Solar Facilities for the European Research Area

SFERA-III

Solar Facilities for the European Research Area

Testing of benchmarking techniques.

Deliverable D8.4

Estimated delivery date:	
Actual delivery date:	
Lead beneficiary:	
Person responsible:	
Deliverable type:	☒ R ☐ DEM ☐ DEC ☐ OTHER ☐ ETHICS ☐ ORDP
Dissemination level:	☐ PU ☒ CO ☐ EU-RES ☐ EU-CON ☐ EU-SEC

THIS PROJECT HAS RECEIVED FUNDING FROM THE EUROPEAN UNION'S HORIZON 2020 RESEARCH AND INNOVATION PROGRAMME UNDER GRANT AGREEMENT NO **823802**

AUTHORS

Author	Institution	E-mail
Brendan Bulfin	ETHZ	bulfinb@ethz.ch
Mario Zuber	ETHZ	mazuber@student.ethz.ch
Alfonso Vidal	CIEMAT	alfonso.vidal@ciemat.es
Martin Roeb	DLR	martin.roeb@dlr.de
Thomas Fend	DLR	
Océane Bizeau	CEA	Oceane.BIZEAU @cea.fr
Valéry Vuillerme	CEA	Valery.VUILLERME@cea.fr
Stéphane Abanades	CNRS	Stephane.Abanades@promes.cnrs.fr
Sylvain Rodat	CNRS	Sylvain.Rodat@promes.cnrs.fr
Axel Curcio	CNRS	

DOCUMENT HISTORY

Version	Date	Change
1	16.11.2022	First draft version
2	05.12.2022	Revised draft
3	09.06.2023	Revised after feedback from review officer (RO)
4	31.07.2023	Revised a second time after feedback from RO

VALIDATION

Reviewers		Validation date
WP leader	Brendan Bulfin	05.12.2022

DISTRIBUTION LIST

Date	Recipients
20.09.2021	Paticipants task 8.2

Disclaimer

use that may be made of the information this publication contains.

Executive Summary

This report outlines several experimental campaigns carried out within the SFERA III consortium which were focused on using concentrated solar energy to drive fuel production processes. The main goal of this report is to illustrate how the benchmarking methods developed in task 8.2 were applied to experimental campaigns on solar fuel production reactors within the consortium. The benchmarking techniques involve the calculation of performance indicators, which include the energy efficiency, the feedstock conversion, the fuel selectivity and upgrade factors in the case of biomass gasification. Standardising the performance indicators used within the consortium, and the broader solar thermochemical fuel production community, is an important step to allow for direct comparison between different approaches, and ultimately to better align the efforts of this research field. The test campaigns reported include; a solar methane reforming process tested in collaboration between ETHZ and IMDEA, pilot scale two step thermochemical hydrogen production reactors tested by CIEMAT and DLR, and a solar biomass gasification reactor investigated by CEA and CNRS. As well as applying the benchmarking techniques, potential routes to improving the performance are also discussed.