

Solar Andalusia: A brief energy outlook and solar technologies evolution

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Agencia Andaluza de la Energía

CONSEJERÍA DE ECONOMÍA, INNOVACIÓN, CIENCIA Y EMPLEO

GENERAL FACTS



- SURFACE: 87,597 km²
- POPULATION: 8.4 million
- PROVINCES: 8
- TOWNS: 770

RES Grid-connected towns: 473

THE ANDALUSIAN ENERGY AGENCY



Agencia Andaluza de la Energía
CONSEJERÍA DE ECONOMÍA, INNOVACIÓN, CIENCIA Y EMPLEO



Public entity created in 2005, assigned to the Regional Ministry of Economy, Innovation, Science and Employment of the Andalusian Government

Aimed at the implementation of a new sustainable energy model based upon:

- **Promotion of renewable energies and energy saving and efficiency.**
- Development of **energy infrastructures** that guarantees an **optimal supply**.
- Raising **citizen awareness on the rational use of energy**.
- Fostering a competitive industrial sector on clean energies.



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ANDALUSIAN ENERGY SYSTEM. RES POTENTIAL

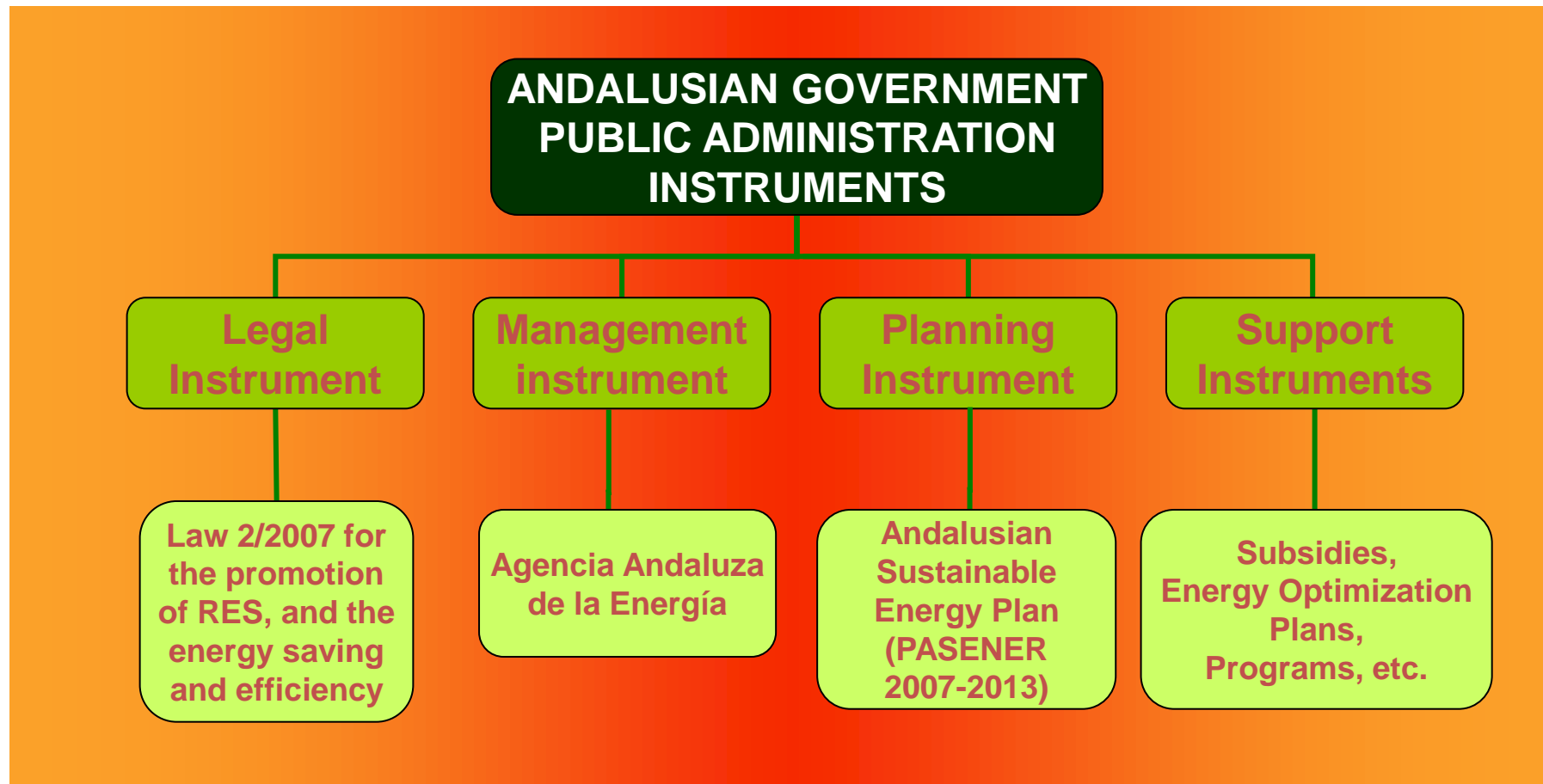
Andalusia advances towards a **more sustainable and quality based energy system**, in which the use of **autochthonous resources** linked to the use of more **efficient technologies** turn into their cornerstones.

Andalusia has a very **high potential of renewable resources** due to its geographical situation, climatology and morphology.

The use of renewable energies has **tripled in the last 10 years** and currently contribute up to **19,3%** (2012) of the total energy consumed. **CO₂ emissions** per electrical unit have been reduced by **15,3%** since 2006.

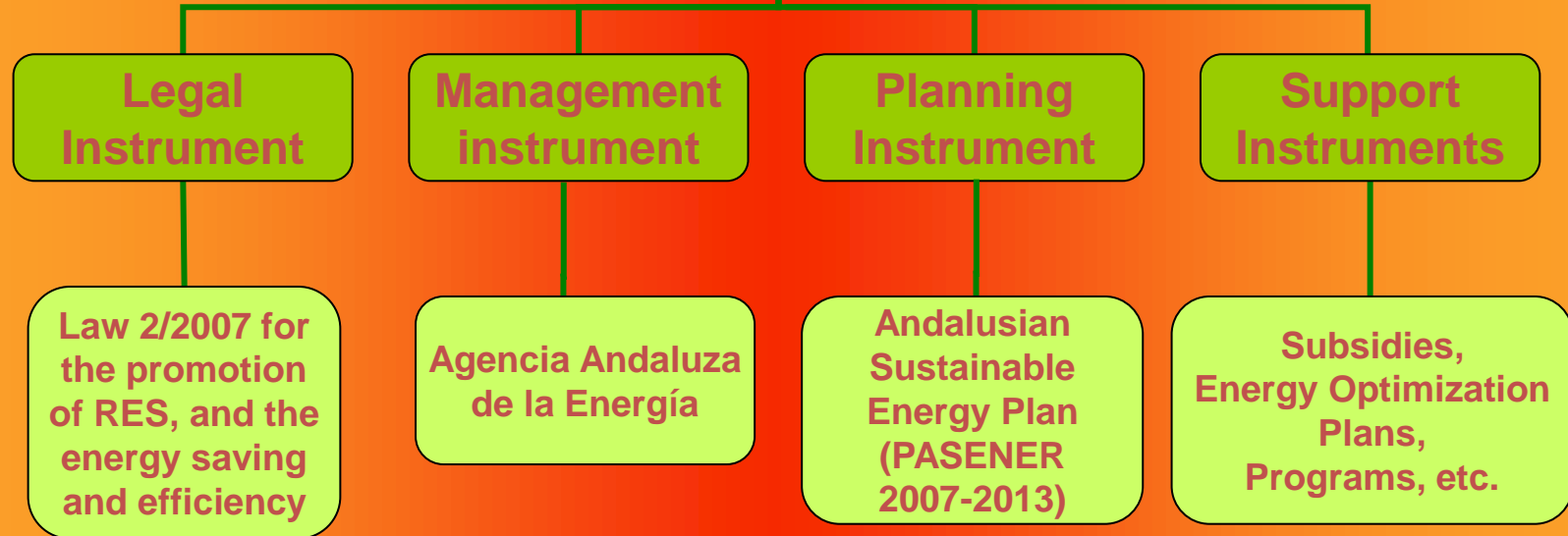


PUBLIC ADMINISTRATION TOOLS



PUBLIC ADMINISTRATION TOOLS

ANDALUSIAN GOVERNMENT PUBLIC ADMINISTRATION INSTRUMENTS



BASIC PRINCIPLES:

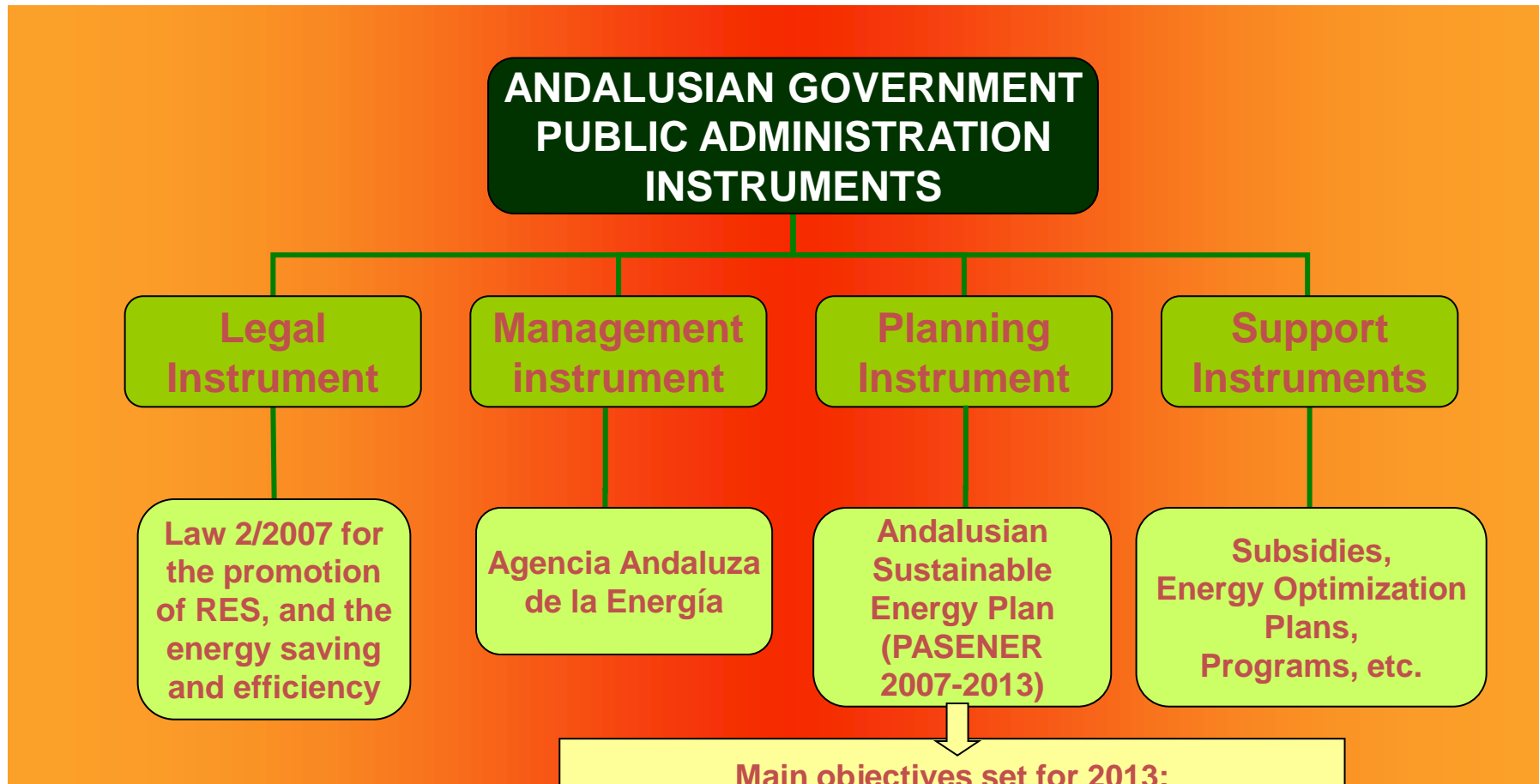
- Primacy of RES amongst other primary energies
- Promotion of more sustainable practices that allow energy saving and efficiency
- Collective solidarity in the use of energy

IMPLEMENTATION OF BUILDING ENERGY CERTIFICATE

IA Y EMPLEO



PUBLIC ADMINISTRATION TOOLS



Main objectives set for 2013:

- 18.3% proportion of RES over primary energy consumption.
- 8% primary energy savings regarding 2006.
- 1% reduction in energy intensity regarding 2006

REDEJA. REGIONAL GOVERNMENT ENERGY NETWORK

A tool to push within the Andalusian administration principles of energy saving and diversification in their buildings.

72 public facilities have signed accession agreements, integrating 11 Regional Ministries and 61 public entities.

The rationale that led the government to strongly promote the creation of this network was the **high potential energy and cost savings** that could be obtained from various public facilities through a **specific, coordinated and effective management of the Andalusian energy bill**.



ANDALUSIAN GOVERNMENT ENERGY FINANCIAL TOOLS



GRANTS PROGRAM

for the sustainable energy development of Andalusia.

Programme aimed at subsidising additional investments that allow improving energy consumption and generation in any activity sector (except primary agriculture).

2008-2012 Grants Program

To **60.175 projects**

Total budget of **185 M€**

Private investment of **more than 1.500 M€.**

REVOLVING FUNDS

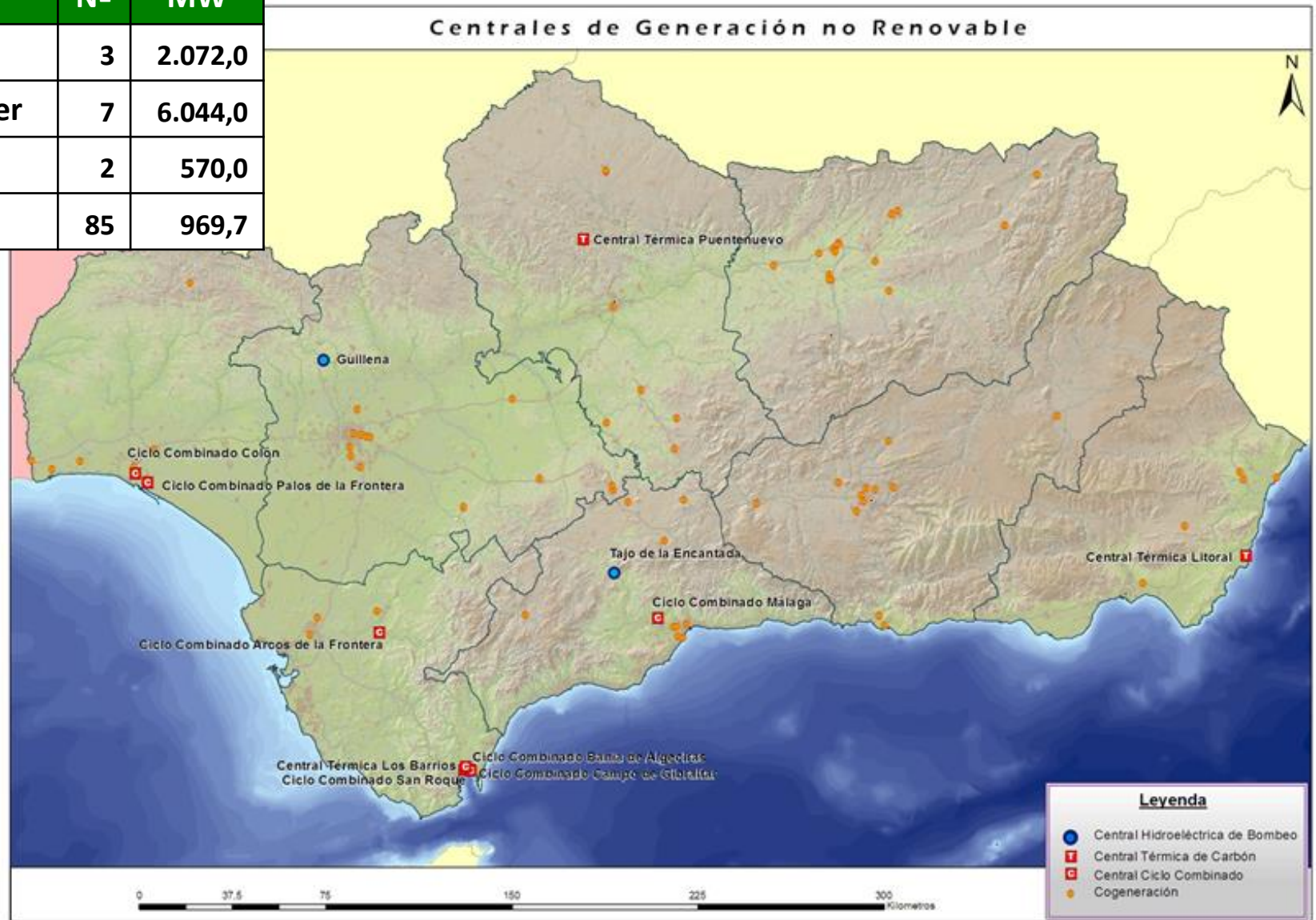
for promoting renewable energy and energy efficiency.

Programme aimed at the concession of ordinary loans, participative loans and granting of guarantees, in market conditions preferably for SMEs.

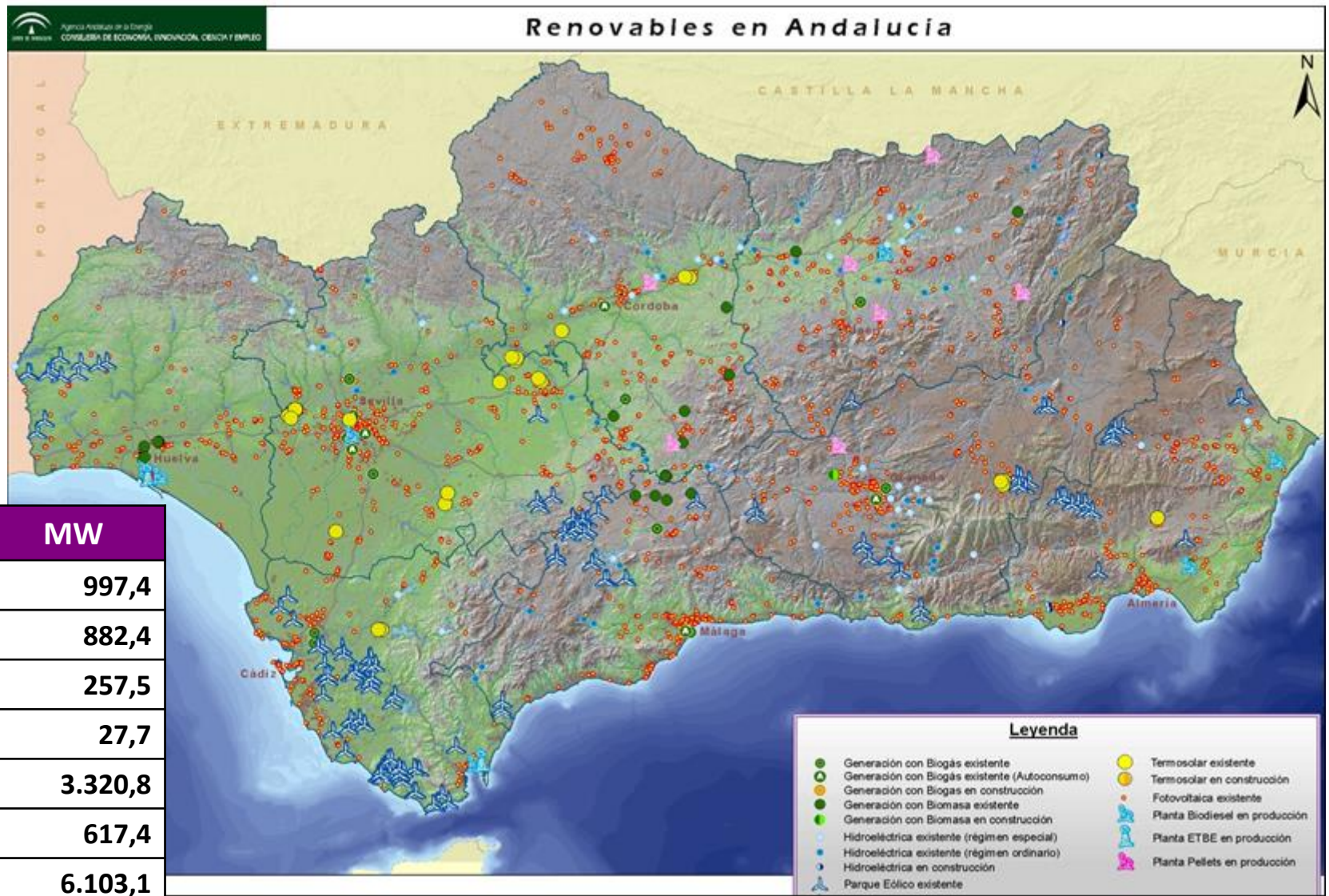


POWER GRID. NON-RENEWABLE POWER PLANTS

Power Plants	Nº	MW
Coal Plants	3	2.072,0
Combined Cycle Power	7	6.044,0
Hydro pump	2	570,0
CHP	85	969,7



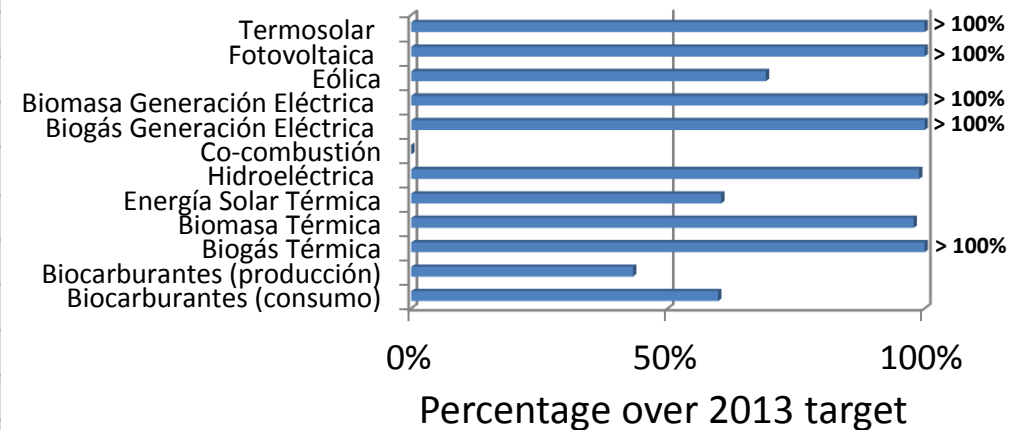
POWER GRID. RENEWABLE POWER PLANTS



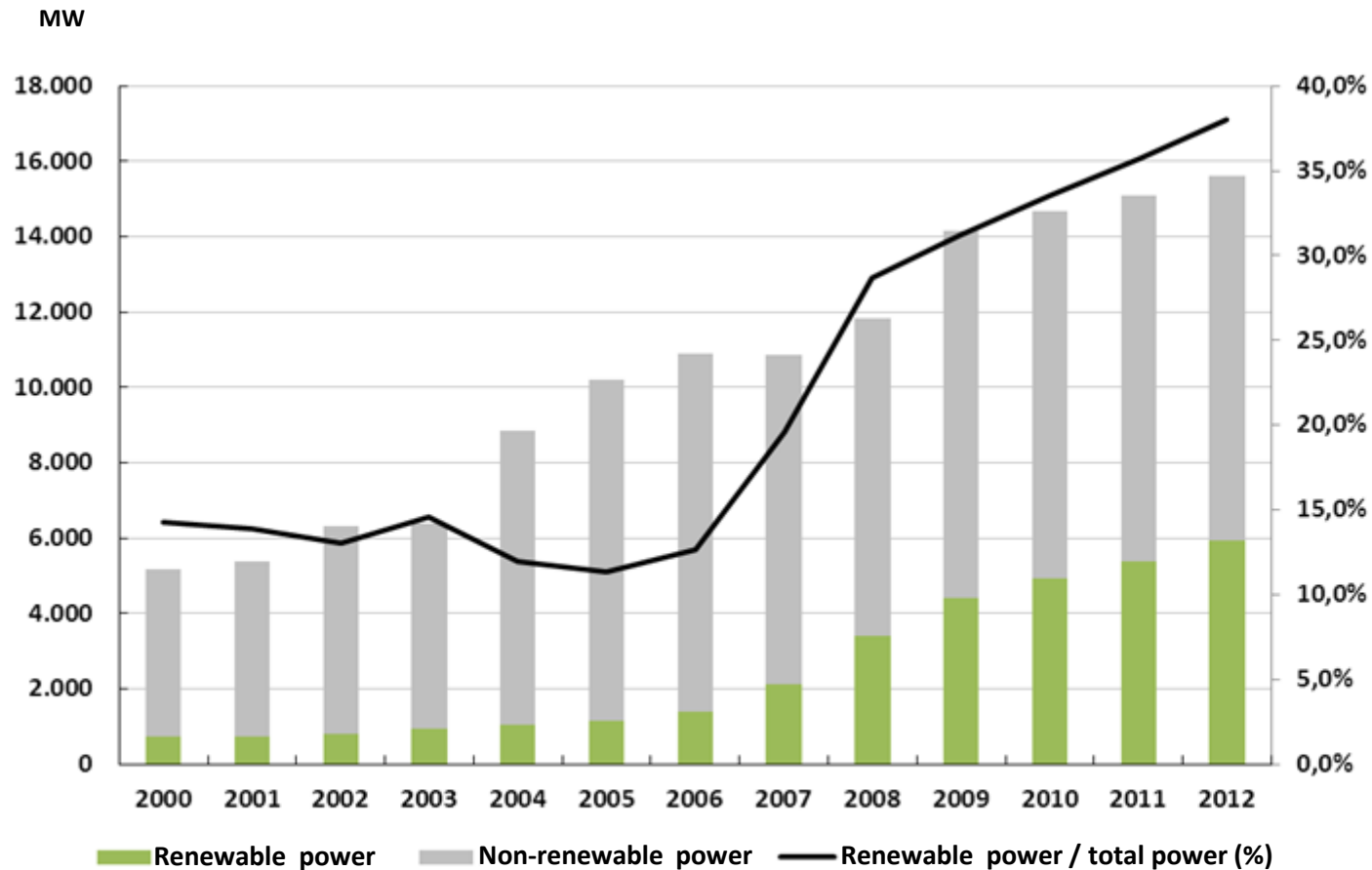
PLANNING RES. POWER TARGETS ACCOMPLISHMENTS

TECHNOLOGY	MAGN.	AS OF 30/09/2013	PASENER Target
Biogas power	MW	27,69	20,10
Biomass power	MW	257,48	256,00
Co-firing	MW	0,00	122,00
Wind	MW	3.320,78	4.800,00
Hydro	MW	617,28	624,00
PV	MW	882,17	400,00
CSP	MW	997,40	800,00
Thermal biogas	Ktep	7,83	3,00
Thermal biomass	Ktep	635,20	649,00
Thermal geothermal	Ktep	0,432	-
Low-temperature solar thermal	m ²	840.462	1.341.554
Biofuels, consumption	ktep	364,02	460,00
Biofuels, production capacity	Ktep	836,60	2.300,00

Degree in PASENER targets accomplishment

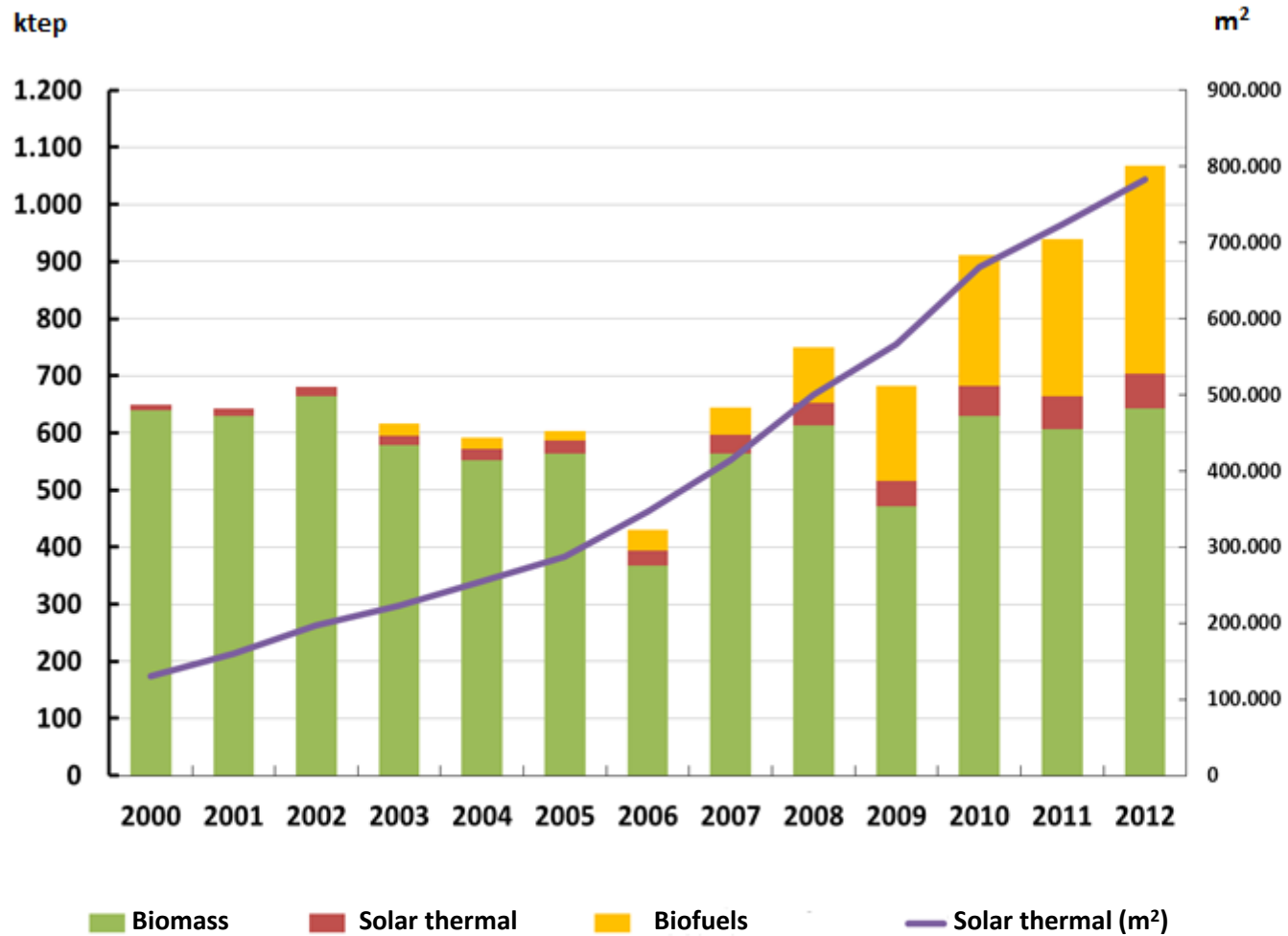


RES PARTICIPATION IN ANDALUSIAN POWER GRID



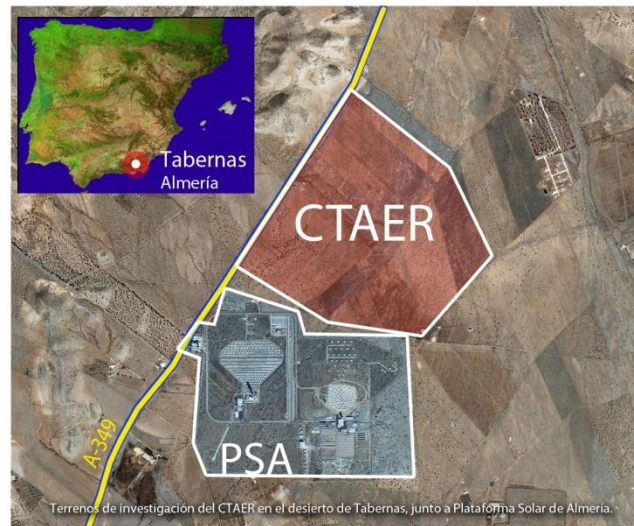
With **6.103 MW**, RES technologies account for a **39,1%** of the total installed power in 2013.

EVOLUTION OF RES THERMAL CONSUMPTION



SOLAR R&D&i IN ANDALUSIA. TEST LABS

Andalusia has been and is a pioneer in the research and development of concentrated solar power technologies (CSP) mainly through research carried out in regional universities and experiences implemented in the **Solar Platform of Almeria (PSA)**, - considered as one of the most important technological research centres in the world.



Andalusia counts on the **Advanced Technological Centre of Renewable Energies (CTAER)**, devoted to the promotion of R&D&i and the technological transference between the companies and institutions related to the sector. The projects of this technological centre are mainly aimed at the improvement of the performance and decrease of technological costs related to renewable resources.

CSP. SOLÚCAR PLATFORM ABENGOA (Sevilla)



Solúcar Solar Platform (Seville)

By Abengoa

180 MW of total power, both tower and parabolic through main R&D center



Exported worldwide



Solana CSP power plant. 280 MW. AZ, USA

*PS10 (10 MW) and PS20 (20MW) tower and heliostat scheme solar thermal power generation.
Below solar thermal power generation with cylinder-parabolic collectors (3 fields of 50MW each)*

CSP. Gemasolar SENER (Sevilla)



17 MW tower-scheme CSP. First commercial-scale plant in the world to work with molten salts as heat transfer fluid. 15 hours autonomy. Non-stop power delivering during 39 days (day & night). 2500 solar-tracking heliostats. Can supply energy for 30.000 households and save more than 50.000 tCO₂

PV. LUCAINENA GRID-CONNECTED (Almería)



*Grid-connected solar PV power plant. 21,5 MW
Can provide energy for 10.000 households and save more than 23.580 tCO₂*

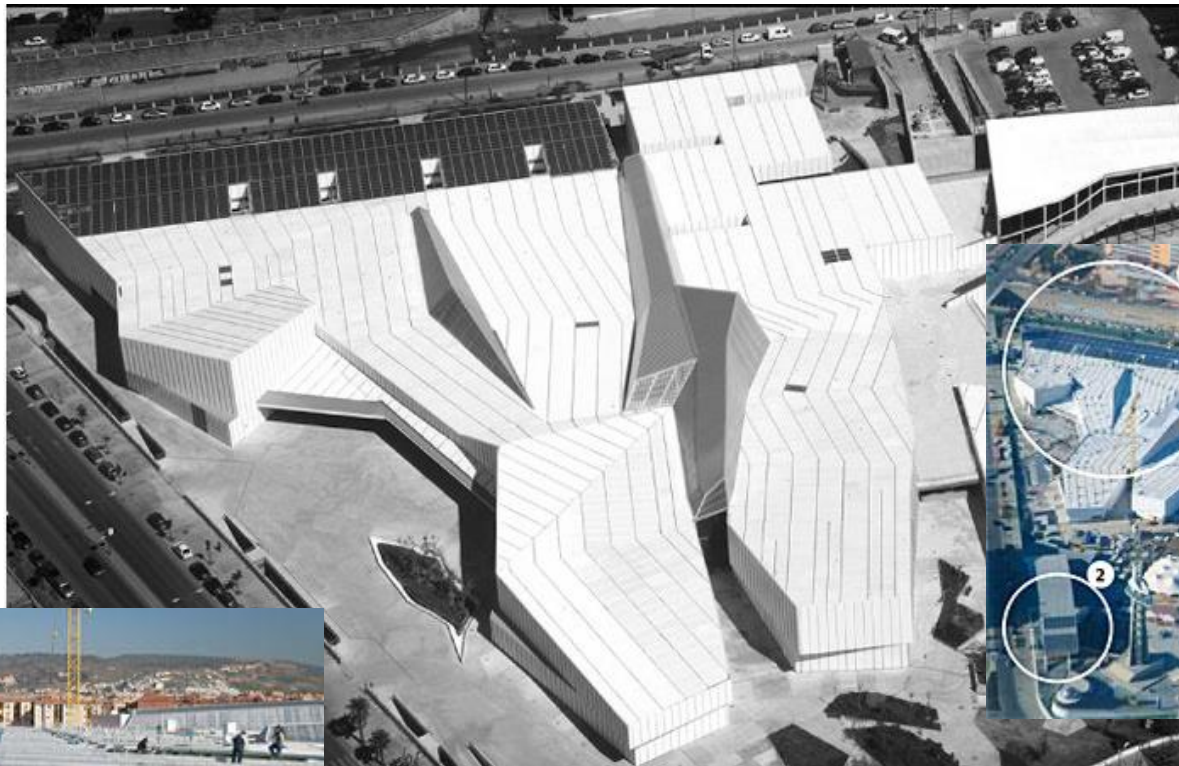
PV. PARK OF SCIENCES (Granada)



15 kW roof-intergrated PV
54 transparent + 72 opaque cell modules
Active surface: **160 m²**
Annual production: **30 MWh**
Provides enough energy for **5 household/y**
Saves **18,3 tCO₂/year**



PV. PARK OF SCIENCES (Granada)



200 kW in **biggest** roof-integrated PV in Andalusia

1.058 solar modules

Active surface: 1.650 m²

Annual production: **287 MWh**

Provides enough energy for **110 household/y**

Saves **260 tCO₂/year**

SOLAR THERMAL. VIRGEN MACARENA HOSPITAL (Sevilla)

*4 wings, 8 storey-buiding, 920 beds
Mean hot water consumption: \approx 50.000 l/day*



*870 m² solar flat-collector thermal field
Heat storage capacity: 60.000 l
Estimated Annual solar contribution : 640 MWh
Solar fraction: 72%*

DOMESTIC SOLAR THERMAL



THE ROAD TO SUCCESS



Business network

Good power network

Energy network for Government building (REDEJA)

Leadership in R+D+I (CTAER, Abengoa, PSA,...)

A pushing legal framework in the past

Building Technical Code (CTE): building specifications

Adequate financial schemes

Synergies between renewable sources



ANDALUSIAN ENERGY STRATEGY 2014-2020

Principles aimed for the design:



Estrategia Energética
ANDALUCÍA 2020

- ✓ **Contribution to an intelligent use of energy.**
- ✓ **Setting energy sector as a main economy engine.**
- ✓ **Guarantee a quality energy supply.**
- ✓ **Acting over energy demand in order for citizens to play a mayor role.**
- ✓ **Optimisation of public administration energy demand.**

