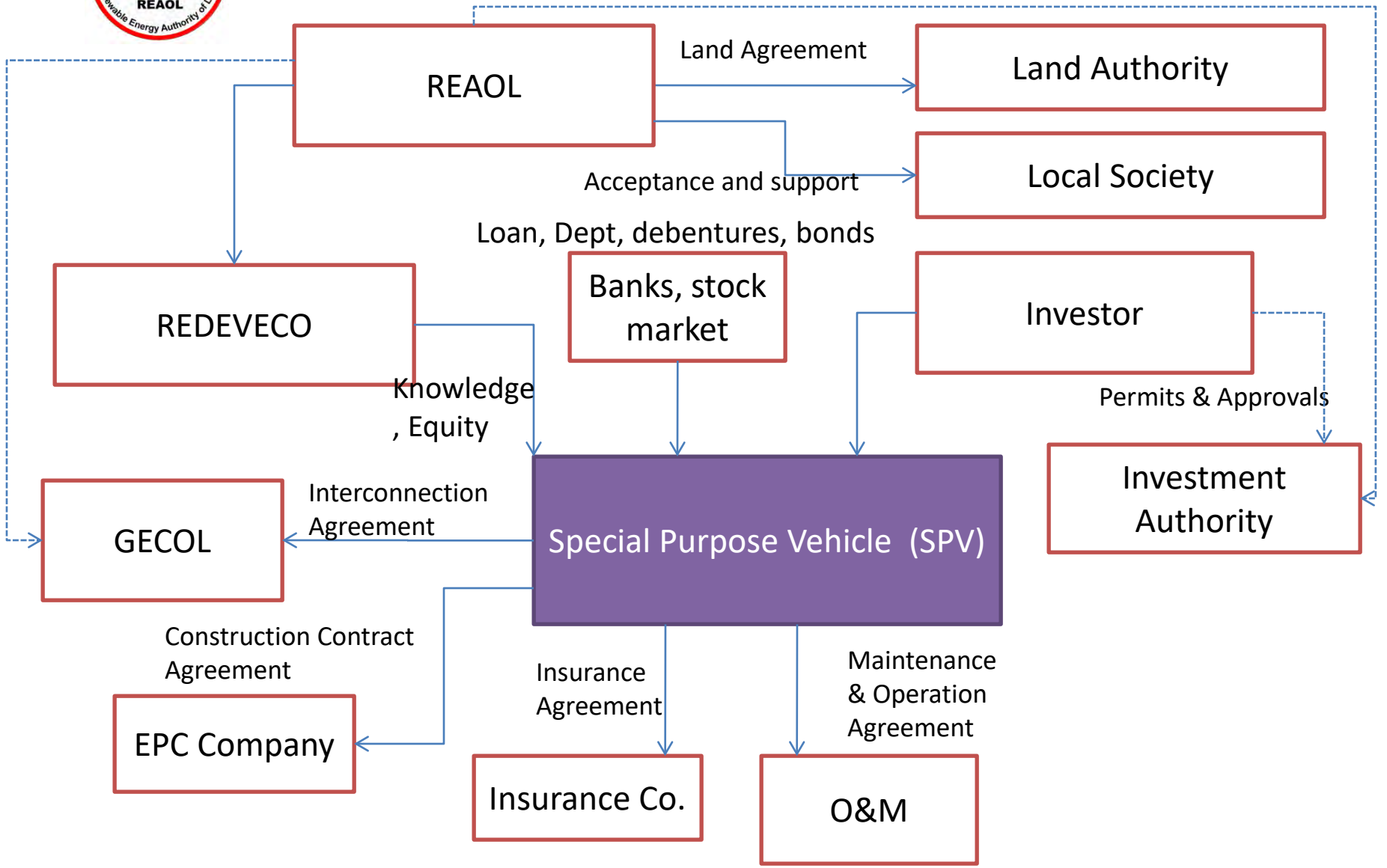
As climate for investment improves in later stages state funds decrease while private funds and share in the company are gradually increased only to become 100 % private at some point

Major step towards de-centralizing the electricity sector "Establishment of REDEVCO"

JOINT VENTURES/Special purpose vehicle companies (SPV's)

REDEVCO 's main tasks are to form:

- **JV's to allow for acquiring right knowledge and experience to run renewable projects**
- **Form SPV's and provide assistance to:**
  - ✓**Obtain necessary funds and equities to cover project development to enable entry of investors.**
  - ✓**Acquire necessary permissions, agreements, and licenses**
  - ✓ **Sign contracts with land owners**
  - ✓**Purchase of service/sign operation and maintenance agreements**
  - ✓**Form partnership with private investors**
  - ✓**Establish bond with GECOL in areas of grid connection and preparation of PPA**
  - ✓**Obtain insurances**


REAOL
Land Agreement
Land Authority
Acceptance and support
Local Society
Loan, Dept, debentures, bonds
REDEVECO
Banks, stock market
Investor
Knowledge , Equity
Permits & Approvals
Investment Authority
GECOL
Interconnection Agreement
Special Purpose Vehicle (SPV)
Construction Contract Agreement
Insurance Agreement
Maintenance & Operation Agreement
EPC Company
Insurance Co.
O&M

REDEVECO

1. The company is to meet the new challenges that has been appeared as a result of fiscal difficulties and restructuring the financial and market rules in country.
2. Smooth any expected financial cooperation and help in building the bridges of confidence and to encourage transparency.
3. Ensure that the development of the first Pilot projects in renewable energy will be on well established rules, regulations and proper working manner.
4. Prepare a platform for the investment and cooperation with international bodies interested in renewable energy projects in Libya.
5. Supervise and Prepare schemes for capacity building for specifically needed skills for Renewable energy project developments, planning and finance.
6. Prepare the detailed documents that lead to proper establishments of SPVs and set ways and rules to deal with stock market. i.e. (permits, forms, PPAs, etc.).

Example of Sites for Solar Parks

Construction of:-

1. **50** MW solar PV power plant in the municipality of **Jadu** near the town of Shakshuk in the Nafusa Mountains west of Libya.

   More than 100 ha dedicated to the development of the PV plant, i.e Possibility of Expending the project up to **100** Mw exist.

2. **50** MW solar PV power plant in the municipality of **Zliten**, in Majer area.

   500 ha dedicated to the development of the PV plant, i.e. Expending of the project is possible up to **300** Mw.

3. **50** MW solar PV power plant in the municipality of **Hoon**, in Jufra area.

Proper land were dedicated to the development of the PV plant,

A feasibility study for these projects were conducted include analyses of the technical, economic, Environmental, geographical, and legal, aspects of the project, in addition to an assessment of grid connection and the social and environmental impacts.

Minimum requirements of each PV & Wind park.

For each PV project:-

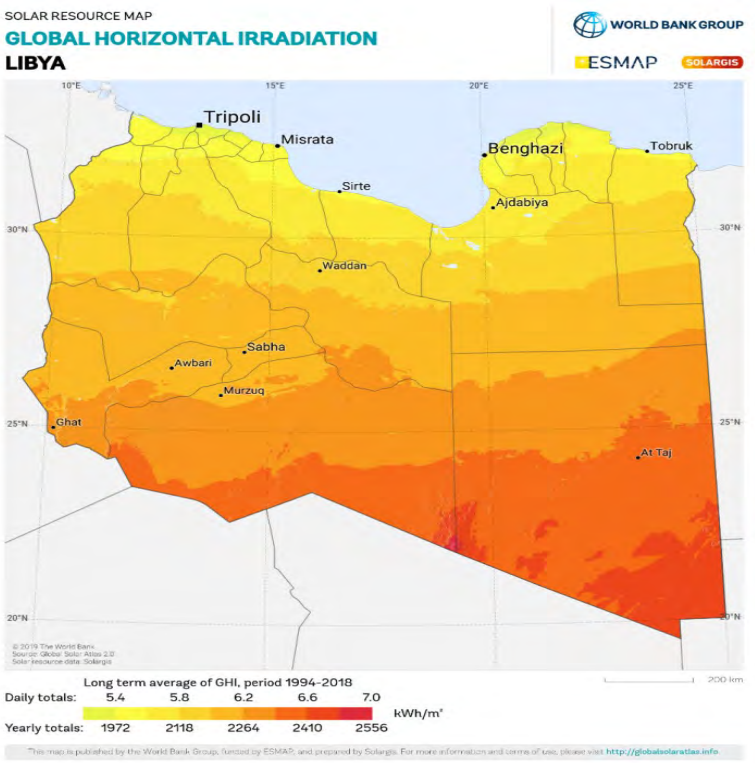
- 50 Mwac , Fix mounted, or 1- axis tracked
- P-Si Modules
- Central inverter

For each wind park:-

- ?? MW onshore wind parks consisting of WTGs of about:-
- Two to Three, MW each,
- Double Feed induction generator (DFIG)
- Fully rated converter type (type 3 and Type 4)
- 90 m hub height
- Rotor diameter of 90 m,
- Upwind / 3 blades rotors / horizontal axis.

Example of Sites for Solar Parks

- *Even though the **solar potential**, or irradiation, of the projects in Jadu and Zliten are one of the **lowest** all over the country, the irradiation can produce very sufficient energy.*
- *The yield assessment for a PV power plant with **fixed mounting system** is **1825 MWh/MWp**[(1)(2)].*
- *The difference in energy expected to be produced between **fixed mounting system** and tracking systems is **18.3%.***



For your attention

And

Stay safe

Dr. Hamid H Sherwali

Chairperson

Renewable Energy Authority of Libya- REAOL

Prof. at Electrical & Electronic Eng. Dep

University of Tripoli

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Department for International Trade

REAOL
Renewable Energy Authority of Libya

Presentation by Renewable Energy Sector Director, DIT Africa

JULY 2021

Renewable Energy

DIT Africa

Ola Sorunke,

Energy Sector Director

ola.sorunke@fco.gov.uk

Department for International Trade

GREAT BRITAIN & NORTHERN IRELAND

Agenda

1. DIT Africa - Overview
2. Energy Market Segmentation & Subsectors
3. DIT Africa Energy Sector and Renewable Energy Capabilities
4. Renewable Energy Challenges – Trade and Investment in Africa
5. UK Renewable Energy Footprint in Africa

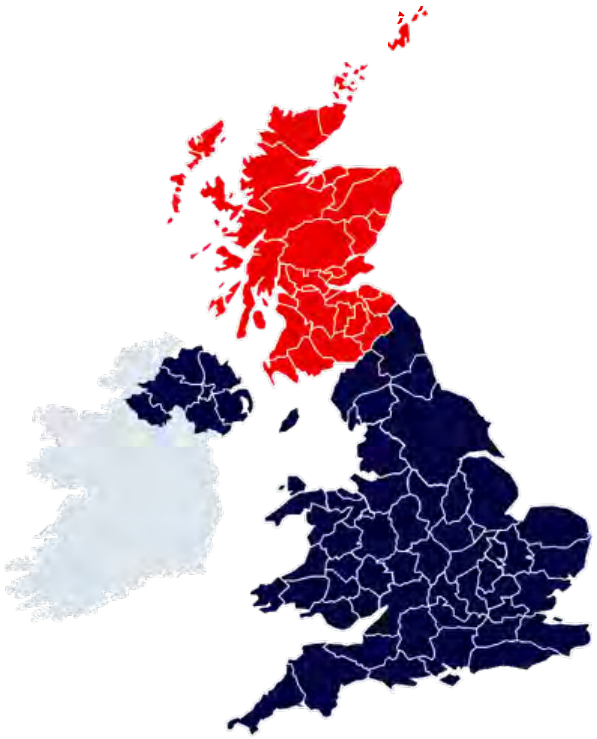
Our Purpose and Vision

Purpose

Use our trading relationships to champion economic growth and job creation by increasing sustainable, inclusive and responsible trade and investment between Africa and the UK, unlocked by our trade policy work.

Vision

Work together to support commercial success and mutual prosperity by building and investing responsibly in our shared economic future at the heart of a sustainable and inclusive global economy.



Renewable Sector Team

The HMTC role is to join-up and coordinate the UK government effort overseas to promote UK trade and prosperity.

The DIT Africa Renewable team is made up of market leads in more than 20 markets across Africa who are supported by the Senior Leadership below.

For more information, send an email to Ola.Sorunke@fco.gov.uk or our Market Entry Team (MET); DIT.Africa@fcdo.gov.uk

Emma Wade-Smith OBE
HMTC - Africa

Alastair Long
HMDTC – Trade and Investment Promotion

Paul Grey
Director: Exports

Martin Phelan
Director: Investments

Ola Sorunke
Sector Director: Energy

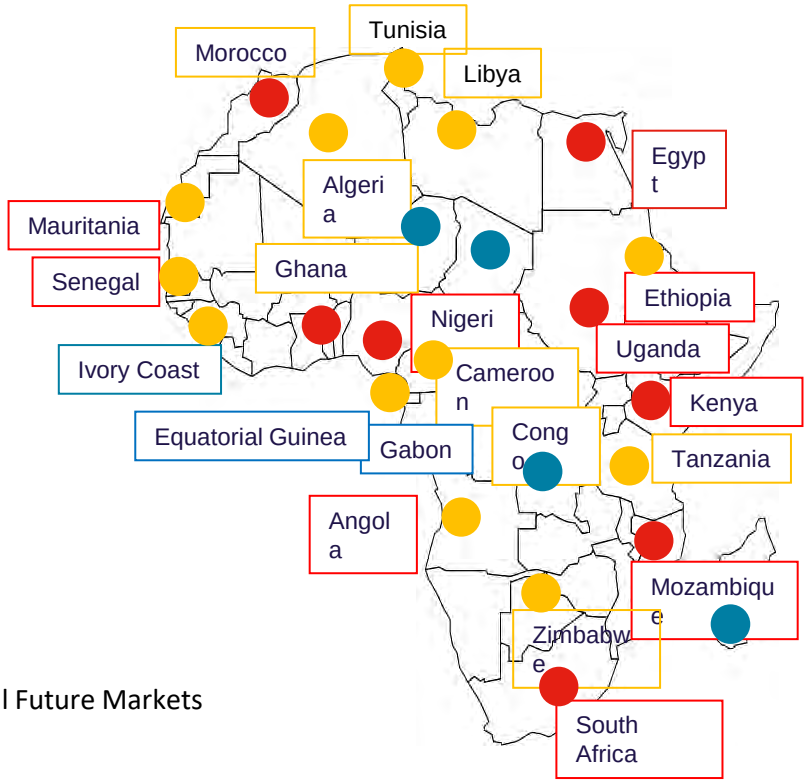
DIT Africa Energy Sector:

What we do:

Support Outward Direct Investment (ODI) into Africa, and Foreign Direct Investment (FDI) into the UK renewable energy sector,

- Support UK based companies, to export renewable energy goods & services to Africa
- Support other Government Departments to understand the trade and investment implications of their domestic and international policy work.

DIT AFRICA ENERGY MARKETS



- Priority Markets
- Strategic Markets
- Frontier Markets – Potential Future Markets

UK Capability in Renewables

We look at Renewable Energy as tech and services spanning generation and distribution in the following sectors;

- Electrical Network
- Hydrogen
- Energy Storage
- Offshore and Onshore wind
- Hydro
- Energy from Waste
- Recycling and Waste Management
- Wave and Tidal stream
- Solar PV and Thermal
- Carbon capture, utilisation and storage
- Energy Efficiency
- Geothermal

Capabilities;

Electrical Networks

- Electrical network design, engineering & smart system planning
- Consultancy, Technical and professional services
- General design, engineering and construction
- Protection and control system hardware
- Network system monitoring and evaluation
- Inspection, maintenance and refurbishment of installed equipment, networks and systems
- Smart Meters

(Lucy Electric, Ricardo, Mott McDonald, Siemens UK, GE, ABB, Babcock, Wilson Transformers, Schneider Electric UK, Steamaco, Trilliant etc.)

Hydrogen

- Water electrolysis materials, engineering, stacks and systems (power to gas and refuelling)
- Methane reforming catalysts and process engineering
- Consultancy including project development and safety
- Fuel cells including high power density PEM and Solid Oxide Fuel Cells
- Transport applications including bus design, combustion engine conversion
- Storage facilities such as salt caverns

(ITM power, Ceres Power, Johnson Matthey, LGT,Arup, Alexander Dennis, Delta, Atkins, etc.)

Energy Storage

- Development and delivery of fully integrated, grid scale energy storage systems;
- Technical Services, with expertise in Energy Storage Solution Analysis;
- Consultancy including all aspects of implementation of Storage Solutions into networks with renewable technology content;
- The development and management of ‘smart’ solutions that can integrate
- both off grid and mini grid technologies with the design interface to the
- appropriate energy storage solution(s)

(Mobile power, Energy Storage Africa, ITM Power, Fraser-Nash, Anesco, Powervault, Highbiew, TNEI etc.)

Capabilities;

Offshore and Onshore wind

- Policy development, Project development (engineering, consultancy, procurement (ECP), consenting, surveying, unexploded ordinance and due diligence);
- Installation (e.g. substations, cables and turbines); and Equipment (turbine blades, towers, foundations, transition pieces, inter array cables, cable protection, substations, vessel equipment and ROVs);
- Tier 2 manufactures in steel components (e.g. cable protection);
- Vessels (installation / O&M), leading technicians and managers;
- Operations and maintenance;
- Specialist offshore legal and insurance products / services;

(Siemens Gamesa Renewable, MVOW, BiFab, CS Wind, SMD, Ecosse Subsea, JDR cables, Arup, James Fisher etc.)

Hydro

- Large scale design and technical engineering
- Small community scale implementation of smaller hydro projects
- Quality, efficient and reliable technology for smaller scale hydro projects (Gilkes)
- Financing (UKEF can debt fund a project that uses at least 20% UK content)
- Intake screens (allowing flow into the system without blockages)
- Electrical systems
- Grid solutions

(Gilkes, Dualas, Mott McDonald, Hydroplan, GE, Lucy electric etc.)

Recycling and Energy from Waste

- The end to end implementation of anaerobic digestion, including design, build and operation;
- Designing and implementing the policy and incentive structure
- required to make EfW facilities economically viable;
- Designing and manufacturing refuse collection vehicles, and sorting equipment
- Design and manufacture of bins, skips and containers for waste
- The supply of waste collection vehicles and bins for separate collections of materials;

(Malaby Biogas, Biogen, Clarke Energy, Kew, WEPP, Donasonic, Lyndex, Ricardo, Arup, Dennis Eagler, Egbert Taylor, JCB, Johnson sweepers etc.)

Capabilities;

Wave and Tidal

- The end to end implementation of tidal stream devices;
- Development and manufacture of tidal stream machines at the kW and MW scale, including new direct drive machines;
- Environment surveys and tidal resource studies;
- Supply of balance of plant items, including cables, foundations and sub structures, control systems and substations;
- Assembly, installation and commissioning, including vessels;
- Integration with storage technologies;
- Operations and maintenance;

(Atlantis Resources, Sustainable Marine Energy, Nova innovation, Aquaterra, Quoceant, EMEC etc.)

Solar PV and Thermal

- Designing and implementing the policy and incentive structure required to make Solar facilities economically viable;
- The development, delivery and ownership / operation of large, grid scale solar projects, medium scale solar projects and integrated hybrid solutions with energy storage and mini grid management;
- General design, engineering and construction services applicable to all types of Solar facility

(Azuri technologies, BBOX, Winch Energy, UKSol, Lightsource BP, Solar Century, Lucy electric, etc.)

Carbon capture, utilisation and Storage

- Strong engineering skill sets, with involvement in the development of overseas CCS deployment projects
- Consultancy and professional services the UK's professional services have been involved in determining feasibility studies
- An experienced oil and gas industry who have the skill set to manage the sequestration of CO2 and the related infrastructure

(WSP, Wood Group, Pale Blue Dot, DRAX, C-Capture, O.C.O technologies Ltd, Econic, Deep branch Biotechnology Ltd etc.)

Capabilities;

Energy Efficiency

- Engineering and architectural services for efficient design
- Modelling and software tools for more effective project design
- Lighting solutions and supply of HVAC equipment
- Project management and logistics for the construction process and site laser scanning
- Design and consultancy services related to district heating
- Products and services related to post occupancy
- Energy management services

(Arup, Foster + Partners, Swan Energy, Centrica Business Solutions, Concept Energy Solutions, Salix, etc.)

Geothermal

- Exploration including geological surveys and drilling, design maintenance and operation of plant
- Designing and implementing the policy and incentive structure required to make Geothermal facilities economically viable
- Smaller scale ‘well head’ turbines (CEG specialise in these)
- General design, engineering and construction services applicable to all types of Geothermal facility

(Hotspur Geothermal, Geo Drill, GT Energy, EGS Energy, Green Energy Geothermal etc.)

Challenges

Access to Finance	Access to affordable finance especially without a concessional product to support rural electrification. Affordable financing to take up opportunity and viable deploy solutions
Competition/Price	Aggressive and proactive competitors such as US, China and India, with attractive pricing and readily finance. UK companies unable to secure financing from UKEF
Business Environment	Hostile environments such as security, government regulations/ policies, political instability, corruption, etc. Project Models challenges with host governments. Viable Tariffs Inefficient Critical National Infrastructure assets.
Perception	UK renewables offer unfairly seen as weak or unable to offer preferred solutions on large scale projects. Lack of Interest in Africa by UK renewable energy companies

Some Key UK Renewable Developers

GLOBELEQ
POWERING AFRICA'S GROWTH

ROLLS ROYCE

M MOTT MACDONALD M

WINCH ENERGY

Lekela

Ryse Energy
the new name for
Sustainable Energy Systems

Clarke Energy

aggreko

actis

KONEXA

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UK Technical Assistance to Libya

1. HMG is working with the Libyan Ministry of Environment to co-develop **Libya's first National Communication to UNFCCC and a high-level Nationally Determined Contribution (NDC),** including a Greenhouse Gas (GHG) inventory and roadmap for developing a more detailed, quantifiable, fully costed NDC for subsequent submissions. This in collaboration with the leadership of the Prime Minister's Office, the Ministry of Environment, the National Oil Cooperation, and the Ministry of Finance and others.

2. HMG will also fund an 18 month multi-donor **project providing technical assistance to GECOL on the renewable energy and energy efficiency components of its Libyan Electrical Grid Stabilisation Plan**. The project will be implemented by UNEP and is co-funded by the EU, building on an existing multi-donor effort to support grid stabilisation and build the groundwork for energy transition.

Department for International Trade

REAOL
Renewable Energy Authority of Libya

Question & Answer Session

Department for International Trade

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Renewable Energy Authority of Libya

Closing Remarks

To find out more…

Contact: hamid.sherwali@reaol.ly

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Please be in touch!