DEVELOPMENT OF NEW STANDARDS FOR SOLAR THERMAL ELECTRICITY.

Lourdes González Martínez, Eduardo Zarza, Werner Platzer. PSA-Ciemat, Fraunhfer-ISE.
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1. Introduction
2. Standardization hierarchy.
3. Development of national standards for Solar Thermal Electricity plants, in Spain, Germany and the USA
Public Research Body
R&D&+ on energy sources and their impact on environment

Data*
- Personnel: 1320 (including PhD students)
- Operational Budget: 100 M€
- External Income: 38 M€

(*) Referred to 2014

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Ciemat – Territorial Centers

Center for the development of Renewable Energies (CEDER)

Center on Socio-Technical Research (CISOT)

International Center on Environmental Law studies (CIEDA)

Extremadura Center of Advanced Technologies (CETA)
Plataforma Solar de Almería

- Inaugurated in 1981 and founded by several partners: Germany, Austria, Belgium, USA, Greece, Spain, Italy, Switzerland, and Sweden
- Real size test laboratory in Tabernas dessert
- Belongs to Spanish Government

Most complete European installation for testing, investigation and development of CONCENTRATING SOLAR THERMAL TECHNOLOGIES

www.psa.es
1. Introduction: Why do standardization tasks in STE start?

- Global installed Solar Thermal Electricity (STE) plants’ capacity has increased from 0.9 GW to more than 4.4 GW in the last years. In the five years from end-2009 to end-2014, global operating capacity rose by an annual average of 46%.
- So the commercial deployment of Solar Thermal Electricity Plants in this Century has shown a lack of standards for this sector.
In spite there are some relevant standards developed in other technical areas useful in STE as:

- ISO 9459 Thermal Performance of Solar Collectors.
- EN 410 and ISO 9050 Glass in Buildings.
- ISO 9059 Solar energy - Calibration of field pyrheliometers.
2. Standardization Hierarchy.

- Depending on the geographical scope there are:
  
  - NATIONAL STANDARDS.
    - Spain → AENOR
    - France → AFNOR
    - Germany → DIN, DKE
    - USA. → ANSI, ASME
    - China → SAC, CNIS
  
  - EUROPEAN STANDARDS
    - CEN
    - CENELEC
    - ETSI
  
  - INTERNATIONAL STANDARDS.
    - ISO
    - IEC
The main objectives of these agreements are to provide a:

- **Framework** for the optimal use of resources and expertise available for standardization work;
- Mechanism for **information exchange** between international and European Standardization Organizations (ESOs) to increase the transparency of ongoing work at international and European levels.

• The development of new standards for the STE sector at national level must be addressed to one of the official standardization entities in that country (AENOR, AFNOR, etc.) to create a specific standardization technical committee or sub-committee.

• At present, there are four countries with specific technical committees for new standards related to the STE sector: Spain, Germany, China and the USA.
Spain is currently one of the countries devoting more efforts to the development of new standards for the STE sector associated to the 2,3 GWe of STE commercial plants.

This effort is coordinated by AENOR, with the creation of the Subcommittee AEN/CTN 206/SC117 “Thermoelectric Solar Energy Systems” on March 2nd, 2010.

This Subcommittee was included within the Technical Committee AEN/CTN 206 “Electrical Energy Production”
AEN/CTN 206/SC117 WG1

- This group is led by CIEMAT-PSA and the contact person is Eduardo Zarza (eduardo.zarza@psa.es). It is composed of two subgroups.

- Three Spanish standards have been already prepared and issued by AENOR:
  - Standard UNE-206010 “Ensaios para la verificación de las prestaciones de las centrales termosolares con tecnología de captadores cilindroparabólicos” (Tests for verifying the performance of solar thermal power plants with the technology of parabolic troughs) (April 2015).
AEN/CTN 206/SC117 WG2

- This group is led by CENER and the contact person is Marcelino Sánchez (msanchez@cener.com). Its objective is the development of standards for the components of the STE plants and it is composed of eight subgroups:
AEN/CTN 206/SC117  WG3

• This group is led by CIEMAT-PSA and the contact person is Javier León Alonso (Javier.leon@psa.es).

• Its objective is the development of standards for thermal storage system for concentrating solar thermal applications.
The technical committee in Germany DKE 374 "Solarthermische Anlagen zur Stromerzeugung" was implemented by DKE as a mirror committee, reflecting the international standardization of IEC/ TC-117 “Solar thermal electric plants”. The intention is to adopt and use the international standard.

The China National Institute of Standardization (CNIS) present the national recommended standards GB/T 26972-2011 of “Vocabulary of concentrating solar thermal power”.

ASME offers the *Performance Test Codes* (PTC), which provide uniform rules and procedures for the planning, preparation, execution, and reporting of performance test results.

Current standardization efforts for concentrating solar thermal technologies are:

- **PTC-52** “Concentrating Solar Power Plants” (under development at present) (Frederic Constantino (e-mail: constantinof@asme.org))
- **PTC-53** “Mechanical and thermal energy storage”. (Teodor Lazar lazart@asme.org).
4. Development of international standards in IEC.

1. The proposal to develop a new standard must be submitted to IEC/TC117 by any of the national standardization entities collaborating with it (e.g., AENOR, AFNOR...).

2. The proposal is received at IEC/TC117, it is given a reference and distributed for voting to the national standardization entities.

3. The proposal is accepted if at least three national standardization entities give a positive answer. In this case, a Project Team is implemented with all the expert people nominated by the national standardization entities during the voting process.

4. When the content of the new standard has been developed and approved within the project team, a Committee Draft (CD) for voting is being prepared and sent to national committees for a final 3 or 4 months public commenting period.

5. After a positive feedback, a Final Draft of the Standard (FDIS) will be produced and issued for 2 month final voting. If 2/3 majority of P-members voting approve and if less than 25% of all votes submitted are negative, the international standard can be issued for official publication and the end of the process.
Development of international standards for STE plants in IEC.

- The Spanish AENOR Committee launched a proposal to IEC for the establishment of a new IEC Technical Committee devoted to STE plants.
- The request was accepted with 20 countries giving a positive vote, and 9 communicating their interest to participate actively.
- The IEC SMB (Standardization Management Board) approved the creation of the technical committee IEC/TC 117 “Solar Thermal Electric Plants”.

- The kick-off meeting, of this international standardization committee, was held in Madrid (Spain).
- At present, 14 countries are actively participating (P-members): Switzerland, China, Germany, Spain, France, Israel, Italy, Japan, Portugal, Sweden, Russia, Egypt, Morocco and USA, and another 11 countries are observers (O-members).
IEC/TC 117 “Solar Thermal Electric Plants”.

IEC TC 117

- CHAIRMAN: Mr. Werner Platzer (e-mail: werner.platzer@ise.fraunhofer.de)
- SECRETARY: Mr. Eduardo García (e-mail: egarcia@saetayield.com)
- ASSISTANT SECRETARY: Ms. Carmen Martin (e-mail: carmartin@aenor.es)
- TECHNICAL OFFICER: Mr. Charles Jacquemart (e-mail: cj@iec.ch)

PT 62862-1-1
Terminology

PT 62862-1-2
TMY

PT 62862-1-3
TMY

PT 62862-2-1
Storage syst.

PT 62862-3-1
Design STEP

PT 62862-3-2
Syst. and comp.

PT 62862-3-3
Syst. and comp.

PT 62862-5-2
Fresnel coll.

Ms. Lourdes González. Ciemat. Spain

Mr. Ibón Salbidegoitia. Meteo for Energy. Spain

Moroccan delagation??

Chinese proposal.

Ms. Fabienne Sallaberry CENER. Spain


Mr. Piero Pili. Elianto. Italy.
Thanks for your attention.
lourdes.gonzalez@ciemat.es

REFERENCES:
• **STE-STAGE Project Deliverable 5.4: Guidelines for Standardisation on STE.** Eduardo Zarza, Werner Platzer. February 2016.

• **RENEWABLES 2015 GLOBAL STATUS REPORT.** REN21 Renewable energy policy networks for the 21th century.