

# Promoting Energy Efficiency Investment: Opportunities and Challenges

**Chouaib BENQLILOU PhD.**  
Industrial Process Engineering Department  
*Ecole des Mines de Rabat*  
benqlilou@enim.ac.ma

# Overview

- Morocco import more than **95%** of its primary energy (*coal, natural gas*)
- Total installed capacity is almost **6400 Mw** and a total consumption is 30 TWh with an annual consumption growth of more than **7,2%** → 981Kwh/capita
- Electricity price is among the highest in the region 17,2 \$c (industry) and 12,8 \$c (consumer)
  - ▣ Rural electrification reach 90% (energy access to remote area)
  - ▣ Economic growth and advancing industrialization

# Challenges

- As a strategic option Morocco promote the investment in Energy efficiency and renewable Energy:
  - Install a capacity of 6000 Mw (hydropower, wind and solar power plant)
    - 42% of total installed capacity by 2020 and
    - 10-12% part of Renewable in the energy mix
  - Achieve a 12% of energy saving by 2020 either in building , industry, transport.
- Expected outcomes
  - to provide a mix solution that **reduce energy dependency** and **energy costs** as well as avoiding CO2 emissions.
  - Promoting job and SMEs creation as well as competitiveness

# Operational Platform I

## Regulatory and legal framework

- **Liberalization of the electricity market** for Extra and High voltage (*medium voltage is planned for 2015*)
- **Renewable energy law 13-09** aims to promote energy production from renewable sources (*> 2 Mw*)
- **Law 47-09** dates in 2011 aims to promote energy efficiency.
  - Mandatory energy audit,
  - energetic assessment impact,
  - energy saving company, ...
- Mechanism for **public-private partnership** a draft was launched on 2011

# Operational Platform II

## Institutions

- **ADEREE:** National "*Agency for the development of renewable energy and energy efficiency*"
- **SIE:** state owned energy investment company; energy development fund (*\$1 billion*)
- **IRESEN:** **economy-based knowledge** (*promoting R&D in wind, solar and thermal innovations*)
- **MASEN:** specific framework for solar projects

# Technical Programs Launched I

- The general states "**etats generaux**" a multidimensional and inclusive process
  - ▣ to assess energy consumption, to quantify energy saving potential and to map the solution deployed in EE in industry, transport, building, agriculture, street lighting.
- Program "**Jiha-tinou**" aims to assess municipalities in terms of their technical and financial capacity to deal with energy efficiency namely street lighting (European Energy Award).
- **Green platform** for capacity building as well as to test and guaranty the quality of equipments at the technological park at Marrakech

# Technical Programs Launched



- **Industrial EE program** considered 360 among the 1855 manufacturing units (representing 90% total energy consumption) – with 53 with high energy consumption.
  - Accreditation of about 200 auditors, some ISO 50001 certification
  
- Large-scale programs throughout Moroccan Kingdom with a relatively reduced investment
  - Program **SHEMSI** oriented to access solar water heater
  - Solar heat pump for agricultural purpose
  - Electricity based PV panel for rural electrification in remote area
  
- **Street lighting.** The municipality of Salè is undertaking a project related to street lighting within the PPP mechanisms and SIE funding
  
- **In industry:** Various enterprises are actually, implementing the concept behind ESCO.
  - Enterprises are dealing with their core business and externalizing the energy management (biomass)

# Technical Programs Launched

III

Energy source	Potentiel	Target 2020	Done
Wind*	<b>25 GWh</b>	2 Gw	<b>860 Mw:</b> (700 Mw, 160 Mw Next by 2015)
Solar	<b>5.5 Kw/m2/day ; 3000hr/yera</b>	2 Gw	<b>900 Mw:</b> (500 Mw Ourzazate; 400 Mw Oujda)
Hydropower		2GW	<b>1745 MW</b>

\* a wind atlas at high resolution is available at ADEREE (Site identification for Renewable)

More than 200.000 housing units constructed each year  
 (building **represents 35% of energy consuming in Morocco**)



# Opportunity for investment

## **Investment potential in Moroccan kingdom over**

- ▣ \$13 billions in renewable energy
- ▣ \$3 billions for energy efficiency in the consumer and industrial sectors

# Promoting EE investment I

## □ **Market oriented**

- **Public procurement:** calls for tenders ( municipalities, state building,...)
- **Identifying and selecting EE projects** (urban labs, *veille technologique*)
- **Large-scale successful** flagship project

## □ **Enterprise oriented**

- Industries should be considered **EE as an opportunity** for enhancing their competitiveness and not as a mandatory goal.
- Promoting the multiplication of ESCO along with the energy saving performance contract.

# Promoting EE investment II

- Clear Monitoring and verification on EE deployment
- Risk mitigation to increase investor trust and confidence (**who guarantee the payment?**)
  - need to develop contractual and **operational PPP mechanism** and a business model in order to maximize investment and to reduce uncertainty
- **Capacity building and Economy-based knowledge**
  - to support these challenges is essential (specifying the requirement in human resources (quality and quantity) : **(Engineers, auditors, SMEs,...)**.
    - 20 Msc launched
    - **Engineers in Energy efficiency and Renewable Energy**

# Thank You

**Chouaib BENQLILOU PhD.**  
Industrial Process Engineering Department  
*Ecole des Mines de Rabat*  
benqlilou@enim.ac.ma

**5<sup>th</sup> International Forum on Energy for Sustainable Development**  
Hammamet, Tunisia, 4-7 November 2014