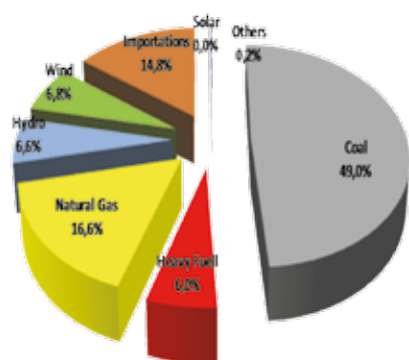


# A SNAPSHOT OF MOROCCO'S POWER SECTOR



*Tarik Hamane, Director, Power Generation Projects and Programs, ONEE, Morocco*



Energy consumption in 2015 34 400 GWh

Tarik HAMANE is the Director of Power Generation Projects and Programs of the Office National of Electricity and Potable Water "ONEE" (the Moroccan Electricity and Drinking Water Utility).

Tarik HAMANE has more than 10 years managerial experience in leading the development of large scale power generation projects in Morocco, including IPPs and PPP projects and for different fuel and technologies (Thermal Power Plants "Clean Coal and Gas") and (Renewables "Wind and Solar").

Tarik has also been involved in securing the ancillary power infrastructure (Port and Storage) as well as successfully managing land acquisition processes.

Key projects include landmark ventures that served as a guiding platforms for a wider implementation of energy projects in Morocco: Tarfaya wind farm 301MW, the Integrated Wind Project 850MW, Taza wind farm 150MW, Safi Coal Fired Power Plant 1400MW, Jorf Lasfar Coal Fired Power Plant 700MW, Extension of Jorf Lasfar Port.

Before joining ONEE, Tarik has served as a R&D Engineer at CNRS in France and CERN in Geneva.

Mr. HAMANE has an MBA from Ecole des Ponts et Chaussées Paris, France, a Master's Degree in Information Systems from Ecole Centrale and INSA Lyon, France, and a MSc degree in Electrical Engineering and in Automatic from Ecole Centrale-Supelec (Ecole Supérieure d'Electricité) Paris and from INSA Lyon.

## 1. A SNAPSHOT INTO MOROCCO (INCLUDING CAPITAL & MAJOR CITIES, POPULATION SIZE, CURRENCY, LANGUAGES, MAIN INDUSTRIES, GOVERNMENT STRUCTURE, UTILITY (GENERATION, T&D) / REGULATOR STRUCTURES ETC.)

ONEE (Office National de l'Electricité et de l'Eau Potable) is the main player in the power sector in the country and is fully owned by the Government of Morocco. As such, ONEE has the status of Single buyer of Power produced except for renewables generation where a specific law allows private to private Power Transactions.

In addition to its own generation facilities, ONEE has signed 10 long term PPAs with Independent Power Producers of which 6 are under operation, and 4 under construction. These include Clean Coal, Gas, Wind and Solar facilities.

Total Installed Capacity in 2015	MW	%
Classical Hydro	1 306	17%
STEP	464	6%
<b>Total Hydro</b>	<b>1 770</b>	<b>22%</b>
Wind Fermes ONEE	205	3%
Wind Fermes Privates (13-09 & Auto)	241	3%
IPP Wind Fermes CED + Tarfaya	352	4%
CCGT Ain Beni Mathar (Solar Part)	20	0,2%
Ouarzazate Solar Power Plant Noor 1	160	2%
<b>Total Wind &amp; Solar</b>	<b>979</b>	<b>12%</b>
<b>Total Thermal</b>	<b>5 411</b>	<b>66%</b>
<b>Total Installed Capacity</b>	<b>8160</b>	<b>100%</b>

Total Installed Capacity in 2015, 8 160 MW

Following is a breakdown of the total consumed electricity (34,4 TWh) by source:

PPAs (IPP) Generation:	53%
ONEE's Power plants:	29%
Electricity Imports:	14.5%
Private to Private :	2.5%
Self-Generation :	<1%

ONE manages all of the transmission grid (400kv, 225 kv and 60 kV). Distribution grids, on the hand, are managed by different distribution companies (Private and public owned). ONEE itself distributes 58% of the total energy directly to end customers.

## 2. WHAT IS THE CURRENT STATUS OF GENERATION IN THE COUNTRY? (INCLUDING LIST OF POWER PLANTS, THEIR GENERATION TECHNOLOGY AND THEIR CURRENT STATUS, E.G. UNDERGOING MAINTENANCE)

Installed capacity in 2015 was 8160 MW. A list of generation facilities is provide above.

## 3. HOW MUCH GENERATION CAPACITY IS CURRENTLY NEEDED AND HOW MUCH IS FORECAST FOR THE NEXT DECADE?

From 2003 to 2014, electric consumption has grown at an average rate of 6,5% per year. This growth rate is the result of

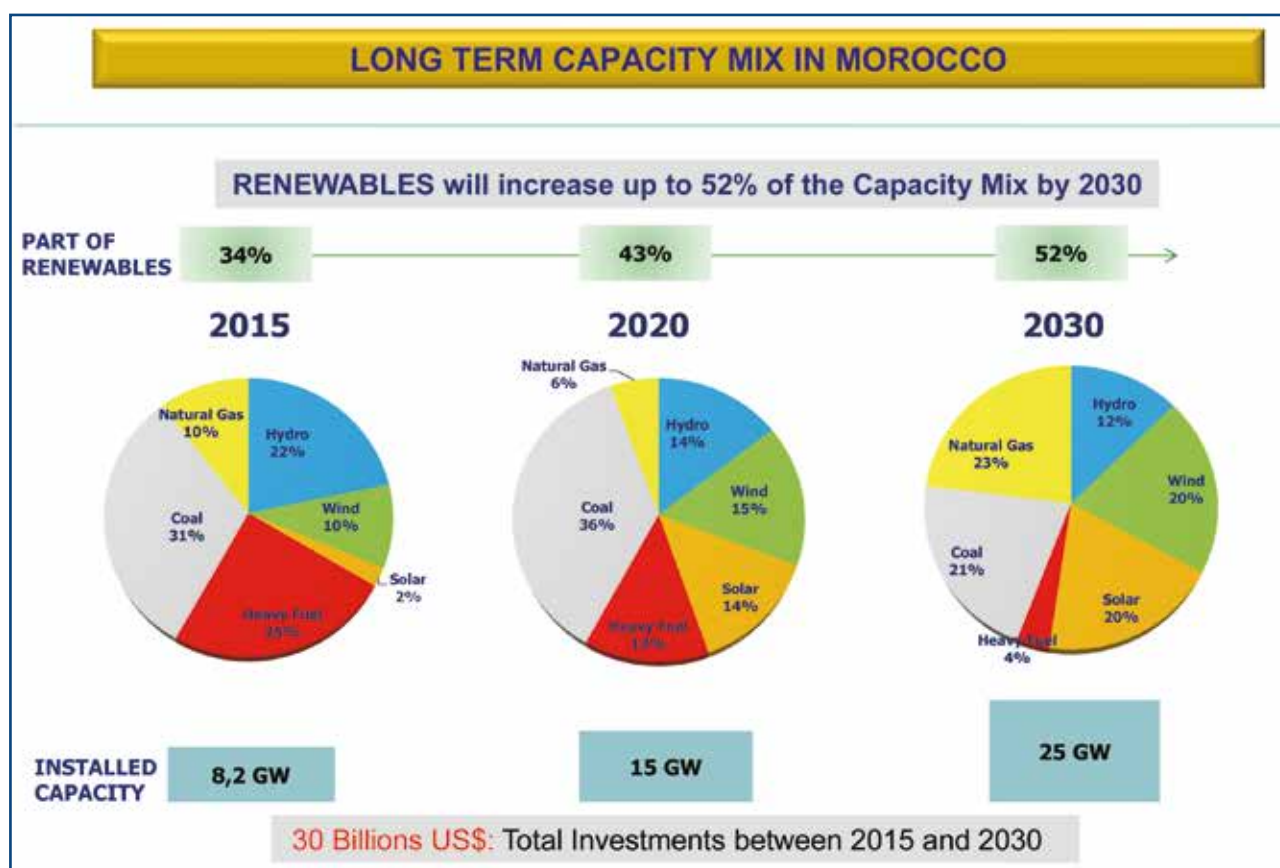


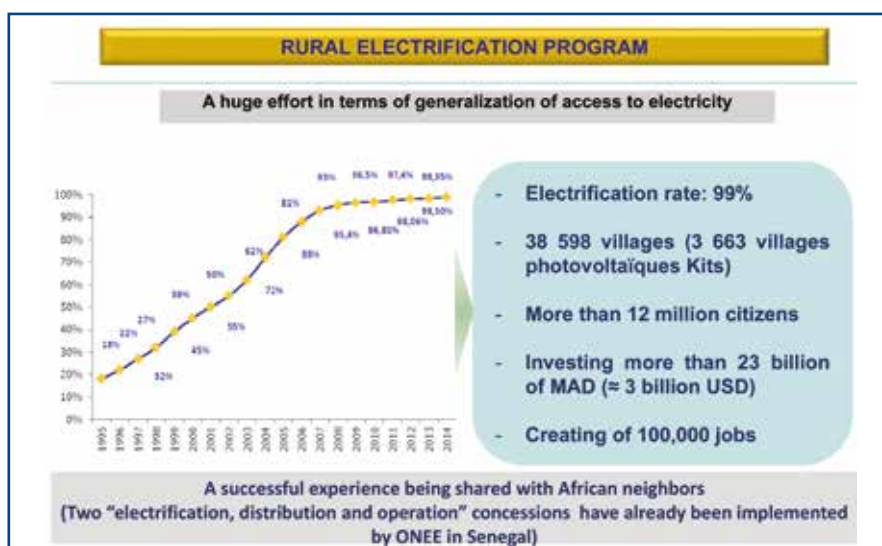
*Electric consumption has grown at an average rate of 6,5% per year."*

a number of factors, including rural electrification, economic development including the introduction of large automobile manufacturing initiatives in Tangiers, urbanization, greater access to electricity and the completion of a number of government infrastructure projects. Based on estimates, Morocco's electric consumption should exceed 6% per annum to reach 85,000 Gwh by 2025.

For the next 15 years, planned Generation facilities to be built are as follows:

Installed Capacity in 2015:		8 160 MW
Additional Capacity 2015-2020:	7 817 MW ->	15 967 MW
Additional Capacity 2020-2025:	4 124 MW ->	20 090 MW
Additional Capacity 2025-2030:	4 730 MW ->	24 820 MW





*The electrification rate in Morocco stands today at 99%."*

The country has a clear plan to have 52% of its Installed Capacity come from renewable sources. As such the plan is to add the following capacities between now and 2030:

- 2400 MW CCGT (Including a LNG Terminal and its enabling Infrastructure)
- 5000 MW Solar
- 4700 MW Wind
- 1400 MW Hydro

#### 4. HOW MUCH GENERATION CAPACITY IS TRADED/IMPORTED AND WITH WHOM IN THE REGION?

Spain and Algeria are the main power trading partners. In 2014, the net exchange with Spain was 5 833,697 GWh while with Algeria, it was 176,537 GWh.

Since 1999, ONEE has been the 4th operator in the Spanish market. As such, it is by choice that large quantities of energy are purchased from Spain (Lower Prices) rather than by lack of capacity.

#### 5. WHAT IS THE RATE OF ELECTRIFICATION IN THE COUNTRY AND THE DEVELOPMENT OF MICRO-GRIDS OR HYBRID SOLUTIONS?

The electrification rate in Morocco stands today at 99% up from the 18% it used to be in 1996.

#### 6. ARE THERE ANY TENDERS THAT CAN BE EXPECTED COMING INTO PLAY IN THE 2ND OR 3RD QUARTERS OF THIS YEAR?

- Gas to power project : Including 5 BCM LNG terminal, 2400 MW CCGT Plants, 400 kms gas pipeline
- Noor Midelt Solar Power Complex (Hybrid 400 MW PV and CSP)
- Noor PV 1 (170 MW PV)
- EPC for 350 km of up to 800 kV transmission line,
- Several Substations ■

*Spain and Algeria are the main power trading partners."*

