

## USAGE OF SOLAR ENERGY IN SPAIN

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### **ABSTRACT**

*This article deals with conditions for usage of solar energy in Spain. It discusses the current status of legislation in Spain and it analyzes the PER (Renewable Energy Plan). It also focuses on installed power and some most important photovoltaic installations.*

### **1. INTRODUCTION**

Usage of solar energy is an important technology for many reasons. As a solar energy technology, it has numerous environmental benefits. As a domestic source of electricity, it contributes to the nation's energy security. As a relatively young, high-tech industry, it helps to create jobs and strengthen the economy. As it costs increasingly less to produce and use, it becomes more affordable and available. Another very serious reason, why the photovoltaic is used is reduction of CO<sub>2</sub> emissions. At a regional and local context, it is remarkable that other renewable energy sources – for example hydropower and wind power have little room for expansion.

Spain is in the second place in Europe in installed photovoltaic power. Mostly the grid connected installations are used - individual installations on a house, installation on the ground with low concentration or with high concentration. Widespread stand-alone installations, such as isolated houses, lighthouses, SOS poles, agricultural applications, telecommunication repetition, etc. are minor contributors of energy productions, but sometimes are the only way of electrification.

### **2. GLOBAL SITUATION IN SPAIN, LEGISLATIVE, NATURE AND OTHER CONDITIONS**

#### **2.1. Current legislative situation**

Industry law 21/1992, of July 16 1992, qualifies the electric energy generation as industrial activity. Law 9/2002 of 30 December 2002, town-planning and rural protection, with modifications resulting from the Law 15/2004 of 29 December 2004, does not contemplate the possibility of locating photovoltaic solar installations in rural areas, as this is an industrial activity.

Such limitations, since rustic area is practically anyone who is not on urban field or in a urban management plan, is a serious drawback for the development of photovoltaic installations because it would be limited to urban areas or how qualified industrial area.

According to Plan of Renewable Energies of Spain 2005-2010, the current rates for the sale of photovoltaic solar energy will be reviewed with the possibility of removing incentives when installed throughout the State 400Mw. Therefore, the longer it takes to come into the sector is the greatest risk of dropping out of him.

#### **2.2. Outlook for the legislation**

There is a series of events that allow us to ensure prompt modification of the legal framework in order to allow photovoltaic installations connected to the grid outside area exclusively qualified as industrial, especially in rustic terrain. The rustic area is virtually all that is not included in urban terrain or in an urban management plan.

The high value of urban terrain makes impossible solar fields constructions, as they can achieve higher economic returns to other uses.

Some electrical distributors are trying to complicate the installation of solar plants, requesting a prior study of environmental impacts associated with the installation of the panels.

### 2.3. *Nature conditions*

Spain has actually the best conditions for usage of solar energy in Europe. The northernmost regions – such as Galicia have similar conditions to Czech Republic. The southern regions are more friendly and have about 80% more solar energy then central Europe. Situation is demonstrated on Fig. 1.

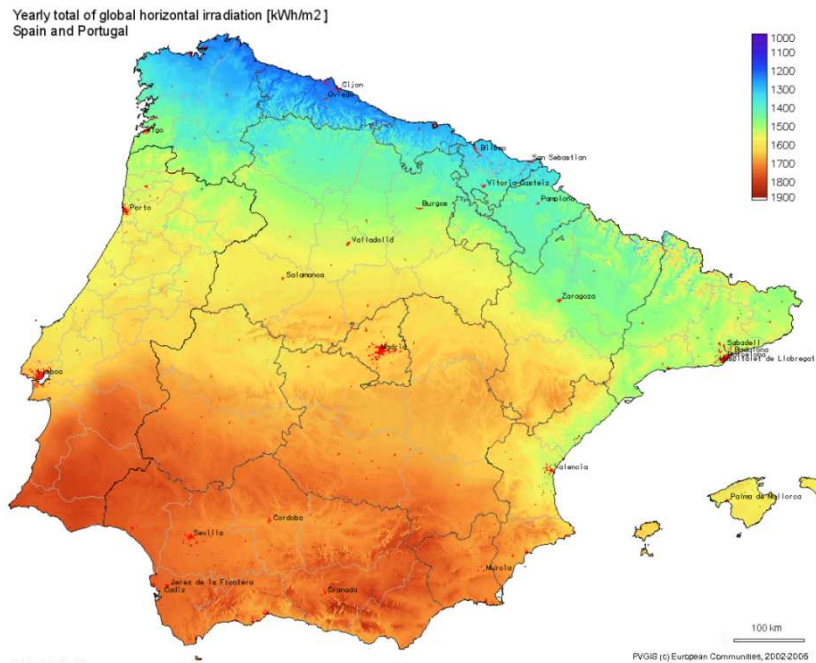


Figure 1 – Solar map of Spain

## 3. SOLAR INSTALLATIONS

The Construction Technical Code makes obligatory to install photovoltaic panels on the roof in next situations – large supermarkets and stores, administrative buildings, hotels, hospitals and clinics. The main target is to reach objectives of the Renewable Energy Plan (PER) 2005-2010.

The main goals of the PER are to create 363 MW in period 2005-2010 to reach total installed power in 2010 as high as 400 MW.

The evolution of real accumulated power during last years over passed the original PER objectives. Because of this situation, new target of 1200 MW to 31.12.2010 was established.

Real situation of this progress demonstrates Fig. 2.

One of the most important solar installations in Spain is Photovoltaic Installation in Monte Alto – Milagro in Navarra. This installation is the most productive photovoltaic installation in the world. Total installed power is 9,5 MWp and estimated annual production 14.000 MWh/year. Power station consists from 858 tracking solar structures with monocrystalline silicon panels with total surface 510.000 m². Installation was started up 17.3.2007 and has 753 owners.

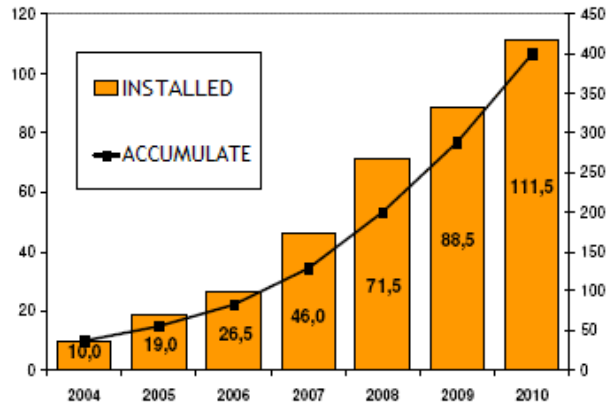


Figure 2 – PER objectives

Photovoltaic Installation Castejón with total installed power 2,64 MWp and annual production 4.400 MWh/year uses 400 tracking structures. Photovoltaic installation Socuéllamos in Castilla-La Mancha with installed power 2,6 MWp and annual production 4.300 MWh/year uses 395 tracking structures. Also other large installation uses various types of tracking systems, what is big difference to Czech Republic.

#### 4. CONCLUSIONS

The solar energy is one of the renewable energies that have experienced a greater development in the last years. Due to the geographical privileged situation of Spain, there are many projects designed to increase the energy contribution of photovoltaic. Today is Spain the second largest in installed power in Europe, right behind Germany. The Renewable Energy Plan targets raised from 400 MW of installed capacity in 2010 to 1200 MW.

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