

	EUROPEAN COMMISSION RESEARCH AND INNOVATION DG	Periodic Report
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Project No: 308952

Project Acronym: OMSoP

Project Full Name: Optimised Microturbine Solar Power system

Periodic Report

Period covered: from 01/02/2013 to 31/01/2014

Date of preparation: 31/03/2014

Start date of project: 01/02/2013

Date of submission (SESAM): 01/04/2014

Project coordinator name:

Prof. Abdulnaser Sayma

Project coordinator organisation name:

THE CITY UNIVERSITY

Version: 1

Periodic Report

PROJECT PERIODIC REPORT

Grant Agreement number:	308952
Project acronym:	OMSoP
Project title:	Optimised Microturbine Solar Power system
Funding Scheme:	FP7-CP
Date of latest version of Annex I against which the assessment will be made:	31/01/2013
Period number:	1st
Period covered - start date:	01/02/2013
Period covered - end date:	31/01/2014
Name of the scientific representative of the project's coordinator and organisation:	Prof. Abdunaser Sayma THE CITY UNIVERSITY
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Project website address:	www.omsop.eu

Declaration by the scientific representative of the project coordinator (1)

I, Prof. Abdalnaser Sayma THE CITY UNIVERSITY , as scientific representative of the coordinator of the project OMSoP and in line with the obligations as stated in Article II.2.3 of the Grant Agreement declare that:

The project has fully achieved its objectives and technical goals for the period.

The attached periodic report represents an accurate description of the work carried out in this project for this reporting period.

The public website is up to date.

To my best knowledge, the financial statements which are being submitted as part of this report are in line with the actual work carried out and are consistent with the report on the resources used for the project (section 6) and if applicable with the certificate on financial statement.

All beneficiaries, in particular non-profit public bodies, secondary and higher education establishments, research organisations and SMEs, have declared to have verified their legal status. Any changes have been reported under section 5 (Project Management) in accordance with Article II.3.f of the Grant Agreement.

Name	Prof. Abdalnaser Sayma THE CITY UNIVERSITY
Date	01/04/2014

This declaration was visaed electronically byCecile BREMONT(ECAS user name nbrecci) on 01/04/2014

1. Publishable summary

Summary description of project context and objectives

The overall objective of this project is to provide and demonstrate technical solutions which will allow future deployment of small scale reliable and cost effective concentrated solar power dish systems in order to enable industry to invest in the next generation of these devices. It is required to address technological challenges with the primary components, the concentrator, the receiver-absorber and prime mover, leading to a demonstration of the concept.

Description of work performed and main results

Within this reporting period, work was carried out in all work packages. All deliverables and milestones were met in a timely manner. Following are the main activities and achievements listed in the order of work packages:

Within WP1, work has progressed for the development of the system components, receiver, concentrator and micro gas turbine. Specifications for the solar receiver and short storage system have been set up. Three alternative receiver designs have been put forward and investigations are being carried out to choose the most suitable design. Thermo-mechanical analysis has been performed and a study to determine the boundary conditions for receiver tests has been conducted. On the concentrator, the dish arrangement for the demonstration system has been determined. Investigations have been carried out for the selection of reflective materials. It was found out that thin glass with reflectance over 90% is the best compromise between performance and durability. Work was also carried out on dish shape optimisation and the automatic tracking system. Preparations are underway for installation of the dish at ENEA.

A Thermodynamic model was developed for the micro-turbine which was used to set out the system operating parameters. A preliminary expander design has been produced and optimisation is underway. The micro-turbine test rig has been designed and is currently undergoing construction. A combustor has been designed, manufactured and tested for laboratory tests of the micro-turbine and bearings were selected.

For WP2, A preliminary definition of operating conditions was completed. A definition of the demonstration system layout has also been completed. It was decided to use a commercial code, Trnys for system simulations. The code is now being validated for use in the OMSoP solar dish system. Sub-models for system components are being integrated with the system as external subroutines. Preparations are underway to install the dish at ENEA site ahead of original schedule. The aim is to perform early experiments to measure solar flux distribution at the focus to assist KTH with the design of the receiver.

For WP3, the cost analysis has been developed in two different stages. The first stage has been dedicated to the unit system to produce preliminary cost functions of the components. Later on in the project, when further data will be provided by the original equipment manufacturers, the cost function will be updated with real costing and implemented in the simulation. Maps of potential markets have been drawn and an approach to uncertainty analysis has been defined.

For the thermodynamic cycle optimization, a literature review on solar dish systems was completed and a report was submitted. A survey of component models available among the partners has been carried and it has been identified that the modelling tools are ready to carry out the required analyses. In summary, work has been carried out on all tasks for the reporting period. All objectives have been achieved and some tasks are running ahead of schedule.

Expected final results and potential impacts

The expected final results of the project are:

- A field demonstration of a solar dish system powering a micro-gas turbine providing a power

output between 5-10kWe. This will include the development of a solar dish with better mirror reflectivity, lighter construction and improved tracking system, a solar receiver achieving turbine inlet temperatures exceeding 800 degrees centigrade and an efferent micro-turbine.

- An optimised solar dish system design which includes short term storage within the receiver for future commercialised units. The optimisation will make use of the data obtained from the field demonstration during the first phase of testing.

- A techno-economic and market analysis that will allow for identifying the most optimum system size for various markets in Europe and worldwide to assist with identifying potential markets.

The potential impact of demonstrating a reliable solar dish micro-turbine system is to open the way for full commercialisation of the system by the end of the project. It is anticipated that a system based on micro gas turbine will overcome the reliability issues with similar systems based on Sterling engines and thus will open the way for widespread deployment. The advantage of this system over other forms of small scale solar systems is its dispatchability through the straightforward hybridisation with other fuels such as natural gas or bio-fuels provided and 24 hour electricity using the same system. Effective utilisation of solar power is essential in increasing the share of renewables and will contribute to achieving the 2020 targets of renewables and emissions reduction. Success of the technology is instrumental in creating job opportunities and providing EU industry with export potential.

Project public website address:

www.omsop.eu

2. Core of the report

Project objectives, Work progress and achievements, and project management during the period

The Project Summary Pdf document contains the core of the report.

3. Deliverables and milestones tables

Deliverables (excluding the periodic and final reports)										
Del. no.	Deliverable name	Version	WP no.	Lead beneficiary	Nature	Dissemination level	Delivery date from Annex I (proj month)	Actual / Forecast delivery date	Status	Comments
1	Report on absorber material testing and evaluation	0.0	1	KUNGLIGA TEKNISKA HOGSKOLAN	Report	PU	20	30/09/2014	Not submitted	
2	Report on short term storage testing and evaluation	0.0	1	UNIVERSITA DEGLI STUDI ROMA TRE	Report	PU	30	31/07/2015	Not submitted	
3	Report on receiver testing and evaluation	0.0	1	KUNGLIGA TEKNISKA HOGSKOLAN	Report	PU	48	31/01/2017	Not submitted	
4	Report on solar dish selected materials	1.0	1	INNOVA SOLAR ENERGY SRL	Report	PU	12	04/03/2014	Submitted	
5	Optimised dish design	2.0	1	INNOVA SOLAR ENERGY SRL	Report	PU	12	17/03/2014	Submitted	
6	Report on solar dish performance	0.0	1	INNOVA SOLAR ENERGY SRL	Report	PU	24	31/01/2015	Not submitted	
7	Report on further optimisation of dish system	0.0	1	INNOVA SOLAR ENERGY SRL	Report	PU	48	31/01/2017	Not submitted	
8	Optimised radial turbine design	0.0	1	THE CITY UNIVERSITY	Report	PU	14	31/03/2014	Not submitted	
9	Bearing system selection	0.0	1	UNIVERSIDAD DE SEVILLA	Report	PU	14	31/03/2014	Not submitted	
10	MGT control system	0.0	1	COMPOWER AB	Report	PU	30	31/07/2015	Not submitted	
11	A report on further MTG optimisation	0.0	1	THE CITY UNIVERSITY	Report	PU	48	31/01/2017	Not submitted	
1	Technical Report: System layout	0.0	2	AGENZIA NAZIONALE PER LE NUOVE	Report	PU	36	31/01/2016	Not submitted	

				TECNOLOGI E,L'ENERGIA E LO SVILUPPO ECONOMICO SOSTENIBILE					
2	Technical Report on steady state simulations	0.0	2	AGENZIA NAZIONALE PER LE NUOVE TECNOLOGI E,L'ENERGIA E LO SVILUPPO ECONOMICO SOSTENIBILE	Report	PU	36	31/01/2016	Not submitted
3	Technical Report of Demonstration Facility .	0.0	2	AGENZIA NAZIONALE PER LE NUOVE TECNOLOGI E,L'ENERGIA E LO SVILUPPO ECONOMICO SOSTENIBILE	Report	PU	38	31/03/2016	Not submitted
4	Report on calibration of instrumentation	0.0	2	UNIVERSITA DEGLI STUDI ROMA TRE	Report	PU	39	30/04/2016	Not submitted
5	Report on preliminary test data	0.0	2	AGENZIA NAZIONALE PER LE NUOVE TECNOLOGI E,L'ENERGIA E LO SVILUPPO ECONOMICO SOSTENIBILE	Report	PU	41	30/06/2016	Not submitted
6	Technical Report on system demonstration	0.0	2	AGENZIA NAZIONALE PER LE NUOVE TECNOLOGI E,L'ENERGIA E LO SVILUPPO ECONOMICO SOSTENIBILE	Report	PU	48	31/01/2017	Not submitted
1	Report on system cost analysis	0.0	3	UNIVERSIDAD DE SEVILLA	Report	PU	24	31/01/2015	Not submitted
2	Report on potential m	0.0	3	UNIVERSIDAD	Report	PU	24	31/01/2015	Not submitted

	arkets for small scale solar-dish microturbines			DE SEVILLA					
3	Final report on the economic appraisal of a 5-10 kW dispatchable power generator	0.0	3	UNIVERSIDAD DE SEVILLA	Report	PU	30	31/07/2015	Not submitted
4	Report on state-of-the-art dish-engine applications	1.0	3	UNIVERSITA DEGLI STUDI ROMA TRE	Report	PU	6	24/09/2013	Submitted
5	List of the available models and their main characteristics	0.0	3	UNIVERSITA DEGLI STUDI ROMA TRE	Report	PU	15	30/04/2014	Not submitted
6	Report on optimum dish-MGT performance	0.0	3	UNIVERSITA DEGLI STUDI ROMA TRE	Report	PU	48	31/01/2017	Not submitted
7	Life Cycle Assessment of Solar Dish System (DEMO)	0.0	3	AGENZIA NAZIONALE PER LE NUOVE TECNOLOGIE, L'ENERGIA E LO SVILUPPO ECONOMICO SOSTENIBILE	Report	PU	40	31/05/2016	Not submitted
1	Consortium Agreement	1.0	4	THE CITY UNIVERSITY	Report	PU	1	25/07/2013	Submitted
2	Project website	1.0	4	European Turbine Network a.i.s.b.l	Report	PU	2	21/06/2013	Submitted
3	Publications, project folder, presentations (Updated at each indicated delivery month)	0.0	4	European Turbine Network a.i.s.b.l	Report	PU	48	31/01/2017	Not submitted

Milestones

Milestone no.	Milestone name	Work package no	Lead beneficiary	Delivery date from Annex I	Achieved Yes/No	Actual / Forecast achievement date	Comments
1	short term storage system design ready	1	1	30/01/2014	No	30/04/2014	report is under way

4. Explanation of the use of the resources

The **explanation on the use of resources** was removed from the scientific periodic reports in SESAM. These details now have to be entered in the cost statement forms in FORCE instead.

Attachments	OMSoP 1st Interim Report Feb 13-Jan 14.pdf
Grant Agreement number:	308952
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Name	
Date	01/04/2014

This declaration was visaed electronically by Cecile BREMONT (ECAS user name nbrecec) on 01/04/2014