

KINGDOM OF MOROCCO



*MINISTRY OF ENERGY, MINES
AND SUSTAINABLE DEVELOPMENT*

New Moroccan Energy Strategy by 2030

ASSETS, CHALLENGES & OPPORTUNITIES

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Ministry of Energy, Mines and Sustainable Development

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Moroccan energy transition Model

1 Security of supply

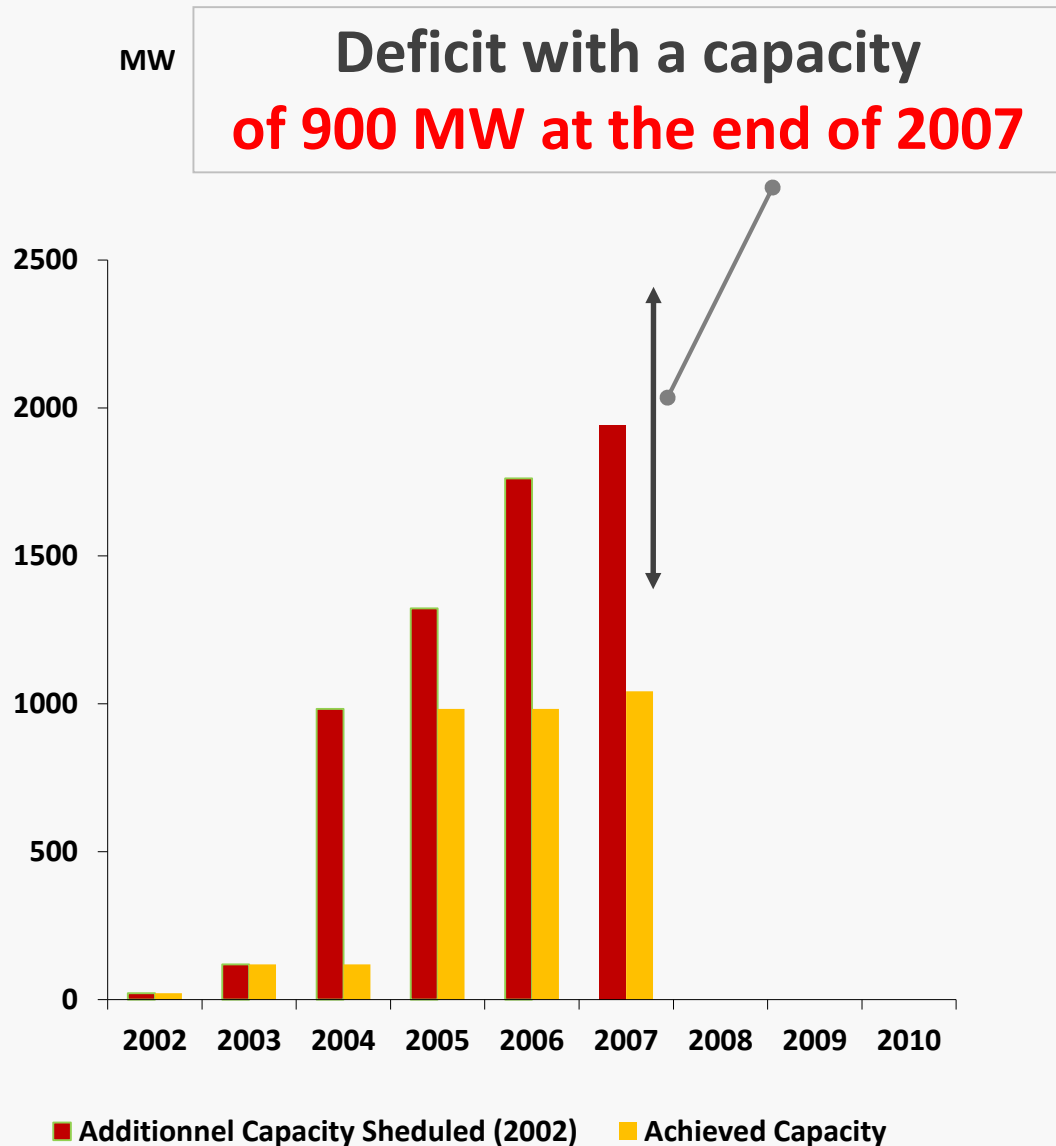
2 Energy Independence

3 Low-carbon energy: Ren + EE

4 Regional energy integration



A critical Moroccan **energy** context in 2008



- 1 Sustained pace of growth in electricity demand : **more than 6%**
- 2 High energy dependency : **98%**
- 3 Deficit in production means
Offer request imbalance
Import of 17% via the Morocco Spain interconnection

National Energy Strategy on going with an emphasis on **renewable energies**

5 Strategic guidelines

Diversified and optimized mix around reliable and competitive technology choices

National resource mobilization by the rise of renewables

Energy efficiency built in national priority

Strengthening regional integration

Sustainability



4 fundamental goals

Widespread access to energy at competitive prices

Security supply and availability of energy

Environmental preservation

Demand side management

National Energy Strategy on going with an emphasis on **renewable energies**

5 Strategic guidelines

4 fundamental goals



Translated into strategy roadmap with short, medium and long term programs having clear and specific objectives Increase renewable installed capacity to 42% by 2020

Clear vision for legislative, regulatory and institutional reforms

Currently, Morocco is really engaged in the path of **energy transition**



1

Improvement of the reserve margin of the electrical system

About 15%

2

2

Increase in the share of wind and solar

**2% in 2009
to 16% in 2016**

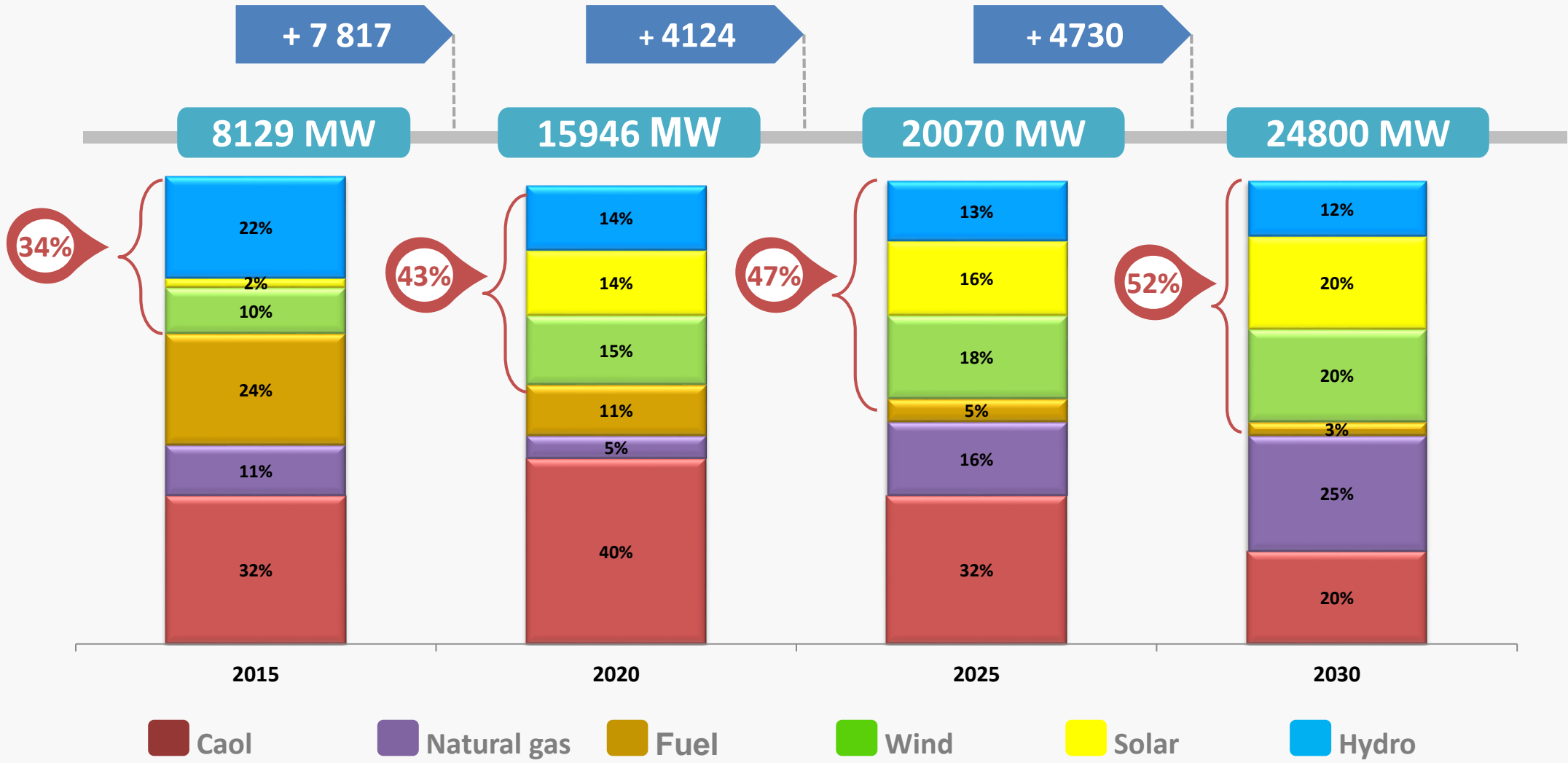
3

Reduction of energy dependence

**98% in 2008
to 93,3% in 2016**

43% of the power installed from Ren by 2020 ⁶

Strong Royal impulse in favor of renewable energies to achieve 52 % by 2030



Historic turning point in 2030

the share of renewable electricity will be higher than the share of fossil fuel electricity

Renewables **major programs** between 2016 and **2030**

Achieving **10100 MW** of additional capacity in renewable energy



20%

Solar

4560 MW



20%

WIND

4200 MW

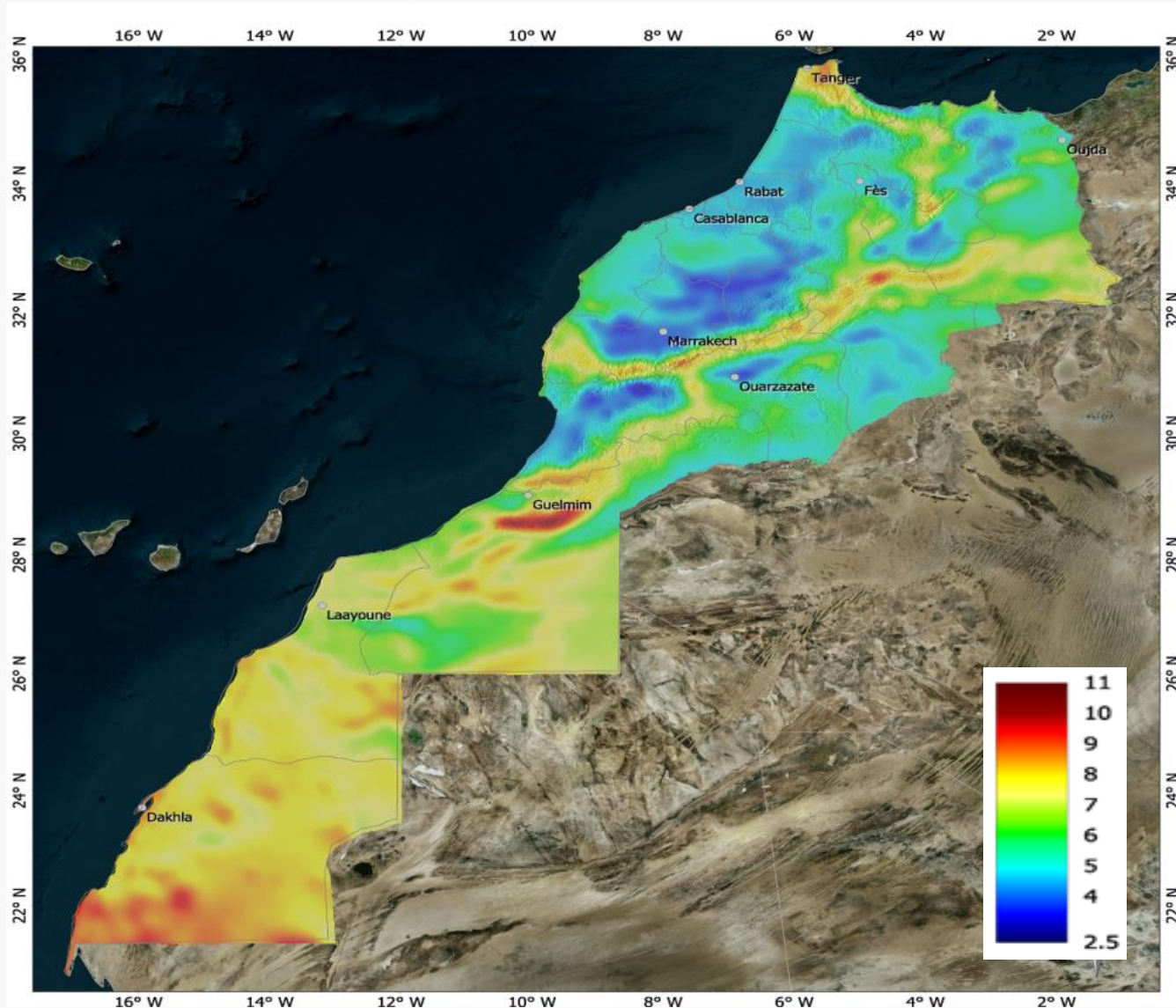


12%

HYDRO

1330 MW

Morocco has huge **renewable energy** resources



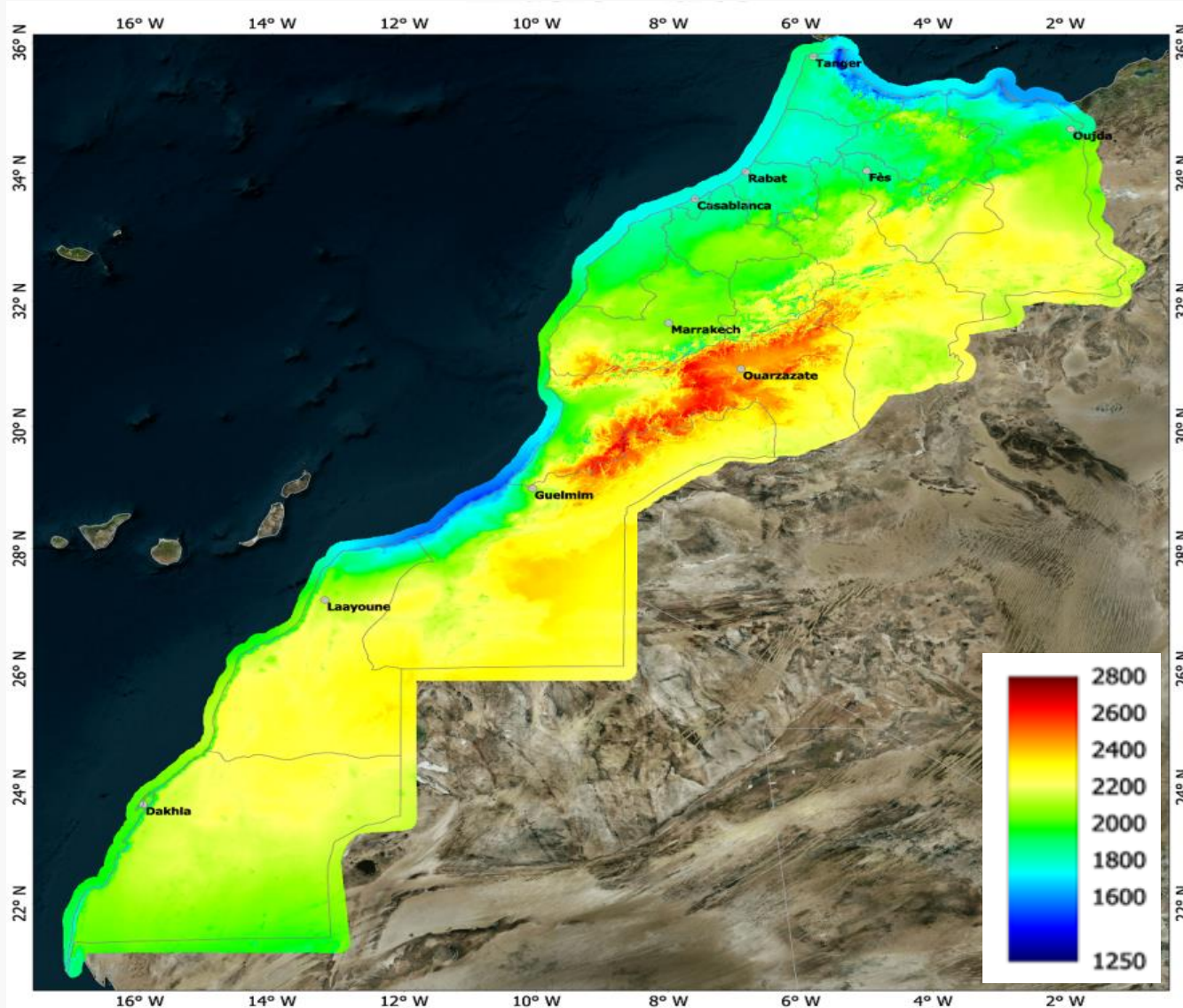
Wind potential

25 000 MW onshore

250 000 MW offshore

Wind speed : 9.5 to 11 m/s by 40 m

Morocco has huge renewable energy resources



Solar potential
20 000 MW

Irradiation of ~ 6.5 kWh/m²/day
3 000 hours/year

CCGT role in reducing intermittence

1

- Flexibility in the management of the peak

2

- **LNG terminal** will be achieved at Jorf Lasfar

3

- Combined cycles : **4800 MW**



Energy Transfer Station by Pumping (ETSP)

Need to enhance the flexibility of the Moroccan electric system



Afourar ETSP (460 MW)

ETSP Marine Program
(**3500 Km** of coastlines)



Morocco: crossroads of electricity transit between Africa and Europe

Morocco-Portugal interconnection

Under study (1000 MW)

Morocco-Spain interconnection

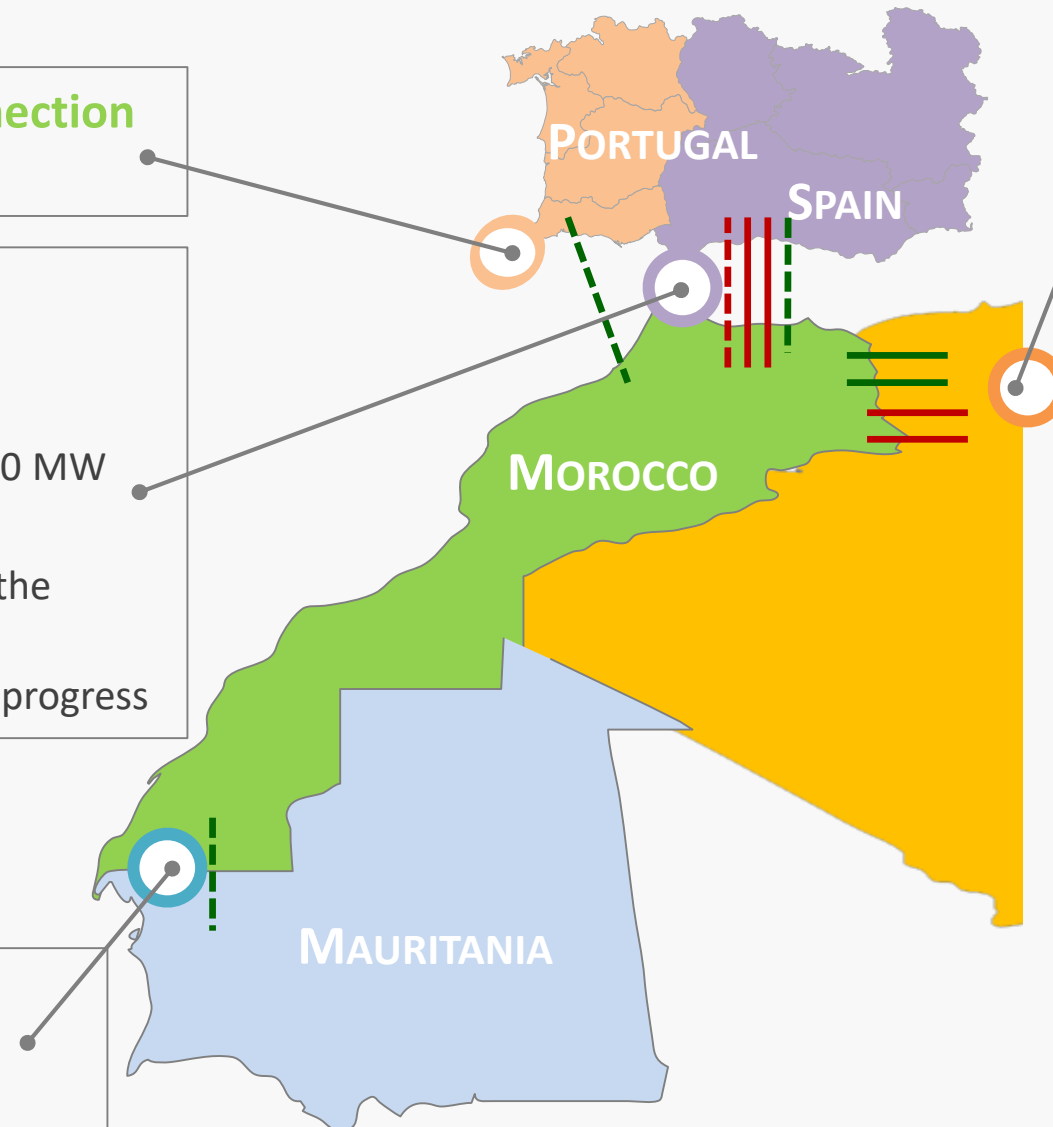
- Commissioned in 1997
- Capacity doubled in 2006
- Available capacity of exchange : 1400 MW
- Commercial capacity : 900 MW
- ONEE has been the 4th operator in the Spanish market since 1999
- Studies of 3rd interconnection is in progress

Expected Morocco-Mauritania interconnection

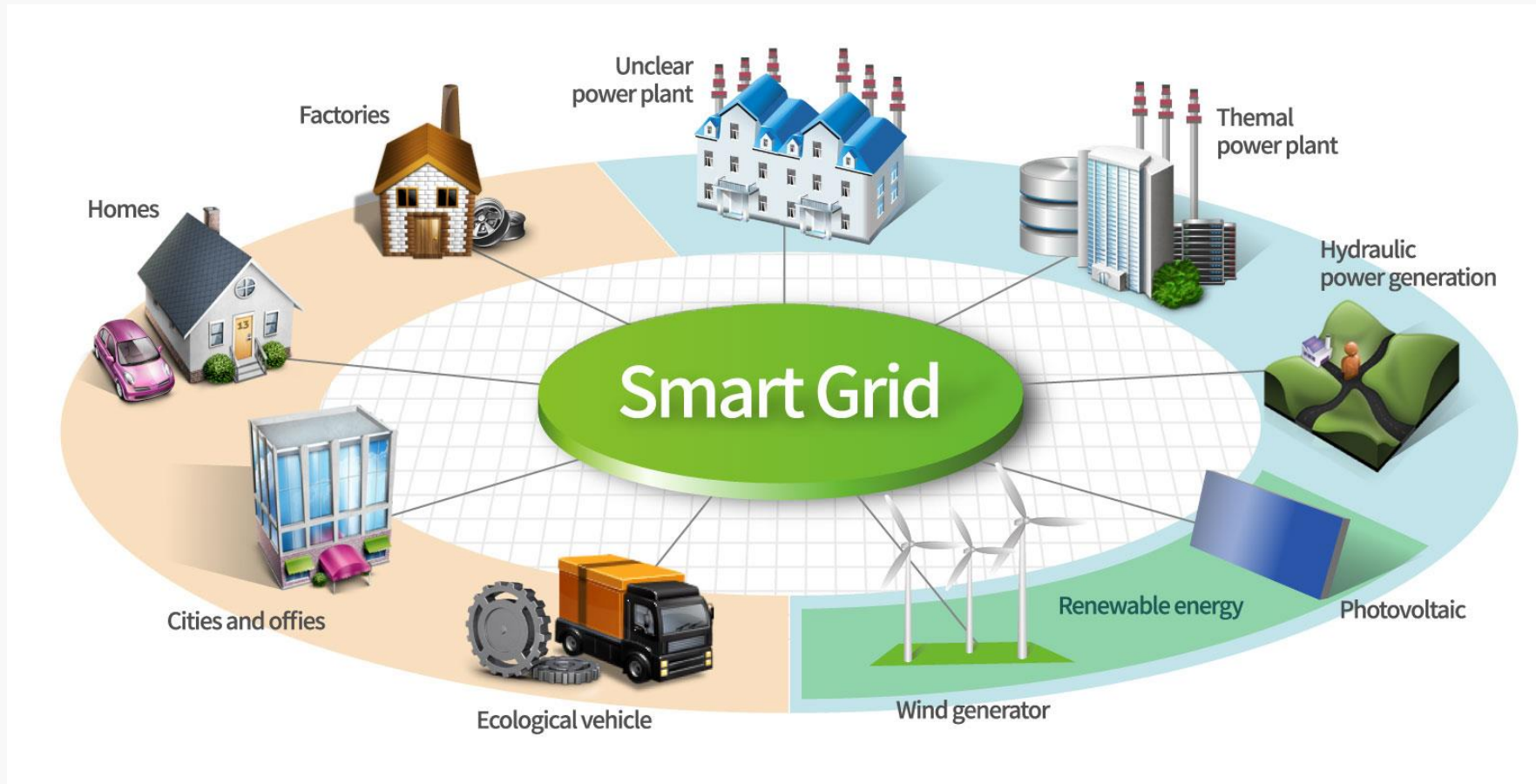
- Under study
- As a first step, Laâyoune-Dakhla line under development

Morocco-Algeria interconnection

- Commissioned in 1988 (2x 225kV lines)
- 400 kV line in 2008
- Exchange capacity 1200 MW



Introducing Smart Grids technologies in the national electricity system



Investment opportunities in **oil infrastructure**

1

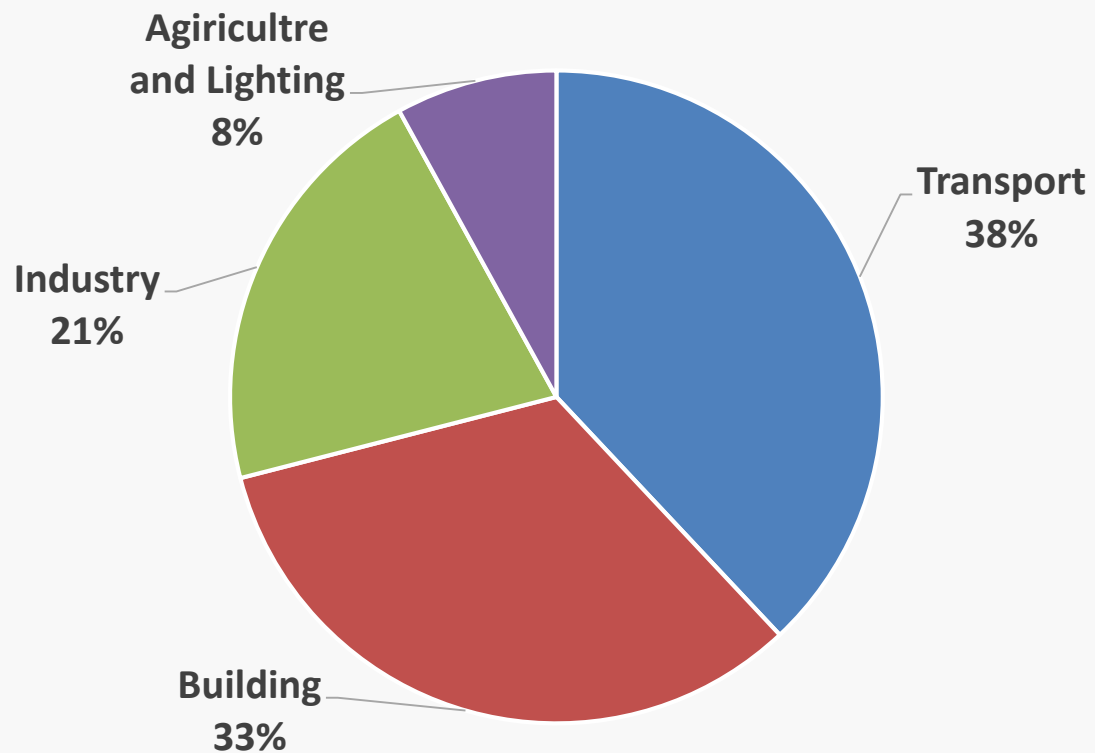
Very promising **areas** in terms of economic efficiency, to achieve large oil regional projects



2

Opportunity to achieve storage capacity for the transshipment of petroleum products at Nador West Med (Mediterranean sea)

Energy efficiency, an important pillar of the Moroccan energy strategy



Saving
5% by 2020

Saving
20% by 2030



Programs targeting consumers in priority sectors
Industry, transport and buildings

Success Keys of the Moroccan energy model



Increasing investor interest

Real opportunity of investment

Integrated Project

850 MW



16

Pre-selected groups

Record price :30 cDh/kwh

Project **Noor Ouarzazate** LNG Project



200

investors presented

Encouraging price level



100

interested companies

46 Billion US \$
2016-2030

Attractif Model & regulatory frame work



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**Thank You
For Your Attention**