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WASCOP WORKSHOP

GENERAL PRESENTATION OF THE SOLWATT PROJECT

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S*LWA11 SOLWATT CONSORTIUM

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Name	Short name	Country
TSK ELECTRONICA Y ELECTRICIDAD SA	TSK	SPAIN
COMMISSARIAT A L ENERGIE ATOMIQUE ET AUX ENERGIES RENOUVELABLES	CEA	FRANCE
DEUTSCHES ZENTRUM FUR LUFT UND RAUMFAHRT EV	DLR	GERMANY
CENATRO DE INVESTIGATIONES ENERGETICAS, MEDIOAMBIENTALES Y TECNOLOGICAS- CIEMAT	CIE	SPAIN
CRANFIELD UNIVERSITY	CU	UNITED KINKDOM
FUNDACION TEKNIKER	ТЕК	SPAIN
RIOGLASS SOLAR SA	RIO	SPAIN
INGENIERIA PARA EL DESARROLO TECNOLOGICA SL	IND	SPAIN
FENIKS CLEANING & SAFETY SOCIADAD LIMITADA	FNK	SPAIN
BARCELONA SUPERCOMPUTING CENTER – CENTRO NACIONAL DE SUPERCOMPUTATION	BSC	SPAIN
BRIGHTSOURCE INDUSTRIES ISRAEL	BSII	ISRAEL
BERTIN TECHNOLOGIES SAS	BT	France
RIOGLASS SCH	RIO SCH	SPAIN
AMIRES SRO	AMI	CZECH REPUBLIC

S*LWA11 FROM WASCOP TO SOLWATT



COOLING		
Air/rock storage	(CU)	
Water/rock storage	(CEA)	
Versatile cooler	(CEA/HdH)	
Hybrid cooler	(CIE/HdH)	

SOILING		
Dust barrier	(CU, CIE, DLR, MAS)	U
Antisoiling coating for reflector	(RIO, TEK, CIE, CEA, DLR, CU)	
Antisoiling coating for absorber	(ASE, CIE, CEA, DLR, CU)	O
Sensor for reflectivity measurement	(TEK)	
Sensor for soiling characterization	(CEA)	
Sensor TraCS	(DLR)	

CLEANING

(TEK)

(DLR)

TRL<5

Ultrasonic cleaner

Gravity lip system

A le Ve

COOLING (CEA/CU/BSII/BT) Water storage 1000 m³ **CLEANING** Ultrasonic cleaner (TEK/FNK/TSK) Heliostat cleaner (CIE/DLR/BSII) **PSCALE** ~ SOILING TRL Dust barrier 100 m (CU/CIE/TSK) n-site tests Antisoiling coatings on 50 (TEK/RIO/RIO reflectors SCH/TSK) Antisoiling coatings on glass 36 (TEK/RIO/RIO SCH/TSK) receiver tubes (RIO/TSK/CIE) Soiling sensor WATER RECOVERY

SOLWATT (2018-2022)

W	at	er	re	co	ve	erv

(CIE/CU/IND/TSK)

S*LWA11 SOLWATT VALUE CHAIN





S*LWA11 LA AFRICANA CSP POWER PLANT



Power plant name	La Africana
Country	Spain (Posodas, near Sevilla)
Owners	Ortiz/TSK/Magtel
Technology	Parabolic trough
Turbine capacity	50 MW gross
Cooling system	Open wet cooling tower
Start year	2012

La Africana CSP power plant will be used for all demonstration and validation, except the heliostat cleaning device and the MEE



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SOLAR ENERGY DEVELOPMENT CENTER (SEDC)





Name	SEDC
Country	Israel
Owners	Brightsource
Technology	Central reciever
Solar field capacity	6 MWt
Start year	2008

SEDC demonstration facility will be used for the demonstration of the heliostat cleaning



PLATAFORMA SOLAR DE ALMERIA (PSA)



Prototype of water recovery system will be installed and tested at PSA

S*LWA11 SOLWATT DEMONSTRATIONS

SOILING SENSOR

- Soiling sensor developed by TEK
- Integration within the solar reflectors during manufacturing process
 → SMART MIRROR
- Test of 30 SMART MIRRORS in LA AFRICANA for 12 months







ULTRASONIC CLEANER

- Adaptation of the device to the 6.248 m parabola
- Integration in a cleaning truck

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• Test in LA AFRICANA for 12 months

HELIOSTAT INTEGRAL CLEANING DEVICE

- Improvement and integration by BSII
- Integration on 10-50 heliostats for various studies and analyses
- Test in SEDC for 12 months

S*LWA11 SOLWATT DEMONSTRATIONS

DUST BARRIERS

- CFD and wind tunnel for improvements
- (100 m, porosity 30-50%) dust barriers located around a corner of the plant
- Test in LA AFRICANA for minimum 12 months

ANTISOILING COATING FOR REFLECTORS

- Real parabolic-through facets of 1700 x 1700 mm2 as maximum
- 50 real-size samples testes in LA AFRICANA for minimum 12 months
- 150*300 mm² samples for accelerated aging tests

ANTISOILING COATING FOR RECEIVERS

- Up-scaling of the deposition process from small flat sample to long glass tube
- 36 receiver tubes of 4060 mm will be installed on solar collector assemblies
- Tests in LA AFRICANA for minimum 12 months





S*LWA11 SOLWATT DEMONSTRATIONS

WATER THERMOCLINE COLD STORAGE

- 1000 m³ water thermocline
- Pit-storage configuration with or without internal membrane
- Installed in LA AFRICANA and tested in parallel with existing condenser cooling system

WATER RECOVERY

- Recovery of the water coming from the blowdown of the Rankine cycle and from any of the waste streams discharged from the CSP plant
- Thermal energy from the partially defocused solar field
- Multiple Effect Evaporation (MEE) bases system
- Installed and tested at LA AFRICANA

PLANT OPERATION OPTIMIZER

- Optimizer with water usage minimization, including cooling systems scheduling, water blow-down reduction, soiling prediction and cleaning schedule decision making
- Implementation of soiling rate forecasting product





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