1500-SiC
Develop a new photovoltaic inverter with SiC for full power operation at 1500V

Project duration: from 03.2018 to 06.2020
Report submitted: 07.2020

Publishable Summary

Photovoltaic (PV) energy is experiencing significant cost reduction over the last years. Lately, the bias voltage of photovoltaic panels has risen from 1000V to 1500V, leading to a significant reduction of the Balance of Plant cost. In order to improve the Levelized Cost of Energy, manufacturers are increasing the installed DC power of PV panels for a given nominal AC power of the inverter (so-called capacity factor) from 1.2-1.3 to higher values. This results in a larger voltage at the maximum power point of the PV panel. As a consequence, conventional power electronics solutions rated at 1700V maximum voltage are not suitable. This is because they are typically designed to deliver nominal power below approximately 1300V, but increasing the capacity factor leads to higher maximum power point voltage. Therefore, new solutions are required in order to deliver rated power near 1500V.

The aim of 1500-SIC is to develop enabling power electronics solutions capable of delivering nominal power at 1500V with very high efficiency and high volumetric power density at competitive cost. The consortium includes Gamesa Electric from Spain, worldwide supplier of PV inverters; Infineon Technologies Austria, worldwide supplier of semiconductors for power electronics; and ETH Zurich Advanced Power Semiconductor Laboratory from Switzerland, a world-class research centre focused on semiconductor devices and power modules. Specifically, the consortium has worked together to develop a novel Silicon-Carbide diode and a MW-class inverter optimized to deliver nominal power at voltage levels up to 1500V. The developed technologies have been built and tested at full scale through a comprehensive testing campaign.

The consortium includes key industrial actors in the supply chain of power electronics for PV solutions and a research centre. This maximizes the impact of the R&D outcomes of this program into the European Renewable Energy Industry.

Project consortium

Coordinator and all contact details:

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Participating countries and financing:

Country	**Number of organisations involved**	**Project costs in EUR**	**Public funding in EUR**
Spain	1	595'298	211’105
Austria	1	531'508	276’070
Switzerland	1	556'555	206’837
Total	*3*	*1'683'361*	*694’012*

Funding agencies involved and contracts

Funding Agency	**Contract N° and Title**
CDTI	SERA-20181001, 1500-SIC
FFG	Project no. 863519, 1500-SIC
Bundesamt für Energie BFE	Photovoltaik-Inverter mit SiC zum Betrieb bei 1500V- Teilprojekt CH – SOLAR-ERA.NET / SI/501702-01