SOLAR HEATING & COOLING PROGRAMME
INTERNATIONAL ENERGY AGENCY

Final Management Report

Task 57: Solar Standards and Certification

2018-12-04

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1. Task Description

The purpose and objectives of the task are to develop, improve and promote ISO standards on test procedures and requirements for solar thermal products - and to harmonize at international level certification schemes in order to increase in general the level of quality and at the same avoid the need for re-testing and re-inspection.

The main activities in Task 57 are grouped in the following subtasks:

Subtask A: Kick-off of operation of Global Solar Certification Network (GSCN)

Subtask B: Improvement of test procedures – support and input to ISO

Subtask C: Promotion and capacity building with respect to ISO standards and state-of-the-art certification schemes

2. Task Objective

The purpose and objectives of the task are to develop, improve and promote ISO standards on test procedures and requirements for solar thermal products - and to harmonize at international level certification schemes in order to increase in general the level of quality and at the same avoid the need for re-testing and re-inspection.

3. Task Scope

The task deals with standards and certification for solar thermal products i.e. solar heating and cooling systems, solar collectors and other components.

4. Task Subtasks

Subtask A: Kick-off of operation of Global Solar Certification Network (GSCN)

Lead Country: Germany

Subtask Leader: Harald Drück, Institut für Gebäudeenergetik, Thermotechnik und Energiespeicherung, IGTE (former ITW)

Objective: Support to the implementation/operation of the Global Solar Certification Network

Subtask B: Improvement of test procedures – support and input to ISO

Lead Country: China

Subtask Leader: He Zinian, Beijing Solar Energy Research Institute, BSERI

Objective: Develop specific proposals for new and improved test procedures and feed into ISO/TC 180.

Subtask C: Promotion and capacity building with respect to ISO standards and state-of-the-art certification schemes

Lead Country/Sponsor: Regional Center for Renewable Energy and Energy Efficiency (RCREEE)

Subtask Leader: Ashraf Kraidy, RCREEE

Objective: The ISO standards for solar thermal products are becoming increasing popular throughout the globe; but still some countries stick to old national standards or even make new national standards. Subtask C will work to convince stakeholders in such countries that the ISO standards are very well proven and useful – and give guidance for implementation.

5. Task Duration

The Task started in January 2016 and completed in December 2018.

6. Country Participation

Country/Sponsor	National Participation Letter (Y/N)	Number of Research Institutes	Number of Universities	Number of Companies	Number of other institutions
Australia	Y			2	
Austria	Y			1	
China	Y	2	1	1	3
Denmark	Y			1	
France	Y			1	
Germany	Y	1	1		
RCREEE	Y				2
Portugal	Y	1			
Spain	Y		2		
Switzerland	Y	1			
TOTAL		**5**	**4**	**6**	**5**

Person months per country

Country/Sponsor	Years	Months per Year	Total
Australia	3	1	3
Austria	2	1	2
China	3	10	30
Denmark	3	3	9
France	2	2	4
Germany	3	2.875	8.625
RCREEE (incl. CDER (DZ))	3	3	9
Portugal	2	1	2
Spain	3	2	6
Switzerland	1	1	1
TOTAL PERSON MONTHS			**75**
TOTAL PERSON YEARS			**6.2**

7. Collaboration with other SHC Tasks and IEA Programmes Outside Organizations/Institutions

Cooperation with Task 55 (Large systems) on draft standard for checking collector field performance.

8. Collaboration with Industry

The task collaborated with industry through:

- The Global Solar Certification Network
- ESTIF
- ISO/TC 180
- CEN/TC 312
- Solar Keymark Network

9. Task Meetings

No Task Definition Workshops were held. The task was follow-up to Task 43, so the task preparations were done in the end of Task 43.

Over the entire term (3 years) of the Task a total of 6 Expert meetings were held.

Meeting #	Date	Location	Number of Participants & Countries/Sponsors
1	2016-03-11	Berlin	17 (10)
2	2016-11-24	Cairo	20 (9)
3	2017-03-08	Freiburg	17 (13)
4	2017-10-29	Abu Dhabi	16 (11)
5	2018-03-08	Madrid	16 (9)
6	2018-09-10	Switzerland	12 (7)

At every second meeting there was organized a GSCN plenary meeting too.

10. Task Results

The following is a brief summary on the key results of each single work activity within the Subtasks.

Subtask A: Kick-off of operation of Global Solar Certification Network (GSCN)

The concept of the **Global Solar Certification Network (GSCN) is now in operation**. After some hesitation, several certification bodies from different certification schemes – and several of their test labs and inspection bodies are now member of the Network. This means that the industry members now can present test and inspection reports from one certification scheme to a certification body from another certification scheme – and obtain certification here – without new testing and inspection.

The first manufacturer has now (November 2018) gone through the process of using test and inspection reports from Solar Keymark (in Europe) to obtain SRCC certification (in USA).

So - after some delay - **now the GSCN concept is taking off!**

A1: Agendas and meeting reports from GSCN plenary meetings

- 8 GSCN Board meetings organized – reports available from: http://gscn.solar/meetings/network%20meetings.html (to be updated)
- 3 GSCN Plenary meetings organized – reports available from: http://gscn.solar/meetings/network%20meetings.html (to be updated)

A2: Improved GSCN working rules

- GSCN Working Rules improved continuously during the task – latest version available from: http://gscn.solar/documents.html

A3: Acquisition and assessment of new network members

Twenty-one members as per 1st November 2018:

- Six major industry members (China and Europe)
- Three certification bodies (US and Europe)
- Five test labs (US and Europe)
- Two inspection bodies (US and Europe)
- Four supporting members (Europe)

Ten applicants as per 1st November 2018:

- Six certification bodies (US, Canada, China, Australia and Europe)
- Two test labs (China and Europe)
- Two inspection bodies (China)

List of members available from: http://gscn.solar/members/list%20of%20members.html

A4: Give assistance to manufacturers the mutual recognition of test reports and inspection reports

- Ongoing – first manufacturer is in the process of utilizing the GSCN concept

A5: GSCN website and other promotion

- WWW.GSCN.SOLAR
- http://task57.iea-shc.org/

A6: Promotion plan

- Promotion plan (version 5)

Subtask B: Improvement of test procedures – support and input to ISO

In subtask B several proposals for new standards have been developed. One is already put forward to ISO for creation of a work item to establish an ISO standard based on the elaborated draft. Three others are ready for presentation to ISO/TC 180 and next ISO meeting.

B1: Reports on accelerated ageing test of flat plate collectors and evacuated tubular collectors

- Report on “Accelerated ageing test of evacuated tube collectors”

Concerning accelerated testing of flat plate collectors Fraunhofer ISE gave status reports on the task meetings from the national projects “Speedcoll” and “SpeedColl2”, see:

- http://www.speedcoll.de/en/home.html
- https://www.speedcoll2.de/en.html.

Work between Fraunhofer ISE (DE) and CABR (CN) was coordinated during three sub-meetings on the issue.

B2: Draft proposal for test procedures for structural testing of collector and supporting structures

- Test methods for mechanical load on support of close-coupled solar water heating systems This is a final draft which may be proposed to ISO/TC 180

B3: Recommendations related to test procedures for building envelope integrated collectors and systems

- Test methods and requirements for building integrated collectors and systems. This is a final draft which may be proposed to ISO/TC 180

B4: Recommendations related to test procedures for e.g. system reliability and safety; new systems types / other applications

- Test methods for close-coupled solar water heating systems - Reliability and safety. This is a final draft which may be proposed to ISO/TC 180

B5: Draft definitions for environmental extreme conditions

- Brief survey report on what is going on in IEC/TC and IEA/ PVPS groups on “Extreme conditions”.

B6: Draft proposal for ISO standard on “Performance check of large collectors fields” (extra deliverable)

- Check of solar collector field performance (has been delivered as proposal for new Work Item to ISO/TC 180)

Subtask C: Promotion and capacity building with respect to ISO standards and state-of-the-art certification schemes

Guidelines for the new collector testing standard ISO 9806:2017 and guidelines for implementing a solar certification scheme have been made.

A questionnaire on use of ISO standards in the solar thermal field has been circulated – and the answer analyzed (showing high satisfaction with the major solar thermal standard (9806:2017).

The work in Task 57 has been dissemination though papers, presentations etc..

C1: Guidelines on ISO 9806

A comprehensive guideline for use of the new solar collector testing standard ISO 9806:2017 has been elaborated. The purpose of this guide is to provide guidance about the application and use of the ISO 9806:2017 standard, concerning the testing of solar thermal collectors. It is intended to support the interpretation and application of the standard. The guide has been developed with three different target groups and objectives in mind. - A guide directed to established and new test laboratories for collector testing. The main purpose here is to give a quick introduction to the standard for new laboratories and in general to contribute to a uniform interpretation of the standard and presentation of results. - A guide directed to manufacturers and importers of collectors. Here, the purpose is to give a very light introduction to the standard and to explain how it is used for type testing as well as for innovation and development support. - A guide directed to certification bodies. The intention here is to provide access to easy evaluation of the presented results.

- Guidelines on ISO 9806

C2: Papers and presentations at national and international conferences and workshops and webinars – see section 11.

C3: Update of Task 43 questionnaire with indication of interest in use of international standards

A new questionnaire with indication of interest in use of international standards has been elaborated – and the results analyzed.

- UTILISATION OF ISO9806:2017 IN GLOBAL SOLAR CERTIFICATION

C4: Model certification schemes

To support implementation of certification schemes in countries regions with tradition/experience in certification scheme, an introduction to product certification schemes at a general level has been elaborated. Here guidelines for how to initiate and implement a certification scheme for solar heating and cooling products are given.

- Guideline for Implementing Certification Schemes for Solar Heating and Cooling Products

In the Arab countries a certification scheme (SHAMCI) for solar thermal product is being introduced. SHAMCI is very much inspired by the European certification scheme Solar Keymark, and in the task a comparison between SHAMCI and Solar Keymark has been elaborated.

- Comparison of SHAMCI and Solar Keymark

11. Reports & Publications

Reports, Published Books & Online Tools

Author(s)/ Editor	Title	Report No. AND Publication Date (month, year)	Target Audience	Web or Print AND "RE" if restricted access*
JE Nielsen et al	GSCN Working Rules, improved continuously during the task – latest version available from: http://gscn.solar/documents.html		GSCN members and applicants	Web
Shen Bin	Test methods for mechanical load on support of close-coupled solar water heating systems This is a final draft which may be proposed to ISO/TC 180	09, 2018	Test labs and manufacturers, ISO/TC 180	Web
Zhang Lei, Gu Xiuzhi	Test methods and requirements for building integrated collectors and systems. This is a final draft which may be proposed to ISO/TC 180	09, 2018	Test labs and manufacturers, ISO/TC 180	Web
He zinian	Test methods for close-coupled solar water heating systems - Reliability and safety. This is a final draft which may be proposed to ISO/TC 180	09, 2018	Test labs and manufacturers, ISO/TC 180	Web
He Zinian	Brief survey report on what is going on in IEC/TC and IEA/ PVPS groups on "Extreme conditions".	09, 2018	Test labs and manufacturers, ISO/TC 180	Web
JE Nielsen	Check of solar collector field performance (has been delivered as proposal for new Work Item to ISO/TC 180)	09, 2018	Test labs and manufacturers, ISO/TC 180	Web
Korbinian Kramer	Guidelines on ISO 9806		Test labs and manufacturers, ISO/TC 180	Web
JE Nielsen	Guideline for Implementing Certification Schemes for Solar Heating and Cooling Products	11, 2018	Certification bodies, national authorities, subsidy scheme operators, and manufacturers	Web
Ashraf Kraidy,Lotus Shaheen	Comparison of SHAMCI and Solar Keymark	08, 2017	Test labs and manufacturers	Web

* Restricted: available only to Task participants via internal Task website

Journal Articles, Conference Papers, Press Releases, etc.

Author(s)/Editor	Title	Publication / Conference (name of journal, newsletter, conference, etc.)	Bibliographic Reference (journal number, year, place, editor, etc.)
JE Nielsen / B Epp	Three Global Solar Certification and Standardisation Meetings in Berlin IEA SHC: Mutual Recognition of Test and Inspection Reports Saves Industry Costs	www.solarthermalworld.org	http://www.solarthermalworld.org/keyword/global-solar-certification-network
JE Nielsen / B Epp	Global Solar Certification Network: Facilitating International High-Quality Collector Trade	www.solarthermalworld.org	http://www.solarthermalworld.org/content/global-solar-certification-network-facilitating-international-high-quality-collector-trade
JE Nielsen / B Epp	YouTube interview: Jan Erik Nielsen: Global Solar Certification Network	SHC Conference, Abu Dhabi 2017	https://www.youtube.com/watch?v=zEe8NkeNt0U
JE Nielsen	"IEA SHC Task 57 Solar Standards and Certification", poster	SOLARTR-2016, Istanbul, Turkey, December, 2016	http://solartr.org.tr/
PTB Workshop on certification of solar thermal products in Maghreb region (North Africa)	"Global Solar Certification Network", JE Nielsen	Morocco 7-9 May 2017	-
SHC 2017 Conference,	"Solar Standards and Certification" JE Nielsen, Keynote	Abu Dhabi, November 2017	http://www.shc2017.org/
Asia-Pacific Solar Research Conference	Global Solar Certification Network, JE Nielsen	Melbourne. December 2017	http://apvi.org.au/solar-research-conference/
EuroSun 2018	Global Solar Certification Network (GSCN) and Global Certification of Collectors, Harald Drück	Rapperswil, September 2018	http://www.eurosun2018.org/home.html
Asia Pacific Solar Research Conference	Utilisation of ISO9806:2017 in Global Solar Certification, Parker J. G, Guthrie L.T. and Guthrie K.I. 2018, Asia Pacific Solar Research Conference Sydney December 4-6 2018.		http://apvi.org.au/solar-research-conference/wp-content/uploads/2018/12/179_SHC_Parker_J_2018_PAPER_reviewed.pdf

12. Conferences and Workshops

Task participants presented Task work and results at **9** conferences and workshops over the course of the Task. See Appendix 2 for list of conferences/workshops.

At every Solar Keymark Network meeting, every ISO TC180 meeting and every CEN TC312 meeting, GSCN was promoted and status given.

13. Task Management: Overall Conclusions & Recommendations

From the final task evaluation, we have good satisfaction with the management (OA and subtask leaders).

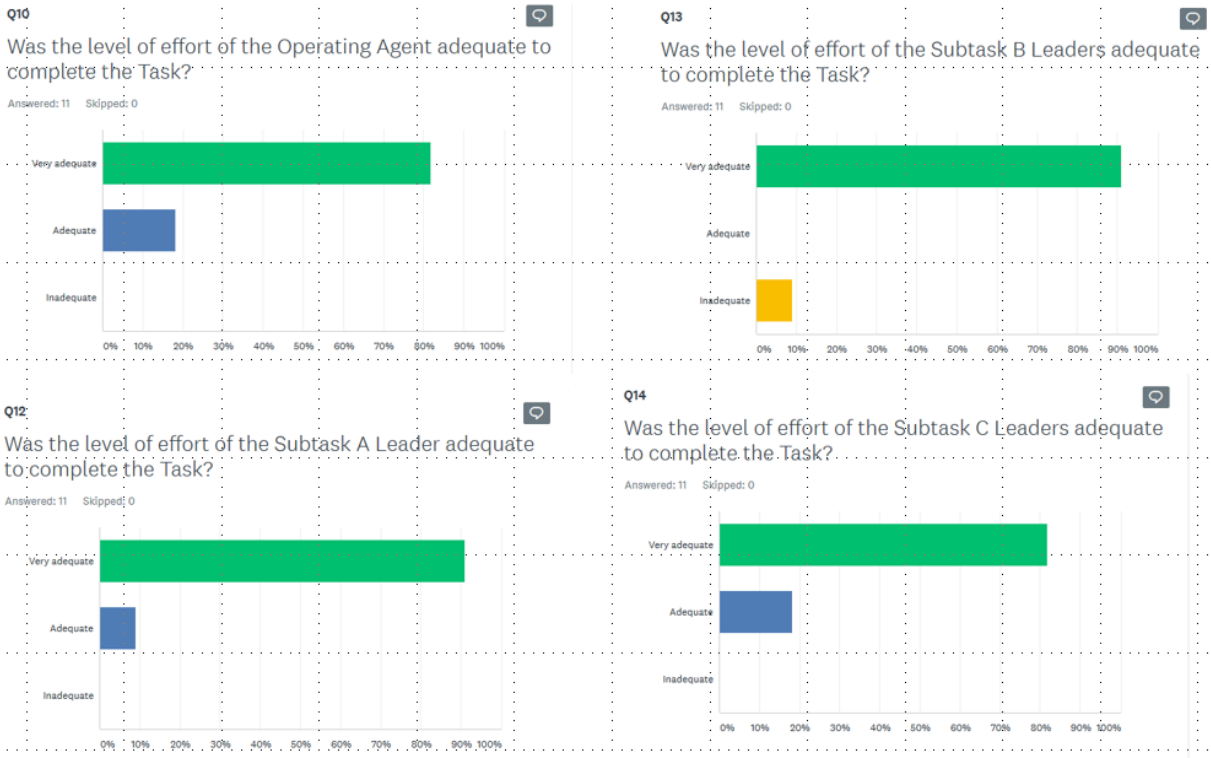

Figure 1. Evaluation of task management.

The task is considered VERY RELEVANT for the industry.

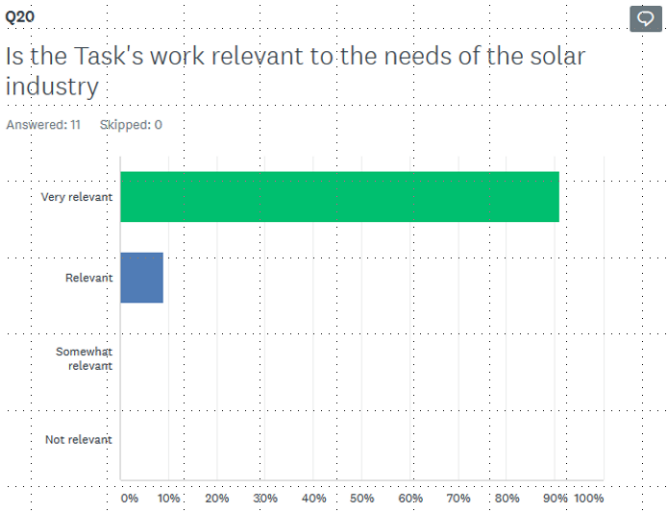

Figure 2. Industry relevance

Although considered very relevant for the industry, stronger involvement of the big industry players and industry associations could be helpful for the work on harmonization of standards and certification schemes.

14. Task Work: Key Accomplishments & Lessons Learned

Key accomplishments

The task managed in the end to kick-off the Global Solar Certification Network, which has potential for saving the industry for a lot of efforts and money in the testing and inspection field. First manufacturer is now (November 2018) in the process of getting certification in a new region, based on test and inspection from his “home certification”.

The task has delivered four proposals for new standards.

A comprehensive guideline on the new collector testing standard has been published.

A guideline on “certifications schemes for beginners” has been elaborated.

Lessons learned

The process of establishing a new global network with the aim of harmonizing standards and certification has not been an easy task – and it has taken longer time than anticipated. Certification bodies and test labs have been hesitating, as they could fear less income due to this harmonization. Industry, who should have been the driving force, did not support the work very much – probably because of focus on home markets due to the stagnating markets the later years.

BUT the GSCN is now establish and operation – so the main lesson learned is: It took time, but it was possible!

The Task has been a very good platform for developing ISO standards.

15. Areas for Future Work

Some of the proposals from the final evaluation:

- Focus on different level of certification that can cover all countries world wide / enhancing multi-level of certifications that fits all markets
- …
- Continuation of support to GSC Scheme. - Development of ISO standards on collector components and system testing
- To promote the use of the test procedures and certifications on accelerated aging, in-situ test performances, and all norms allowing to give a clear view to "investors" (Esco - Banks - infrastructure funds) allowing them to get norms as tools to invest money in a secured way to largely develop the solar thermal market.
- …

And there is even a specific proposal for a follow-up task included in the evaluation responses:

Draft proposal for Task 57 follow-up Task

- Title: Quality assurance for solar thermal markets development
- Subtask A: Building market confidence driven by labelling / certification
    - Harmonizing certification schemes (GSCN)

- Comparative labelling
- Collectors (SOLERGY)
- Solar water heaters
- Investigate labelling models
- Performance guarantees?
- Support to standardisation work
- Standardised calculation of solar heat prices (follow-up on Task 54)
- …

- Subtask B: Emerging markets
  - Analysis of influence of quality issues on market development
  - Promotion/implementation of installer guidelines/training
  - Templates for support schemes (such as subsidy schemes / building codes / regulation) considering product and installation quality
  - …
- Subtask C: Disruptive marketing strategies
  - Leasing / contracting
  - “Heat for free”
  - Digitalisation (smart control)
  - …
- Subtask D: Dissemination
  - Business model for operation and promotion of GSCN
  - Promotion of ISO standards
  - Webinars on implementing quality assurance and regulation
  - …

Appendix 1: Task Experts

Country	Name	Institution / Company	Email	Role
Algeria	Abdelkrim Chenak	CDER	a.chenak@cder.dz	National Expert
Austria	Harald Poscharnig	GREENoneTEC	harald.poscharnig@greenonetec.com	National Expert
Australia	Ken Guthrie	Sustainable Energy Transformation Pty Ltd	ken.guthrie@setransformation.com.au	National Expert
Australia	Jeremy Osborne	Energy Analysis & Engineering	jeremy.osborne@energyae.com	National Expert
China	He Zinian	Beijing Solar Energy Research Institute (BSERI)	hezinian_bj@163.com	Subtask B Leader
China	Zhou Xiaowen	Tsinghua Solar Energy Co. Ltd.	xwzhou2003@aliyun.com	National Expert
China	Tong Xiaochao	CABR Certification Centre	xiaochao.tong@gmail.com	National Expert
China	Lin Jiali	China General Certification Centre	linjl@cgc.org.cn	National Expert
China	Zhang Lei	China Nat. Engineering Research Center for Human Settements	leiz@cadg.cn	National Expert
China	Shen Bin	Zhejiang Solar Energy Products Quality Testing & Inspection Center	158877727@qq.com	National Expert
China	Gu Xiuzhi	Beijing Building Materials Testing Academy Co,Ltd	guxiuzhi@126.com	National Expert
Denmark	Jan Erik Nielsen	SolarKey Int.	jen@solarkey.dk	OA
France	Pierre Delmas	NEWHEAT	pierre.delmas@newheat.fr	National Expert
France	Alexis Gonnelle	NEWHEAT	alexis.gonnelle@newheat.fr	National Expert
Germany	Harald Drück	ITW, University Stuttgart	drueck@itw.uni-stuttgart.de	Subtask A Leader
Germany	Korbinian Kramer	Frauenhofer ISE	Korbinian.kramer@ise.fraunhofer.de	National Expert
RCREEE	Ashraf Kraidy	RCREEE	ashraf.kraidy@las.int	Subtask C Leader
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Spain	Ramon Pujol Nadal	University of Balearic Islands / Solar Optics	ramon.pujol@uib.es	National Expert
Spain	Julian David Hertel	University of Balearic Islands / Solar Optics	julian.hertel@uib.es	National Expert
Switzer-land	Andreas Bohren	SPF, Rapperswil	andreas.bohren@solarenergy.ch	National Expert
Germany	Arnulf Knorr	GIZ/RCREEE	Arnulf.Knorr@GIZ.de	Observer

Appendix 2: Conference/workshop/seminar Presentations

Conference / Workshop / Seminar Name	Activity & Presenter (keynote, presentation, poster, etc.)	Date & Location	# of Attendees	If Task Hosted: # Countries, Industry, Government, Research
ESTIF Webinar	"Global Certification", JE Nielsen	Web, February 2016	-	
SHAMCI workshop	ISO standards, Ken Guthrie; GSCN, JE Nielsen	Cairo, 2016-11-24	20 (9)	
SOLARTR-2016	Poster: "IEA SHC Task 57 Solar Standards and Certification", JE Nielsen	Istanbul, Turkey, December, 2016	-	-
PTB Workshop on certification of solar thermal products in Maghreb region (North Africa)	"Global Solar Certification Network", JE Nielsen	Morocco 7-9 May 2017	30	-
SHC 2017 Conference,	"Solar Standards and Certification", JE Nielsen, Keynote	Abu Dhabi, November 2017	-	-
Asia-Pacific Solar Research Conference	Global Solar Certification Network, JE Nielsen	Melbourne. December 2017	-	-
EuroSun 2018	Global Solar Certification Network (GSCN) and Global Certification of Collectors, Harald Drück	Rapperswil, September 2018	-	-
IEA SHC National Day	Solar Standards and Certification – Task 57, JE Nielsen	Lisbon, November 2018	-	-
Solar Academy Seminar	IEA SHC Webinar on Solar Standards & Certification, JE Nielsen et al	Web, December 2018	-	-
Asia Pacific Solar Research Conference	Utilisation of ISO9806:2017 in Global Solar Certification, Parker J. G, Guthrie L.T. and Guthrie K.I. 2018, Asia Pacific Solar Research Conference	Sydney December 4-6 2018.	-	-