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Agence Marocaine pour l'Efficacité Energétique

Funded by the European Union

meetMED
Mitigation Enabling Energy Transition in the MEDiterranean region
Together We Switch to Clean Energy

MED ENER

RCREEE
Regional Center for Renewable Energy and Energy Efficiency
المركز الإقليمي للطاقة المتجددة وكفاءة الطاقة

Moroccan experience on Energy Efficiency monitoring and evaluation methods

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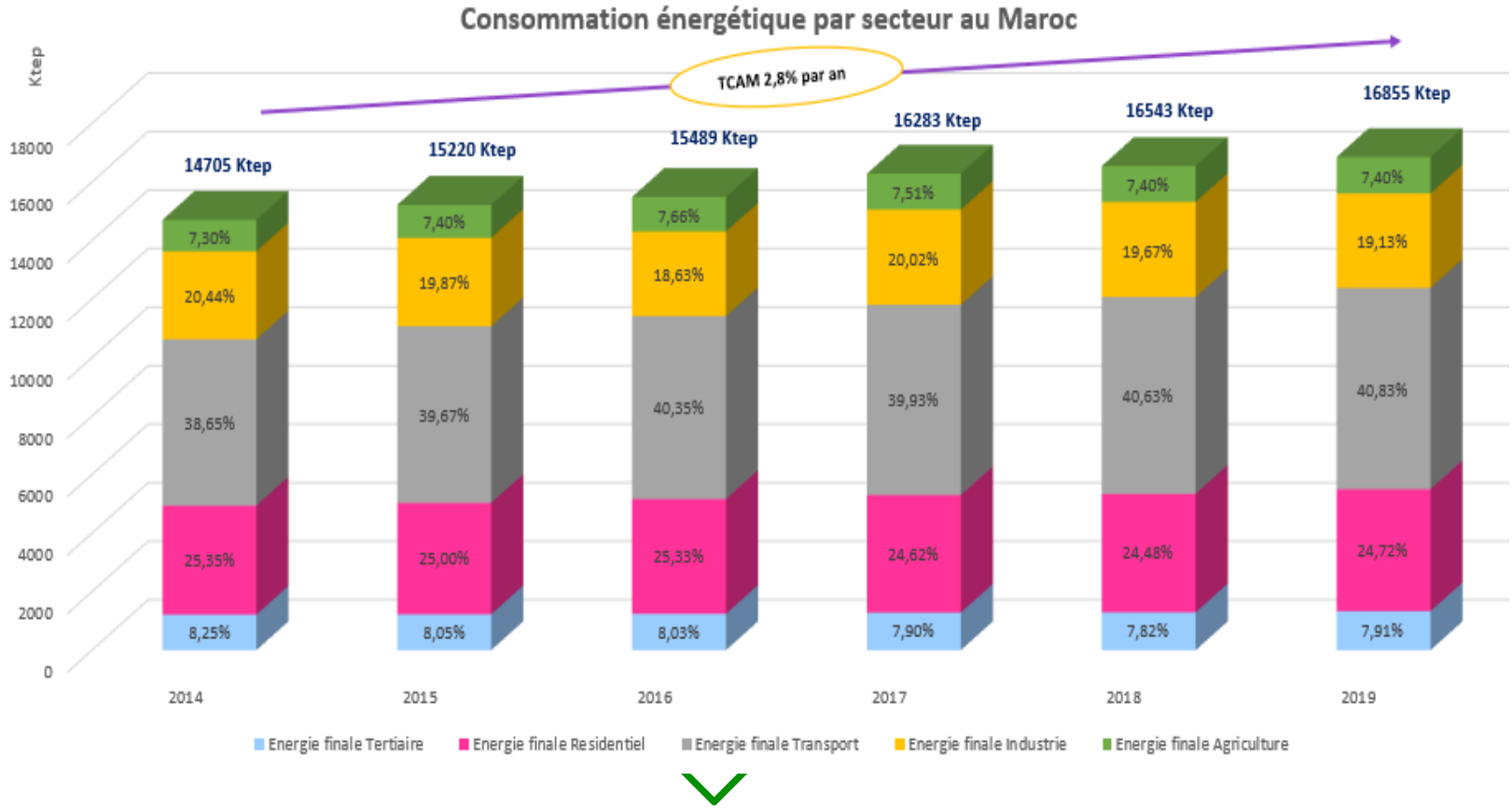
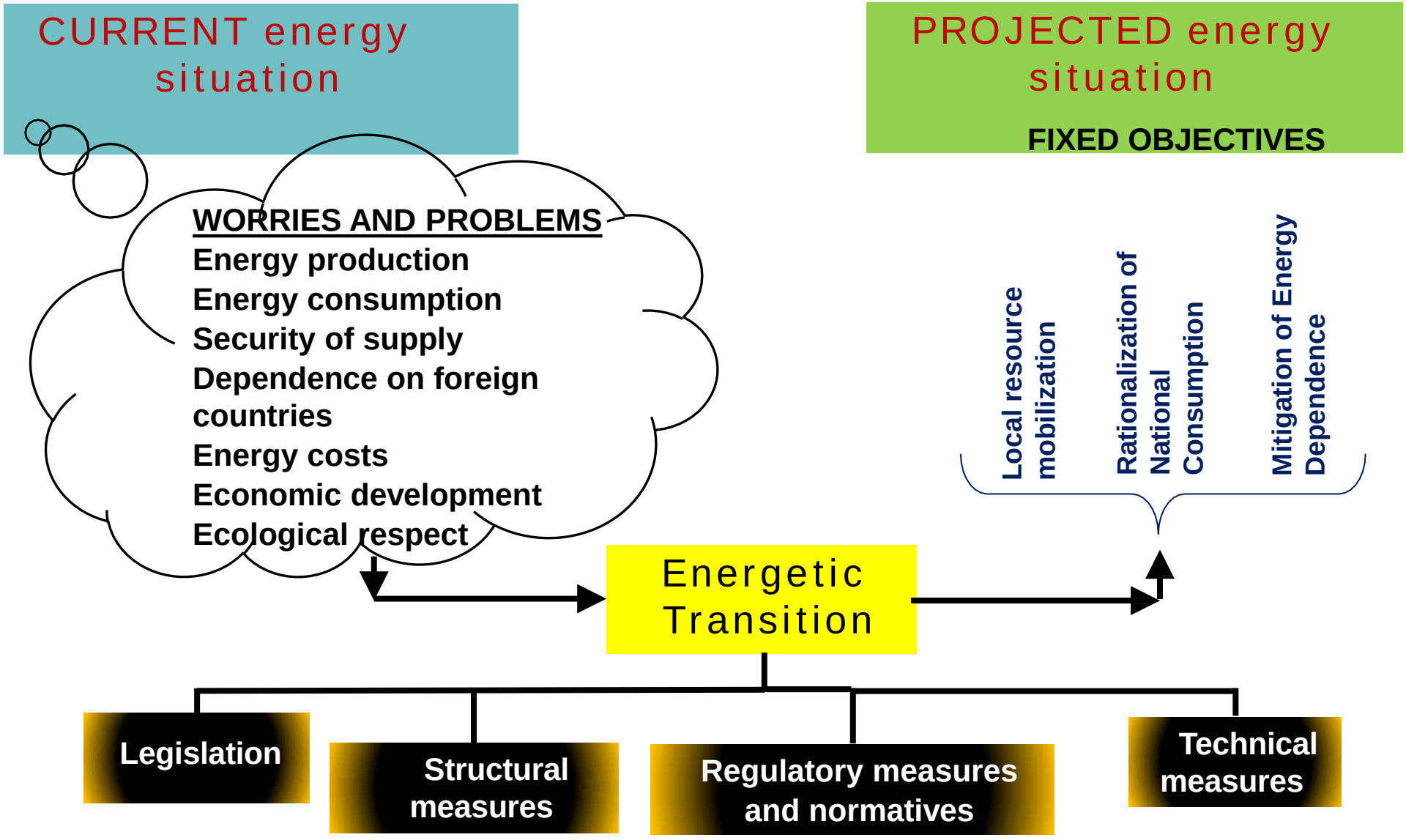
Energy Efficiency context in Morocco

Morocco is a country faced with the virtual absence of identified fossil energy sources and a heavy dependence on imports for its energy needs. However, this still very high energy dependence around 96% until 2008 seems, due to the increase in the share of renewable energies, to be reduced to 89% in 2019.



Defining an energy transition



Foundations of the energy transition – Moroccan model

1. High energy dependence (> 90%)

Unpredictability of the energy bill

-2012: **106** Billion DH
-2016: **54** Billion DH
-2018: **70** Billion DH
-2020: **50** Billion DH

2. Dominance of fossil products in the energy mix

Petroleum products 52%
Coal 31%
Natural gas 4%
Renewable energies: 9%
Electricity imports 4%

3. Energy consumption Evolutionary

- 2018 > 20 MTEP
- 2019 > 21 MTEP
- 2020 (Influenced by Covid) > 20 MTEP
- Growing demand > 5%

4. Five energy-intensive sectors
   - Electricity 42%
   - Fuels 58%

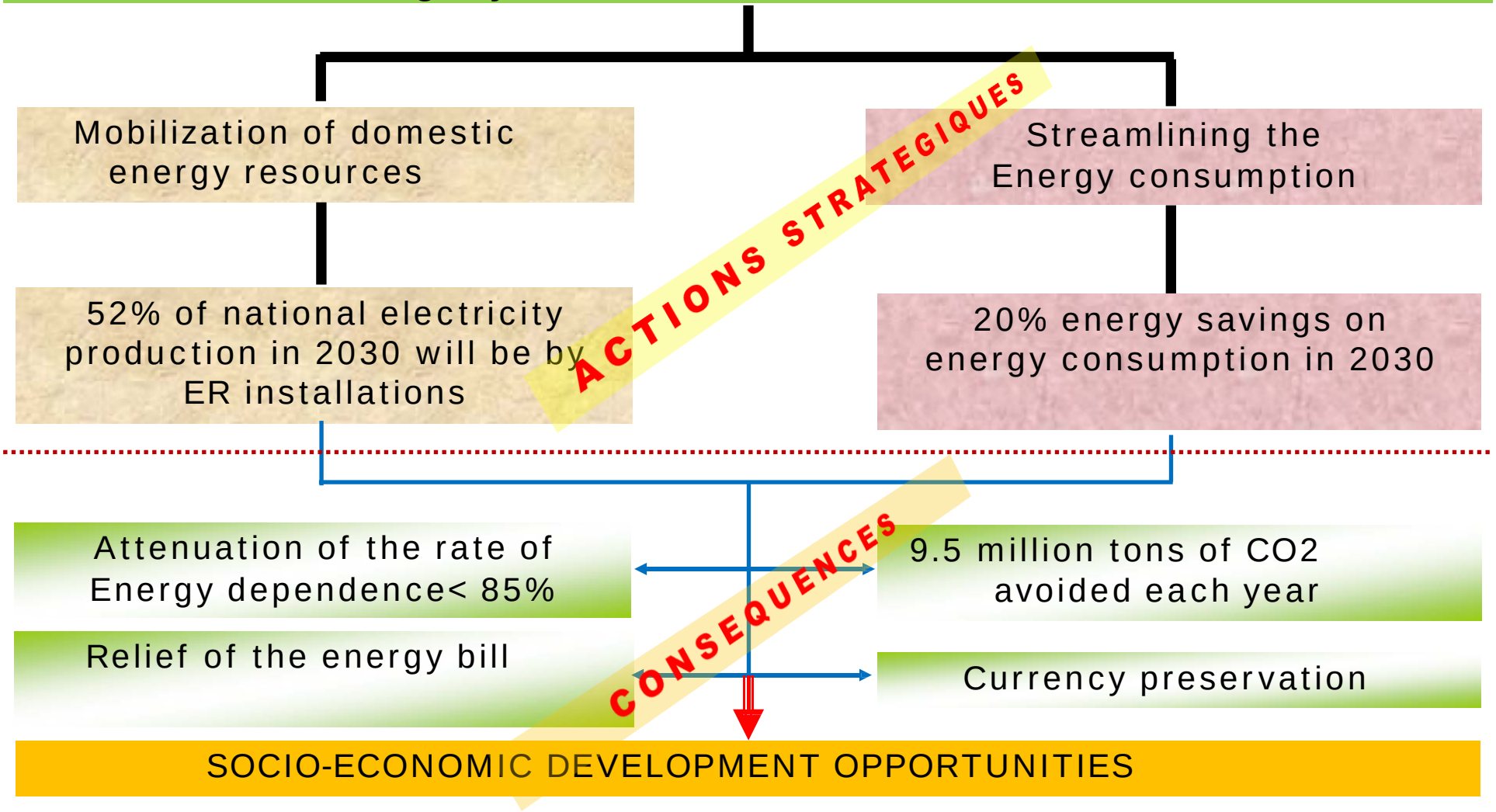
- Transport ≈ 38%
- Building ≈ 33%
- Industry ≈ 21%
- Public lighting & Agriculture ≈ 7%

Without energy transition, the consumption will double in 2030.

- Increase in bill
- Intensification of dependency
- Currency expenditure

Energy transition objectives – Moroccan model

The correction of malfunctions observed in the energy situation,
Achieves the following objectives:



Actions of the Moroccan model for the energy transition

Legislative measures

- **Law No. 13.09 on :**
  - **The opening of the electricity grid to private RE production ;**
  - **Buying and selling electricity by the private sector**
- **Law No. 47.09 on the Introduction and Structuring of Energy Efficiency**

Structural measures

- **RESTRUCTURING**
  AMEE (Laws n° 16.09 and n° 39.16)
- **CREATION :**
  - **The agency in charge of electricity production by the REs (MASEN, laws n° 57.09 and n° 37.16)**
  - **The R&D Institute on New Energies (IRESEN in 2011)**
  - **The national regulatory authority of**
  - **electricity (ANRE, law 48.15)**
  -

Regulatory and normative measures

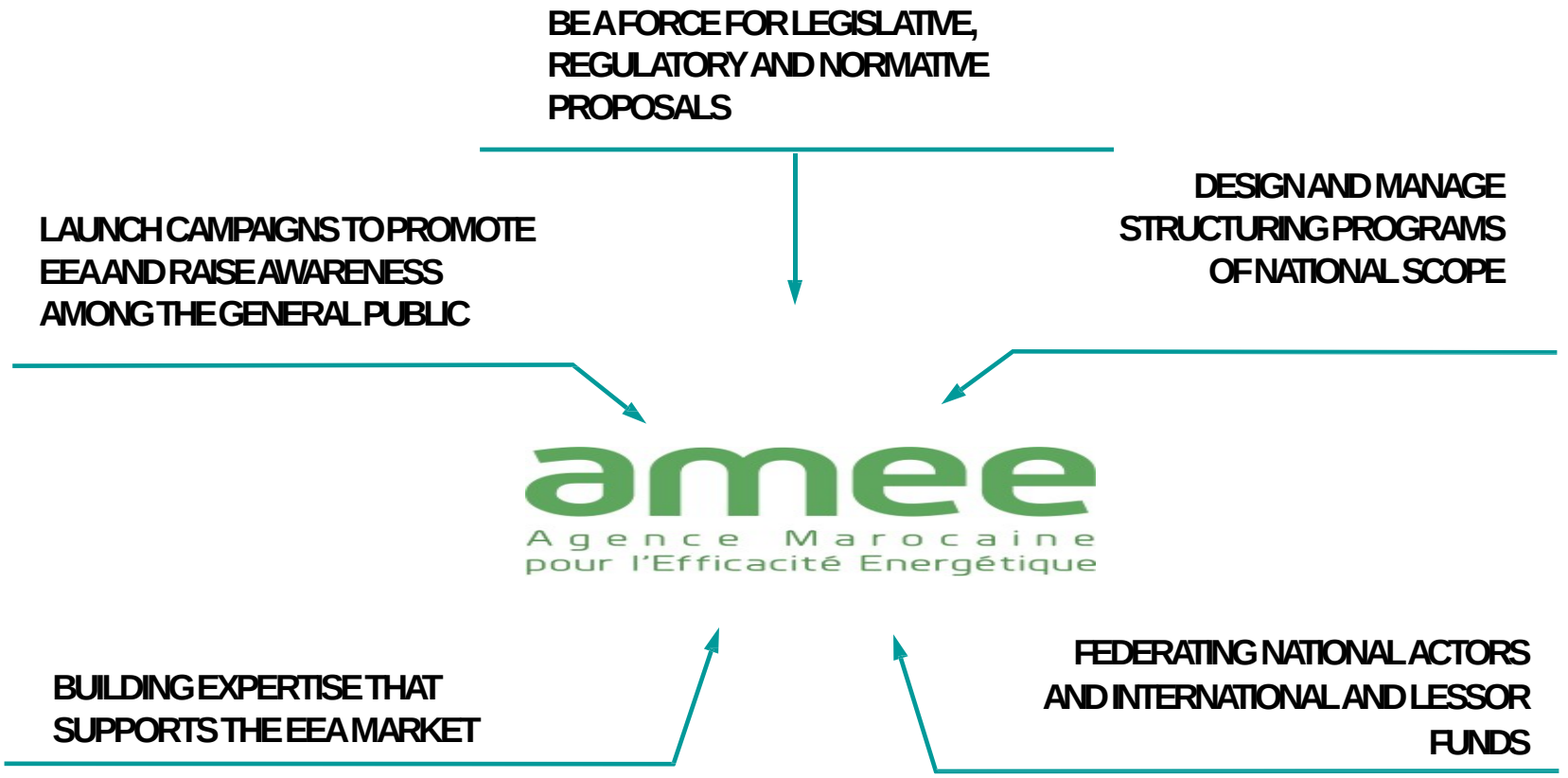
- **Implementing decrees relating to MASEN**
- **Implementing decrees relating to AMEE**
- **Implementing decree relating to ANRE**
- **Decree on the thermal regulation of constructions in Morocco RTCM**
- **Decrees relating to access to the electricity network**
-

Technical measures

125 Measures in the EE sector :

- **14 measures in industry**
- **27 measures in transport**
- **26 measurements in the building**
- **17 measures in public lighting**
- **14 measures in agriculture and fisheries**
- **27 cross-cutting measures**
-

Public actions for energy efficiency



History of amee

Renewable Energy Development Center

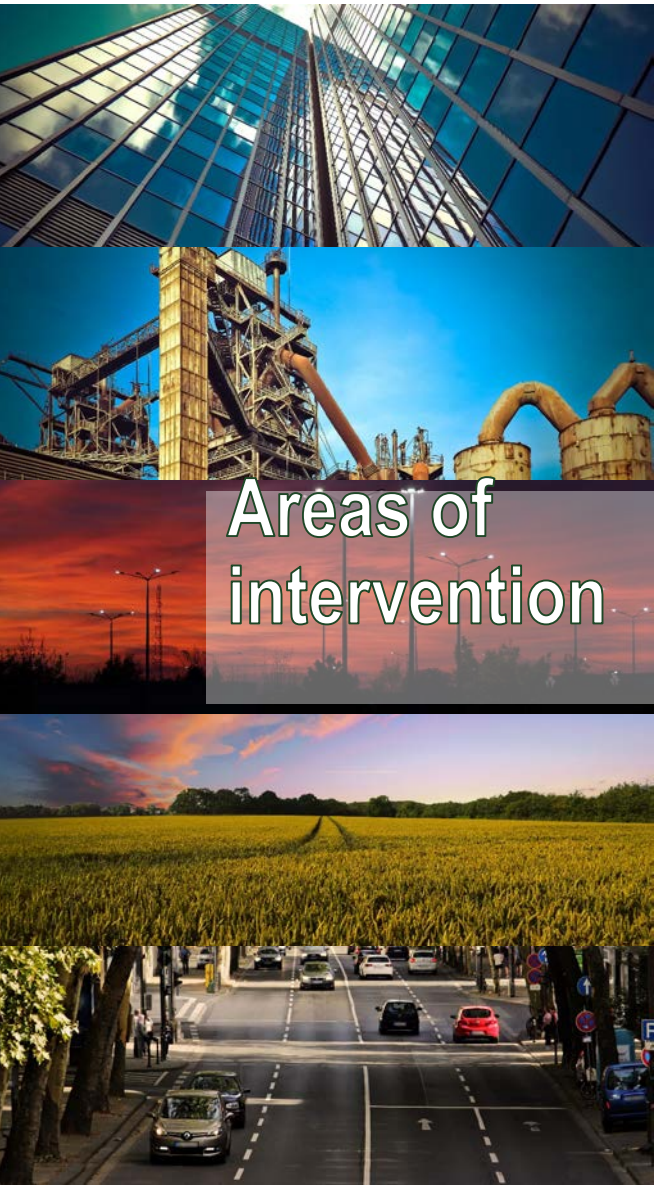
1982

Renewable Energy and Energy Efficiency Development Agency

2010

Moroccan Agency for Energy Efficiency

2016



Areas of intervention

BUILDING

Energy diagnosis and implementation of the RTCM

INDUSTRY

Mandatory audit ISO 50001

PUBLIC LIGHTING

Integration of EE measurements in public lighting

AGRICULTURE

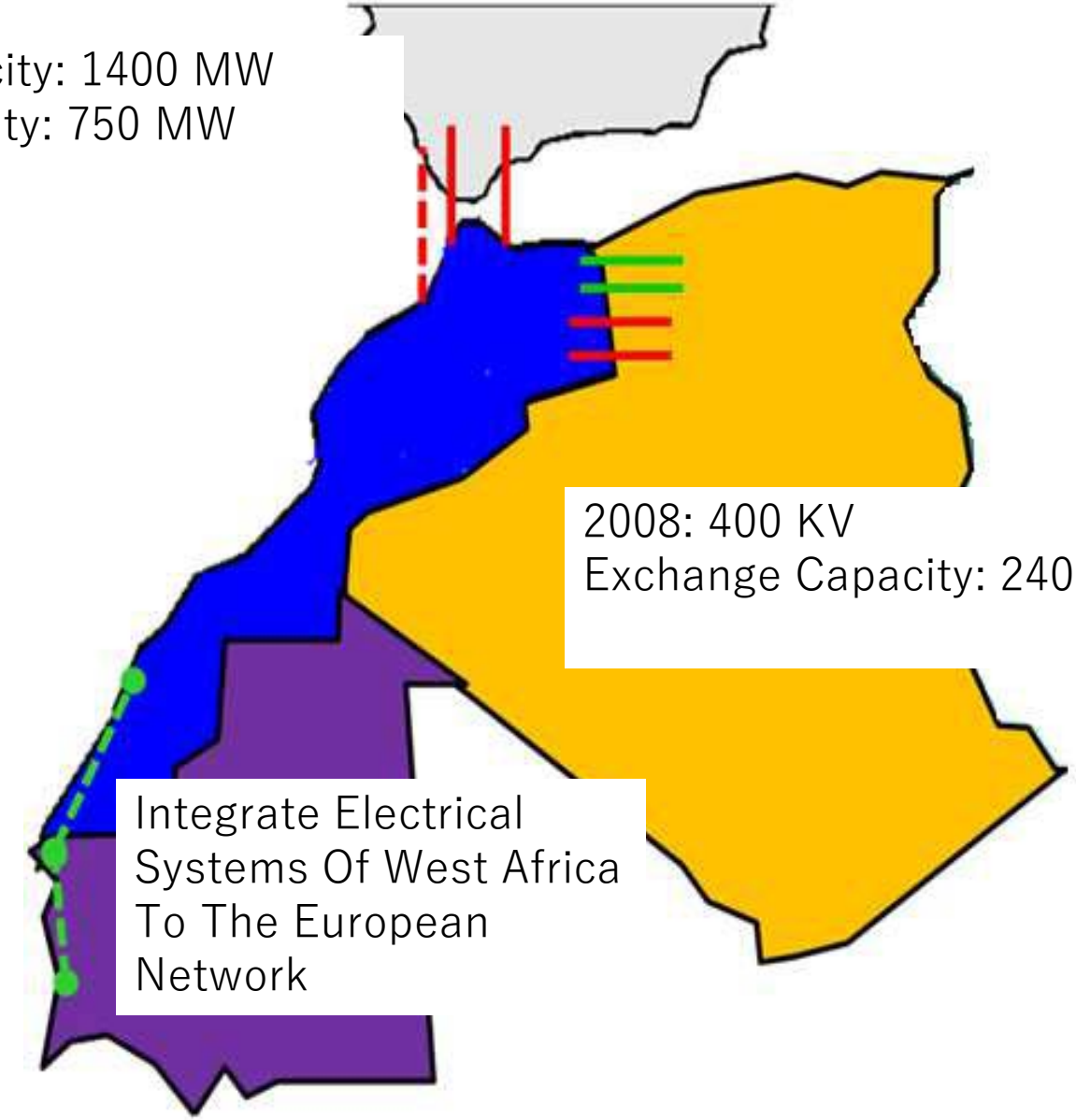
Promotion of RE and EE in agricultural activities (solar pumping)

TRANSPORT

Energy diagnosis of fleets, awareness and training on eco-driving

No blackout policy

Exchange Capacity: 1400 MW
Imported Capacity: 750 MW

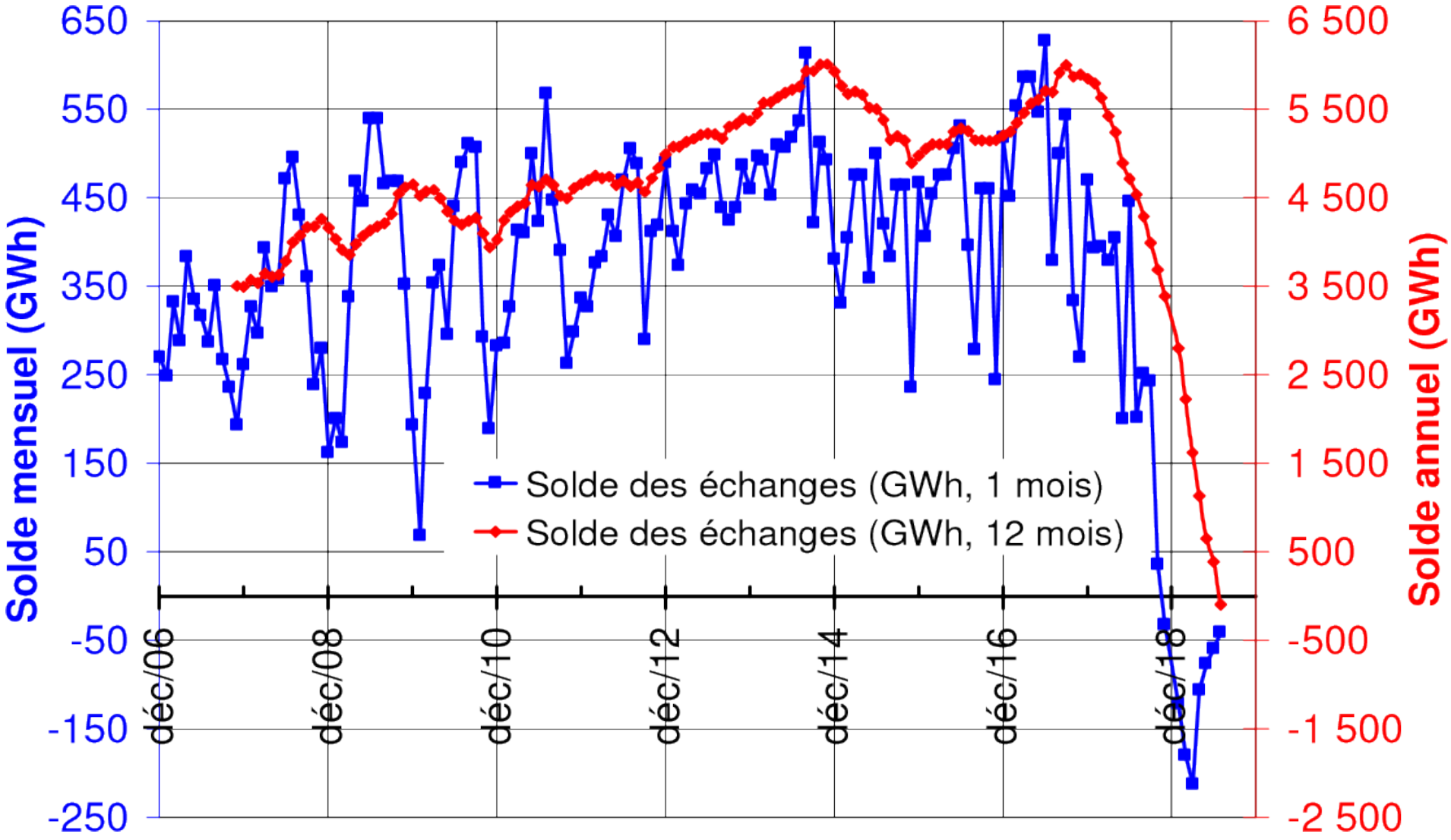


2008: 400 KV
Exchange Capacity: 2400 MW

Integrate Electrical Systems Of West Africa To The European Network

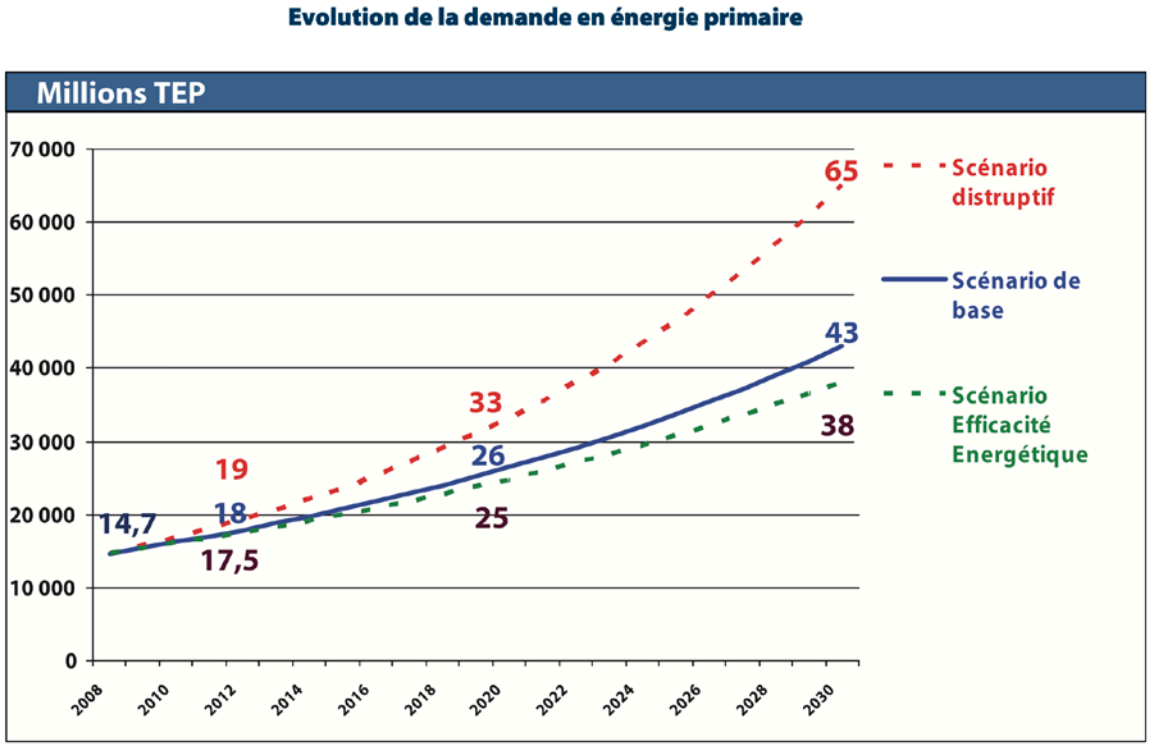
Source: MEMEE

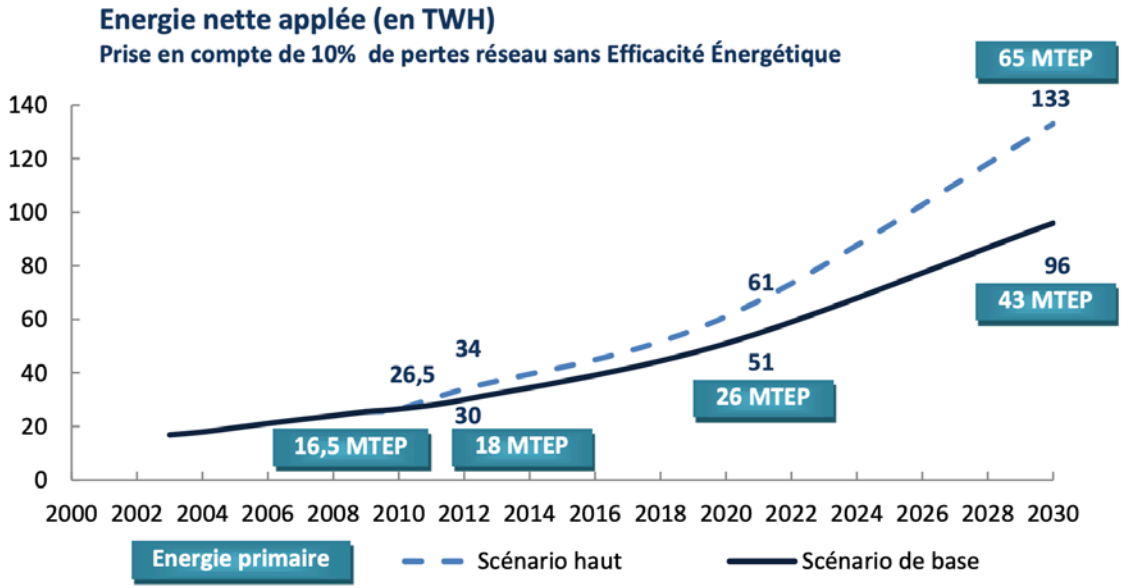
Exchange of electricity between Morocco and Spain/Algeria



Estimation of Energy Savings (state of play)

- The national energy strategy used primary energy and annual growth rates to estimate future energy needs
- No clear indication on how to calculate the 20% target by 2030. The baseline is projected to be 2009.
- Currently primary consumption is 22Mtoe in 2020 which would represent almost 15% decrease.





IE

Department of Observation and Programming (MTEDD)

The Estates General

- In 2013, the Estates General was able to have a detailed data to establish objectives by measures and sectors.
- Final energy use for trend
- Savings are expected from 2016.
- The savings are estimated at 13% for 2030.
- A review in the EE strategy sets out a target of 20% by 2030

According to the trend of general studies and the estimate of the final energy of 2020, we are around 17% energy savings. (Due mainly to the decrease in consumption in relation to COVID)

AAGR in constant increase

Hypothèses d'évolution de l'intensite énergétique et consommation par secteurs

	2000	2006	2012	2020	2030	TCAM 00-06	TCAM 00-12	TCAM 06-12	TCAM 12-20	TCAM 12-30	TCAM 20-30
Global	7,571	9,758	13,528	20,421	30,901	4,3%	5,0%	5,6%	5,3%	4,7%	4,2%
Inudstire	2,062	2,659	3,518	4,855	6,226	4,3%	4,6%	4,8%	4,1%	3,2%	2,5%
Transport	2,494	3,051	4,343	6,118	8,561	3,4%	4,7%	6,1%	4,4%	3,8%	3,4%
Bâtiment	2,229	3,045	4,225	7,281	12,988	5,3%	5,5%	5,6%	7,0%	6,4%	6,0%
Agriculture & Pêche	0,786	1,003	1,442	2,167	3,126	4,1%	5,2%	6,2%	5,2%	4,4%	3,7%

Energy Savings Estimation (Methodology)

- Need for a new model that reflects the fluctuation of external economic variables that affect energy consumption.
- In accordance with ISO 50001 and IPMVP methodologies, AMEE used regression analysis to correlate demand with other socio-economic variables.
- The model was created from available energy balance and HCP economic data.
- The fraction between the actual (EE trend) and the projected (BAU) over the year 2020 gives us 13.17% or 2.3 Mtoe. That said, it is more prudent to use the average over the period 2014-2020 which limits fluctuations such as that of COVID. Thus, the average cumulative savings is 7.23%.

Years	Final Energy Energy (kTEP)	Population	PIB (millions de DH)	Projection (GDP) (kTEP)	Difference between projection and real (GDP)(ktoe)	Cummul of Economies	% Savings	Intensity	Cumulation of
2005	11245	30.2150	527.679,0					0,0213	
2006	11515	30.606	577344					0,0199	
2007	11903	30.998	616254					0,0193	
2008	12566	31.391	688843					0,0182	
2009	12694	31.786	732449					0,0173	
2010	13248	31.786	764302					0,0173	
2011	13997	32.579	802607					0,0174	
2012	14339	32.978	827497					0,0173	
2013	14660	33.378	872791	14660				0,0168	0,00%
2014	14705	33.848	925376	15436,43	731,43	731,43	4,74%	0,0159	2,43%
2015	15220	34.125	987950	16241,61	1021,61	1753,04	6,29%	0,0154	3,78%
2016	15489	34.487	1013559	16571,13	1082,13	2835,17	6,53%	0,0153	4,51%
2017	16283	34.852	1063297	17211,14	928,14	3763,31	5,39%	0,0153	4,70%
2018	16543	35.220	1108463	17792,32	1249,32	5012,63	7,02%	0,0149	5,12%
2019	17069	35587	1152806	18362,90	1293,61	6306,24	7,04%	0,0148	5,42%
2020	15238	35952	1089521	17548,58	2310,58	8616,82	13,17%	0,0140	7,23%
			Savings in 2020 (kTEP)		2310,58				
					Spot year	Average			
			Savings in 2020 %		13,17%	7,23%			
			Primary consumption economies achieved in 2020 in millions MAD		8453,06				

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Thank you for your attention

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