

The national Spanish solar obligation (CTE)

With the approval of the Technical Buildings Code (CTE, Código Técnico de la Edificación) in 2006, Spain became one of the countries with the most advanced solar legislation in the world. The municipal solar obligations remain in force as long as they have stronger requirements than the CTE.

The CTE has been the most significant reform of the Spanish building sector for decades, covering security of the buildings structure, fire safety, other safety and health issues, sustainability and energy efficiency of the buildings. The latter part goes far beyond the minimal level of implementation of the EC Directive on the Energy Performance of Buildings and includes an obligation to cover 30-70% of the Domestic Hot Water (DHW) demand with solar thermal energy.

The first buildings subject to the CTE have been authorised in late 2006 and will therefore not be finished before 2008. No post-hoc data on its implementation are therefore available.

Based on different scenarios on the development of the construction market, the Spanish government expects between 1050 and 1750 MW_{th} new solar capacity to become operative until 2010, leading to yearly savings between up to 165.000 of tons oil equivalent.

Main clauses of the CTE

The solar thermal part of the CTE applies to any kind of new buildings, independent of their use, and to those undergoing a renovation. Exceptions are foreseen in the case of buildings that satisfy their DHW demand by other renewables or by cogeneration, meaning that also in this case the “solar obligation” is in reality a renewable heat obligation. Other exceptions are buildings with insufficient access to the sun, or under specific historic-artistic protection. In these cases, the reduced or absent solar contribution must be compensated by other measures leading to the same result, like energy efficiency or other renewables.

The required solar fraction of the domestic hot water demand varies from 30-70%, depending on following parameters:

- 1) The assumed volume of DHW demand: the larger the consumption, the higher the required solar fraction. This is due to the fact that solar systems are more effective if the heat load (i.e. the consumption) is higher. The CTE defines typical consumption as the Madrid regulation (see table above):
- 2) The kind of back-up energy: in case of electricity, the required solar fraction is higher than in case of gas or oil back up.

- 3) The level of solar radiation available. The CTE divides Spain in five climatic zones and allocates each province, or in some cases smaller territorial units, to one of these zones.

Having determined the required solar contribution, the CTE contains prescriptions on the method to calculate the system performance and on the required maintenance procedures.

The CTE defines a number of technical requirements on the components, design and installation of the solar thermal system, including sections on the solar collector and its components, the working fluid, the storage systems, the hydraulic circuit, the controllers and the conventional auxiliary system.

These technical requirements cover dozens of pages and can not be discussed in detail here. This high level of detail originates from the wish of the government to assure the quality and the proper working of the solar systems and to reduce the possibility of different interpretations, thus creating more legal clarity. The CTE also contains detailed prescriptions on the regular inspection and maintenance operations to be carried out by trained personnel.

Discussion on the prescriptive approach

Looking at the CTE, several experts from the solar thermal sector expressed doubts whether this approach based on detailed prescriptions is suitable. It is argued that a result-oriented approach would be more desirable: instead of prescribing a number of technical solutions, it might be more useful to foresee checks on the effective performance of the solar thermal systems and foresee sanctions, like an obligation to improve them, if the a significant under-performance is ascertained.

Some of the general arguments against the risk of over-prescriptive regulations are :

- The transaction costs implied by the need of justifying special solutions may discourage solar companies from trying to find optimal tailored solutions and lead to the use of sub-optimal solutions explicitly approved by the CTE.
- Some solutions may be valid in general, but sub-optimal or even not applicable in specific situations.
- The prescriptions risk to be discriminatory against certain kind of solar components, technologies or designs, particularly in the case of niche-solutions that easily tend to be neglected while defining general rules
- Development of new technologies or system design may be hampered
- The prescriptive approach may deflect attention from the effective purpose of the quality assurance measures: to guarantee that the solar systems installed produce the expected amount of energy for a long time.

Unclear sanctioning regime

However, these prescriptions do not include clear rules about the monitoring of their implementations by public bodies and about the sanctions to be applied if the system is not delivering the expected energy.



The responsibility to monitor the implementation of the CTE and sanction the non compliant constructors is delegated to the regional authorities, which might not have the human resources and/or the political will to follow up closely this matter. Currently, there is not yet any experience with this stage of the implementation of the CTE, since the first buildings subject to the CTE have been authorised in October 2006 and have therefore not yet been finished. However, the Spanish solar thermal industry believes that this could become a serious limit to the application of the CTE.