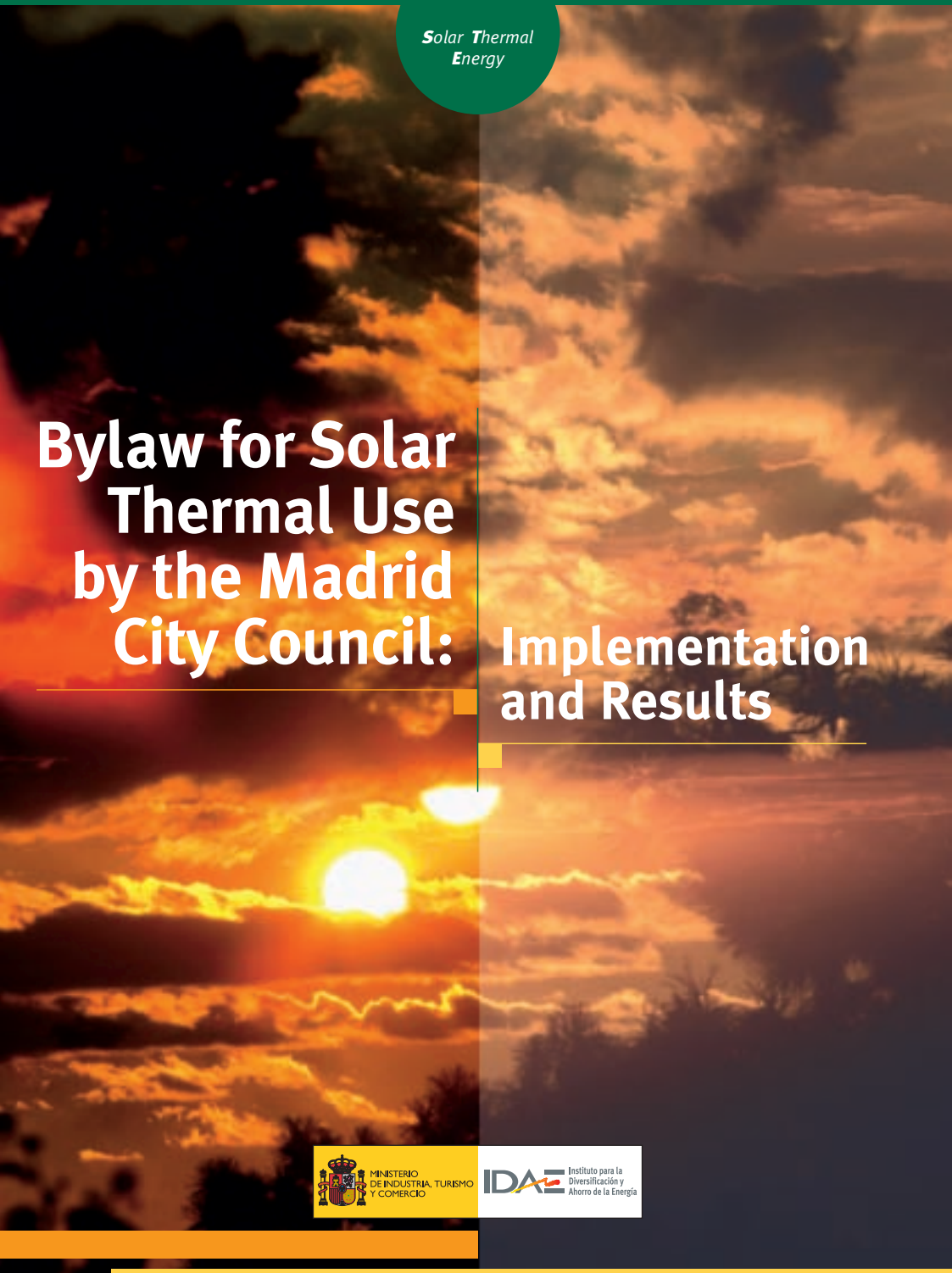
Solar Thermal Energy

Bylaw for Solar Thermal Use by the Madrid City Council: Implementation and Results



MINISTERIO DE INDUSTRIA, TURISMO Y COMERCIO
IDAE Instituto para la Diversificación y Ahorro de la Energía

Madrid solar thermal bylaw aims at regulating the compulsory installation of systems for the collection and use of solar energy at low-temperature to produce sanitary hot water and swimming pool heating in buildings and constructions situated within the municipal area of Madrid to comply with the conditions set forth in this regulation.

This bylaw was approved in plenary meeting of the City Council in open ordinary session on 27th March 2003, and was published in the Official Bulletin of Madrid No. 109 on 9th May 2003. It finally came into force six months after its official publication.

AFFECTED BUILDINGS

The contents of the bylaw on the Capture of Solar Energy for Thermal Uses are to be applied to any use of sanitary hot water and swimming-pool heating.

Buildings of:

- New construction
- Full or partial refurbishment

Indoor swimming pools

+

Uses afected:

- Residential (homes)
- Public service buildings (schools, health centres, hospitals, cultural buildings, etc.)
- Buildings for sports facilities
- Tertiary sector buildings (Hotels, business premises, offices, etc.)
- Industrial buildings
- Any other which implies the use of domestic hot water

Obligation to install solar thermal energy to cover a minimum percentage of the demand for sanitary hot water or swimming-pool heating depending on:

- The building's demand
- The substituted fuel

MINIMUM SOLAR CONTRIBUTION

The demand of the building is assessed by taking the unit values shown on the following table:

Consumption criteria	*Litres DHW/day at 60 °C*	
Houses	30	per person
Block of apartments	22	per person
Hospitals and clinics	55	per bed
Hotels****	70	per bed
Hotels***	55	per bed
Hotels/Hostels**	40	per bed
Camping	40	per space
Hostels/Guest-houses*	35	per bed
Residences (elderly, students, etc)	55	per bed
Communal dressing rooms/showers	15	per service
Schools	3	per student
Barracks	20	per person
Factories and workshops	15	per person
Offices	3	per person
Gymnasiums	20 to 25	per user
Laundries	3 to 5	per kilo of laundry
Restaurants	5 to 10	per meal
Cafeterias	1	per lunch

As for residential use, the number of persons per dwelling is to be calculated using minimum values.

Bedroom numbers	1	2	3	4	5	6	7	≥ 8
People	1,5	3	4	6	7	8	9	As a hostel

Once the building's demand has been obtained, the minimum solar contribution for the solar installation is then to be calculated. This calculation is done depending on the substituted fuel:

Building's total demand (l/d)	% Solar contribution	
	General case	Joule effect
0-1.000	60	70
>1.000	75	

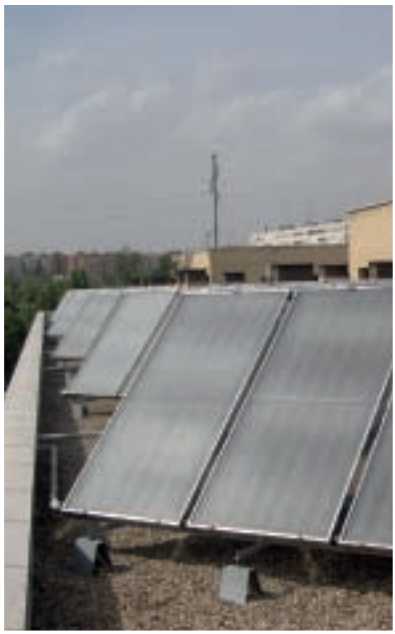
BALANCE OF APPLICATION

Since the approval of the solar bylaw on 10th November 2003 and up to December 2005, 424 municipal permits have been processed for new or renovated buildings, and for which the installation of a solar thermal energy system was compulsory.

The area to be installed amounts to 28,197 m² and 89% of the said permits has been processed for buildings in the residential sector, equalling 25,177 m².

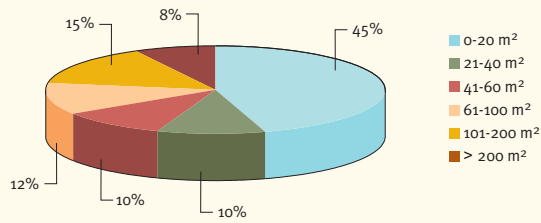
Type	m²	%
Residential	25,177	89
Industrial	800	3
Hotels and Residences	698	2
Offices	289	1
Educational Centres	11	<1
Others	1,222	4
TOTAL	28,197	100

Source: Town council of Madrid



The size of installations is somehow small, since 45% of the approved permits are meant for installations under 20 m². These installations are made in houses, offices or small industrial facilities that behave as offices for sanitary hot water purposes.

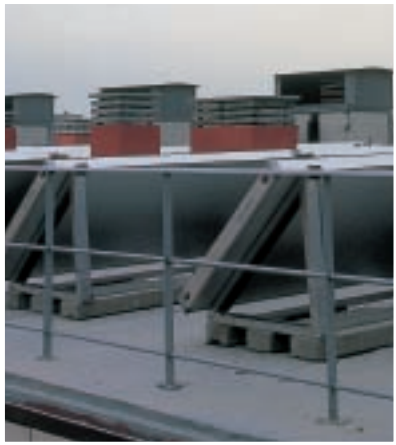
Distribution of building permits according to the installations size



Source: Town council of Madrid

At the other end of the scale, installations over 100 m² make up 23% of the permits, whereas the installations over 200 m² add up to 8%.

Outside the residential area, stand out a large installation of 400 m² to be done in Madrid's central distribution market and another one in a 655 m² shopping centre.



Installations that have to be made as a result of the bylaw requirement are under execution or will be done in the following 12 months.

RELEVANT DATA

- The bylaw has been well received by all the involved actors (developers, architects, engineers, municipal experts).
- The Madrid solar bylaw was published in accordance with the requirements of the Technical Building Code and therefore does not need to be updated.
- The exemptions level is practically zero, given that most of the buildings under way are new construction ones in new urban development areas.
- Projects with an area of 28,197 m² solar thermal energy installations have been submitted in 26 months. These installations will produce an annual average of 19,700 MWh, an estimated annual economic saving of € 1,834,300 and a reduction of CO^2 6,900 toe.
- The greater proportion of installations will be made in the residential sector (homes), which involves a direct financial saving for people, and an educational effect on the use of renewable sources.
- Madrid's approval of the Solar Bylaw has meant that at least 12 other municipalities in the Region have approved solar bylaws in the last 3 years.
- More information
  http://www.erec-renewables.org/projects/proj_K4_RES-H_homepage.htm

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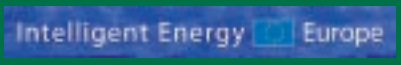

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