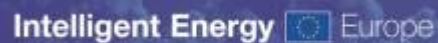


Project PROSTO
Lisbon 17th March 2010



Solar Ordinance in Murcia (Spain)



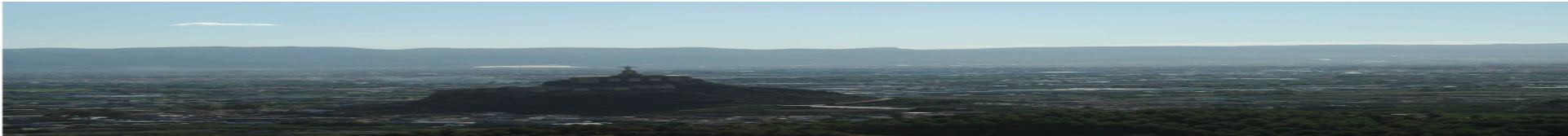


Murcia

Murcia is the **capital** city of the Autonomous Community of the Region of Murcia, located at the river Segura in south-eastern Spain.

Its **population** is 433,850 (2008) ranking seventh in Spain, and the population of its metropolitan area is 743,326 ranking ninth between the largest metropolitan areas of the country. Since 1995, the mayor has been Miguel Ángel Cámara Botía (PP).





Geography (I)

- Murcia is built nearly in the centre of a low-lying fertile plain known as the huerta (orchard or vineyard) of Murcia, which includes the **valleys** of the Segura and its right-hand tributary, the Guadalentín.
- Despite the **proximity of the sea**, the climate is subject to great variations: the summer heat is severe while frosts are occasionally experienced in the capital during the winter.
- **Precipitation** in Murcia is scarce with less than 200 mm (7.9 inches) registered in the hydrological year October 2004 through September 2005.



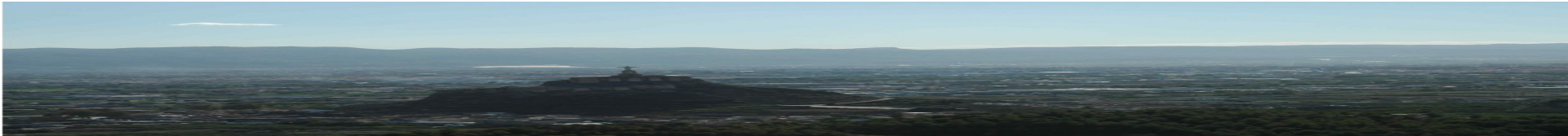


Geography (II)

The city extends approximately **882 square kilometres** (341 sq mi) and is divided from east to west in two parts separated by a series of mountain ranges. These two zones are called Field of Murcia and Orchard of Murcia.

The city is located at **43 m.a.s.l.** in the medium alluvial plain of the Segura river (Vega Media del Segura. It is a river with **Mediterranean pluvial system**, little volume but with strong swellings, like those of 1946, 1948, 1973 or 1989 that flooded the Murcian capital.



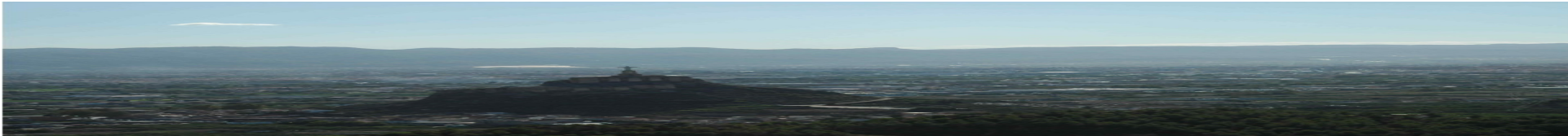


Climate (II)

Given its proximity to the Mediterranean Sea, Murcia enjoys a **Mediterranean climate, of semi-arid type**, with mild winters and warm to hot summers.

It has more than **300 days of sun in the year** with few days of precipitation. The water is considered very good in the region in addition to the great orchard diversity that characterizes the zone. Sometimes it undergoes heavy rainfall where the entire year's precipitation is concentrated into a few days.



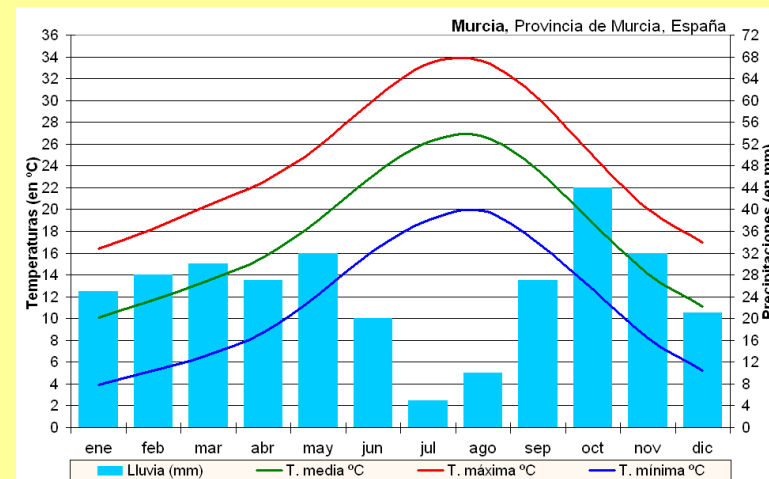


Climate (II)

In **winter**, the average temperature ranges from 16°C during the day to 4°C at night.

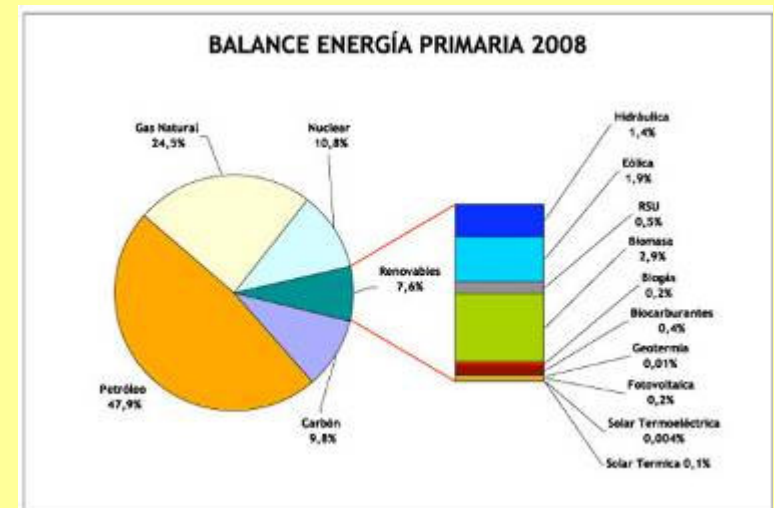
In **summer**, the average temperature ranges from 30°C during the day to 20°C at night.

However, during many summers, the temperature will surpass 35°C. The 20th century record high temperature for Spain was 47.2 °C (117.0 °F) in Murcia on July 4, 1994.



Energy in Spain

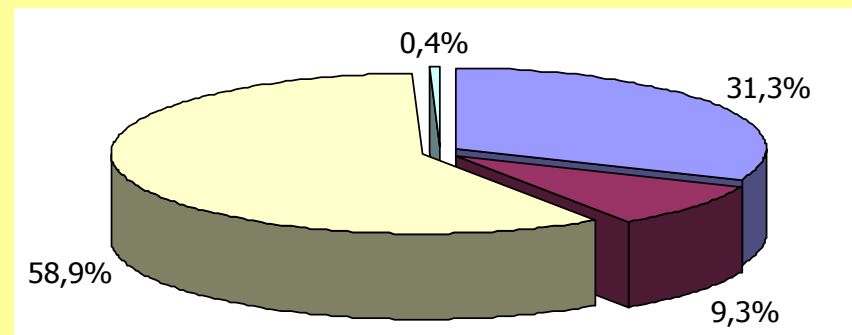
- The eventh highest external **energy dependence** of the UE-27 with a rate of **81.4%**
- EU-27 mean: **53.8%** (according to Eurostat)
- This situation makes national economy very **vulnerable** to the changes of international **prices of gas and oil**.
- Spain is still far from the national and European objectives in the use of biomass, solar thermal and geo-thermal sources for direct energy consumption. This three energy sources together represent **less than 3%** of the total primary energy consumption in Spain.




Energy consumption in Murcia

- The annual consumption per capita of energy in the municipality is 1.200 toe per year and citizen which is 49% under the national level that rounds 2,4 toe per year and citizen. The actual distribution of primary energy consumed is shown in the following graph for the year 2007:

- 58.9% of the energy comes from oil,
- 9.3% comes from natural gas,
- 31% form electricity and
- only 0.4% from renewable sources





Why a solar ordinance in Murcia?

- Implementation of **new legal framework**, Technical Building Code.
- Need of regulation for protection of the **visual impact** on roofs and facades
- Need to face some problems with **large exemption categories**, e.g. buildings in the shade, historical buildings or landscape protected areas with deep studies.
- Need of **monitoring the performance** of the systems and boost the market giving a warranty of the design of the systems
- The philosophy of the administration is that the **responsible** of the project is the technician that designs it (Architect/Engineer). The execution projects are not monitored, only the basic projects.

Technical Building Code

Tabla 3.2 Radiación solar global

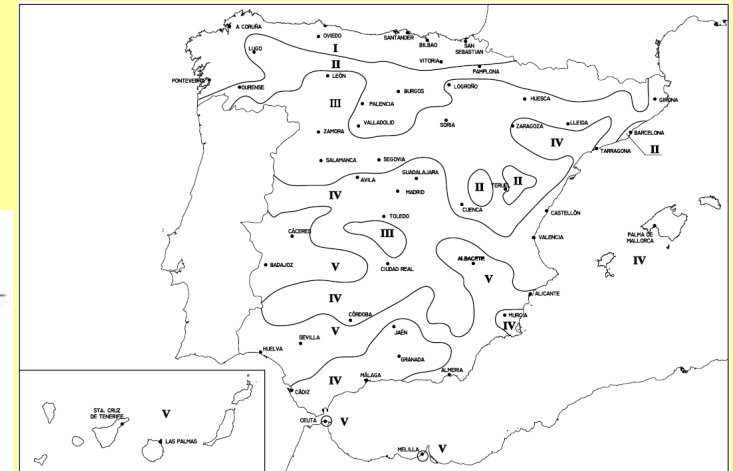
Zona climática	MJ/m ²	kWh/m ²
I	$H < 13,7$	$H < 3,8$
II	$13,7 \leq H < 15,1$	$3,8 \leq H < 4,2$
III	$15,1 \leq H < 16,6$	$4,2 \leq H < 4,6$
IV	$16,6 \leq H < 18,0$	$4,6 \leq H < 5,0$
V	$H \geq 18,0$	$H \geq 5,0$

Tabla 2.1. Contribución solar mínima en %. Caso general

Demanda total de ACS del edificio (l/d)	Zona climática				
	I	II	III	IV	V
50-5.000	30	30	50	60	70
5.000-6.000	30	30	55	65	70
6.000-7.000	30	35	61	70	70
7.000-8.000	30	45	63	70	70
8.000-9.000	30	52	65	70	70
9.000-10.000	30	55	70	70	70
10.000-12.500	30	65	70	70	70
12.500-15.000	30	70	70	70	70
15.000-17.500	35	70	70	70	70
17.500-20.000	45	70	70	70	70
> 20.000	52	70	70	70	70

Tabla 2.2. Contribución solar mínima en %. Caso Efecto Joule

Demanda total de ACS del edificio (l/d)	Zona climática				
	I	II	III	IV	V
50-1.000	50	60	70	70	70
1.000-2.000	50	63	70	70	70
2.000-3.000	50	66	70	70	70
3.000-4.000	51	69	70	70	70
4.000-5.000	58	70	70	70	70
5.000-6.000	62	70	70	70	70
> 6.000	70	70	70	70	70





Legal and economic framework

- Requirements of solar thermal energy in housing developments General Urban Plan for Murcia. Article 9.12
- RITE (Regulations of Thermal Facilities in Building
- National Law (Technical Building Code)
- National Certification System. LIDER, CALENER
- Local ordinances
- Registration of information of the solar thermal facility and before obtaining building license



Stakeholders

NGOs: Asociación Columbares, Asociación de Amigos del Garruchal, Asociación Acción Solar, Asociación Amigos Sierra de Columbares, ACICA – Acción Ciudadana contra el Cambio Climático.

Official associations of professionals: engineers, architects, etc

Official Chamber of Commerce, Industry and Navigation

Universities

Energy suppliers

Regional Savings Bank

Regional Technological centers

Local Youth Council.

Federation of Entrepreneurs of Construction

Association of Entrepreneurs of Renewable Energy

Regional Administration.

Murcia Union of Consumers



Administrative Process

- **Input from** some departments of the City Council, and associations of architects and engineers regarding the definition and legal text of the STO.
- **Initial approval** of the STO by the Plenary of the City Council. (March 11th 2008) Publication in the official diary of the Region de Murcia.
- **Allegations** period (1 month minimum There were no allegations).
- **Definitive approval** of the STO by the Plenary of the City Council (September 29th 2008). Publication of the definitive text in the official diary of the Region de Murcia
- ~~**Come into force** of the STO (October 14th 2008)~~



Fiscal incentives and subsidies

- Local subsidies are available for buildings constructed before the approval of national regulation (2006) that makes compulsory to install solar thermal energy.
- Not available for new buildings, since the National Law for Construction was approved (2006) .
- The financial mechanism is a deduction in the Construction and Facilities Tax (ICIO) of 50% the value of the solar facilities



Flanking measures

- The philosophy of the administration is that the **responsible** of the project is the technician that designs it (Architect/Engineer). The execution projects are not monitored, only the basic projects.
- The creation of a **register of the facilities**, could be interesting in order to have technical data, and monitor the maintenance of the facilities.
- **Training course** for municipal technicians (public servants) about solar thermal systems, design and maintenance
- **Check** of several facilities installed in public buildings to check their performance
- Present situation: national regulation establishes to have a plan of maintenance with an enterprise.

Current situation

- 15 **municipal** buildings/sport centres have a solar thermal system
- Target for next years: all sport facilities to have solar thermal energy
- More than 200 **private-owned buildings** installed solar systems from 2002 to 2009

year	systems installed	Aggregate	Total investment (public+private)	average investment	Subsidy	%
2002	38	38	301.401 €	7.932€	12.495€	4,15%
2003	44	82	501.772 €	11.404€	50.656€	10,10%
2004	23	105	227.837 €	9.906€	40.488€	17,77%
2005	29	134	244.236 €	8.422€	53.083€	21,73%
2006	29	163	357.782 €	12.337€	114.372€	31,97%
2007	16	179	233.429 €	14.589€	25.360€	10,86%
2008	18	197	198.152 €	11.008€	30.500€	15,39%
2009	13	210	71.785 €	5.522€	22.621€	31,51%

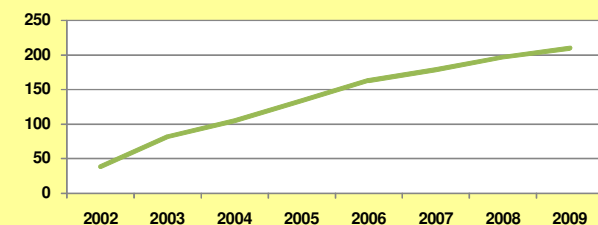


FICHA INSTALACIÓN SOLAR TÉRMICA para edificios de nueva construcción

• entregar una vez construida la instalación, para la obtención de la cédula de habitabilidad

Datos de identificación de la instalación	
Ref. Instalación	
Localización	
Nº Expediente Ayuntamiento:	
Nº Expediente Industria:	
Nombre y apellidos o razón social	
NIF	
Teléfono	
Fax	
Datos constructivos de la instalación	
Superficie total de captadores	
Orientación de los captadores	
Datos energéticos de la instalación	
Número total de viviendas del edificio	
Número de habitantes/ usuarios estimado de la instalación	
Demanda anual ACS (m3)	
Aporte energético solar anual (KWh) para la producción de ACS	
% Aporte solar sobre demanda total de energía para producción de ACS	
Observaciones	

Aggregated solar thermal systems installed in the city of Murcia





Structure of the ordinance

- **Chapter I: General aspects**
 - Art 1: Aim of the ordinance
 - Art 2: Buildings and facilities affected

- **Chapter II: Solar energy for technical uses**
 - Art 3: Affected uses
 - Art 4 Guarantee of compliance of this ordinance (administrative process of license for start the construction)
 - Art 5 Technology (best available, no restrictions)
 - Art 6: Requirement of the systems and legal regulation (CTE HE4, other obligations)



Structure of the ordinance

- Art 7: Landscape protection (visual impact, Artistic buildings, light reflection, pipes)
 - Art 8: Installer companies (legal rules for installer companies)
 - Art 9: Maintenance (the owner/user need to have a contract of maintenance/ measurement devices to check the performance of the solar system)
 - Art 10: Fiscal incentives and subsidies (every year will be published. For buildings not affected by the CTE)
 - Art 11: Monitoring (Register of facilities)
- **Chapter III: Solar energy for electricity production**
 - Art 12: Large energy systems (municipal properties could be rented for installing systems for energy production)



Structure of the ordinance

- **Chapter IV: Legal application and sanctions**
 - Art 13: General issues
 - Art 14: Inspection, requirements (local administration will have power to perform inspections)
 - Art 15: Stop of installing the systems (if it does not fulfill the requirements)
 - Art 16: Penalties (legal regulation for infractions)
 - Art 17: Infractions (minor, major, extreme)
 - Art 18: Sanctions:
 - Minor $<750\text{€}$
 - Major $751\text{€} < X < 1.500\text{€}$
 - Extreme $1.501\text{€} < X < 3.000\text{€}$
 - Art 19: Responsibilities (owner and/or user of the building)



Thanks for your attention
Fernando Sánchez Lara