

Workshop on
**“Transforming the energy system to achieve the 2°C target:
investment risks and policy challenges”**

Renewable Energies Development Opportunities in North Africa: Morocco Approach

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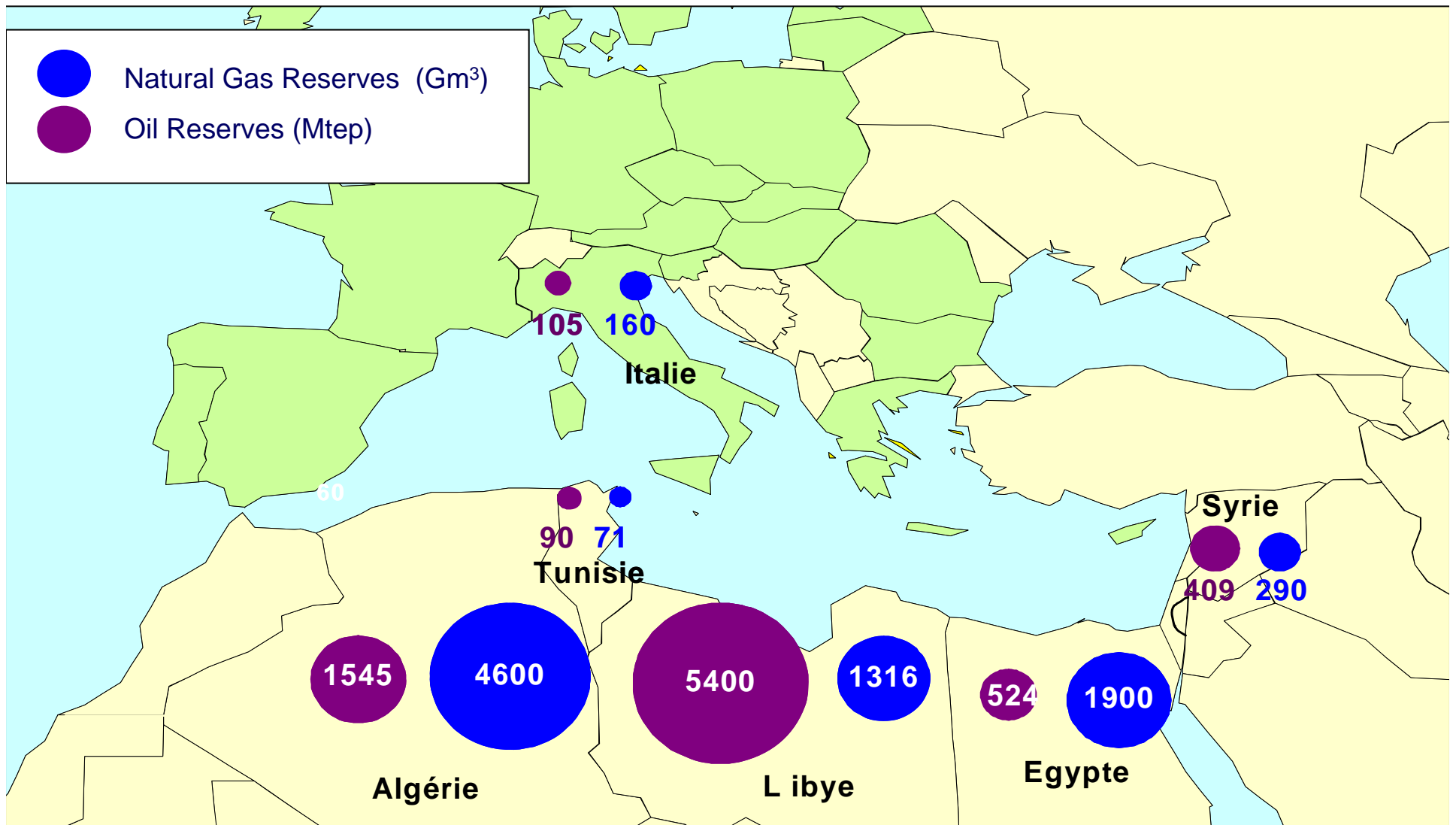
Common Indicators for North African Countries

- Rapid demographic growth combined with low income
- Rapid urbanization and increasing socio-economic needs
currently, the urban rate varies from about 43% in Egypt to 65% in Tunisia, 63% in Algeria and 55% in Morocco
- Growing demand for energy services and related infrastructures and unsustained consumption of energy, water, forests,...(causing environmental and social overstress)

Key Indicators for Energy Sector

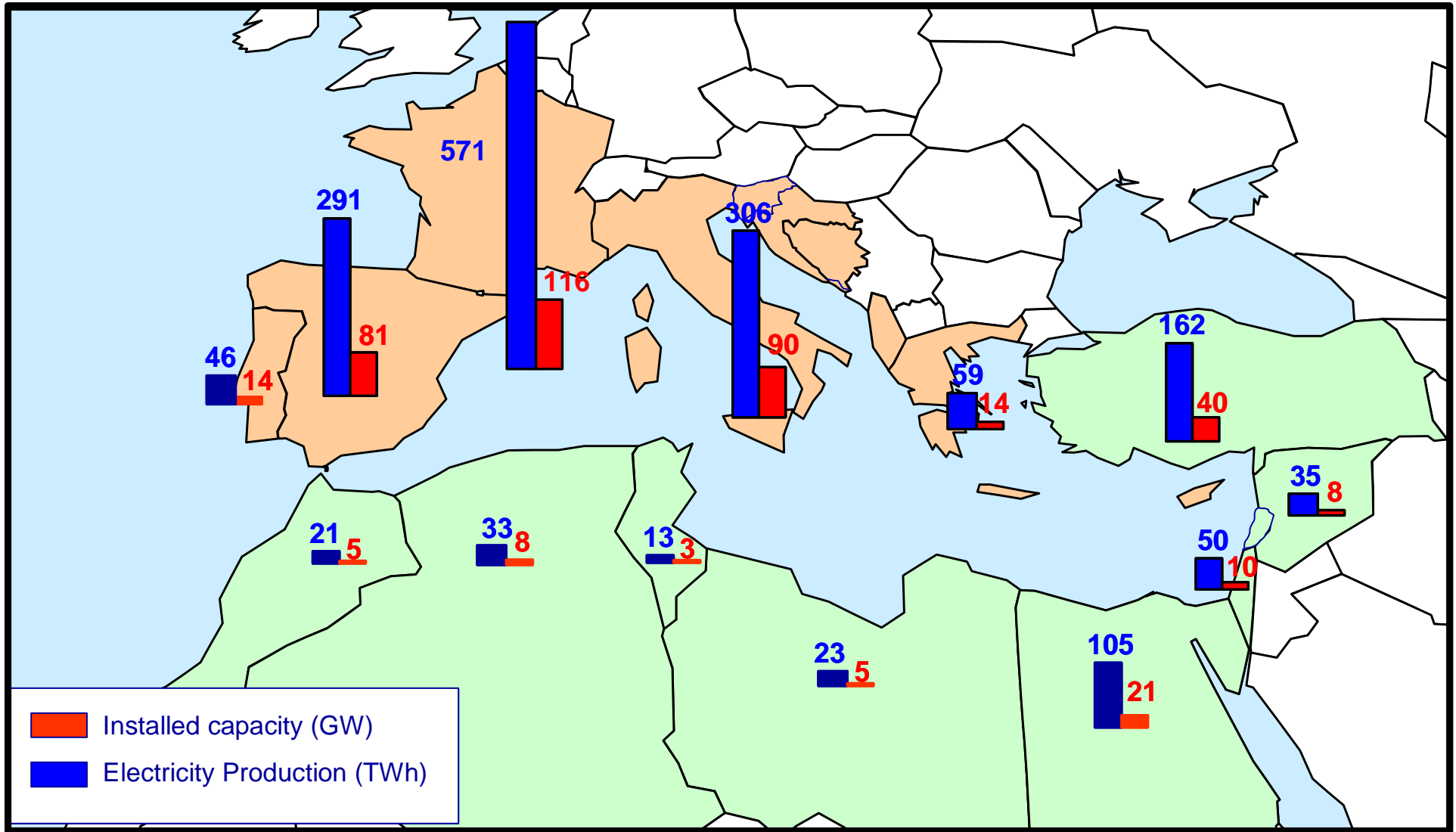
- Disparities with energy resources: Algeria, Libya and Egypt are hydrocarbon exporting countries while Tunisia is a small producer and Morocco is energy dependent (impact on national energy policy)
- Morocco consumes mostly oil and coal, Algeria consumption dominated by gas and Egypt, Libya and Tunisia dominated by oil
- Electricity demand: important increase in all countries (almost 10 times in 30 years) which is higher than the energy demand and GDP growths
- Electricity trend to continue (6 to 7% average annual growth expected up to 2020)
- To meet the growing electricity demand, important production capacities had to be installed, which require substantial energy and financial needs
- Electricity transmission and distribution networks to be developed and reinforced

Oil and Gas Reserves



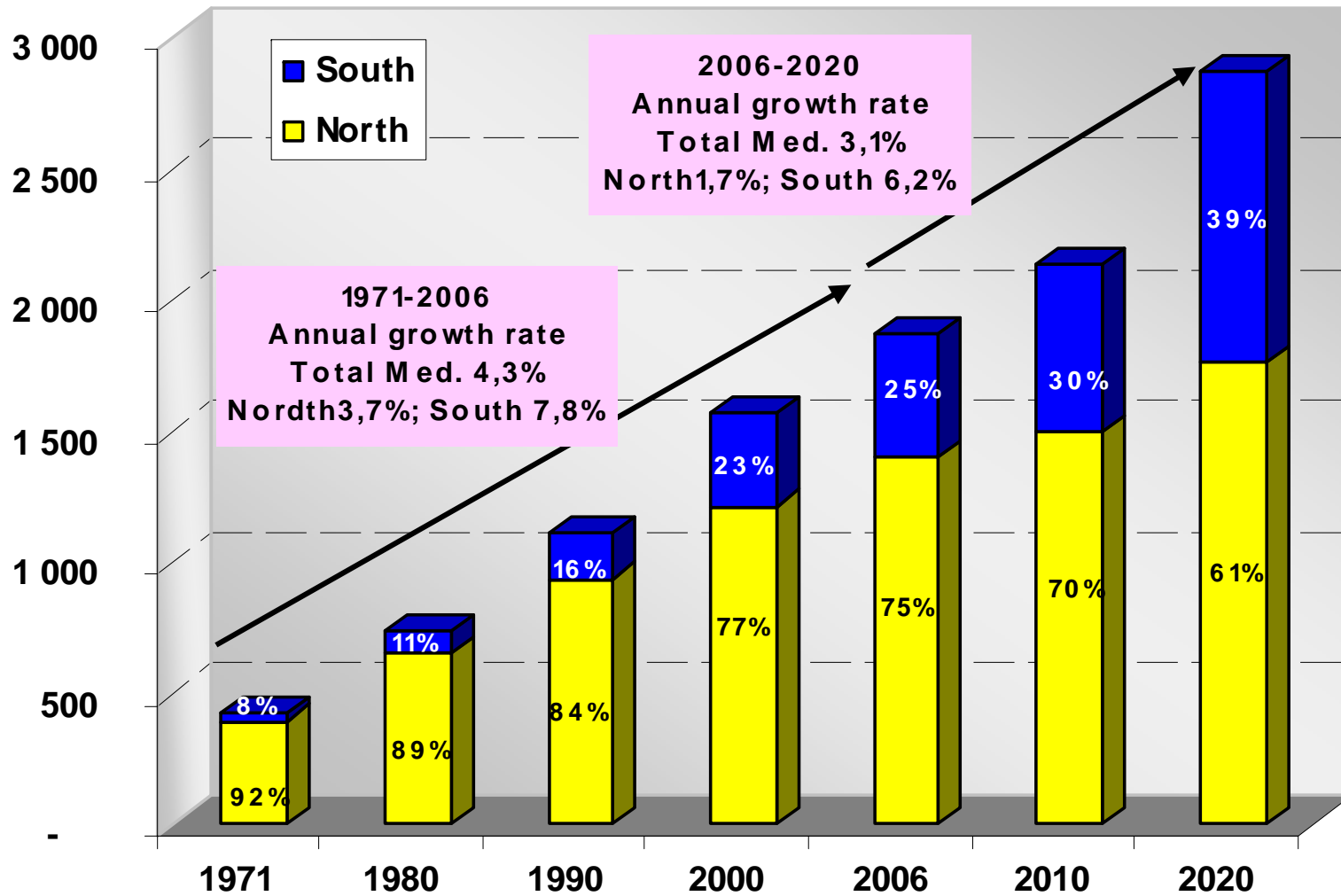
Source: OME

Installed Capacity and Power Production



Source: OME

Electricity Demand



Source: OME

Electricity Demand (TWh)

Potential of RE in North African Countries

- Important potential of RE resources, especially solar and wind
- Current low penetration in electricity generation: Large hydro accounts for most of the capacity installed, wind especially in Morocco and Egypt, solar thermal under way, PV mostly in Morocco for rural electrification
- Current Installed wind capacities in Egypt (330) and Morocco (120)
- SWH installed: ~ 825 000 m², 70% in Egypt (2006)
- PV installed: ~ 26 MWp, 63% in Morocco (2006)

Potential of RE in North African Countries

- Planned capacities to be installed:
 - Morocco: 1000 MW of wind by 2012, 2000 MW of solar by 2020
 - Tunisia: 150 MW by 2009
 - Libya: 120 MW by 2010
 - Egypt: 7200MW by 2020
- North African countries can make use of their important resources to promote RE technologies for local development
- The development of such sources of energy is still held back by institutional, regulatory, financial and other issues
- Stronger private sector infrastructure which needs attractive return on capital
- Regional Cooperation: Set the aims for future bilateral arrangements to increase the deployment of RE technologies between the countries

Current situation of CDM in North African Countries

- Countries having ratified KP and established DNA except Libya
- Important potential for CDM projects particularly energy sector (RE & EE)
- Today North African countries are not benefiting from CDM
Morocco (5 projects), Egypt (4), Tunisia (2)
- Several barriers need to be overcome, capacity building, interest of investors....
- CDM also must be expanded and adapted
- Regional carbon fund is needed and carbon strategy

MOROCCO CASE

- Heavy energy constraints: dependency on imports + 95%
- Rising oil and coal prices: the overall oil bill represented for the year 2007 around 10% of GDP
- Morocco is registering sustainable economic growth and related to this, electricity demand: 7-8%/year
- Renewable Energy and energy efficiency is one of the best solutions to the country's energy challenge

MOROCCO HAS IMPORTANT RENEWABLE ENERGY SOURCES

MW or m²	Potential achievable 2012	Potential achievable 2020
Wind	1.060	3.260 à 8.700
PV	80	2.000
CSP	180	800
Biogas	300	1.400
TOTAL	1.620	7.460 MW à 12.900 MW
SWH	394.000	1.700.000

OBJECTIVE: 20% of electricity produced from RE by 2012

10% of the Energy consumption from RE by 2012

MOROCCAN RE & EE PROGRAM 2012 OBJECTIVES

- 2000 MW Solar program recently announced
- Power generation: 1000 MW Wind parks
- Objectives for energy efficiency
- Objectives for implementing an appropriate institutional and regulatory framework dedicated to RE and EE to encourage investments in the sector
- Necessary actions to follow up the whole program

REGULATORY FRAMEWORK

- Law on Renewable energies
- Transforming CDER to an operational agency for renewable energy and energy efficiency, with regional approach and operation
- Creation of an agency dedicated to solar energy production
- Raising auto-production limit from 10 to 50 MW for industries and private
- Under approval: law on Energy Efficiency

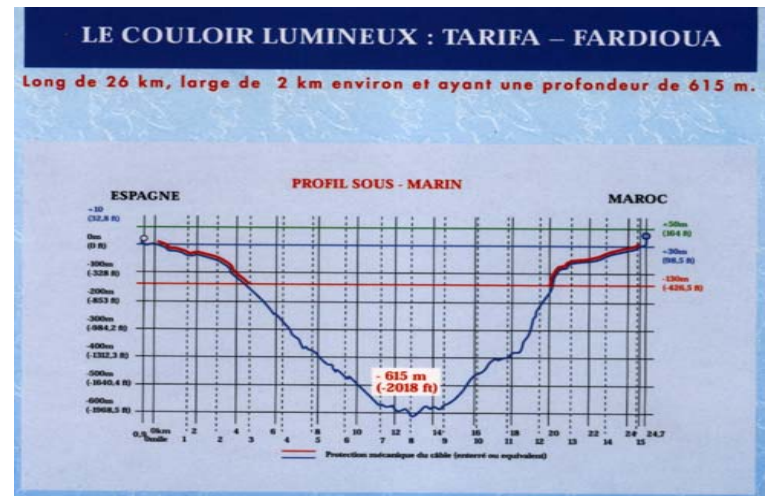
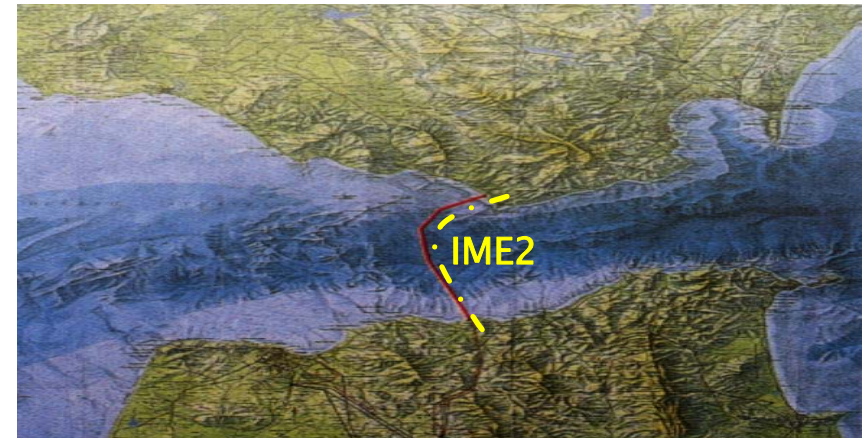
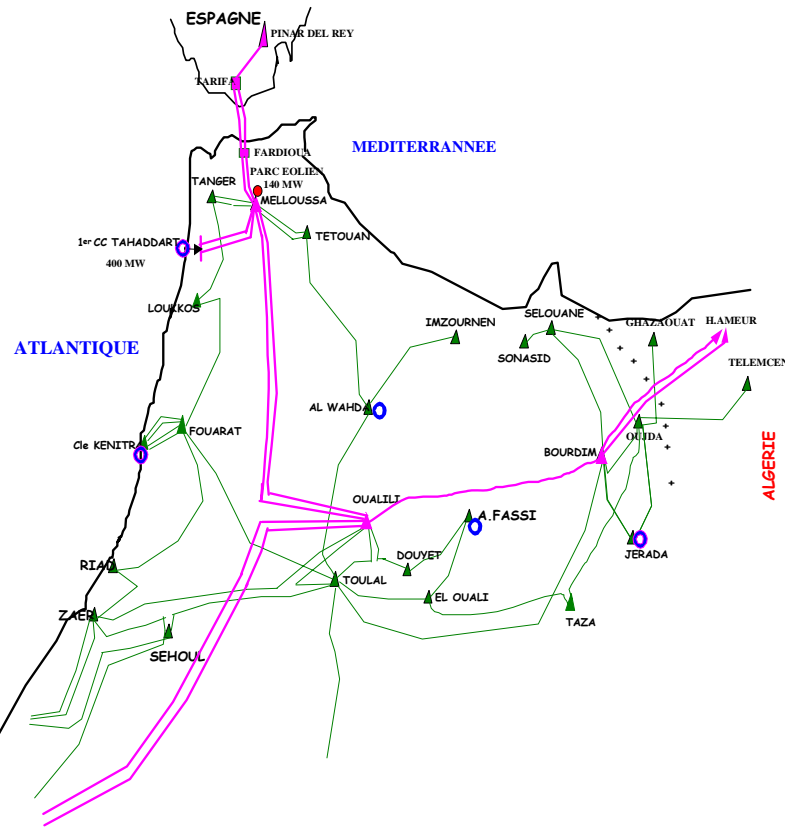
Other Regulatory laws provisions

- Law related to the liberalization of the electricity market (underway)
- Law n° 28-00 related to waste management (2006)
- Framework Law on environment protection (2003)
- Law on impact studies (2003)
- Law related to restrictions on air pollution (2003)
- Law 10-95 on Water (1995)

WIND ENERGY Projects

Wind sites	Average speed of wind at 40 m	Installed capacity
ParK in service		
A.Torres	11 m/s	50,4 MW
modèle	11 m/s	3,5 MW
Lafarge	10 m/s	10 MW
Essaouira	9 m/s	60 MW
Park in construction		
Tanger	9 m/s	140 MW
Park in developement		
Tarfaya	7,5 m/s	300 MW
Touahar	7,5 m/s	100 MW
Laayoune		240 MW
Foum El Oued		200 MW
Sendouk (Tanger)		60 MW
Dessalination		100 MW

STRONG REGIONAL INTERCONNECTION



Morocco – Spain : **700 MW** (97) to **1400 MW** (06)
 Morocco – Algeria : **400 MW** (88/92) to **1000 MW**

Conclusion

- Large scale RE development can satisfy market drivers:
 - Energy security (affordable, diversification supply, power on demand, based on inexhaustible resources, capacities can be expanded in time)
 - Economic development (job creation, local development...)
 - Cleaner environment (low pollution, climate protection, no risks for health and environment)
- Lack of a level playing field between RE and conventional due to large subsidies on fossil fuels in North African countries. Removal of subsidies requires strong political commitment
- Mobilisation of private sector (equipments, services and adapted financing)
- Local manufacture of equipment, quality control and capacity building
- Overcome grid integration technical and policies issue

THANK YOU

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