
Electricity Sector
in Egypt

Presented by

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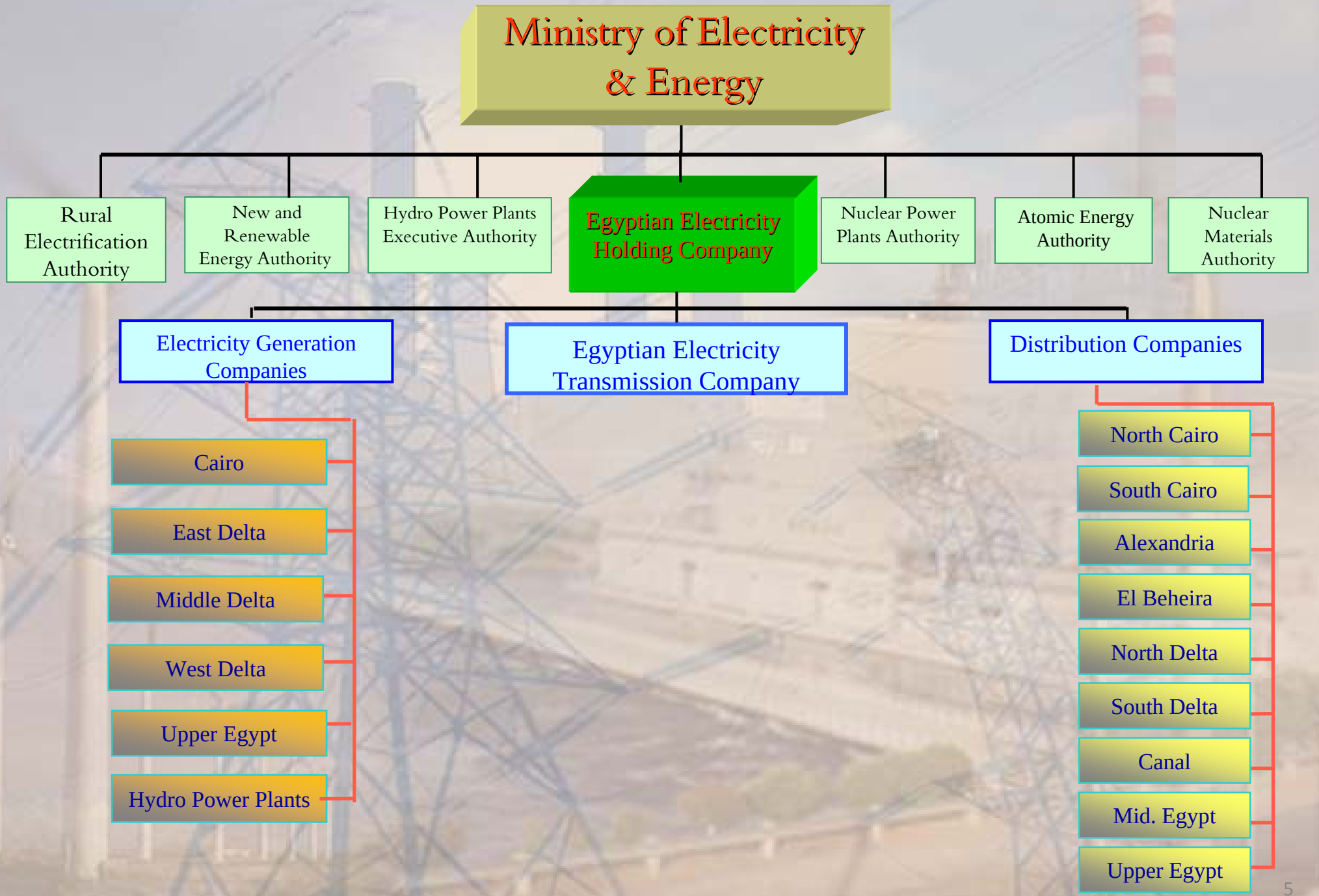
Mission

Providing continuous and safe supply of electricity to all consumers on economic bases and according to international performance standards taking into consideration all the environmental, social and economic determinants. and producing electricity from diversified sources of conventional and renewable energy.

Strategic Main Goals of Electricity Sector in Egypt

- **Maximizing the utilization of all resources.**
- **Promotion of the renewable energy utilization.**
- **Promotion of Electrical Interconnection.**
- **Improving efficiency of energy production and use, by adopting energy efficiency policies.**
- **Environment protection by adopting suitable measures in electricity generation.**


Ministry of Electricity & Energy
Rural Electrification Authority
New and Renewable Energy Authority
Hydro Power Plants Executive Authority
Egyptian Electricity Holding Company
Nuclear Power Plants Authority
Atomic Energy Authority
Nuclear Materials Authority
Electricity Generation Companies
Egyptian Electricity Transmission Company
Distribution Companies
Cairo
East Delta
Middle Delta
West Delta
Upper Egypt
Hydro Power Plants
North Cairo
South Cairo
Alexandria
El Beheira
North Delta
South Delta
Canal
Mid. Egypt
Upper Egypt

Current status

Total Installed capacity 27440 MW

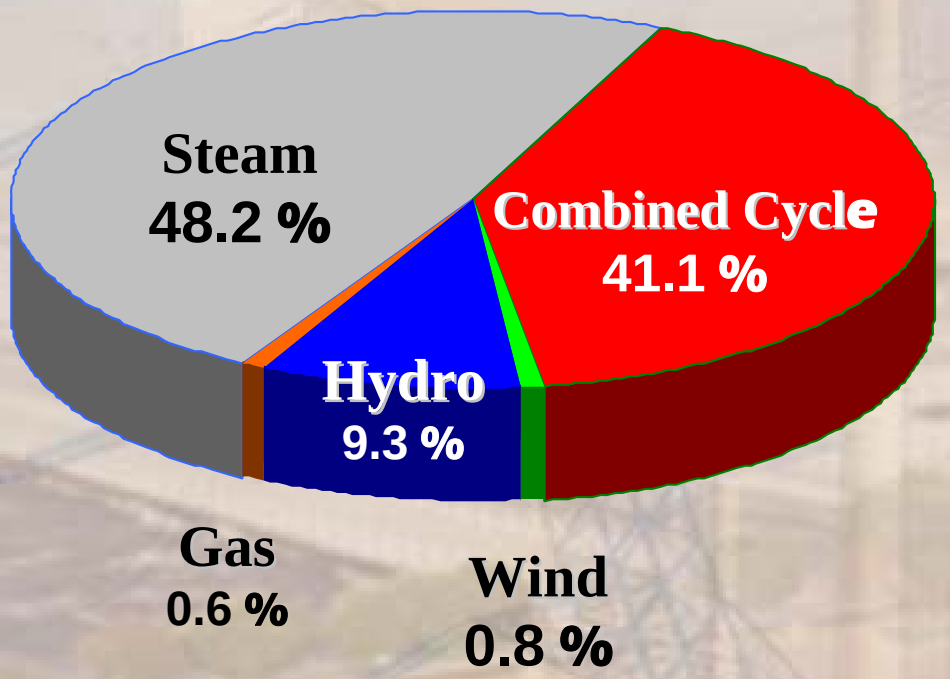
Installed capacity from thermal power Plants:	**23908**	**MW**
Installed capacity from hydro:	**2842**	**MW**
Installed capacity from wind:	**550**	**MW**
Installed capacity from solar:	**140**	**MW**

Generated Electricity: 139'000 Gwh

24% from Electricity available with no Fuel

Diversifying the Energy Resources Generation

2009/2010



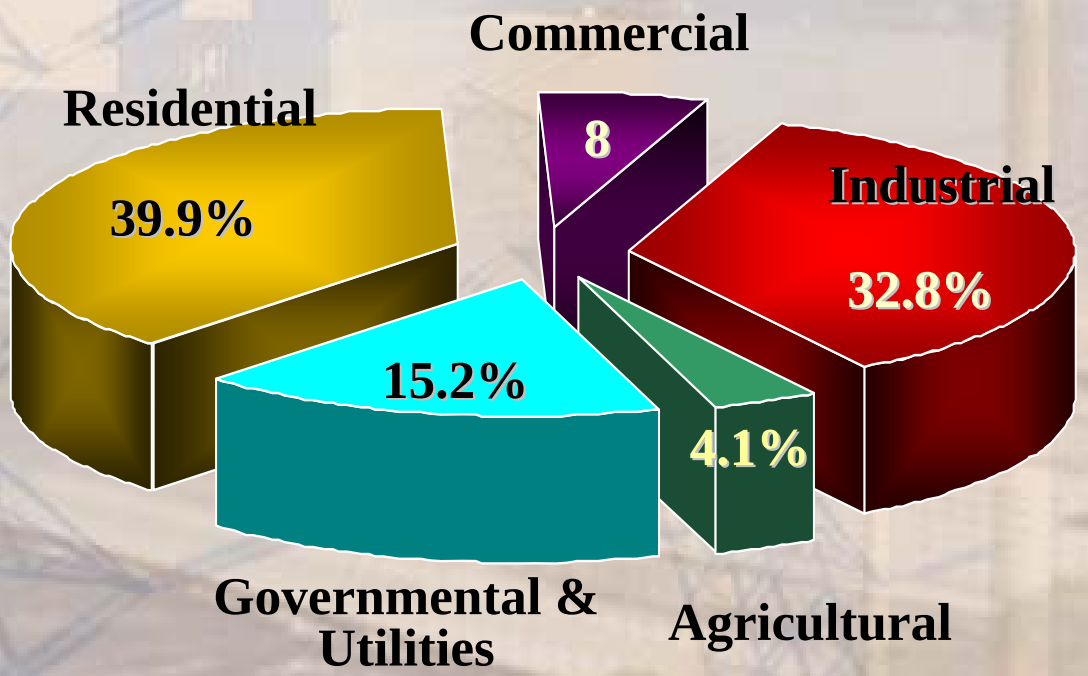
Large Scale Wind Farms

- Since 2001, series of large scale wind farms were established with capacity of 550 MW in cooperation with Germany (KFW), Denmark (DANIDA), Spain and Japan (JICA).

- **Key Indicators:**
  - **Generated Electricity:** **~ 6600 GWh,**
  - **Fuel Saving:** **~ 1.4 million T.O.E.,**
  - **Emissions Reduction:** **~3.3 Million T.CO2.**

Access & Consumers

Consumers
(Million) **26.4**



Access to Electricity more than 99 %

Performance Indicators

Rate of Fuel Consumption :

Improved by 38% to reach 216 gm/kWh

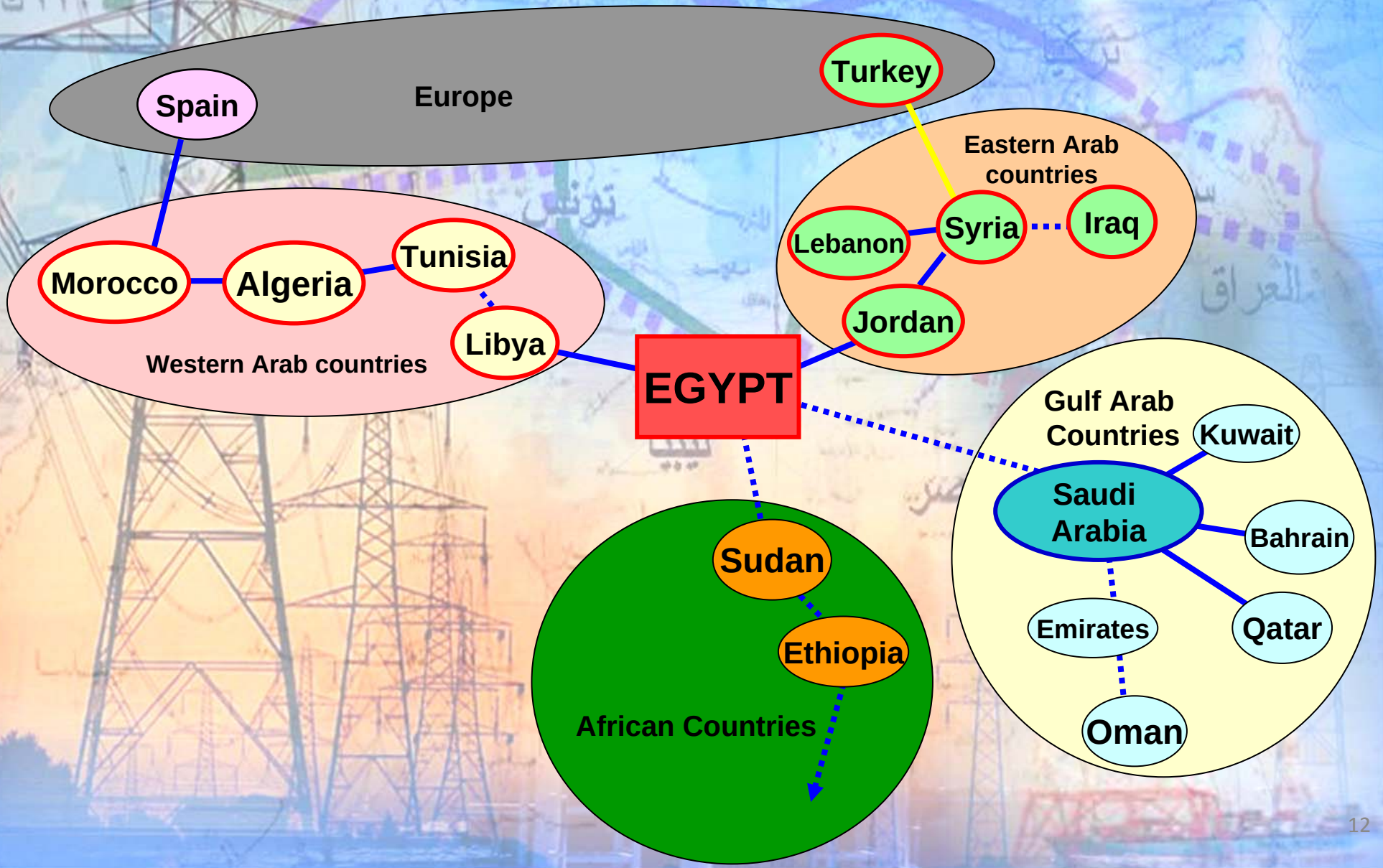
Percentage of Electrical Energy Loss :

Improved by 40% to reach 10.9%

Percentage of CO_2 Emission:

Reduced by 44% to reach 0.54 kg/kWh

Egypt is a Hub for Electrical Interconnection



Local Manufacturing

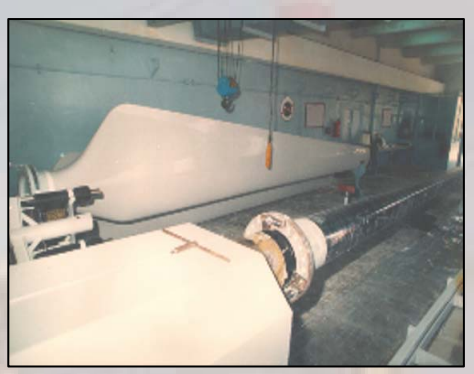
The Ministry Of Electricity & Energy (MOEE) established a localization program for design, installation and manufacture of components of electrical equipment with a target to raise the percentage of local participation

The results of this program are the following :

- **100%** of the Transmission Networks up to 66 kV and all Distribution Network components.
- **100 %** in the Transmission Networks up to 220 kV.
- **42 %** of power plants components.

Wind Energy Equipment:

- **30%** of the wind energy equipments are locally manufactured.
- There is a plan for the private sector participation to raise manufacturing of wind energy equipments to **70%** at the end of 2020.



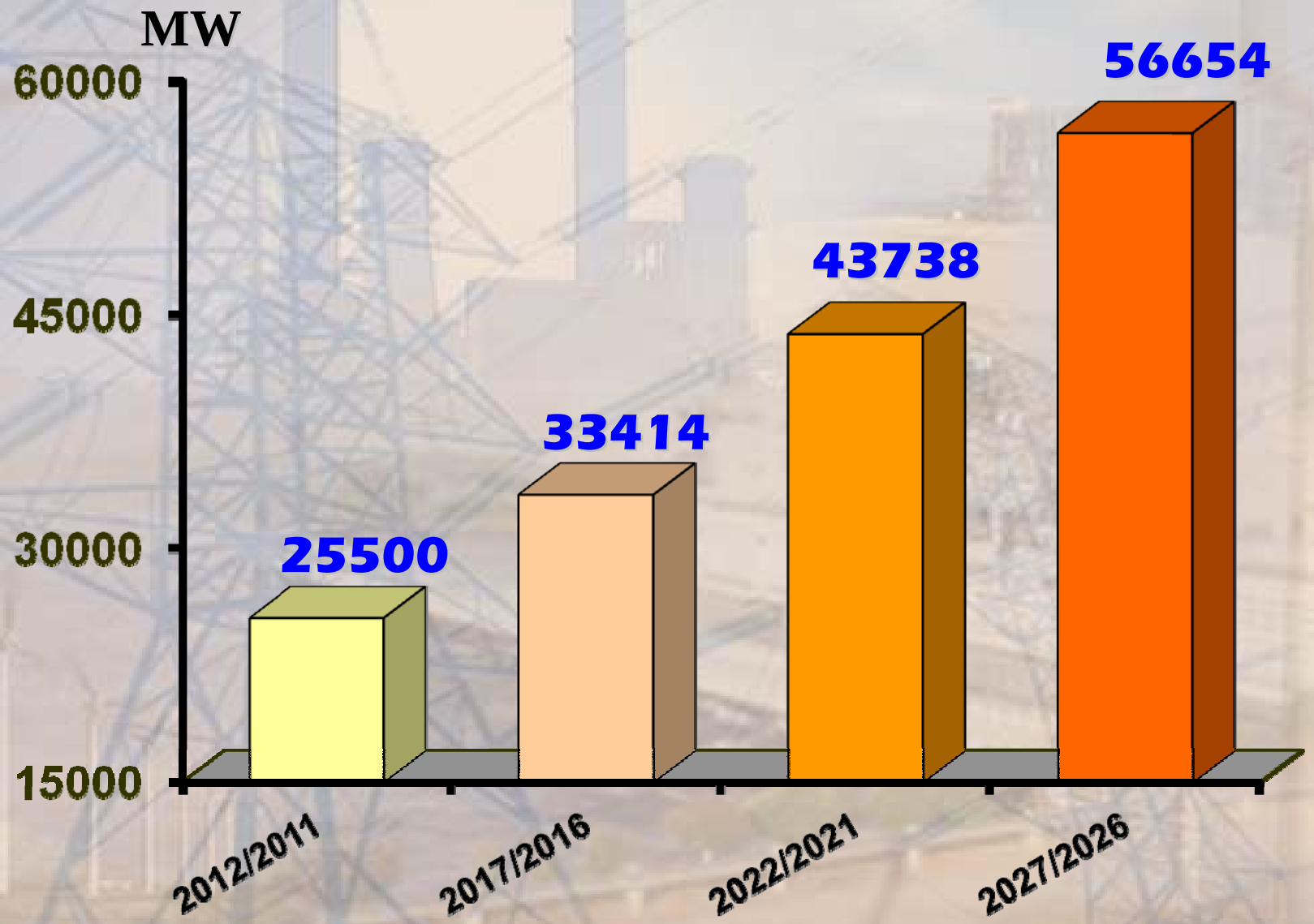
Solar Energy Equipment:

The local share in the 1st solar thermal power plant project is **50%**.

All these equipment cover the needs of local market and are exported to Arabian, African and European countries.

Future Expansion of Electricity Sector

Peak Load Evolution Till 2027



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Power Projects Plans Until 2027

Year	Power Plants (MW)*	Transformer (MVA)	Lines (km)
2007-2012	8750	19320	51000
2012-2017	12400	18125	60410
2017-2022	14950	18600	62000
2022-2027	19700	21225	70750
Total	55800	77270	244160

* Conventional only

Thermal power plants 2012- 2017

Governmental Projects			
Project Name	**Capacity (MW)**	**Type**	**Estimated Operation Date**
Banha	**750**	**Combined Cycle**	Simple cycle 3,4/2013 Combined cycle 1/2014
North Giza(1,2)	**1500**	**Combined Cycle**	Simple cycle 2,3,4,5/2013 Combined cycle 11/2013, 1/2014
North Giza(3)	**750**	**Combined Cycle**	Simple cycle 5,6/2014 Combined cycle 3/2015
Suez	**650**	**Steam**	4/2015
South Helwan	**1950**	**Steam**	Steam unit (1) 3/2016 Steam unit (2) 6/2016 Steam unit (3) 9/2016
Alshabab	**1000**	**Simple cycle**	6/2011
Damietta	**500**	**Simple cycle**	7/2011
West Damietta	**500**	**Combined Cycle**	10, 12/2011, 1,2/2012
6 of October	**600**	**Simple cycle**	3,4/2012
Safaga	**1300**	**Steam**	Steam unit (1) 5/2017 Steam unit (2) 8/2017

Thermal power plants 2012- 2017

Private Sector Projects (BOO)			
Project Name	**Capacity (MW)**	**Type**	**Estimated Operation Date**
Dairut	**2250**	Combined Cycle	Simple cycle 3-5/2014 Combined cycle 12/2014
Qena	**1300**	Steam	Steam unit 6/2016 Steam unit 9/2016
Ayat	**1950**	Steam	Steam unit (1) 2/2017 Steam unit (2) 5/2017 Steam unit (3) 8/2017

Renewable Energy Projects 2012- 2017

Governmental Projects		
Project Name	**Capacity (MW)**	**Estimated Operation Date**
1.Wind		
Project 1	**200**	2012/2013
Project 2	**220**	2013/2014
Project 3	**120**	2013/2014
Project 4	**180**	2014/2015
Project 5	**200**	2014/2015
Project 6	**200**	2014/2015
2.Solar thermal power		
Project 1	**100**	2015/2016
3.Photo Voltaic		
Project 1	**20**	2015/2016
Project 2	**20**	2016/2017

Renewable Energy Projects 2012- 2017

Private Sector Projects		
Project Name	**Capacity (MW)**	**Estimated Operation Date**
Wind		
Project 1 **(IPP)**	**120**	2013/2014
Project 2 **(BOO)**	**250**	2013/2014
Project 3 **(BOO)**	**500**	2014/2015
Project 4 **(BOO)**	**500**	2015/2016

Private Sector Participation in Power Projects

- **In 1996, law 100 was issued allowing the private sector to build, own, and operate electric power generation plants .**
- **The 1997 Investment Guarantees and Incentives Law and its amendments provided developers with a number of guarantees and incentives.**
- **In 2001, the Egyptian Electricity Regulatory Agency (EgyptERA) was established.**
- **Three private thermal power plants launched in 2002 and 2003 under Build, Own, Operate and Transfer (BOOT) Scheme and are operating efficiently with a total installed capacity of 2048 MW.**

- **In 2007, the Custom Tariff Law of Egypt was issued providing incentives for the Private Sector to participate in the renewable energy projects by reducing customs tariff on imported equipment from 5% to 2%.**
- **A new electricity law has been drafted and in the process of ratification by the Parliament. The new law will establish a gradually liberalized electricity market regulated by EgyptERA.**
- **The new electricity law also includes foreseen measures to encourage generation of electricity from renewable energy.**

Electricity Sector's Policy Towards Encouraging the Private Sector (Local and Foreign) to Invest in Power Plants

First approach: Private Investment in Power Plants included in The Five-Year Plan through International Bidding:

In this approach EEHC will announce for an international adjudication, and the project company is mainly required to take the following actions:

- **Obtain the required License from EgyptERA allowing him to produce Electricity.**
- **Obtain the required Consent from different authorities especially the Environmental Affairs Agency pursuant to the respective environmental conditions.**
- **Comply with the Commercial Operation Date (COD) stipulated in the Five-Year Plan of the Electricity Sector. The amount of fuel required for operation of the plant will be deducted from the amount of fuel allocated to the Electricity Sector.**

EEHC will purchase the energy produced by the Investor's plant considering that the fuel cost is a pass through item.

Examples for First Approach:

- **On 14/5/2009 EETC announced an adjudication for a Wind Power Plant 250 MW to be constructed by the Private Sector through the Build, Own & Operate Scheme (BOO).**
- **On 28/1/2010 EETC announced an adjudication for a Combined Cycle Power Plant 2×750 MW or 3×750 MW to be constructed by the Private Sector through the Build, Own & Operate Scheme (BOO).**

- **The Expansion Plan 2012-2017 includes the addition of conventional Power Plants with a total capacity of 15000 MW (including 2600 MW as emergency plan); about 37% of which will be installed by the Private Sector.**
- **The Wind Energy's Expansion Plan up to 2020 includes the participation of Private Sector Wind Farms with a percentage of about 67% of the total capacity added by Wind Farms.**

Second approach: Private Investment in Power plants as an Independent Power Producer (IPP) and sell the electricity directly to the customers.

In this approach the investor is required to take the following actions:

- **Coordinate with his own customers (new customers who are not planned to be provided with electricity through EETC within the current 5-year plan but are in urgent need for such electricity) and sign contracts with them to sell the output energy directly to them. The investor will determine the size of the power plant to be constructed.**
- **Coordinate with the Ministry Of Petroleum to secure the fuel supply for his plant.**
- **Coordinate with the Egyptian Environmental Affairs Agency (EEAA) to obtain its approval for building this power plant.**
- **Arrange for the project site and obtain all other consents from the relevant authorities.**

- **Obtain the required License from EgyptERA.**
- **Coordinate with Egyptian Electricity Transmission Company (EETC) about the site location. EETC will study the interconnection of this site to the transmission network, and the investor will pay the transmission fees.**

EETC will provide backup supply in case of his power plant outages and also can purchase the excess power from the IPP according to a contract between the project company and EETC.

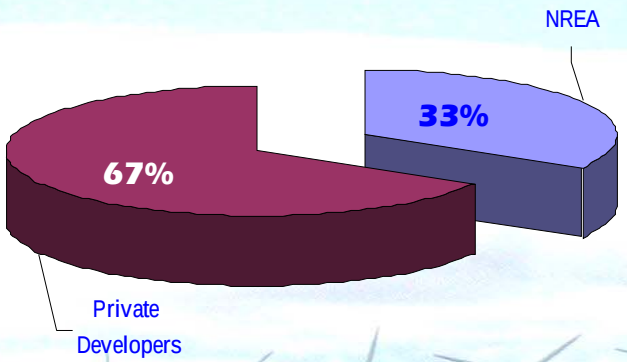
National RE Strategy up to 2020

- In February 2008, the Supreme Council of Energy approved an ambitious plan to:

Satisfy 20% of the generated electricity by renewable energies by 2020, including 12% from wind energy, i.e., reaching more than 7200 MW grid-connected wind farms.

Possible tracks

- Governmental projects
- Private investments

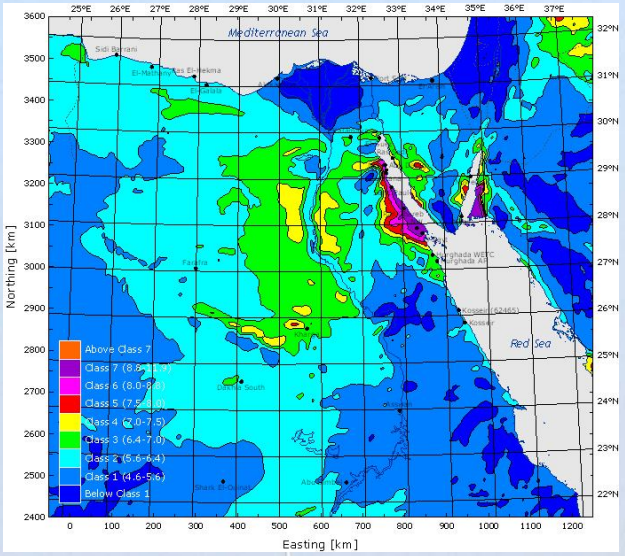


Support of Egyptian Government for RE Projects

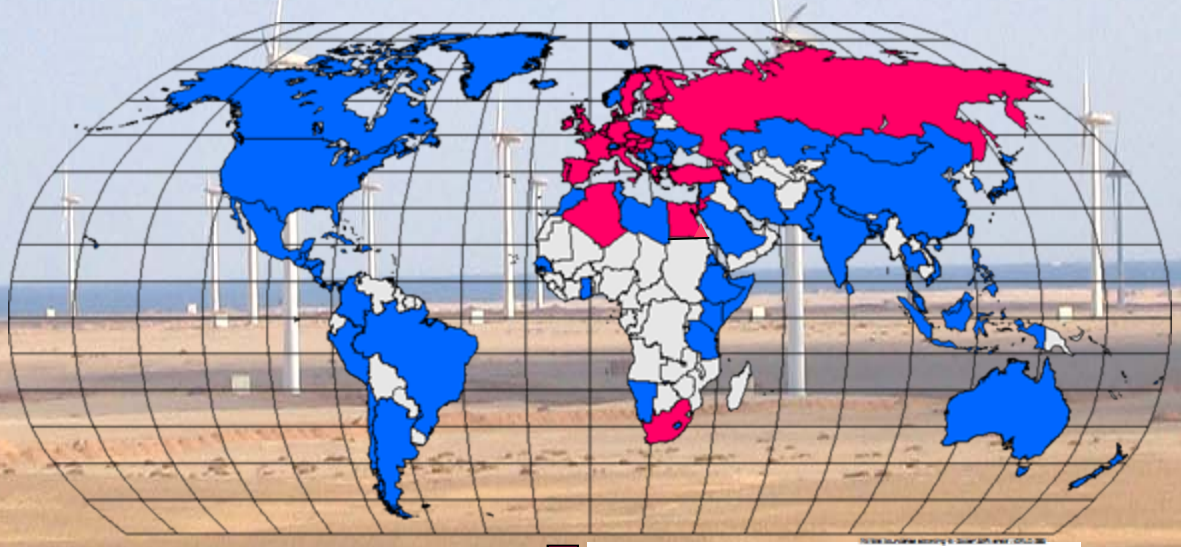
- More than 7600 square kilometers of desert lands have been allocated for implementing future projects.
- All permits for land allocation are already obtained by NREA.
- Signing land use agreement with the investor against payment equivalent to a percentage of the annual energy generated from the project. This percentage will be determined by the Cabinet.
- EIA including Bird migration study will be prepared by NREA in cooperation with international consultant and financed by KFW.
- Exempting all renewable energy equipment and spare parts from the customs duties & Sales Taxes.
- Signing long term Power Purchase Agreement (PPA) (20-25) years.
- Central Bank of Egypt will guarantee all financial obligations of EETC under the PPA.
- The project will benefit from carbon credit.
- The project company shall get license for power generation from Egyptian Electricity Regulatory Agency.

Wind Atlas

Egypt enjoys an excellent wind regime, particularly along the Suez Gulf where the average wind speed reaches about 10.5 m/sec.



Egypt is one of 38 countries in the world that published a National Wind Atlas



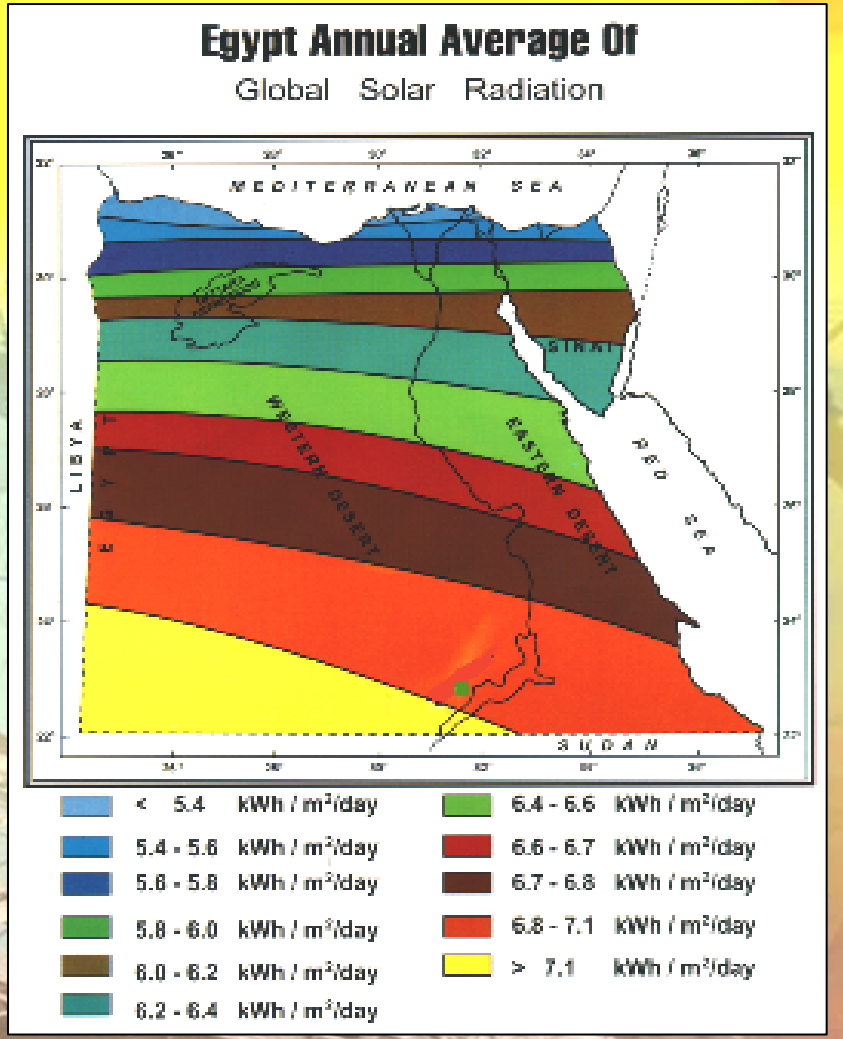
Countries have National Wind Atlas
Countries have Wind Atlas in some regions
Countries don't have Wind Atlas

Source: www.windatlas.dk

Solar Atlas

The Solar Atlas was issued, and indicated that Egypt is considered as one of the sun belt countries where it is endowed with high intensity of direct solar radiation ranging between 2000 – 3200 kWh/m²/year from North to South.

The sun shine duration ranges between 9-11 h/day from North to South, with very few cloudy days.




ENERGY EFFICIENCY
IMPROVEMENT

On the supply side:

- Rehabilitation and renovation of old power plants.
- Optimizing the share of the combined cycle power plants.
- Conversion of old thermal power plants to work in dual firing system.
- Rehabilitation and renewal of transmission and distribution networks and installation of capacitor units at substations.

On the demand side:

In response to the decree, of Supreme Council of Energy in 2009, the following programs have been or being implemented:

- **In the residential sector**

Over 8.5 million energy saving lamps were distributed over the last two years through electricity distribution companies (DCs) with half price and 18 months guarantee. The rebate was given by the DCs.

- **In public (street) lighting sector:**

About 160 thousand efficient lamps were installed to replace conventional lamps among target of one million lamp (about one fourth of the total lamps in Egypt's streets).

Other programs:

- Energy conservation measures (mainly efficient lighting and power factor correction) in many administrative buildings.
- Labeling and standards program for home appliances.
- Energy efficiency codes for residential, commercial and public buildings.

HUMAN RESOURCES
Capacity Building

- The Egyptian Electricity Holding Company (EEHC) has 20 training centers, which are geographically distributed overall Egypt, specialized in the fields of electricity production, transmission & distribution.

- These centers provide different training programs to the engineers , technicians, accountants, administrators , and other specialties.

Leadership Development Center

- Established in 1995 to develop new leaders capable to achieve the mission of the MOEE
- Financially supported by USAID (1995 – 2002) and technically assisted by the Institute of International Education (IIE).
- Conducts training on :
  - Leadership Development Program (LDP); almost a year: Core Program
  - Management
  - English Language Skills
  - Computer Skills

Opportunities for US Firms

- **FINANCING AND CONSTRUCTING THERMAL POWER PLANTS AS WELL AS REALIZING RE STRATEGY 2020 TO CONSTRUCT WIND AND SOLAR PROJECTS**

- **PROVIDING TECHNICAL ASSISTANCE IN THE FOLLOWING AREAS:**

  - **Management of maintenance works in power plants and networks.**
  - **Energy Efficiency:**
    - Efficient mechanisms of service delivery utilizing market approaches, PPP model and others.
    - Alternative program evaluation systems with reference to different levels of data availability.

❑ CONTRIBUTE TO THE FOLLOWING CAPACITY BUILDING PROGRAMS:

- Management of maintenance works in power plants and networks.
- Congestion management in existing transmission network.
- Planning and management of energy efficiency programs.
- Support - again – the Leadership Development Program (LDP) of the electricity sector by allowing review of current training materials and facilities, recommend and execute the required developments, and facilitate advanced training in USA (for one month).

MUTUAL BENEFITS

- Reinforce the American-Egyptian relations at both governmental and people levels.
- Assure increased role of American companies and institutions in Egypt.
- Expand the American technologies in the Egyptian market.
- Facilitate human development for Egyptian staff to achieve better productivity and quality.
- Assure sustainable social and economic development in Egypt.


thank you