

**Centre de Développement des Énergies
Renouvelables**

MOROCCO'S SWH APPLICATIONS

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 - ✓ **ENERGY SECTOR IN MOROCCO**
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National Context

New Energy Strategy

- ✓ **Secure and Diversify Energy Supply**
 - ✓ **Generalize Energy access, optimize Costs and preserve Environment**
 - ✓ **Renewable (10% by 2012) and Energy Efficiency (12 to 15% by 2020) High Priority**
 - ✓ **More appropriate Regulatory and Institutional framework**
 - ✓ **Financing scheme**
-

National Context

Strategic deployment

- ✓ **RE + EE Law (regulation, Labeling, Energy Audits fiscal and finance incentives)**
 - ✓ **RE & EE Support Fund, leverage mechanism: 1 Billion \$ US**
 - ✓ **Self Power Production Encouragement : new limit at 50 MW**
 - ✓ **Evolution of CDER toward National Agency for EE & RE Promotion in charge of Programs Implementation**
 - ✓ **Prime Minister Circular : incitation of Institutions, Public Institutions and Local Communities to integrate EE and RE in their Investment Programs**
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Royal guidelines

Extrait Discours De Sa Majesté Le Roi

Juillet 2008

« Le Maroc n'a d'autre choix que de renforcer localement sa capacité de production d'énergie et d'ouvrir la voie aux investissements prometteurs en matière d'approvisionnement énergétique. Il se doit également de poursuivre résolument les efforts visant à faire des énergies alternatives et renouvelables la clé de voûte de la politique énergétique nationale. »



National Programme Development of RE & EE

- ❖ Development of laws, regulations and incentives on RE and EE**
 - ❖ Framework Law on Renewable Energy and Energy Efficiency**
 - ❖ Fund to support renewable energy and energy efficiency programs**
 - ❖ Encouragements of the electricity auto production: threshold raised to 50 MW, access to the grid, with acquisition of the surplus to 60% of tariff,**
 - ❖ Gradual liberalization of the electricity sector**
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National Context

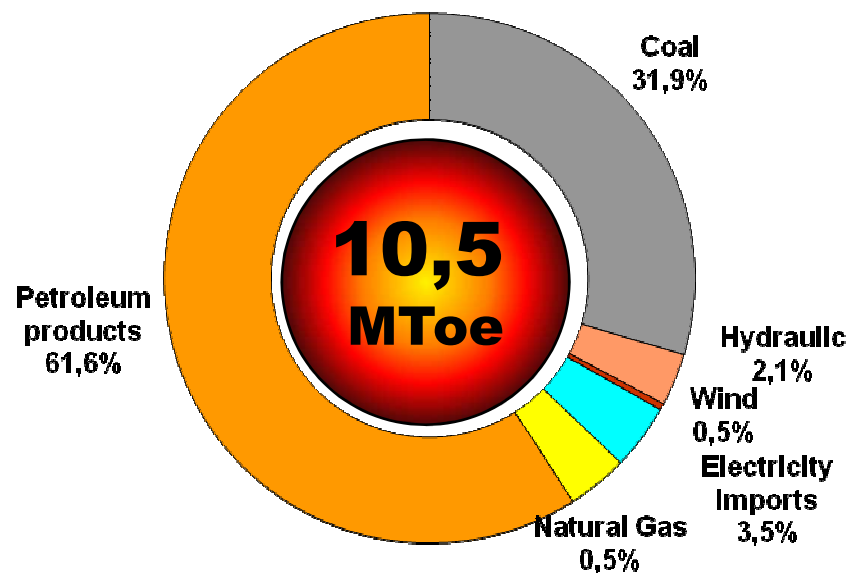
Drivers of a Dynamic Economy (Growth 6%) Infrastructure Programs open to RE & EE "Agreements between Ministers"

- ✓ Program of 150,000 new houses per year
 - ✓ Program "Emergence" for Industrial Development through "new Industrial Zones"
 - ✓ "Plan Azur" Tourism Infrastructure strengthening
 - ✓ "Plan Vert" for Agricultural Sector modernization
 - ✓ ...
 - ✓ ...
-

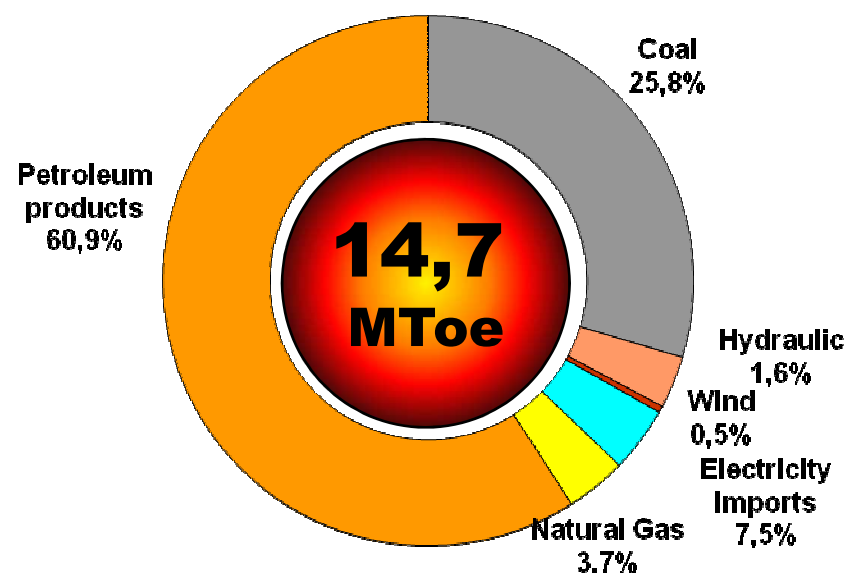
ENERGY SECTOR IN MOROCCO

Primary Energy Consumption

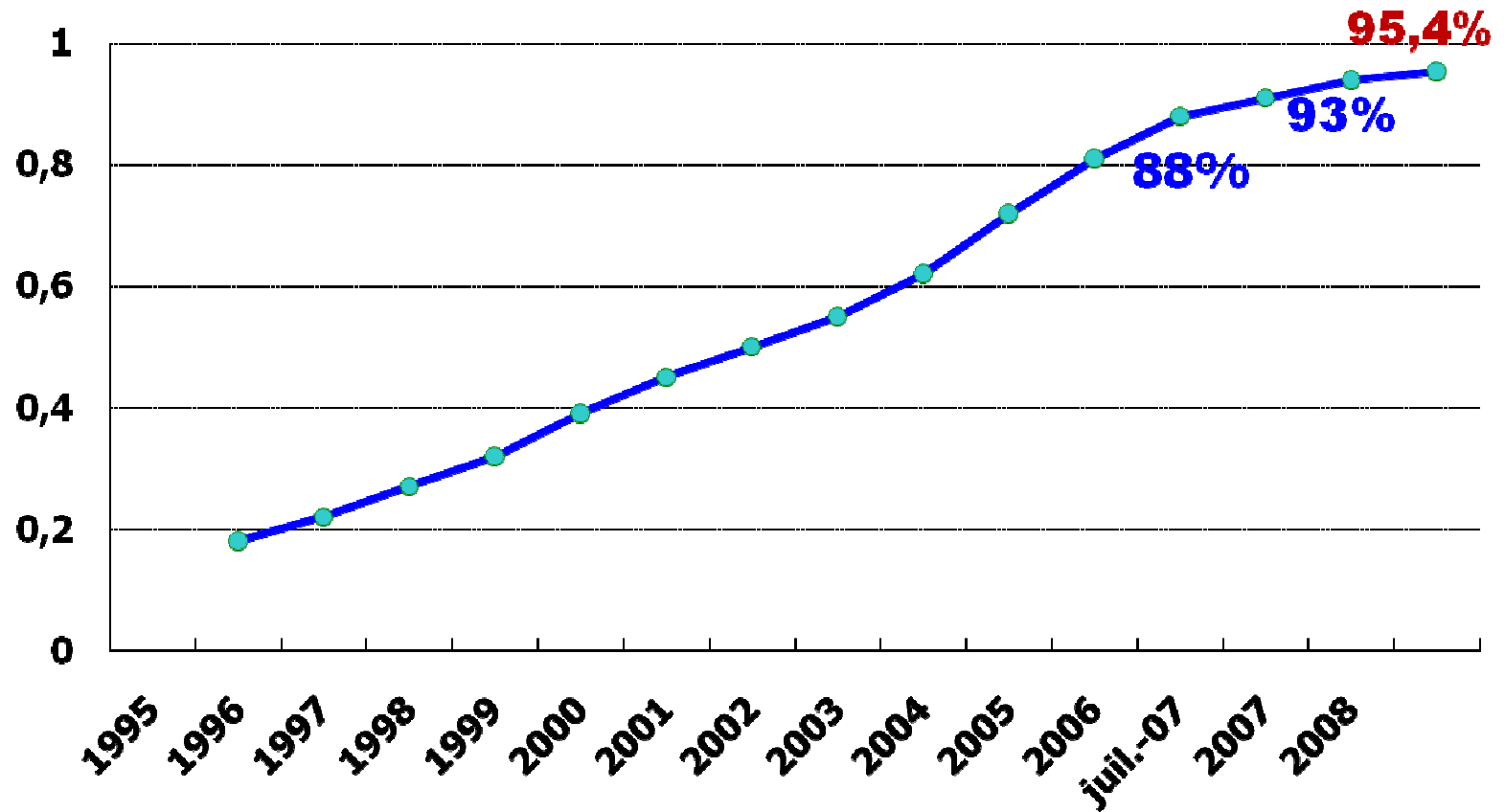
2002



2008



RURAL ELECTRIFICATION



RENEWABLE ENERGY OPTIONS

Development of domestic resources: **Renewable Energies**



OBJECTIVES 2012

- **10%** in the energy balance
- **20%** in the power generation

IMPLEMENTED WIND FARM

POWER INSTALLED 123,5 MW

Wind Farm	Power	implemented	speed
CED-Tetouan	50 MW	Aug 2000	11 m/s
Koudia El Badia	3.5 MW	March 2001	11 m/s
Lafarge-Tetouan	10 MW	sept 2005	11 m/s
Essaouira	60 MW	April 2007	9.5 m/s

RENEWABLE ENERGIES PERSPECTIVES

OBJECTIVES 2012

10% in the energy balance

- **WIND** 1000 MW ©
 - **Hydraulic** 440 MW ©
 - **Off Grid programs** ©
-

GRID CONNECTED RNE PROJECTS 2012

	Projects	Power	Expected
WIND	Tanger	140 MW	2009
	Touahar-Taza	100 MW	2009
	Sendouk	100 MW	2009
	Tarfaya	300 MW	2010
	Laayoune	240 MW	2010
	Foum El Oued	200 MW	2011
SOLAR	Ain Beni Mathar	20 MW	2009

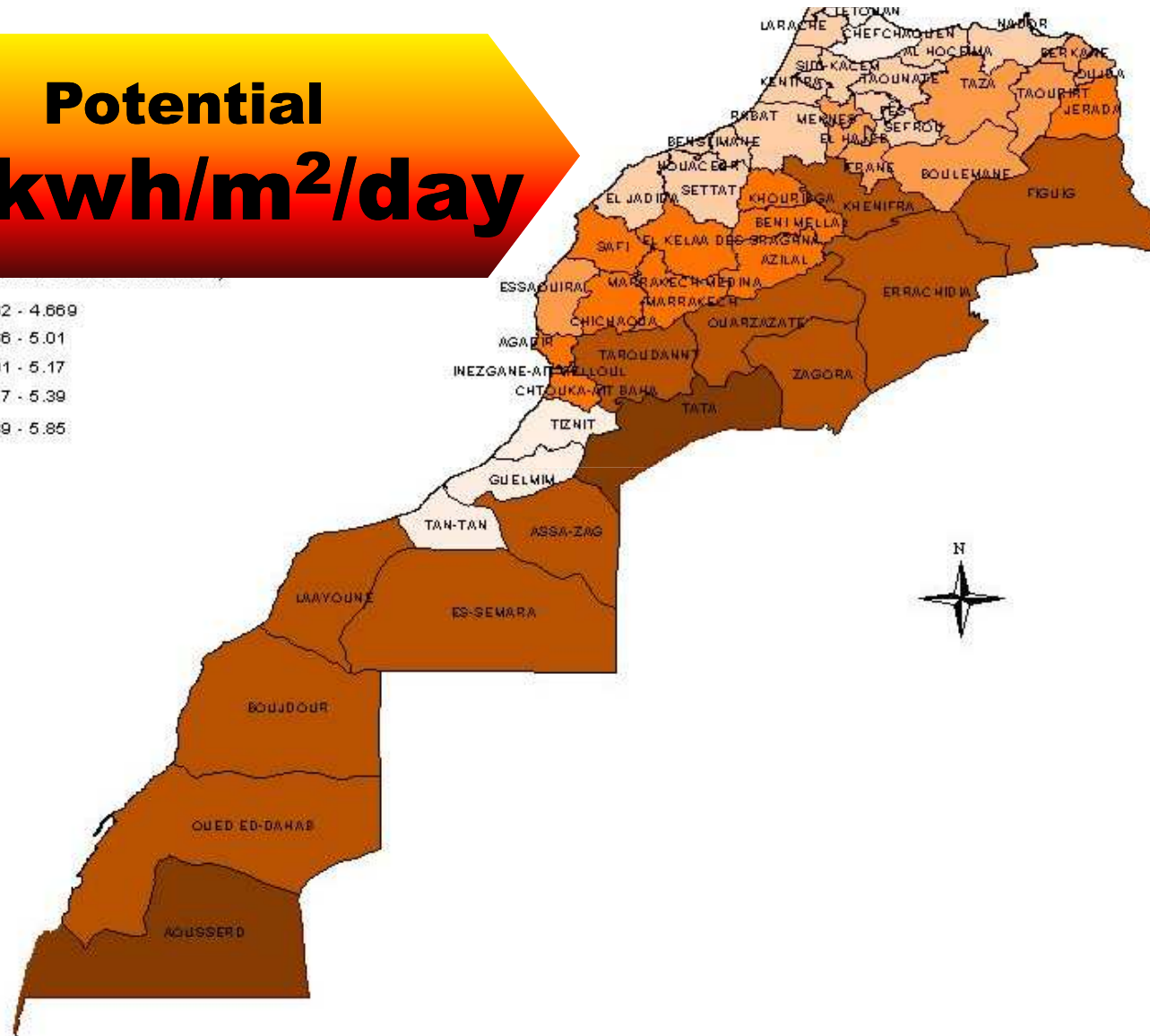
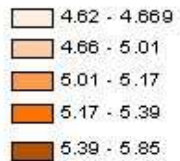
GRID CONNECTED RNE PROJECTS 2012

Hydroelectric power **440 MW**

Projects	Power	Expected
Tanafnit El Borj	40 MW	2009
Pumping storage facilities Abdelmoumen	400 MW	2012

SOLAR POTENTIAL MAP OF MOROCCO

Potential
>5 kwh/m²/day



OFF-GRID DECENTRALISED RENEWABLE ENERGIES PROGRAMS

**Solar
photovoltaic**

150 000
Homes electrified
PERG

**Solar Thermic
(PROMASOL)**

200 000 m² solar
collectors installed

PROSPECTIVE 2020-2030

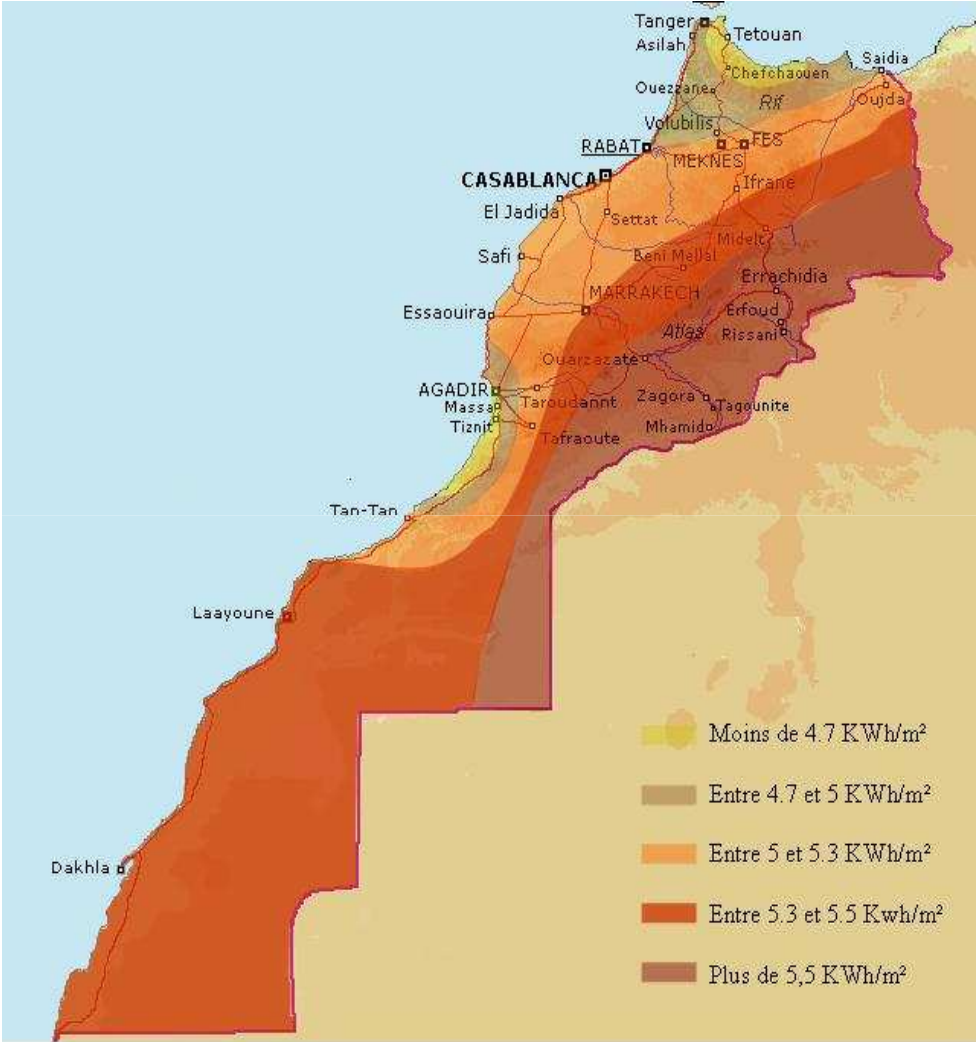
SOLAIRE: Ressource of the future

Feasible potential

- PV 1 080 MWp
 - SWH 3 000 000 M²
 - CSP 1000 MW
-
- 4,2 Millions tons/y CO2 avoided
 - 600 000 Toe/y economised
 - 15.000 Jobs created

(* the realization of this potential is conditioned by the profitability of the projects and notably the costs reduction of access to solar technologies.

Source CDER/GTZ



PROSPECTIVE 2020-2030

Le Solaire Thermique basse température (CES)

	Surface cumulée réalisable m ²	Energie produite GWh/an	Energie économisée kTep/an	CO ₂ évité kT/an	Puissance épargnée MW	Emplois créés
2020	1 700 000	1190	102,6	682	400	920
2030	3 000 000	2100	181	1 204	700	1600

Le Solaire Thermique à concentration (CSP)

	Puissance cumulée réalisable MW	Energie produite GWh/an	Energie économisée kTep/an	CO ₂ évité kT/an	Emplois créés
2020	470	1880	161,7	1 110,4	1500(*)
2030	1000	4000	344	2 362,6	3200

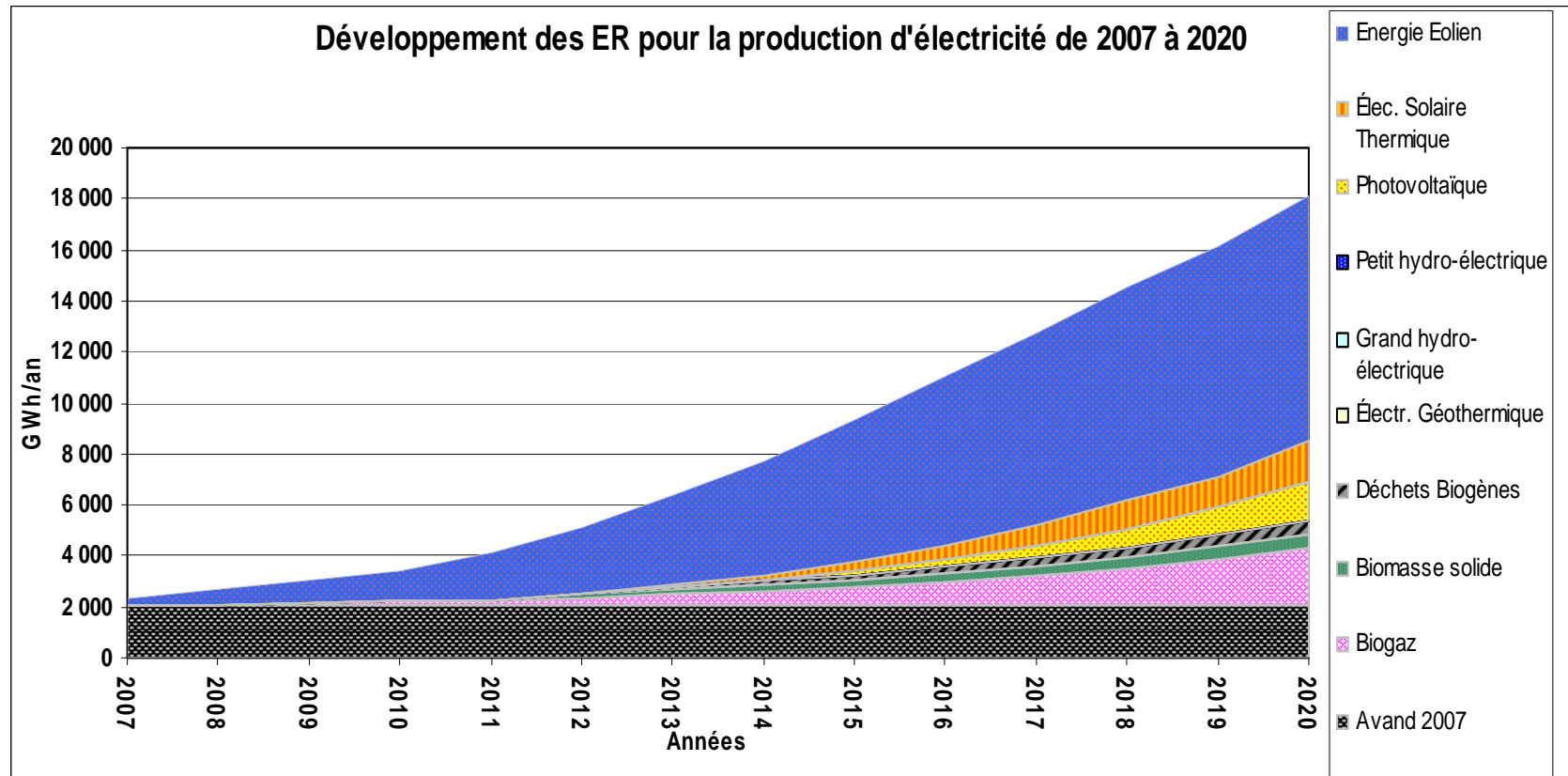
(*) avec option fabrication locale de 60% des composants

National Context

National Potential : Prospect

Until 18 TWh by RE for 2020 (33% of electric energy needs)

15% of national Energy Balance



Réf : Etude GTZ - CDER

Moroccan Market Development
PROMASOL - Program of SWH

Technology

- Thermosiphon

Forced



PROMASOL

- ✓ **Market Development Program Moroccan SWH PROMASOL**
 - ✓ **100.000 m² over 4 years**
 - ✓ **Enhancing Quality: certification, labeling, training**
 - ✓ **Institutional promotion of sectoral programs**
 - ✓ **Market Promoting by : Technical and financial support to supply and direct support to projects through leasing fund with FOOGER with the bank 'Dar Addamane'.**
 - ✓ **Communication: Awareness, TV & radio spot, press...**
-

Commercial Insurance Partnerships (CIP)

- ✓ **Increase the capacity of distribution and marketing of SWH based on partnerships between producers and importers on the one hand and distributors on the other.**
 - ✓ **CIP 1st phase (duration 1 year):
5 companies with the generation of 8000 m² of solar collectors with more than Dh 40,000,000 in sales,**
 - ✓ **CIP 2nd phase (duration 6 months):
4 Company with the objective of generating 6000 m² of solar collectors and more than Dh 30,000,000 in sales,**
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Accompaniment to the Solar Industry (ASI)

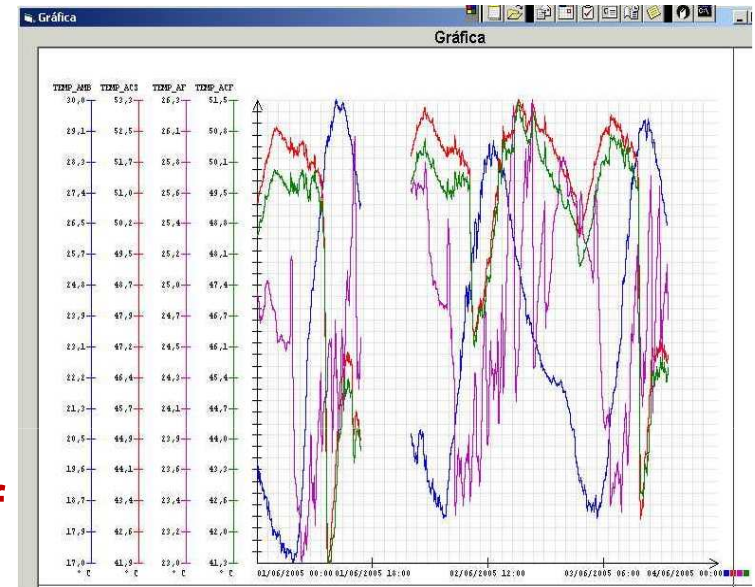
- ✓ **Designed for industrial or manufacturers who plan to invest in the manufacturing of SWH,**
 - ✓ **Objective: To encourage local production of SWH to reduce the purchase price and offer jobs opportunities.**
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Financial support : leasing type

- ✓ Facilitate accessibility to the Equipment and quality services
 - ✓ mobilize the rental-purchase, as a mode of financing for the acquisition of SWH by various categories of moroccan economic agents
 - ✓ Guarantee Fund of EE & RE FOGEER: Dh 10 million, 70 projects, 20,000 m²
 - ✓ Direct support to projects:
 - Technical and financial engineering (10% investment cost)
 - reclamation costs by 1.5% (bonification charges financières)
 - ✓ Indirect support, assessed at 12% of the overall project budget
 - ✓ Accompaniment by CDER, the Supplier approved, having met the prescribed conditions.
-

Quality of Equipment and services

- ✓ Application of the GSR at 20 projects and results assessment,
- ✓ Development of a system of remote monitoring: Follow up the energy performance of solar thermal collective systems
- ✓ Realization of a bench test of solar collectors and systems with the support of the CSTB,
- ✓ Labeling of products according to Moroccan standards : 9 products certified
- ✓ Use of CDER quality label for certified products



Quality of Equipment and services

- ✓ Organization of training sessions for architects, engineering experts, installers and technical managers of charitable homes, schools, hospitals.
- ✓ Approval of 100 installers in partnership with the profession (industry...),
- ✓ Training & Education: 20 workshops, capacity building of a distribution network, maintenance training.



Cooperation and Promotion

- ✓ **Implementation of promotional activities, implemented through awareness raising and technical and financial support, in partnership with the departments using the hot water in their buildings including:**
 - **Social Sector (Entraide Nationale, Secretariat d'Etat Chargé de la Jeunesse)**
 - **Higher Education Sector**
 - **Health Sector**
 - **Hotels Sector**
 - **Housing Sector**
-

Cooperation & Promotion

List of realisations :

Sector	Surface (m ²)	Storage (L)	Energy supplied (Kwh/yr)
Social	413	29 200	277 400
boarding schools	590	37 400	402 600
Health	490	31 500	330 700
Clubs & hotels	393	29 250	240 750
Total	1900	127 350	1 251 450

Cooperation & Promotion

- ✓ Operation 1000 SWH
- ✓ Dissemination of 1000 individual SWH, 150 liters at DH6000, including installation,

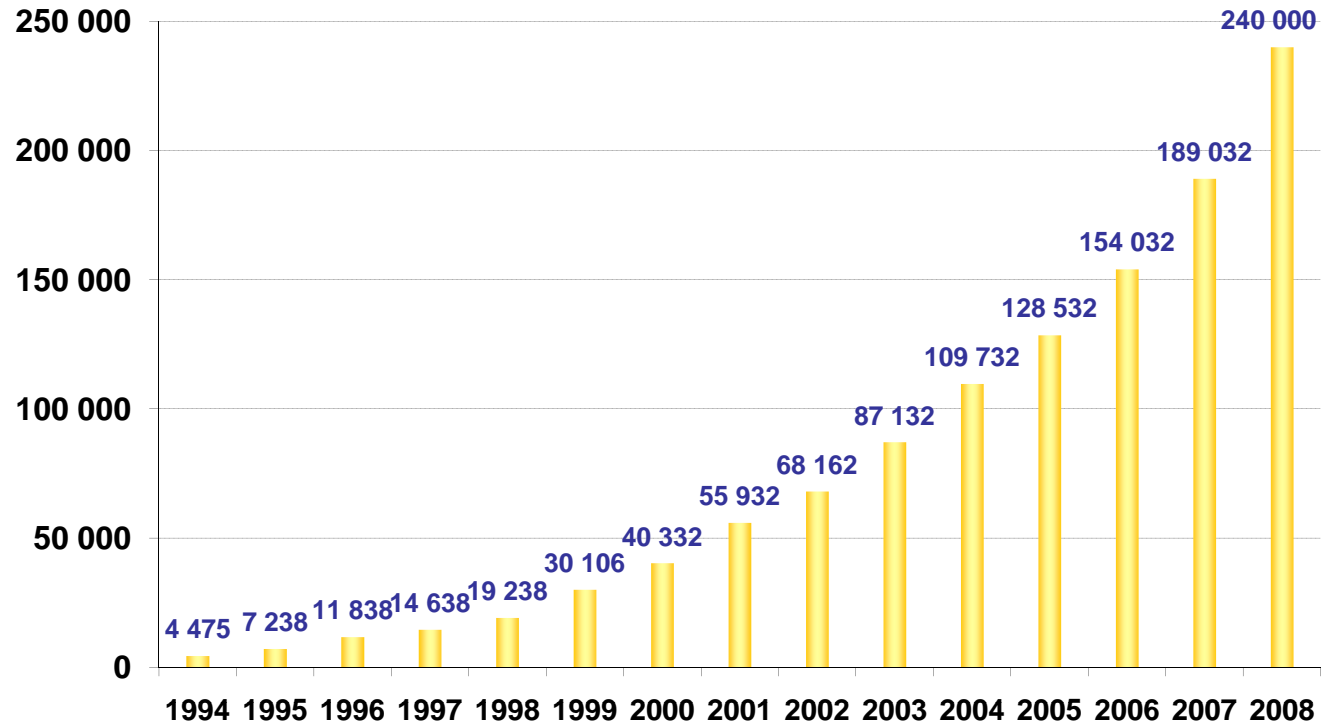
Objectives:

- ✓ facilitate access to the SWH,
 - ✓ generalize its use, particularly in the residential sector,
 - ✓ push the private sector to reduce prices on the domestic market.
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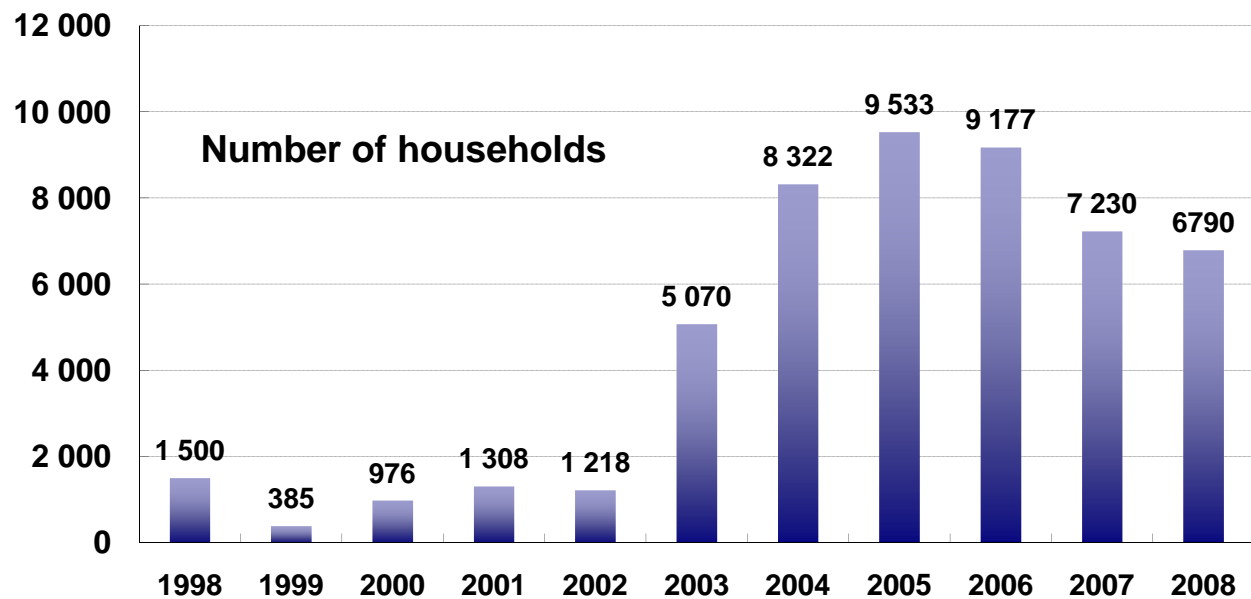
Communication

- ✓ **Spot TV**
 - ✓ **Spot Radio**
 - ✓ **Support for distributors: Posters on highway, supermarket exhibitions and fairs, Press Inserts**
 - ✓ **Organization of sectoral seminars and workshops:, hotels, Habitat, health, National Mutual and the private sector ...**
-

National evolution of SWH m²



National evolution of SHS / PV



Conclusion

The **dynamics** of Morocco development, put in evidence by the big finished projects or under realization in all economic and social sectors, harbor and airport infrastructures, freeways, industry, tourism, new cities, **entails** the growth sustained of the energy demand that will be satisfied by the enhancing of the offer and the efficiency of the energy uses.

The energy efficiency is considered today like a fourth energy after fossil, renewable and nuclear energies. The Moroccan's ambition is to achieve an economy of 15% of our energy consumption by the year 2030 by a better use of energy in all domains of economic and social activity. It is imperative to consume energy better to face our energy needs grows.

In this goal, The Ministry of Energy, Mines, Water and Environment put in place a National Plan of Important Actions to ensure the adequacy of the offer to the energy demand and to reinforce the energy efficiency in the key sectors of the national economy.

To institutionalize the energy efficiency, several conventions of partnership have been concluded with the Ministries in charge of the habitat, the Tourism, the National education and the industry and others will be established with other major actors on the national energy field. Our objective through these partnerships is to introduce in a sustainable manner the techniques of energy efficiency to the level of all sectoral programs of development, to encourage the industrial enterprises to use renewable energies and cogeneration, to generalize the energy audits to the level of the SME, to elaborate an energy efficiency code in the building foreseeing the development of solar water Heaters , to generalize the use of low consumption lamps and to use facilities adapted to the level of the streetlight

These actions cannot be put in work without an incitement regulatory and institutional framework in the height of our ambitions.

THANK YOU

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