

SPAIN

Asociación Española de Normalización (UNE)

Solar-thermal deployment supported by standards

Overview

Commercial concentrating solar-thermal power plants were first developed in the 1980s. Since then, significant technological improvements have been demonstrated, which have made solar plants more efficient in terms of cost and performance. Systematic development of three technologies – troughs, towers and dishes – has led to their ever-increasing ability to concentrate and harness solar energy for electricity production. These advances have enabled large-scale deployment of solar-thermal electric (STE) plants because of their competitiveness, compared to other renewable energy sources, in terms of predictability and reliability of production, power quality, dispatchability, grid stability, and so forth.

Identifying a gap in the standardization aimed at solar-thermal products, the industry recommended developing a series of standards that would define terminology and procedures based on the experience gained during the last decades. Conveniently, in Spain, the industry's main stakeholders were also experts on the national technical committee in charge of solar-thermal standards and could ensure continuous feedback and prioritization where needed.

The first item on the agenda was UNE 206009:2013, *Solar thermal electric plants. Terminology*, which constitutes the terminological base for the solar-thermal industry, to be used in all thermal electric standards. It ensures a common understanding of terms and definitions across the entire sector. Similarly, UNE 206013:2017, *Solar thermal electric plants. Procedure for the generation of solar radiation percentiles years*, which sets out a procedure for elaborating a solar year percentile value (ASP Value) for the design of solar energy projects, is valid for any type of STE plant. The standard helps determine the relevant Direct Normal Irradiance, or DNI, for a particular project and its specific location.

UNE 206010:2015, *Tests for the verification of the performance of solar thermal power plants with parabolic trough collector technology*, is a more specific standard. Of the three STE technologies available, priority was given to the parabolic trough collector, which represents the most consolidated technology for production of clean and renewable energy. The standard provides guidelines for carrying out performance acceptance tests of large parabolic trough solar-thermal

power plants, based on the uncertainty level given in ISO/IEC Guide 98-3 (expression of the uncertainty in measurement). The key features analysed in the standard are availability of solar energy, power consumption, net power generation, non-solar energy supply (backup), and net plant efficiency. Furthermore, it also provides general guidelines for instrumentation, estimation of plant performance parameters and reporting of results. This standard is applicable not only to new STE plants, but also to other plants where these features must be known.

Outcomes and benefits

In Spain, the standardization activities for solar power are advanced. The STE industry is committed to improving technologies that focus on plant efficiency and reducing deployment and operating costs. At the same time, research into new technologies going forward seeks to make solar more competitive and cost-effective for power production. Standards have a key role to play in achieving this goal, and those developed by UNE have already become a reference for improving the quality of current STE plants, as well as ensuring the highest quality of future plants.

The solar power industry relies heavily on standardization to develop normative documents that address both general aspects common to all technologies and specific aspects of each. On the international scene, UNE's work is taken up by the International Electrotechnical Commission (IEC), of which Spain holds the secretariat, to develop International Standards for systems of STE plants and their components. These have also referred to technical aspects standardized by ISO.

The UNE standards will also support the Spanish Integrated Plan for Energy and Climate (PNIEC), which envisions the implementation of 5 GWe of new STE plants over the period 2021-2030. Such large-scale deployment of STE plants should go a long way to reducing CO₂ emissions worldwide.

Partners involved

The standards work was promoted by the Spanish Standardization Committee on Solar Thermal Electric Plants (Comité Técnico de Normalización Nacional para Energía Solar), whose main contributors are:

- CIEMAT (Centro de Investigaciones Energéticas, Medioambientales y Tecnológicas), a public research body assigned to the Ministry of Science and Innovation. The Plataforma Solar de Almería (Solar Platform of Almería – PSA), which belongs to CIEMAT, is Europe's largest research, development and test centre on solar concentrating technologies.
- The Centro Nacional de Energías Renovables (National Renewable Energies Centre – CENER), an industrial technology centre dedicated to the research, development and promotion of renewable energy in Spain.
- PROTERMOSOLAR, the Spanish Association for the Promotion of the Solar Thermal Industry, which consists of around 50 members representing the sector's entire value chain: developers, constructors, component manufacturers, engineers, consulting firms, research centres, etc.

Timeline

The UNE standards for solar-thermal energy were developed over a five-year period from 2012 to 2017. Based on previous work, UNE 206009, which lays down the terminology for the industry, took only 18 months to complete and was published in July 2013. That same year saw the start of work on UNE 206010 for parabolic trough collectors, which was released 15 months later in April 2015. Last in the series, UNE 206013 (solar radiation percentiles) was published in May 2017.