Renewable Energy in Egypt

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- Renewable Energy Sector.
- Renewable Energy Schemes.
- Feed-in Tariff, (FiT).
- Socio-Economic Effects.
- New Solar Atlas of Egypt.

Vision, Strategy, and Policies Of Renewable Energy

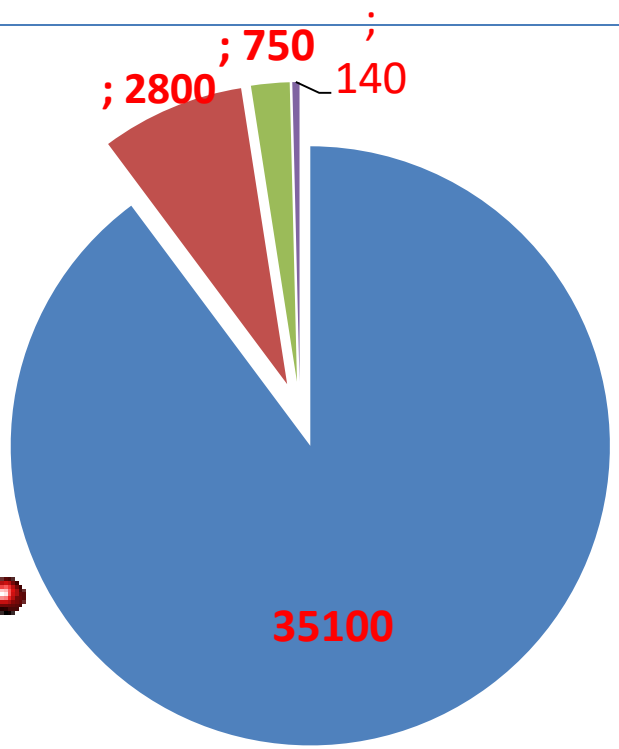
Vision, Strategy, and Policies

Vision	Increase Share of renewable energy in the energy sector.
Targets	Generate electricity from renewable energy; - 20% by the year 2022, - 37% by the year 2035.
Policies	a) Competitive Biding b) Merchant Scheme c) Feed-In Tariff, FiT

Renewable Energy Sector

Electricity in Egypt

- Total installed capacity about 38.8GW
  - 35.1 thermal,
  - 2.8 hydro,
  - 0.75 wind
  - 0.14 CSP
- Secured supply to 99% of the population.
- Renewable Energy (Wind & solar) represent about 2.5% from the installed capacity & 0.8% from the electric energy.



New and Renewable Energy Authority, NREA

Established in 1986

The national focal point to develop and introduce renewable energy technologies to Egypt on a commercial scale together with implementation of related energy conservation programs

Legal Framework

1) Constitution / Article 32

To get optimum benefits from renewable energy, promote its investments, and encourage R&D, in addition to local manufacturing.

2) Law No. 203 of Year the 2014

To Motivate Production of Electricity from Renewable Energy Sources.

3) Electricity Law, July 2015

It governs the electricity sector in Egypt.

4) Announcement of the Second Round of FiT

5) Cabinet Decree No. 1947 of the Year 2014 on Feed-in Tariff -1st Round

It establishes the basis for Feed-in Tariff for energy produced from renewable energy projects and encourage investment in renewable energy.

6) Prime Ministerial Decree No. (2532) of the Year 2016 on Feed-in Tariff-2nd Round

Regulations to Avail Land for renewable Energy Projects.

Legal Framework

7) Prime Ministerial Decree No. (37/4/15/14) of the Year 2015

Regulations to Avail Land for renewable Energy Projects.

8) Investment Law No. 8 of the Year 1997 (as amended)

On Investment Guarantees and Investments

9) Presidential Decree No. 326 of the Year 1997 (as amended)

It establishes the Electric Utility and Consumer Protection Regulatory Agency, affiliate of the Ministry of Electricity and Renewable Energy, responsible of the issuance of permits and licenses for generation, transmission and distribution.

10) Law 4 for the Protection of the Environment (as amended)

The law formulates the general policies for protecting and promoting the environment.

11) Law No. 102 of the Year 1986 (as amended)

Establishes the New and Renewable Energy Authority, NREA. NREA has the primary role in promoting and developing renewable energy in Egypt.

12) Companies Law No. 159 of the Year 1981 (as amended)

It establishes the requirements for incorporation of an SPV and the general rules for its management.

Renewable Energy Schemes in Egypt

Renewable Energy Development Schemes

Framework for RE Development Mechanisms

Competitive Biding

NERA*
- EPC contracts since 1993
- 750 MW → 1890 MW
- Solar (PV) ≈ 80 MW

EETC+

a) Wind (PPA Initially signed)
- 250 MW @ Gulf of Suez

b) Tendering Phase
- 250 & 50 MW, Wind & CSP, respectively
- 2 x 200 MW PV Projects

Merchant
- IPP since 2012

Fit/Quota since 2014
- 2000 MW Wind
- 2000 MW PV
- 300 MW PV (rooftop)

+ EETC: Egyptian Electricity Transmission Company
** NREA: New and Renewable Energy Authority*

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Projects done through Competitive Bidding

- 1040 MW Wind Energy in operation, erection, and contracted.

- The 1st CSP plant is 140 MW including solar field of 20 MWe based on parabolic trough technology and 120 MW combined Cycle. It is in operation since July 2011.

Projects Planned to be established through Competitive Bidding

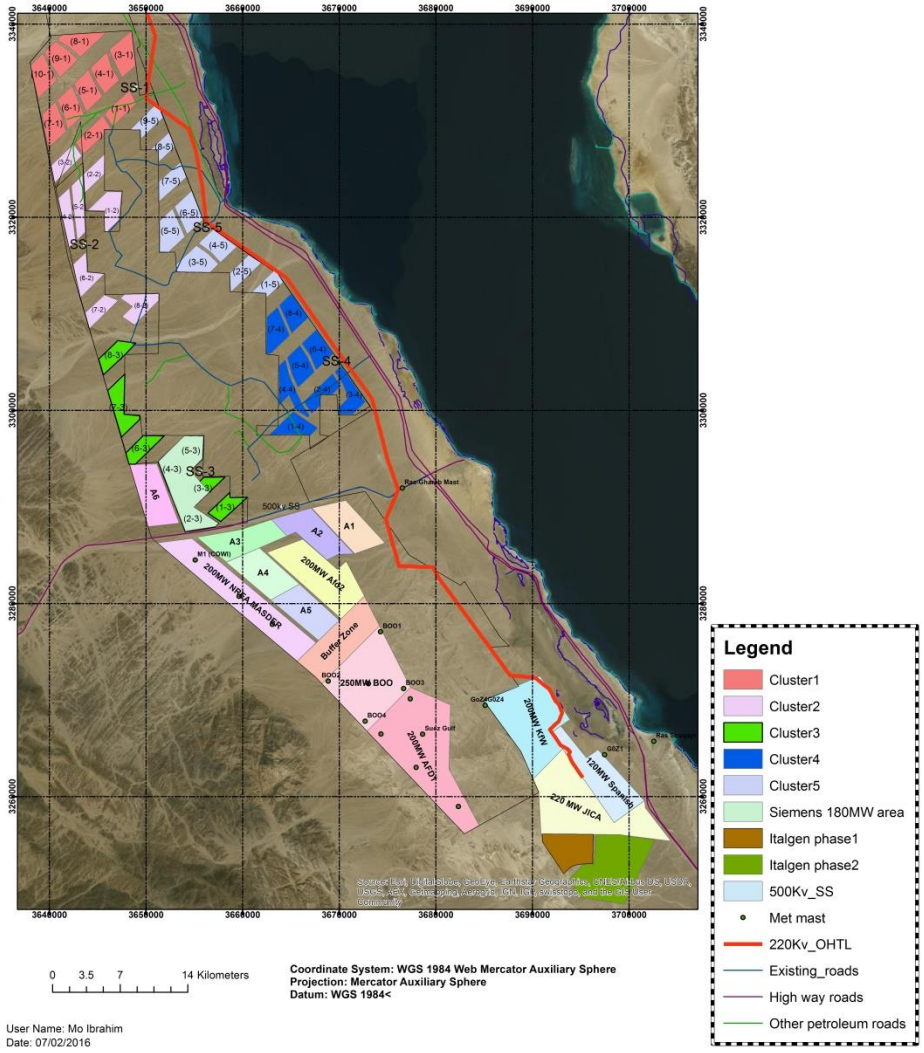
Wind Projects Under Developmer

a) 200 MW, NREA/MASDAR

b) 200 MW, in cooperation with French Agency for Development, Afd.

c) 200 MW, in Cooperation with Germany, EU, Afd

d) 200 MW, in Cooperation with Japan (on the Nile Western Bank).



Solar Projects Under Development

a) EPC:

2 grid connected PV projects, 20 MW each, in Hurghada & Kom Umbo are

b) BOO:

20 MW x 10 of PV Projects at Kom Umbo
200 MW of PV Project at West Nile region
100 MW CSP Project at West Nile region

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Feed-in-Tariff, 2nd Round

Due date: Oct. 28, 2016

A) Wind Energy

A-1) Tariff

Ranges from US$ 7.6 Cents/ kWh to US$ 4.0 Cents/kWh, according to the full operating hours in the site, from 2500 h to more than 5000 h, respectively.

A-2) Maturity: 20 Years

A-3) Payment conditions: 40% at EGP 8.88 and 60% pegged to the USD at the rate applicable on the due date

A-4) Project components: 60% foreign and 40% Egyptian.

A-5) Arbitration: Will be governed by the Rules of the Cairo Regional Centre for International Commercial Arbitration (CRCICA). The seat of arbitration will be offshore (exact location not announced).

A-6) Eligible Developers: Only the pre-qualified developers under Round 1.

A-7) Financial Closure: within 1.5 years for wind projects

A-8) Targeted Capacity: 2000 MW

Feed-in-Tariff, 2nd Round

Due date: Oct. 28, 2016

A) Photovoltaic > 500 kw

A-1) Tariff

US$ 8.4 Cents/ kWh to projects range from 20 – 50 MW

US$ 7.99 Cents/kWh to projects more than 500 kW

A-2) Maturity: 25 Years

A-3) Payment conditions: 30% at EGP 8.88 and 70% pegged to the USD at the rate applicable on the due date

A-4) Project components: 70% foreign and 30% Egyptian.

A-5) Arbitration: Will be governed by the Rules of the Cairo Regional Centre for International Commercial Arbitration (CRCICA). The seat of arbitration will be offshore (exact location not announced).

A-6) Eligible Developers: Only the pre-qualified developers under Round 1.

A-7) Financial Closure: within 1.0 year for wind projects

A-8) Targeted Capacity: 2000 MW

Feed-in-Tariff, 2nd Round

Due date: Oct. 28, 2016

A) Photovoltaic < = 500 kw

A-1) Tariff

1.0288 EGP/ kWh for residential sector

1.0858 EGP/kWh to projects less than 500 kW

A-2) Maturity: 25 Years

A-3) Payment conditions: EGP

A-6) Eligible Developers: Open.

A-7) Targeted Capacity: 300 MW **(about 4 MW installed & 6 MW under construction)**

Socio-Economic Effects

Environmental Issues

CO_2 Abatement from RE Projects

Year	Installed Capacity MW	Fuel Savings ktoe	Energy GWh	CO_2 Abatement k-tCO_2
2015/2016	750	442	2057	1132
2023/2024	10480	6344	29572	16265

About **52400** indirect jobs (**5 jobs/ MW**) .

About **5250** direct jobs (**0.5 jobs/ MW**)

Local Manufacturing

- Egypt's key strengths for renewable energy industry development are:
  - Government's commitment and support,
  - Availability of raw materials in the country .
  - Cost of energy (industrial),
  - Relevant technological
  - Manufacturing ability,
  - Ease of getting credit (financial risk competitiveness parameter),
- qualified labor force available for: engineering, technical and management Knowledge and base capacities exist, but specifics for installation and maintenance shall be built.

Local Manufacturing (Cont.)

- The share of local content in the existing wind farm reached between 25-30% (towers, cables, transformers, civil & electrical works) and there is a plan to increase this share by 2022. The local share in the 1st solar thermal power plant project reached to 50% in the solar portion.
- The new tenders documents shall encourage the bidders to use local components. Bidders who will use the local components of the wind turbines (blades, towers, generators, cables, switch gears,.....etc) will be preferred.
- New factory for blade manufacturing is under implementation by Siemens Company.
- 3 PV modules Assembly Factories (AOI, Arab International Optronics and Prism).
- A contract has been signed between the Ministry of Military Production & German Consultant to conduct a feasibility study to establish a PV modules factory

New Solar Atlas of Egypt

Solar Atlas

- Solar Energy Nowcasting SystEm (SENSE) pilot are of great and absolute importance in order to produce:

  (i) the analytical solar energy Atlas of Egypt mainly for the efficient solar energy exploitation and

  (ii) the nowcasting of the solar energy potential in real time in order to support the Egyptian energy authorities to better plan solar energy demands,

- NREA considers this developed Solar Atlas as an excellent addition and complementing the government's efforts in finding other venues of electricity production.

Thank You