



**ONE energy efficiency programs  
Activities relating to supply and  
demand**

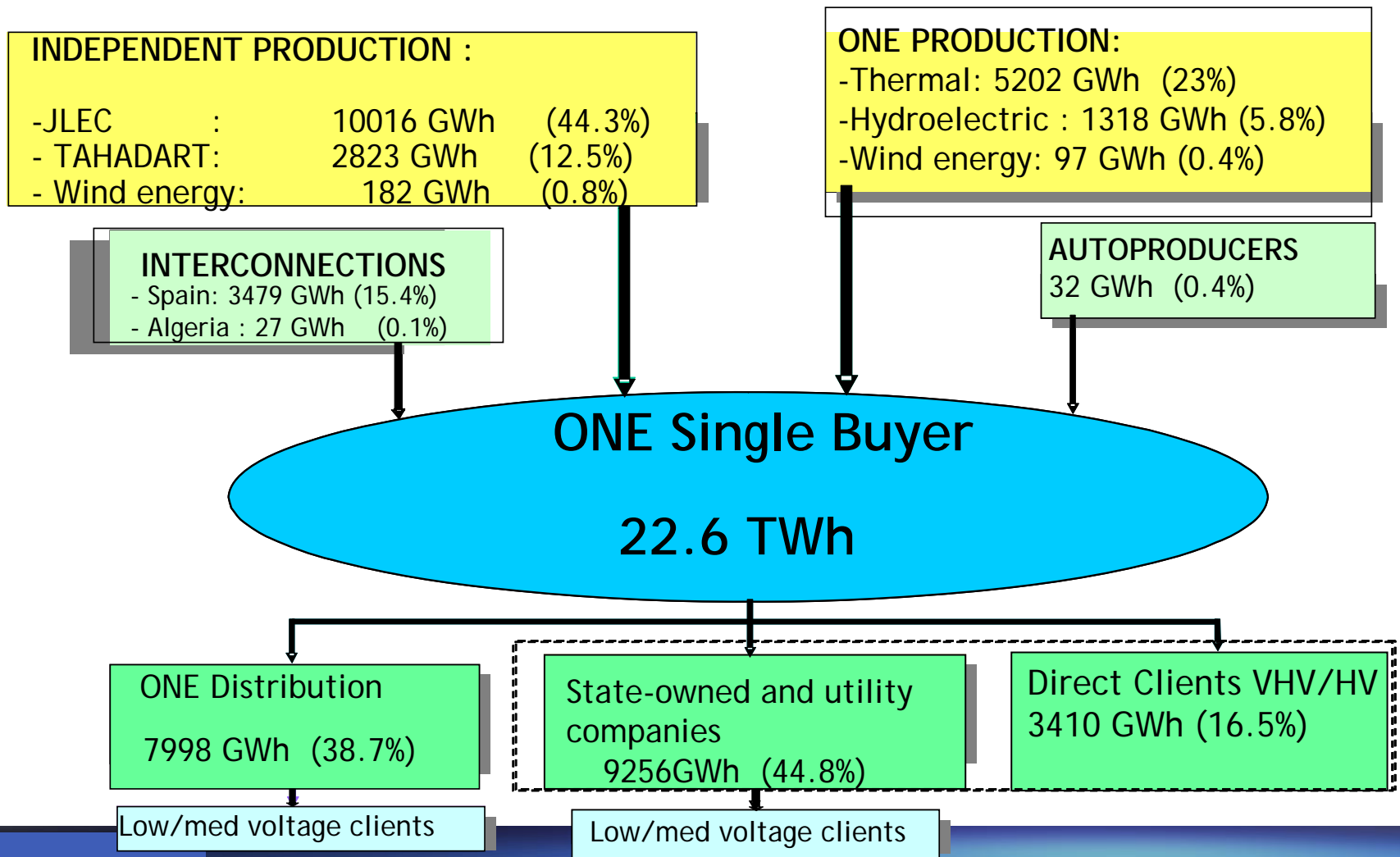
November 25, 2008

# Strategy for Supply- and Demand-Side Energy Efficiency

1. Rehabilitation of existing power plants
2. Construction of more efficient power plants
3. Tracking losses in the transmission network
4. DSM Action Plan
5. The Optima example and constraints to developing energy efficiency

# National Electricity System

## Balancing Supply / Demand in 2007



# Activities for Energy Efficiency in Production

- Rehabilitation of existing thermal power plants to improve consumption rates and availability
- Construction of new more efficient power plants
- Reduction in the import bill and in CO2 emissions through improvement in the mix of renewable energies at the production plant level

## ONE Thermal Power Plan Rehabilitation Program

### Mohammedia Coal Plant:

- Overhaul turbo-alternator units (recover turbine efficiency)
- Upgrade the command control system
- Refurbish the grinding and the burner systems to improve combustion (finer grains in the coal units)
- Refurbish coal unit furnaces and replace cupro-nickel condensers with new titanium condensers to stop the corrosion of the boiler screen tubes

### Mohammedia Plant

- Overhaul turbo alternator units (recover turbine efficiency)
- Improve systems for cleaning heat surfaces of boilers and the rotating air reheaters (to maintain optimum combustion conditions)

### Kenitra Plant

- General overhaul of turbo alternator units.
- Retrofit boilers
- Rehabilitate alternator rotors and power offtake systems

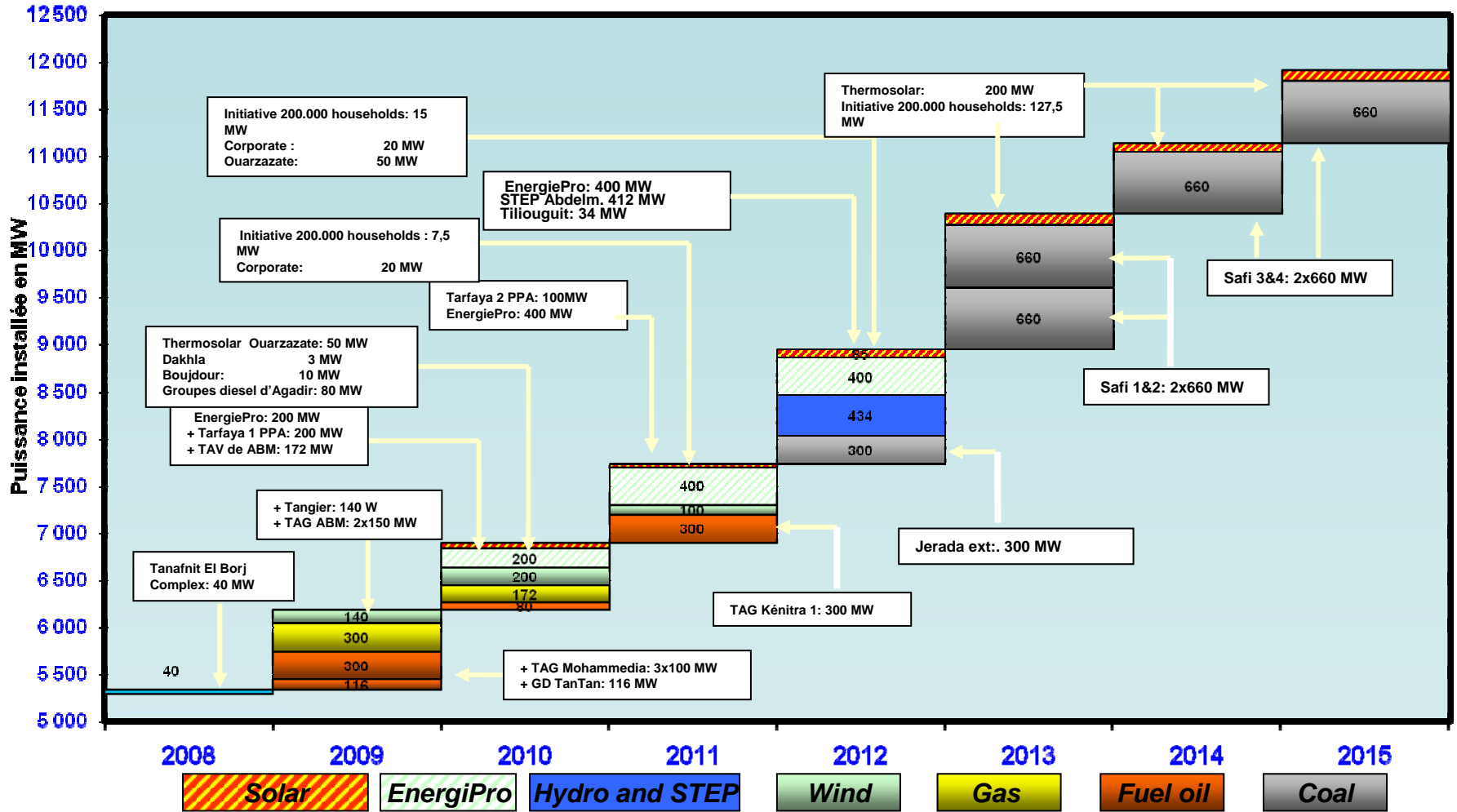
### Jerada Coal Plant

- Overhaul and retrofit turbo alternator units
- Rehabilitate all boilers and gas circuitry
- Upgrade partially the command control system

### Gas Turbines

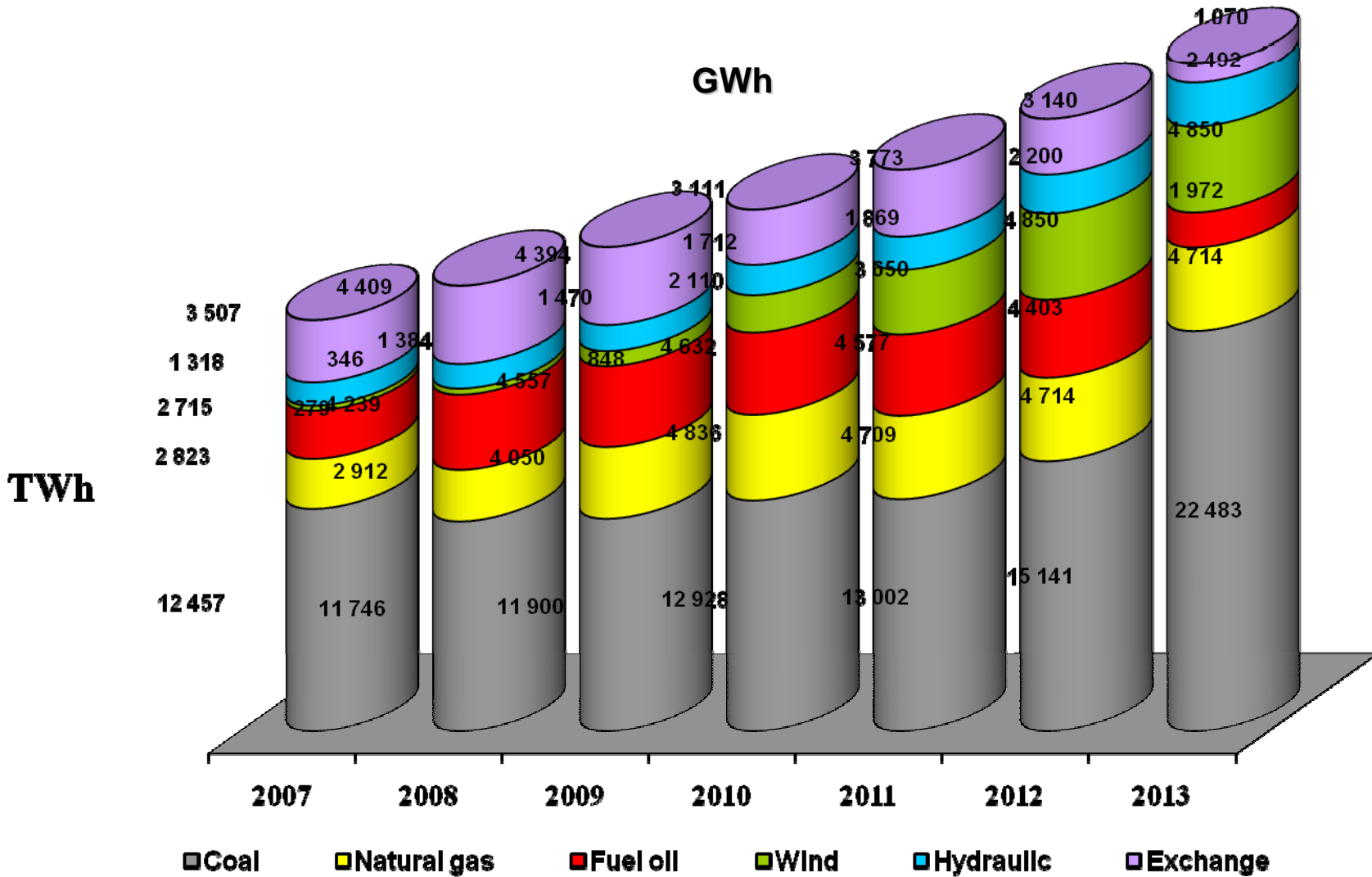
- Reestablish current stock
- Upgrade specific consumption (major inspection program)
- Put new more powerful power plants into service and improve efficiency of fuel consumption

# Program to Equip ONE 2008 - 2015

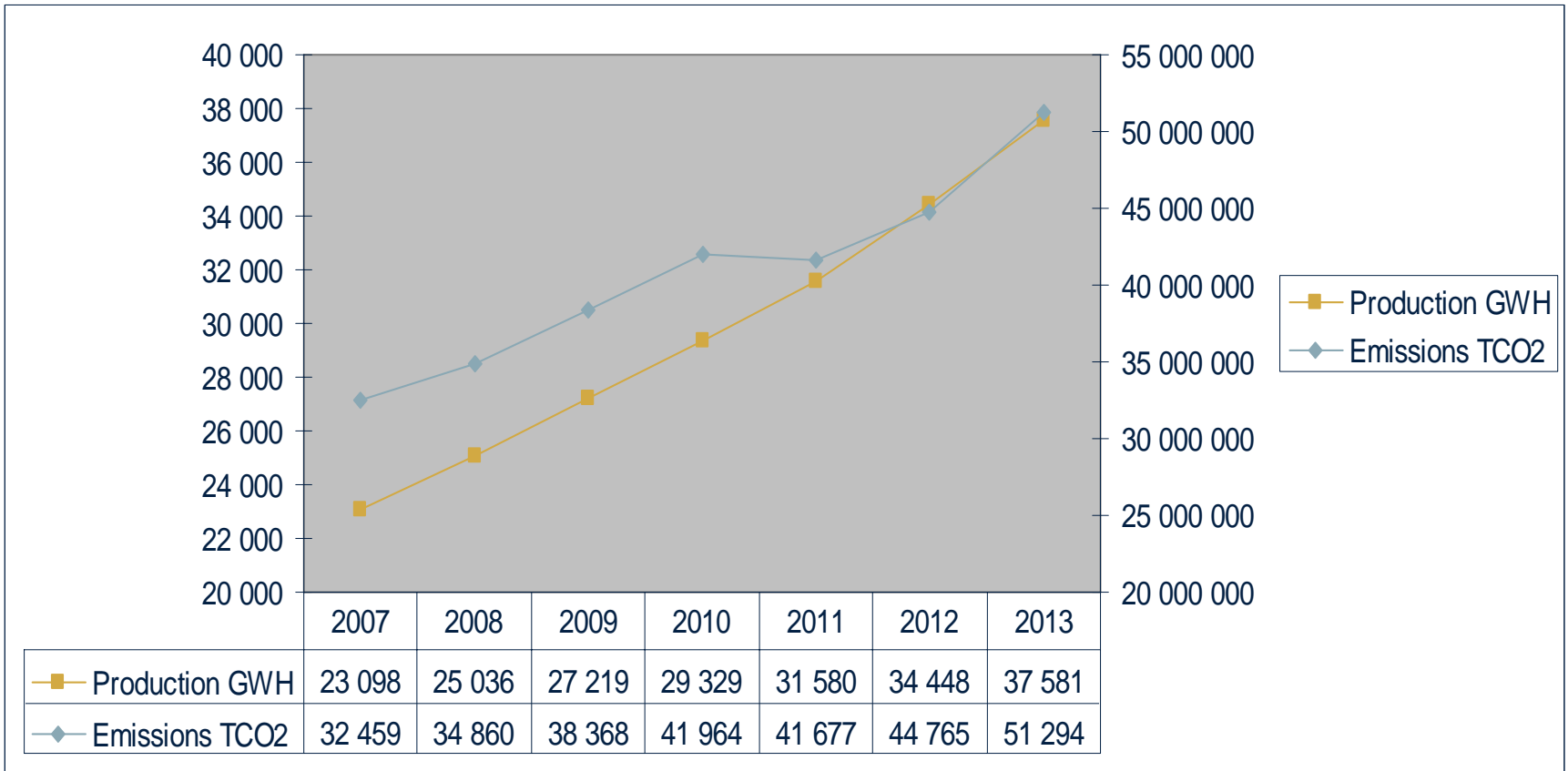


|                                      | 2008 | 2009 | 2010  | 2011  | 2012  | 2013  | 2014  | 2015  |
|--------------------------------------|------|------|-------|-------|-------|-------|-------|-------|
| Total incremental power ( MW)        | 40   | 896  | 1611  | 2439  | 3658  | 5100  | 5855  | 6625  |
| Reserve Margin (8%)                  | 0%   | 2.2% | 5.8%  | 5.2%  | 9.4%  | 18.7% | 14.4% | 14.0% |
| DSM Impact in MW                     | 50   | 100  | 200   | 250   | 300   | 300   | 300   | 300   |
| Reserve Margin with DSM actions (8%) | 1%   | 4.5% | 10.4% | 10.5% | 15.6% | 24.8% | 19.9% | 19.0% |

# EVOLUTION OF THE COMPOSITION OF NET ELECTRICITY PRODUCTION



# Thermal plants: trends in CO2 Emissions and generation

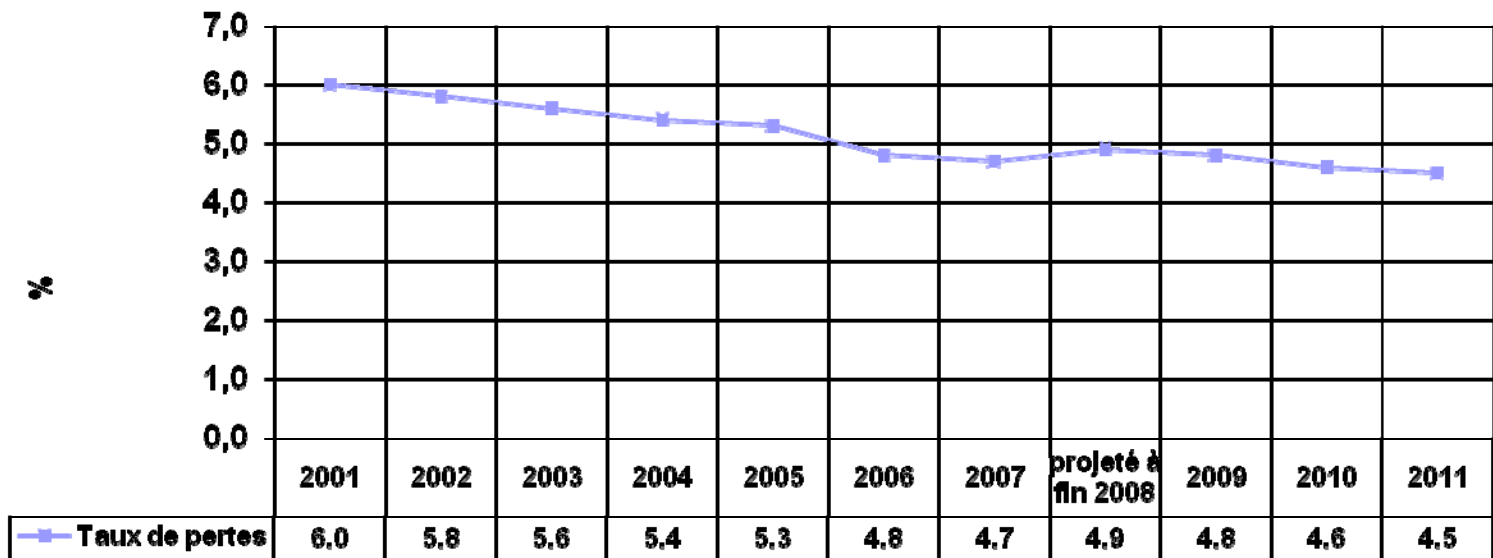


# Energy Efficiency Actions on the Network

- Reactive power compensation: Systematically equip the HV/MV and VHV/MV plants with condenser batteries ( 50 MW of loss reduction by 2011)
- Network Development: Strengthen networks by the extension of 400 kV to the center and south of Morocco
- Geographic equalization of the network in terms of generation
- Operating measures: Better monitoring of the tension map in order to reduce losses

# Demand-Side Energy Efficiency: Improving the Rate of Network Losses)

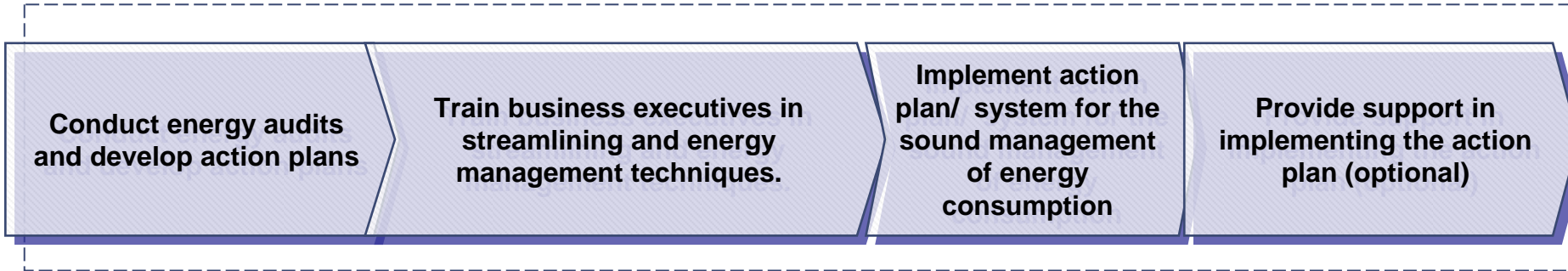
**Trend in Rate of Loss from the Transmission Network**



# DSM Action Plan Measures

|                                       | Measure  | Potential for optimization and <b>deadline</b>           |
|---------------------------------------|--|--|
| <b>Institutional measures</b>         | <b>Adopt :</b><br>- GMT+1 or European timetable<br>- Put into widespread use continuous and flexible working hours.<br>- <b>Promote delegated management of public lighting to third parties.</b>  | <b>90 to 140 MW</b><br><br><b>50 MW</b>                  |
| <b>Measures relating to equipment</b> | <b>Introduce low consumption bulbs</b><br>5 million LCBs in 2009<br>15 million LCBs in 2010/ 2011<br><b>“Chourouk” initiative for solar energy in urban areas and promotional campaign</b>   | <b>200 MW</b><br><b>600 MW</b><br><b>500 MW by 2015</b>  |
| <b>Tariff measures</b>                | <b>-Introduce super-point rate for manufacturing clients (optional)</b><br><b>-Introduce two rate system for LV heavy consumers (optional)</b><br><b>-Social rate incentive (20% / 20%)</b><br><b>-Three rate system for distributors (obligatory)</b> | <b>80 MW</b><br><br><b>117 MW</b>                        |
| <b>Industrial measures</b>            | <b>Improve energy efficiency in industrial zones</b><br>Optima<br>EnergiPro<br><b>Quality certification of high energy efficiency equipment</b>  | <b>50 to 100 MW</b><br><b>1000 MW</b>                    |
| <b>Awareness building</b>             | <b>Communication campaign in industries and households, ...</b>  | <b>Encouragement and speeding up of all the measures</b> |

# Optima Offer of Service for Energy Efficiency



## FINANCIAL CONTRIBUTIONS

|             |            |                    |
|-------------|------------|--------------------|
| -ANPME      | 40 to 50%  | } Consultancy fees |
| -ONE        | 30%        |                    |
| -Enterprise | 20% to 30% |                    |

## Intervention modalities / INTERMEDIATION



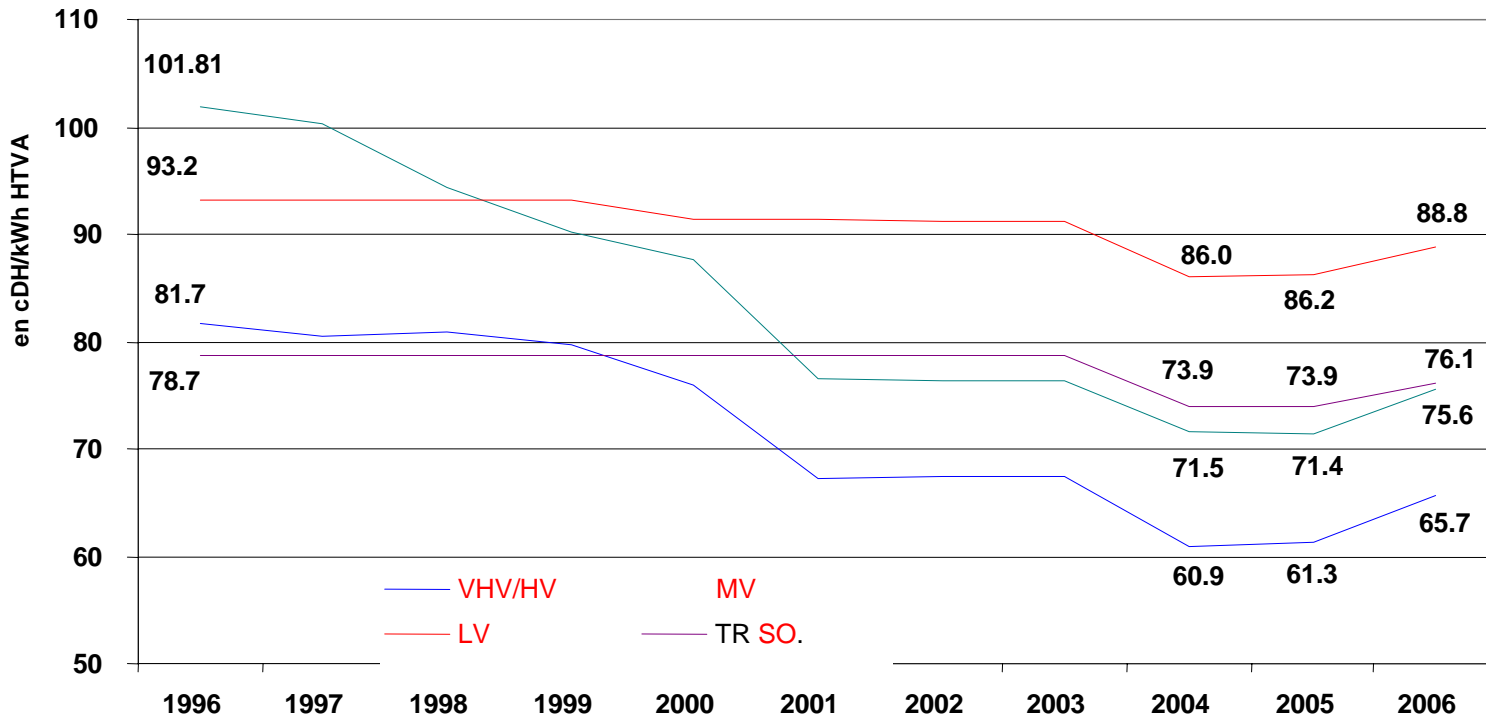


# Constraints to the Development of Energy Efficiency in Morocco

| Constraints to the development of energy efficiency                             | Measures taken to remove the constraints  |
|---|---|
| Subsidy for the price of energy   | Fee adjustment proposal covering certain consumer groups not included in low income households ( <i>tranche sociale</i> )   |
| Lack of training and awareness building for industrial clients                  | Organization of energy caravans in large cities and industrial areas of Morocco<br>Awareness building through television and radio spots  |
| Lack of technical standards on energy efficiency                                | Training of an inter-ministerial working group to develop standards f   |
| Limited supply of consulting firms and/or energy service companies              | Organization of two calls for expressions of interest in order to select consulting firms;<br>Negotiations with foreign consulting firms to set up office in Morocco; and<br>Establishment of a training plan for ONE engineers working in the field of energy efficiency |
| Lack of subsidies to invest in energy efficiency (EE)                           | International organizations negotiations (WB; KfW; EIB; ADB);<br>Creation of the Energy Efficiency Fund; and<br>ONE budget appropriation for EE in 2009   |
| Lack of any laws or regulations concerning the obligation to have energy audits | New law on renewable energy and energy efficiency projected for 2009  |

# Trends in Average Prices

Evolution of average prices in Morocco



ONE Sales price low when compared with production cost