SUPCONSOLAR

QUARTERLY UPDATE

Q1,2 2021

To Provide Low-cost, High-quality, and Clean Energy!

ZHEJIANG SUPCON SOLAR TECHNOLOGY CO.,LTD.

TOP NEWS

SUPCON SOLAR's High-precision Intelligent Heliostat was Rated "Excellent" by CSP Services

SUPCON SOLAR's high-precision intelligent heliostat has passed the quality inspection of CSP Services, a prestigious third-party institution, and obtained the certification report jointly issued by CSP Services and DLR.

CSP Services GmbH
Report

– Confidential –

Certification of Heliostat with Review by DLR according to SolarPACES Heliostat Testing Guideline (July 2020)

Client: Zhejiang Supcon Solar Technology Delingha, People's Republic of China

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Solar Research

Deutsches Zentrum für Luft- und Raumfahrt
German Aerospace Center

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17. December 2020

Compliance with the best practices of the SolarPACES Heliostat Performance Testing Guideline (version 0.995, 09.10.2020)

Dear Sirs and Madams,

DLR is subcontracted to review and certify that the measurements carried out by CSP Services on the SupCon Heliostat in Delingha, Qinghai Province P.R China, from 22.07.2020 to 30.07.2020 and documented in the report "Certification of Heliostat with Review by DLR according to SolarPACES Heliostat Testing Guideline, Version 17 December 2020" comply with the best practices of the SolarPACES Heliostat Performance Testing Guideline (version 0.995). To this end, CSP Services provided all the necessary materials, documentation and reports and fully answered all our question during detailed face-to-face-meetings upfront and online meetings during the evaluation process. The following reviews were undertaken by DLR:

Prior to measurement: Review measurement parameters and procedure:
a. Review that measurement parameter list is according to the „Best-Practices" of the actual SolarPACES Heliostat Performance Testing Guideline
b. Review that measurement procedure is according to actual „Best-Practices" of the actual SolarPACES Heliostat Performance Testing Guideline

After measurements: Review of measurement process, data evaluation and review of CSP Services measurement report:
a. Review of the measurement process
b. Review of the evaluation process and data treatment procedures
c. Review of the CSP Services measurement report

Conclusion: DLR confirms that based on the reviews and the questions answered by CSP Services and according to our best knowledge, the heliostat measurements and evaluations documented in the report "Certification of Heliostat with Review by DLR according to SolarPACES Heliostat Testing Guideline, Version 17 December 2020" were performed according to the „Best-Practices" of the actual SolarPACES Heliostat Performance Testing Guideline (version 0.995, 09.10.2020). Parameters of the guideline list which were not ordered by the client were left blank.

Sincerely,

i.A. Dr.-Ing. Marc Röger
(SolarPACES Subtask Leader, DLR Team Leader)

i.A. Tim Schlichting
(Manager HelTep Jülich)

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The authors have evaluated the measurement and evaluation procedures applied by CSP Services at their best knowledge. However, our liability is excluded or limited to the contract conditions.

The German Aerospace Center is a member of the Helmholtz Association. DLR is represented by its Executive Board and persons authorised to act on its behalf. For information, please contact the Head of the Legal Department, Linder Höhe, 51147 Cologne (DLR Headquarters).

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▲ Certification report of heliostat

The technical team of CSP Services tested several heliostats installed in different positions of the heliostat field of SUPCON SOLAR Delingha 50MW Molten Salt Tower CSP Plant, and adopted various professional measurements, such as photogrammetry, deflectometry to investigate the deformation of the heliostats in dependence of gravity loads and ambient temperature changes, and used its tracking accuracy test system to test the heliostats. All measurement and data processing procedures used by CSP Services for the current certification are according to the best practices described in the SolarPACES Heliostat Testing Guideline (version 0.995, 09.10.2020), and the

measurement parameters and procedure, measurement process, evaluation process and data treatment procedures, CSP Services measurement report have been reviewed by DLR.

CSP Services Certification Report shows that the heliostat is characterized by minor reflector slope deviation and high tracking accuracy. In particular, the tracking performance of the heliostats is considered excellent, which is the best remark by CSP Services when carrying out the third-party test evaluation.

▲ High-precision Intelligent Heliostat

The accuracy and operation stability of heliostat directly determine the efficiency of tower CSP plant, and consequently affect electrical generation and profitability of the plant. The heliostat with high reflector precision and tracking accuracy can accurately reflect the sunlight to the designated position of the receiver, improve the facula quality, reduce spillage loss, and effectively improve solar-electric efficiency, so as to improve electrical generation and reduce unit cost.

Click here for the full paper →

Background of the CSP Services：

CSP Services, an affiliate to DLR, is an independent private company committed to certification services of products and systems of CSP. It is also a renowned third-party organization in the field of reducing technical risks and improving efficiency of CSP. It is engaged in prototype evaluation, quality assurance, inspection and performance improvement of solar collectors, and has rich experience in measuring technology applicable to solar collectors, and its testing and certification results are widely recognized in the global CSP industry.

SUPCON SOLAR Delingha 50MW Molten Salt Tower CSP Plant Passed the Technical Assessment of Fichtner

Delingha 50MW Molten Salt Tower CSP Plant, constructed by Zhejiang SUPCON SOLAR Technology Co., Ltd. (SUPCON SOLAR), has passed complete technical assessment of Fichtner, a German independent engineering consultancy company. **In the assessment report, Fichtner considers the design of the plant corresponds to state-of-the-art design of similar plants in the world, the self-developed heliostat and control system and other core equipment are of high quality, and the plant has good operation performance and advanced quality with the level of other international peers.**

FICHTNER

Independent Technical Assessment of SUPCONSOLAR's Molten Salt Solar Tower Plant Technology
SUPCONSOLAR

8913501/FICHT-22726678-v1 FICHTNER | 1 Due Diligence Report

Document approval

	Name	Signature	Position	Date
Prepared by:	Brakemeier		Project Manager	09.12.2020
Checked by:	Alisch		Project Director	09.12.2020

Document revision record

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2	11.11.2020	Due Diligence Final Report – additional amendments	22616567	Brakemeier	Alisch
3	20.11.2020	Due Diligence Final Report – few remaining amendments	22655447	Brakemeier	Alisch
4	25.11.2020	Due Diligence Final Report – one last correction	22666622	Brakemeier	Alisch
5	09.12.2020	Due Diligence Final Report – Disclaimer corrected	22726678	Brakemeier	Alisch

Disclaimer

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8913501/FICHT-22726678-v1 FICHTNER | 3 Due Diligence Report

▲ Technical Assessment of Fichtner

The assessment was independently carried out by the technical team of Fichtner. It took several months for the technical team to conduct detailed investigation, review and confirmation on the overall design and general equipment condition of the plant, technology of main equipment, operation performance and running data of the plant, commissioning procedures of key systems and O&M strategy. **The assessment report shows that the design of the plant corresponds to state-of-the-art design known by Fichtner from other molten salt solar tower technology providers, the condition of the plant equipment and operation can be considered as good,**

and the overall design has some remarkable highlights, including the self-developed heliostat and control system are deemed to be of high quality; the number of salt pumps is minimized reducing costs and own electricity consumption of the plant, while still maintaining high quality and availability; the two heat-exchanger-trains based steam generation system design leads to higher operation flexibility.

In addition, the technical experts of Fichtner confirm that the operation performance of the plant was good based on the review of the operation data during the performance test period and on-site investigation. Fichtner focuses on evaluating the performance of the plant in the first half year (October 2019 to March 2020) of the performance test period. Based on the analysis of key indicators such as the total DNI, actual/theoretical electricity production, electricity delivered to the grid, auxiliary power consumption, **Fichtner deems that the plant has fulfilled an average of 97.06% theoretical electricity production during this period, ascending on monthly basis, which reflects the improving operation strategies, and further performance at the current levels can be expected.**

Table 1-1 Actual DNI and electricity generation results[7]

	DNI kWh/m^2	E_{gross} MWh_e	E_{net} MWh_e	Own cons MWh_e	Own cons in % of E_{gross}	Achievement rate in %
Oct 19	170.91	10,399.4	9,181.5	1217.9	11.71%	85.60%
Nov 19	177.74	12,417.0	11,298.8	1118.2	9.01%	93.38%
Dec 19	152.42	10,844.3	9,748.8	1095.5	10.10%	97.60%
Jan 20	157.57	11,016.0	9,841.1	1174.9	10.67%	100.99%
Feb 20	221.15	17,179.5	15,381.7	1797.8	10.46%	102.90%
Mar 20[8]	175.71	13,013.4	11,635.2	1,378.2	10.59%	100.31%
SUM/ WeighAve*	1,055.5	74,869.6	67,087.10	7,782.5	10.39% (WeighAve)	97.06% (WeighAve)

* WeighAve is the average value weighted with the monthly DNI share on the total DNI sum

The conclusion of the assessment report is that, from a general technical perspective, Fichtner considers the plant as being of advanced quality. In the comparison to plants of other international technology providers the quality of Delingha 50MW solar tower plant can be rated as similar. The new design approaches are surprising and tend to lead to significant improvements of performance and O&M.

Click here for the full paper →

FICHTNER

Background of the Fichtner：

Fichtner is the largest independent engineering consultancy company in Germany. Since the late 1970s, Fichtner is active in the field of CSP and has since then successfully executed more than 130 assignments in relation to solar thermal projects in over 35 different countries, covering all the implementation stages of the project, mainly serving as owner's engineer, technical consultant, financing consultant, etc.

NEWS IN BRIEF

The National Standard for CSP Led by SUPCON SOLAR was formally approved

On May 6th 2021, according to the notice of the National Standardization Administration Committee, the Technical Requirements for Thermal Collection System of CSP Tower Plant (Plan No. 20210670-t-524) prepared by SUPCON SOLAR was officially approved. This national standard fills in blank of the technical standard for the Thermal Collection System of the CSP Tower Plant in China, and further promotes the standardization of the CSP.

SUPCON SOLAR has actively participated in the development of CSP technical standards:

SUPCON SOLAR won the 2020 China Energy Innovative Enterprise

▲ Photo of winners, Right 6: Zhang Haobin (Vice President of SUPCON SOLAR)

On Mar. 16, 2021, the 6th China Energy Development and Innovation Forum was held in Beijing, China. Zhang Haobin, the Vice President of SUPCON SOLAR, gave a speech about PV+CSP Integrated Energy Development Solution. An innovation award ceremony was held during the forum. SUPCON SOLAR won the 2020 China Energy Innovative Enterprise for its technological breakthroughs in field of CSP. It is the only CSP company to receive this honor.

MARKETING EVENTS

SUPCON SOLAR Attended The 8th China International CSP Conference

On May 13, 2021, the 8th China International CSP Conference 2021 was held in Beijing, China. More than 400 people from the CSP industry attended. Jin jianxiang, the Board Chairman of SUPCON SOLAR, gave a speech of Operating Experience of Delingha 50MW CSP Project & the Status and Prospect of CSP Industry.

PROJECT UPDATE

Operation of SUPCON SOLAR Delingha 50MW CSP Plant

- Construction started in Mar. 2017, synchronized to the grid in Dec. 2018
- Reached full-load operation in Apr. 2019
- Monthly power generation exceeds 10 GWh for the first time in Aug. 2019
- The first quarter of 2020 saw consecutive fulfillment rate over 100%
- From July 2019 to July 2020, annual generation reaches 121.82GWh, fulfillment rate achieved 88.6%. If the impact of grid curtailment is excluded, the fulfillment rate is 94.35%

Location	Qinghai, China
Installed Capacity	50MW
Storage Time	7 Hours with Molten Salt
Occupied Land	2.47km^2
Molten Salt Volume	10093 tons
Solar Field	542,700m^2
Heliostats Quantity	27,135 sets (20m^2 each)
Electricity Production	146 GWh/year
Coal Saving	46,000 tons/year
CO_2 Emission Reduction	121,000 tons/year

Operation of POWERCHINA Gonghe 50MW CSP Plant

- Construction started in May 2018, synchronized to the grid in Sep. 2019
- Reached full-load operation in Nov. 2020
- Successfully completed 240-hour trial operation in Nov. 2020
- Single-day output achieved 539MWh in May 7th 2021

Location	Qinghai, China
Installed Capacity	50MW
Storage Time	6 Hours with Molten Salt
Occupied Land	2.13km^2
Solar Field	600,320m^2
Heliostats Quantity	30,016 sets (20m^2 each)
Electricity Production	156.9 GWh/year
Coal Saving	51,200 tons/year
CO_2 Emission Reduction	154,000 tons/year

SUPCONSOLAR

SUPCON SOLAR is a leader in providing integrated solutions for Tower CSP across the world.

- Founded in 2010, focus on CSP Tower
- Independent R&D with fully patented technology and homebred equipment
- Technology providing, equipment integration, engineering service
- Development, investment, construction, operation of CSP projects

Website: www.cosinsolar.com Twitter: @SupconSolar Youtube: SUPCON SOLAR