

A H2020 Research and Innovation Action project, Grant Agreement number 814985

# D7.3 – Dissemination, Communication and Exploitation Database – Report of Activities



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WP 7: Dissemination, Communication and Exploitation

Task 7.2: Dissemination

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- PU = Public
  - PP = Restricted to other programme participants (including the Commission Services)

RE = Restricted to a group specified by the consortium (including the Commission Services)

CO = Confidential, only for members of the consortium (including the Commission Services)





# History of Changes

Version	Date (dd/mm/yyyy)	Changes
0	12/05/2021	Version created by David Sánchez
1	18/05/2021	Comments made by Giampaolo Manzolini
2	28/05/2021	Comments made by Noelia Martínez
3	07/06/2021	Final version approved by Giampaolo Manzolini

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## **Executive Summary**

The Dissemination, Communication and Exploitation Database will store the Dissemination Plan along with the information produced by any other dissemination and exploitation activity. This repository will be made accessible from the project website and will include D7.3 which will be a report of all the activities developed along with instructions about how to retrieve this information. At least two updates are scheduled (halfway through the project and at the end of it) even if more frequent updates will be needed to ensure that the time lapse between generation of the information and access to it is kept to a minimum.

This document provides a review of the Dissemination, Communication and Exploitation activities carried out by the SCARABEUS consortium in the first half of the project (M1-M24). The document is organised in four sections plus a short section with concluding remarks. Section 1 provides introductory concepts to dissemination, communication and exploitation and how these are managed in the Open Research Data Pilot of the European Commission. Section 2 presents information about communication activities whilst Sections 3 and 4 present similar information for dissemination and exploitation respectively.

Sections 2 to 4 have similar structures. For each activity, a first subsection presents a brief description where the role of the activity in the overall dissemination, communication and exploitation strategy is explained. This subsection also provides information about why a particular channel/platform is selected to carry out the activity. A second subsection reports the information needed to access the information. This latter information is also available in the *Dissemination Logbook* that is attached to the report.





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## Introduction

## 1 Introductory notes on the Open Research Data Pilot

The European Commission launched, in Horizon 2020, a flexible pilot for open access to research data with the intent to improve and maximise access to and re-use of research data generated by Horizon 2020 projects, taking into account the need to balance openness and protection of scientific information, commercialisation and IPR, privacy concerns and security. In this context, research data is regarded as information (particularly facts or numbers) collected to be examined and considered, and to serve as a basis for reasoning, discussion or calculation. This means objective information (not interpretation of them) which can be used by other researchers working within the same field of knowledge and whose sharing is not harmful to the project partners or to the project as a whole. Therefore, it is recognised by the European Commission that some research data cannot be made open and, therefore, the principle of 'as open as possible, as closed as necessary' is applied to the project results. Based on this, it is possible to opt out of research data sharing at any stage - before or after the signature of the grant agreement - but reasons have to be given e.g. for intellectual property rights (IPR) concerns, privacy/data protection concerns, national security concern, if it would run against the main objective of the project or for other legitimate reasons.

Building upon the large effort carried out by the OpenAIRE project funded by the framework programme of the European Commission (*Open Access Infrastructure for Research in Europe*, 2009-2012)<sup>1</sup>, the Open Research Data Pilot relies on two main pillars -developing a Data Management Plan (DMP) and providing open access to research data (if possible)- and requires that the partners of a project commit to:

- Develop (and keep up-to-date) a Data Management Plan (DMP).
- Deposit their data in a research data repository.
- Ensure third parties can freely access, mine, exploit, reproduce and disseminate their data.
- Provide related information and identify (or provide) the tools needed to use the raw data to validate their research.

The *Data Management Plan* of the SCARABEUS project was already released as deliverable report D7.X and it is now complemented by this document in order to comply with the foregoing requirements set forth by the Commission.

Within the context of Open Access to research, it is of uttermost importance to avoid usual misconception that publishing all results in Open Access is mandatory as a condition linked to the funding provided by the European Commission. This is, nevertheless, not the case as shown schematically in Figure 1 extracted from the rules on open access to scientific publications and research data of the European Commission. In this document, it is made clear that *"open access requirements do not imply an obligation to publish results"*<sup>2</sup>. Therefore, the decision to publish and grant open access to this material is entirely up to the project partners and it is actually a decision made downstream in the decision-making process, once the decision to either publish directly or first protect the results as a means to facilitate explotation has already been made. This is also clear in the document issued by the Commission; "open access does not affect the decision to exploit research results commercially, e.g. through patenting. The decision on whether to publish through open access must come after the more general decision on whether to publish directly or to first seek protection".

<sup>&</sup>lt;sup>2</sup> Guidelines to the Rules on Open Access to Scientific Publications and Open Access to Research Data in Horizon 2020, 2017, H2020 Programme of the European Commission



<sup>&</sup>lt;sup>1</sup> OpenAIRE Factsheet, 2013, Open Access Infrastructure for Researchin Europe, Project factsheet.



Figure 1 – Open access to scientific publication and research data in the wider context of dissemination and exploitation<sup>2</sup>

## 2 Scope and organisation of the document

This Deliverable Report D7.3 presents a review of the activities carried out by the consortium to communicate and disseminate the activities developed by the consortium in the first twenty-four months of the project and to raise awareness of the project itself and of the support provided by the European Commission to the development of clean, secure and efficient energy technologies. The document also provides information about the different initiatives aimed at the shorter and longer-term exploitation of the project results.

Based on this overall scope, the document is organized in four main sections. The first section provides the context for the Open Research Data Pilot and definitions to effectively differentiate communication, dissemination and exploitation. Then, the activities carried out in each of these three fields are presented accompanied by a brief description of their objective and target audience/stakeholder and of the procedure to get access to the associated information.

## 3 Definitions<sup>3</sup>

Dissemination and communication are key elements of any H2020 project. They have the purpose to increase the awareness of EU-funded R&I activities and project results in the understanding that this will directly and indirectly provide many benefits; for example, by helping to secure or increase research and innovation funding, establish new research or business contacts, and stimulate further research<sup>4</sup>.

The terms Dissemination and Communication do imply a certain amount of overlap and the boundaries between the two might be unclear to individuals for whom the H2020 programme is not familiar. This is why the European Commission regularly issues documents aimed at facilitating the effective communication and dissemination activities in research and innovation actions; for instance, through the European IPR Helpdesk project.

 <sup>&</sup>lt;sup>3</sup> These definitions have already been provided in the *Dissemination and Communication Plan* but they are presented here again to facilitate a clear understanding of the differences between dissemination, communication and exploitation.
 <sup>4</sup> The European IPR Helpdesk, 2015, *Making the Most of Your H2020 Project*, H2020 programme, Grant Agreement No. 641474.



Communication	Dissemination	Exploitation	
"Communication on projects is a strategically planned process that starts at the outset of the action and continues throughout its entire lifetime, aimed at promoting the action and its results. It requires strategic and targeted measures for communicating about (i) the action and (ii) its results to a multitude of audiences, including the media and the public and possibly engaging in a two-way exchange."	"The public disclosure of the results by any appropriate means (other than resulting from protecting or exploiting the results), including by scientific publications in any medium."	"The utilisation of results in further research activities other than those covered by the action concerned, or in developing, creating and marketing a product or process, or in creating and providing a service, or in standardisation activities."	Definition
(Source: EC Research & Innovation Participant Portal Glossary/Reference Terms)	(Source: EC Research & Innovation Participant Portal Glossary/Reference Terms)	(Source: EC Research & Innovation Participant Portal Glossary/Reference Terms)	
<b>Reach out to society and show the impact and benefits</b> of EU-funded R&I activities, e.g. by addressing and providing possible solutions to fundamental societal challenges.	<b>Transfer knowledge &amp; results</b> with the aim to enable others to use and take up results, thus maximising the impact of EU-funded research.	<b>Effectively use project results</b> through scientific, economic, political or societal exploitation routes aiming to turn R&I actions into concrete value and impact for society.	<b>O</b> bjective
<b>Inform</b> about and <b>promote</b> the project AND its results/success.	Describe and ensure results available for others to USE	Make concrete use of research results (not restricted to commercial use.)	<b>O</b> Focus
Multiple audiences beyond the project's own community incl. media and the broad public.	Audiences that may take an interest in the potential <b>USE</b> of the results (e.g. scientific community, industrial partner, policymakers).	People/organisations including project partners themselves that make concrete use of the project results, as well as user groups outside the project.	Target Audience
<ul> <li>Rules for Participants</li> <li>RIA &amp; IA Proposal Template 2.2 b)</li> <li>Grant Agreement Art. 38.1</li> </ul>	<ul> <li>Rules for Participants</li> <li>RIA &amp; IA Proposal emplate 2.2 a)</li> <li>Grant Agreement Art. 29</li> </ul>	<ul> <li>Rules for Participants</li> <li>RIA &amp; IA Proposal Template 1.1, 2.1, 2.2 a)</li> <li>Grant Agreement Art. 28</li> </ul>	<sup>§</sup> ତ୍ରି Formal Obligations

#### Figure 2 – Communication, Dissemination, Exploitation. Definitions<sup>4</sup>.

The differences between Dissemination, Communication and Exploitation are shown in Figure 2. Whilst the latter is clearly dealing with paving the way to market deployment of the technology developed in the project, the first two are more similar. Indeed, dissemination and communication are related to disclosing information about the project. Nevertheless, despite this similarity, the focus of each activity is different:

- Communication is general and informative in a twofold sense: i) it is aimed at a much wider audience, and ii) it aims to inform about and promote the project and its results.
- Dissemination is technical in nature since it must provide the interested stakeholders with the necessary information to make use of the project results. Therefore, accessibility and usability of results are key to any dissemination activity.

A useful example of the difference and interlink between communication and dissemination is extracted from

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the "Making the Most Out of Your H2020 Project" report:

A magazine article highlighting the project's work and achievements that is written for communication purposes could end up in the hands of potential stakeholders outside the project and trigger interest in using some of the results. The initial communication tool has now become a dissemination tool as well. This illustrates how certain tools and activities can oscillate between communication and dissemination, depending on the target group and content.





## Communication

## 1 Website

#### Description of activity

The hub for all the communication activities within SCARABEUS is the project website which can be found at www.scarabeusproject.eu. The project website contains information about all the relevant aspects of the project: objectives, consortium, work programme, activities carried out by the consortium, publication of results, etc. It is designed with a comprehensive structure which provides nice and easy navigation between areas and quick identification of new contents on the landing page. Figure 3 displays a screenshot of the homepage of the website, illustrating how the visitor would find the promotional SCARABEUS videoclip upon landing on the site.



The SCARABEUS project has received funding from the European Union's

Horizon 2020 research and innovation programme under grant agreement N° 814985 The aim of the SCARABEUS project is to demonstrate that the application of supercritical CO<sub>2</sub> blends to CSP plants has the potential to reduce CAPEX by 30% and OPEX by 35% with respect to state-of-the-art steam cycles, thus exceeding the reduction achievable with standard

#### Figure 3 – Homepage of SCARABEUS showing promotional videoclip on landing

Dissemination, communication and exploitation activities are tightly interconnected in SCARABEUS, not only conceptually but also from a practical standpoint. Therefore, to enable seamless integration of these three areas of data and information exchange, the digital repository of the project is accessed from the project website directly (see link on the top right corner in Figure 3).

Some metrics of the effective communication through the project website are listed below:

- Between M6 and M24, the project website has received almost 11500 page visits, originating from 4500 sessions of 2700 visitors (different users). This means that each visitor visits 2.6 pages of the SCARABEUS platform on average.
- Most landing IPs are located I Italy and Spain (35% overall), with a significant amount of visitors

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coming from United States, United Kingdom and China. Interestingly, 20% of the visitors are located in countries not participating to the SCARABEUS consortium.

- Social media is a jumping board for potential visitors, as credited by the large amount of them which land on the project website from LinkedIn.
- To date, the project website has been updated XX times, either with new contents or with modifications of existing contents.

#### Access to information/data

The project website can be accessed at <u>www.scarabeusproject.eu</u>. All sections of the website are available to interested visitors.

## 2 Social media - LinkedIn

#### Description of activity

LinkedIn enables a unique platform for the effective communication of the project activities to a large variety of stakeholders. It is also very flexible and allows for quick updates to be quickly distributed, as opposed to the slower distribution of information through the project website. Complementary capabilities of LinkedIn such as tagging or direct messaging also provides added value. A screenshot of SCARABEUS' LinkedIn account is shown in Figure 4.



Figure 4 – Homepage of SCARABEUS' LinkedIn account

The impact of an effective communication is measured quantitatively and qualitatively. In the first twenty





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four months of the project, the account has accrued 250 followers and this number keeps increasing steadily as information is regularly posted and capturing the interest of new followers. In the last twelve months, over forty posts have been added to the account, with an average number of organic impressions between 200 and 500 although some posts exceed 1500 impressions. This translates into an *engagement rate* that remains consistently between 6 and 8%. This is considered a very good engagement rate for LinkedIn (2% is widely acknowledged to be a good rate).

From a qualitative standpoint, the most important aspect of communication is to make sure that the target stakeholders are reached. In this regard, 30% of the visitors to SCARABEUS' LinkedIn account are classified as having an "engineering" affiliation, 30% fall in the category of "research and education" and 30% belong to project management, business and administration. The remaining 6-7% is made up of a variety of backgrounds. This breakdown of affiliations reveals that the outreach is carried out effectively.

#### Access to information/data

The SCARABEUS LinkedIn account can be reached by logging into LinkedIn and searching for <u>@SCARABEUSPROJECT</u>. The information therein is free and visitors can decide to become followers and receive regular updates on the information posted.

## 3 Promotional video

#### **Description of activity**

The SCARABEUS consortium is constantly looking for means to communicate the project effectively and maximize the outreach of dissemination activities. Based on this and bearing in mind the huge relevance of social media in the exchange of information at all levels, general information or technical information equally, Annex I to the Grant Agreement already identified YouTube as an excellent opportunity to raise awareness of the social, economic and environmental challenges tackled by the SCARABEUS technology.

The Annex to the Grant Agreement set the objective to produce two short video clips to be uploaded to YouTube. The first video was aired on July 20<sup>th</sup> 2020 and is currently available at the YouTube account of the project coordinator, Politecnico di Milano, and on the home page of the SCARABEUS website. It is a general dissemination vide disclosing information about the project objectives and fundamentals as well as the partners and their contributions/responsibilities. It has a duration of 2 minutes and has alreadybeen viewed by over 2200 users. A second video will be produced in the last year of the project with the aim to disclose the most relevant results of the project. A screenshot of the promotional video is shown in SCARABEUS' LinkedIn account is shown in Figure 5.







Figure 5 – Screenshot of the promotional video of SCARABEUS

#### Access to information/data

The promotional video can be viewed on the home page of the SCARABEUS website and is also available on the YouTube channel of Politecnico di Milano, project coordinator: <u>https://youtu.be/3F8koz7PLqs</u>

## 4. Webinar Series

#### Description of activity

SCARABEUS is a multidisciplinary project that embraces several areas of technology: from fundamental research aimed at the characterization of novel working fluids (thermodynamic properties, equation of state) to the implications on the design and performance of heat exchangers and turbomachinery, dealing also with Life Cycle assessment and Social Capital Valuation. This feature of SCARABEUS' poses multiple technical challenges to the consortium but, at the same time, it also opens up opportunities for cross-fertilization as already demonstrated in the first half of the project.

The Webinar Series are aimed at sharing this holistic, multidisciplinary approach to research and development with interested professionals and young engineers, in a casual and stimulating environment. Far from the constraints of technical publications or conference presentations, the webinar series provide a virtual space where active discussions about each topic and their impact on other aspects of the technology are enabled and encouraged.

In the first half of the project, one webinar series comprised of nine events has been organized. The first event was delivered by the Project Coordinator and presented an overall view of the project: fundamentals, work programme, objectives, challenges... Then, eight webinars focused on specific aspects of the technology, starting with the fundamentals and ending with the ultimate impact of the SCARABEUS technology on society and the energy market. This is presented in Figure 7.









The individual webinars have a duration of one hour, the first 30 minutes of which correspond to a presentation by one or more speakers. Then, an open discussion chaired by the Dissemination Manager of the project is held for 30-45 minutes. The webinars were attended by some twenty attendees on average and a very positive feedback was received by University of Seville, acting as coordinator of the Dissemination activities.

A summary of the webinars and attendances are reported in the following Table 1.

#### Table 1 – Summary of the webinars, the leading partners and the number of attendees.

Webinar	Partner	Date	Attendees
Introducing SCARABEUS: objectives and current results	POLIMI	November 25	20
Introduction to power plant modelling and simulation	USE	December 2	31
Modelling and simulation of solar fields	ABE	December 9	13
Modelling and simulation of fluid properties	UNIBS	December 16	12
Role of Thermal Energy Storage system in CSP	POLIMI	January 13	17
Design and simulation of turbomachinery	CITY	January 20	19
Design and simulation of high temperature TES systems	TUW	January 27	9
Life Cycle Analysis of CSP plants	QUA	February 3	7
Natural Capital Valuation of CSP plants	LEAP	February 26	7

The second webinar series is scheduled for 2022. This second series will focus on the progress made during the development of the project. This will expectedly complement the fundamentals presented in the first webinar series.





#### Access to information/data

Attendance to the webinar series was free of charge upon registration through an online form for organizational purpose only. Tracking the background, interest and affiliation of the attendees did enable tailoring of the contents (focus, depth...) and therefore maximizing the added value of the activity.

Presentations have been made available at the conference website where a specific menu for webinars is available to visitors. Downloading of the presentations is accessible from this site: <a href="https://www.scarabeusproject.eu/webinars/">https://www.scarabeusproject.eu/webinars/</a>

### 5. General communication activities

#### Description of activity

In addition to specific communication actions like those described in the foregoing sections, the SCARABEUS team takes advantage of other potential communication (and dissemination) actions where interaction and networking with relevant stakeholders is possible. Such is the case of the meetings with R&D institutions, professional networks, governmental agencies and others where the researchers involved in SCARABEUS can spread the word of the activities carried out by the consortium and also raise awareness of the main social and environmental problems that the project aims to tackle. These activities are not planned; rather, they come from stakeholders and media which become interested in the project. The following list provides the most relevant general communication activities:

- Participation to meetings/Events for communication of the general features of SCARABEUS and of the support of the European Commission to carry out high-level research in Europe.
  - Pro. Paolo Iora, University of Brescia. Italian National Infoday for the 2020 SC3 Secure, Clean and Efficient Energy. July 2019, Rome (Italy).
  - Prof. David Sánchez, University of Seville. Presentation at the Infoday for the 2020 SC3 Secure, Clean and Efficient Energy. October 2019, Seville (Spain).
  - Prof. Giampaolo Manzolini, Politecnico di Milano. Attendance to the CSP workshop arranged by the EU commission. November 2019.
- Interviews on mass media: radio broadcasters (national), printed newspapers, etc. by Prof. Giampaolo Manzolini, Politecnico di Milano.
- Publications in topical publications on energy and renewable energies. A summary of the objectives and activities carried out by the SCARABEUS consortium was published on *New Energy Update* in April 2020.





Figure 7 – Prof. David Sánchez (centre) at a communication event organised by the regional and national governments in Southern Spain.

#### Access to information/data

Information about website these events is reported through the project (https://www.scarabeusproject.eu/activities/) and LinkedIn accounts. More information is also found in the Dissemination Logbook which can be accessed from the project site: https://www.scarabeusproject.eu/disseminations/. As said, this document is public.

## 6. Dissemination Logbook

#### Description of activity

The *Dissemination Logbook* contains a detailed list of the dissemination and communication activities carried out by the consortium. It is an Open Access document comprised of the Dissemination and Communication Plan (D7.1) and a detailed list of dissemination and communication activities, similar to the information presented in this document but formatted according to a systematic pattern:

- Date of activity.
- Title of activity.
- Description of activity.
- Type of activity.
- Work Package and Task to which the activity is linked.
- Leading partner carrying out the activity.
- Availability of the information.
- Link to publication.
- Additional information.

The updated *Dissemination Logbook* is updated regularly and the last version of it can be downloaded from the project website, following the link at the top of the *Dissemination* page. A screenshot of the list of activities in the *Dissemination Logbook is shown* in Figure 6.





#### SCARABEUS

DISSEMINATION LOGBOOK (WP7)

Date	10.6	Description	npe		1625	teau	AVA.15.015	Additional mo
12/04/2019	Kick-off meeting	SCARABEUS kick-off meeting	M	1	1.1	POLIMI	NA	Brussels
		Webinar regarding Kelvion's Printed Circuit Heat						PCARADER and at 26 min and 15 c
21/04/2020	Kelvion's Printed Circuit Heat Exchanger	Exchanger including general communication about	Spk	4		K EL	Yes	SCARABEUS part at 26 min and 15 s
		the SCARABEUS project						Available (Phttps://www.youtube.com/watch?v=1XhVQRURX4
	from security and CARbons of involve (Albons of the fit of a Blands for	talian National Infoday for the 2020 - SC3 Secure						Presentation by Paolo lora
01/07/2019	Supercritical Crickoon and Aug Arcentative nature	Class and Efficient forces:	Gen			UNBS	Yes	Romo Bab
	Endercy opgrade of solar power plant	chan and a hour and g	-					ito inc, italy
24/07/2019	Abengoa announces its participation in the SCARABEUS project	Publication in the company blog	Gen			ABE	Yes	General public communication action
	through its blog			7				
	Investigating the effect of using different CO2 blends as working	Tel: La constanta da 660 finanza da da 6 meter	0					Abstract submitted - Conference rescheduled for February 22th to 25th
02/08/2019	fluids on the turbine design for a 100 MWe Power plant	7th International scu2 Power Cycles symposium	Con	3		CIII	NO	2021. Paper withdrawn and prepared for journal submission.
	An exploring of aCO2, additive for properties modification							HDRUGC SUDMICLED
02/08/2019	An elaberation of sector as a listing the properties mountation	7th International sCO2 Power Cycles Symposium	Con	4		TUW	No	Conference rescheduled for February 22th to 25th 2021, San Antonio
	used for power cyce applications based on process simulation							FADW ACHDING
02/08/2019	Updated Review of the Potential of Supercritical Carbon Dioxide	7th International (CO2 Rower Cycler Semonsium	Con	e e		1152	No	Conference recheduled for Debruary 23th to 35th 2021 See Antonio
	Cycles for Concentrating Solar Power Applications							100
	Supercritical CO2 power cycle research by European Academia:							invited speaker
02/08/2019	SCARABEUS	7th International sCO2 Power Cycles symposium	зрк	5		USE	NO	Conference rescheduled for Hebruary 22th to 25th 2021, San Antonio
14/08/2019	Types of heat exchangers for sCO2 power cycles	Bachelor thesis; author: Alexandra Puchegger	Gen	6		TUW	Yes	printed version available at Institute for Energy Systems and Thermodynamics
	6	A constant of the A of A constant of the constant						
20/09/2019	Supercritical CO2/AlternativeHuid Biends for Efficiency Opgrade	Presentation at the 3rd turopean supercritical	Con	7		POLIMI	Yes	Paris, 19th and 20th of September 2019
	of Solar Power Plant	CO2 Conference						
	Writing successful proposals for the H2020 programme:	Presentation at the Infoday for the 2020 - SC3				1.000		Panel session. David Sánchez panelist
01/10/2019	SCARABEUS	Secure, Clean and Efficient Energy	Gen			USC	NU	Seville, Spain
01/10/2019	Poster presentation	25th SolarPACES conference	Con	7		POLIMI	No	Poster session
		Interview by Maurizio Melis for Smart City						
08/10/2019	Interview with Prof. Manzolini	broadcasted nationaly by Radio 24	Gen	7		POLIMI	Yes	Podcast available for download
		broadcasted nacionally by Radio 24	-					
	Charakterisierung der Wärmeübergangseigenschaften von	Bachelor thesis; author: Paul Schwarzmayr; title						Printed version (German Janguage) available at Institute for Energy Systems
22/11/2019	superinting on the material galget galget galler	translated in English: 'characterisation of heat	Gen	6		TUW	Yes	and Thermodynamics: results will be shown in paper soon
	supervices and coz	transfer of supercritical CO21						and ine modynamics; results will be shown in paper soon
	Presentation of the project and synerates discussion with other	Attendanceto the CSP workshop arranged by the						
27/11/2019	Bioroists	fU commission	Gen	1		POLIMI	Yes	
01/12/0010	the last state of a second ball (0) when which the	Description of the Address of the Provide States of the Address of	6			0.0%	0	for free second with damage and a second for large damage balance
04/12/2019	Wear-line design of a supercritical CO2 micro asia turbine	Paper submitted to Assit jurbo Expo 2020	Con	3		CIT	Un-request	Conterence paper, withdrawn and prepared for journal submission.
24/12/2019	Nethodology for CU2 mixture identification	Appied InermalEngneering	JOUPK	2		POUM	16	Gold Upen Access
31/01/2019	Überblick und Freebnisse bestehender sCO2 Forschungsanlagen	Term paper: author: Philip Bukowan	Gen	6		TUW	Onconnect	Title translated to English: 'Overview and results of existing sCO2 test ries'
,								
17/02/2020	Wärmeübergangseigenschaften von superkritischem CO2	Term paper; author: Paul Schwarzmayr	Gen	6		TUW	On-request	More theoretical work of bachelor thesis
31/03/2020	Experimental and analytical procedure for the characterization of	Journal paper submitted to Applied Thermal Epsis	Iou PR	2	2.1	UNBS	Yes	Revised version submitted Available when published
	innovative working fluids for power plants applications			-				
			-					
								Article publised online in the New Energy Update journal.
02/04/2020	Blended sCO2 fluids could slash CSP costs, early data shows	Article in New Energy Update	Jou NPR	7		USE	16	Link: https://analysis.newenergyupdate.com/csp-today/blended-sco2-
								fluids-could-slash-csp-costs-early-data-shows
								Workshop for MSc and PhD students interested in the topic. Delivered at
22/04/2020	Modeling and simulation of CSP systems	Workshop	Gen	5		USE	On-request	USE during the 2nd Progress Meeting (CANCELLED due to COVID-19)
								Networking agent in in the organized by SCARABE IS and SOCRATCES Co.
22/04/20220	Rede and the American face of the institution of the second second second	the second second	6			1000		Networking event jointry organised by SCARABEOS and SOCRATCES. Co-
22/04/2020	Role and challenges for CSP in the future energy landscape	Networkingevent	Gen			USE	Un-request	located with the 2nd Progress Neeting at USE (April 21st 2020)
								(CANCELLED due to COVID-19)
29/04/2020	CO2-based mixtures for transcritical cycle in CSP applications	Master Thesis dissertion	Gen	2		POUM	No	Master thesis dissertion
	Cost of Electricity of Concentrated Solar Power Plants Using	Journal paper for Applied Themal Engineering's				1.000		
30/04/2020	Supercritical Carbon Dioxide Power Cycles	special issue on sCO2 technologies	JOUPK	5	15.1.1	USE	16	Under review
	influence of CO2 based mixture transport properties on the							
01/07/2020	darian of host such many	Master Thesis dissertion (start)	Gen	2		UNIBS	On-request	
	uesprormes exchanges		-	-		-		
14/07/2020	Corrosion behavior of metallications used in sCO2 nower ordes	Master Thesis dissertion	Gen	2		UNBS	On-request	
						0.105	an request	
	Potential of Supercritical Carbon Dioxide Power Cycles to Reduce							
22/07/2020	the Levelsed Cost of Electricity of Contemporary Concentrated	Journal paper for Applied Sciences's special issue	Jou PR	5	T5.1.1	USE	Yes	Open Access
	Solar Power Plants	on sCO2 technologies						
				-				
23/07/2020	Mean-line design of a supercritical CO2 micro-axial turbine	Journal paper for Applied Sciences's special issue	Jou PR	3		CITY	Yes	Open Access
		on sCO2 technologies						
	Assessment of the relative importance of boundary conditions							
28/07/2020	on the performance of a cascade of axial compressor blades	Bachelor thesis	Gen	3.65		USE	Yes	In Spanish, Available upon request.
	operating on ideal and non-ideal working fluids							
			-					
13/08/2020	Thermal efficiency gains enabled by using supercritical CO2	Paper submitted to the 4th European sCO2	Con	5	T5.2	LISE	Yes	Paner submitted in early November 2020
	mixtures in Concentrated Solar Power applications	Conference for Energy Systems						
	Binary interaction parameter upper tainty in the optimisation of a	Paper submitted to the 4th Euroneen sCO2						
13/08/2020	terre plate de la seconda de la terre de la terre de la desia	Cardena and as for man for the second	Con	3		CITY	No	Paper submitted in early November 2020
	cranae inter oper, consequences on continuousge	contradictor citago systems						
01/09/2020	SCARABEUS project page on Quantis website	Dissemination through website	Gen	5		QUA	Yes	Available on company's website
	Influence of the fountions of State on the performance of							
25/09/2020	CO2+C6F6 as in povative working fluid in transcritical ordes	Journal paper submitted to Energy	Jou PR	2		UNBS	Yes	Available when published (Gold Open Access)
	Adoption of CO2 blended with C6F6 as working fluid in CSP							Oral presentation at SolarPACIS 2020 (online). September 28 - October 2
01/10/2020	olants	Conference paper	Con	2 & 5		POLIMI	No	I o intactivity by POLIMELINIBS and LISE
	Assessment of RANS turbulence models for evaluating large scale							
01/10/2020	sCO2 axial turbine performance	Abstract submitted to ASME Turbo Expo 2021	Con	3		CITY	NO	
	Sensitivity of transcritical orde and turbing design to donant	Journal paper for Applied Themal Engineering's						
03/10/2020	fraction in CO2-based workingfluids	special insue on a CO2 technologies	Jou PR	3	1	CITY	Yes	Under review
<u> </u>	reaction in cost bable working rules	spear as conscion score technologies		I		I		to be descent as well as well as well to an an an and to all the descent of the second s
07/10/2020	Supercritical CO2 blends for Concentrated Solar Power plants:	Live webinar: Supercritical CO2 cycles - Theory and	Sok	5	1	ABE	Yes	Invited spearker to live webinar sponsored by KTH Energy Platform, October
	H2020 SCARABEUS project	applications	. apra	· ·		101		7 2020
	Modifications to the conductance ratio methodology to enable							
07/10/2020	transient performance assessment of heat exchangers of	Master thesis dissertation	Gen	4 & 5	1	USE	Yes	waster thesis by POLIMI Brasmus student at USE. Joint development by USE
	unknown geometry				1			and POLIMI
-	Influence of Working Build Composition on the Ontinum	1	1	1	-	1		1
14/10/2020	Characteristics of Blanded for mobiled Cables D	Abstract submitted to ASME Turbo Expo 2021	Con	5	T5.1.2	USE	No	Abstract accepted. Paper under preparation
	characteristics or biendeu supercritical Carbon Dioxide Cycles							

Figure 8 – Screenshot of the Dissemination Logbook

#### Access to information/data

The Dissemination Logbook can be accessed from the project site, following the associated link available atthetopoftheDisseminationmenuoftheprojectwebsite:https://www.scarabeusproject.eu/disseminations/The document is public so downloading is unrestricted.





## Dissemination

## 1 Journal publications

#### **Description of activity**

Publication of articles in scientific journals is a common dissemination channel for researchers. Journals are organized according to subjects and/or categories and indexed in scientific databases. They are also ranked according to different metrics which quantify their impact on the community. The most common metrics to assess the impact of scientific journals are the Impact Factor according to Journal Citation Reports (JCR) and Scimago (SCR):

- The JCR impact factor (JCR-IF) measures how often the articles published in the journal in the past two years have been cited in the current year, relative to the number of articles published.
- The SCR impact factor (SCR-IF) measures the number of cites over a period of three years but it also takes into consideration the quality of the journals where the citing articles are published.

A complementary figure of metric to assess the impact of a given article is the number of times a work is cited by other authors. Nevertheless, there is a delay in the accounting of cites owing to the time needed for the original work to be published and the citing article to be written, reviewed and eventually published. Therefore, despite the interest of this metric, it is usually not applicable to track the impact of dissemination in the lifetime of a research project.

The SCARABEUS consortium has published four journal papers in peer-reviewed journals and three more papers are currently under review. The journals are in the first quartile of either JCR or SCR, hence meeting the objective to disseminate results through high-impact journals.

- G. Di Marcoberardino et al., 2020, Experimental and analytical procedure for the characterization of innovative working fluids for power plants applications, Applied Thermal Engineering (178) pp. 115513.
- F. Crespi et al., 2020, Potential of Supercritical Carbon Dioxide Power Cycles to Reduce the Levelised Cost of Electricity of Contemporary Concentrated Solar Power Plants, Applied Sciences (10) pp. 5049.
- S.I. Salah *et al.*, 2020, *Mean-Line Design of a Supercritical CO*<sub>2</sub> *Micro Axial Turbine*, Applied Sciences (10) pp. 5069.
- O.A. Aqel et al., 2021, Sensitivity of transcritical cycle and turbine design to dopant fraction in CO2based working fluids, Applied Thermal Engineering (190) pp. 116796.

#### Access to information/data

In order to comply with the Open Research Data Pilot and in agreement with Annex I to the Grant Agreement, all these papers are published in either Open Access journals or in regular journals under Gold Open Access individually. Links to the publishers of all journals are provided in the accompanying *Dissemination Logbook*.

## 2. Conference papers

Description of activity



The Annex to the Grant Agreement identifies the presentation of results at international scientific conferences as a core dissemination activity as this enables showcasing the latest results of the project while networking with other members of the scientific, governmental and industrial communities (key stakeholders of SCARAEBSU). This activity has unfortunately been hindered by the COVID -19 pandemic, as a consequence of which all conferences since March 2020 have been either cancelled or transformed from face-to-face into virtual events. At the beginning, this brought about hesitation about the added value of participating to this virtual events as opposed to publishing in journals directly.

Nevertheless, the scientific community has shown the capacity to creatively develop channels and platforms for knowledge sharing that are specifically tailored to enable interaction and effective sharing of results. These platforms are being used widely now and enabling the organization of conferences virtually but with much added value in terms of socialization and networking.

The SCARABEUS consortium has been very active in the presentation of results at international conferences, following the original *Dissemination and Communication Plan*. In particular, nine papers have been presented at international meetings such as *SolarPACES*, *European sCO*<sub>2</sub> *Conference for Energy Systems*, *International sCO*<sub>2</sub> *Power Cycles Symposium* and *ASME Turbo Expo*. These are reference events in the areas of renewable energies, turbomachinery and power cycles and, very specifically, supercritical Carbon Dioxide technology.

- M. Binotti *et al., Supercritical Carbon Dioxide/Alternative Fluid Blends for Efficiency Upgrade of Solar Power Plant*, 25<sup>th</sup> SolarPACES conference, 1 4 October 2019, Daegu.
- M. Binotti *et al.*, Supercritical CO<sub>2</sub>/Alternative Fluid Blends for Efficiency Upgrade of Solar Power Plant, 3<sup>rd</sup> European Supercritical CO<sub>2</sub> Conference, 19-20 September 2019, Paris.
- F. Crespi *et al.*, Thermal efficiency gains enabled by using supercritical CO2 mixtures in Concentrated Solar Power applications, 4<sup>th</sup> European Supercritical CO2 Conference, 23-24 March 2021, Prague.
- O. Aqel et al., Binary interaction uncertainty in the optimisation of a transcritical cycle : consequences on cycle and turbine design, 4<sup>th</sup> European Supercritical CO<sub>2</sub> Conference, 23-24 March 2021, Prague.
- G. Manzolini *et al., Adoption of CO<sub>2</sub> blended with C<sub>6</sub>F<sub>6</sub> as working fluid in CSP plants, 26<sup>th</sup> SolarPACES conference, 28 September 2 October 2020, Online.*
- M. White et al., Comparison of CFD Predictions of Supercritical Carbon Dioxide Axial Flow Turbines Using a Number of Turbulence Models, ASME Turbo Expo, 7-11 June 2021, Online.
- F. Crespi et al., Influence of Working Fluid Composition on the Optimum Characteristics of Blended Supercritical Carbon Dioxide Cycles, ASME Turbo Expo, 7-11 June 2021, Online.
- F. Crespi et al., The Potential of Supercritical Cycles Based on CO<sub>2</sub> Mixtures in Concentrated Solar Power Plants: an Exergy-Based Analysis, 6<sup>th</sup> International Seminar on ORC Power Systems, 11-13 October 2021, Munich.
- F. Crespi et al., Updated Review of the Potential of Supercritical Carbon Dioxide Cycles for Concentrating Solar Power Applications, 7<sup>th</sup> Supercritical CO<sub>2</sub> Power Cycles Symposium, 21-24 February 2022, San Antonio (TX).

Contributions to these conferences take the form of technical papers with an extension of 8-10 pages which are peer-reviewed by at least two experts in the area who are affiliated to academia, industry and/or government.

#### Access to information/data

Some of the aforecited conferences (*European sCO<sub>2</sub> Conference for Energy Systems, International sCO<sub>2</sub> Power Cycles Symposium*) make the presented papers available from the conference website whilst, for others (*SolarPACES, ASME Turbo Expo*), papers are published in associated journals where Open Access cannot be enabled. Fortunately, some of the latter are changing the publishing policy and have recently enabled Gold Open Access publication for authors willing to pay the corresponding fee. Such is the case for *ASME Turbo Expo*.





Links to publications are provided in the accompanying *Dissemination Logbook*. Some of these links take interested readers to the digital repositories of the conference whereas others point towards publishers of papers which are not accessible freely. In these cases, links to academic repositories are provided.

## 3 Social media - Research Gate

#### Description of activity

SCARABEUS makes use of ResearchGate as a scientific social media to disseminate the activities and results of the project, akin to the utilization of LinkedIn for general dissemination. This platform is acknowledged to be the largest network in terms of active users (users who actually make use of their accounts) and it therefore opens up many opportunities to raise awareness of the contribution of SCARABEUS to advancing Concentrated Solar Power technology.

ResearchGate has a fundamental difference with respect to LinkedIn inasmuch as it does not enable the creation of corporate accounts linked to a project. Rather, all accounts are personal and linked to researchers. This is why a SCARABEUS folder has been created by the Dissemination Manager of SCARABEUS (Prof. David Sánchez) and then shared with all the researchers at the SCARABEUS partners, listed as collaborators. The scientific documents produced by the project are then stored in this folder so it becomes a sort of hub for the scientific information of SCARABEUS. As of today, the folder accrues 500 reads from ResearchGate users.

#### Access to information/data

The information stored in the SCARABEUS folder of ResearchGate can be accessed freely by any user of ResearchGate. Those documents who are not subjected to copyright restrictions or whose copyrights have been cleared through appropriate Gold Open Access fees can be downloaded. Then, for documents which are limited by copyright transferred to Third Parties, the abstract is reported along with directions to the publisher site (digital object identifier). A complementary feature of ResearchGate is the possibility to send messages to authors of papers so they can expand the information provided in the paper or maybe engage in further discussions and opportunities for collaboration.

## 4. Training

#### **Description of activity**

As reported in the *Dissemination and Communication Plan*, the SCARABEUS project supports the importance of training the next generation of engineers and it has therefore incorporated early-stage researchers from the academic institutions into the project team, hence developing research at the doctoral level for the complete duration of SCARABEUS. The incorporation of these PhD students to all the academic partners of SCARABEUS has been announced through LinkedIn and the project's website. Also, several undergraduate and graduate students are developing or have already developed their theses incardinated in the research teams at each institution and this activity will remain throughout the remainder of the project. As of today, there are six PhD students involved at the academic partners of SCARABEUS and they are complemented by nine undergraduate students whose theses are linked to the project. This is at the high end of the project targets as reported in Annex I to the Grant Agreement.





#### Access to information/data

The bachelor (BSc) and master (MSc) theses of students involved in SCARABEUS will be made available through the repositories of each institution and links will be provided through the *Dissemination Logbook* attached. These documents may be in English or in the native language of the students, depending on the requirements of each academic institution.

PhD students will, on the other hand, disseminate the results of their work regularly through common scientific channels like journal papers or conference contributions. Then, at the end of the project, when the PhD theses will have been completed, these documents will be made available through the scientific repositories of the corresponding academic institutions and also through the project website. The availability of these dissertations will be announced through the dissemination platforms of SCARABEUS: website and LinkedIn.



## Exploitation

## 1 Exploitation LogBook

#### Description of activity

The first step towards exploitation and, in particular, commercialization is identification of the actual product. The SCARABEUS project investigates different areas of Concentrated Solar Power where the newly developed, sCO<sub>2</sub>-based power cycle will be employed. Therefore, it is possible that the exploitable result be one single product or, on the contrary, a variety of them. This is even more so given the diversity of background knowledge used and also the several energy-related applications where the results could be applied/exploited. The researchers involved in each focus area of the project know the current state-of-theart in their respective areas and will therefore help identify which the exploitable products of SCARABEUS really are.

Once the identification of *products* is complete, the next step is to study how to protect these results before disclosing them to potential stakeholders, in order to ensure that Intellectual Property is preserved in the subsequent stages towards commercialization.

The identification of exploitable results is managed through the Exploitation LogBook which serves as the main pillar of the Exploitation Database. It has the basic information to classify a potentially exploitable product. It has the following information for each entry:

- Date of identification.
- Title of exploitable result.
- Description / Expected use / Innovative content .
- Owner and Other partners involved.
- WP Task.
- Type of IPR Copyright: Patent, Trade Mark, Design Rights, Know-How, Trade Secret.
- Status of IPR: map of patent for patentability, patent filing, patent submissions, granting of patent.
- Target Market.
- Market size: cumulative capacity, units installed, revenue
- Additional information.

The exploitation logbook is updated regularly. Abengoa sends bimonthly reminders through e-mail to ensure that the database remains updated.

During the first half of the project, Abengoa regularly encouraged the partners to find and detect new opportunities to launchproducts or technology. This activity will be intensified through personalized contacts with the individual partners in the consortium a well as through focus-meetings exploring industrial protection options.

A survey made by the IP Department at Abengoa and the management team will be distributed amongst the the partners with the aim to detect exploitation opportunities. Once the survey will be filled by one of the partners, a meeting between the Patent Office at Abengoa and the individual partne(s) involved in the new knowledge generated will devise a roadmap to patentability. The survey will explore the process, software, designs, and possible products that the partners have developed in the project since, sometimes, the experts do not acknowledge that the work they have carried out is susceptible of being protected or which the





appropriate routes to protect this work are most suitable. The distribution of this survey will start in July 2021 and in is expected to end on September 30<sup>th</sup>. Then, the intellectual properties meetings will start.

#### Access to information/data

The information is made available to the partners in the SCARABEUS repository, which can be accessed from the project website: https://repository.scarabeusproject.eu/index.php/login





## Conclusions

This deliverable report has presented a summary review of the communication, dissemination and exploitation activities carried out by the SCARABEUS consortium in the first half of the project. The overall balance is positive. As reported, the activities are commensurate with the standards of research and innovation actions within the H2020 programme and also the timeline of the project. This is even more so in the current context where the COVID-19 pandemic has hindered many of the networking and outreach activities originally planned.

As far as the Open Research Data Pilot is concerned, the consortium has tried its best to enable unlimited access to all the dissemination materials produced. This applies to peer-reviewed journals, conference proceedings and other channels. There is currently little information which cannot be accessed by interested readers.

Finally, it is to note that other communication activities were organized by the consortium, most notably joint dissemination events with other projects in related calls of the H2020 programme. These activities were eventually cancelled and are now being organized with a different format. These joint events are deemed very important by the consortium and will receive a lot of attention in the coming months. Future updates of this document and of the *Dissemination Logbook* available on the project website will report more information.

For any query about Dissemination and Communication activities, please get in contact with Prof. David Sánchez at <u>ds@us.es</u>.





## SCARABEUS 🔇

#### DISSEMINATION LOGBOOK (WP7)

Entry #	Date	Title	Description	Туре	WP	Task	Lead	Available	Link to publication	Additional Info
1	12/4/19	Kick-off meeting	SCARABEUS kick-off meeting	М	1	1.1	POLIMI	NA	Brussels	Brussels
2	21/4/20	Kelvion's Printed Circuit Heat Exchanger	Webinar regarding Kelvion's Printed Circuit Heat Exchanger including general communication about the SCARABEUS project	Spk	4		KEL	Yes	SCARABEUS part at 26 min and 15 s Available @ https://www.youtube.com/watch?v=1XnVQJkORX4	SCARABEUS part at 26 min and 15 s Available @ https://www.youtube.com/watch?v=1XnVQlkORX4
3	1/7/19	Supercritical CARbon dioxide/Alternative fluids Blends for Efficiency Upgrade of Solar power plant	Italian National Infoday for the 2020 - SC3 Secure, Clean and Efficient Energy	Gen	7		UNIBS	Yes		Presentation by Paolo Iora Rome, Italy
4	24/7/19	Abengoa announces its participation in the SCARABEUS project through its blog	Publication in the company blog	Gen	7		ABE	Yes		General public communication action
5	2/8/19	Investigating the effect of using different CO2 blends as working fluids on the turbine design for a 100 MWe Power plan	Tth International sCO2 Power Cycles Symposium	Con	3		CITY	No		Abstract submitted - Conference rescheduled for February 22th to 25th 2021. Paper withdrawn and prepared for journal submission.
6	2/8/19	An evaluation of sCO2-additives for properties modification used for power cycle applications based on process simulation	7th International sCO2 Power Cycles Symposium	Con	4		TUW	No		Abstract submitted Conference rescheduled for February 22th to 25th 2021, San Antonio (TX)
7	2/8/19	Updated Review of the Potential of Supercritical Carbon Dioxide Cycles for Concentrating Solar Power Applications	7th International sCO2 Power Cycles Symposium	Con	5		USE	No		Paper accepted Conference rescheduled for February 22th to 25th 2021, San Antonio (TX)
8	2/8/19	Supercritical CO2 power cycle research by European Academia: SCARABEUS	7th International sCO2 Power Cycles Symposium	Spk	5		USE	No		Invited speaker Conference rescheduled for February 22th to 25th 2021, San Antonio (TX)
9	14/8/19	Types of heat exchangers for sCO2 power cycles	Bachelor thesis; author: Alexandra Puchegger	Gen	6		TUW	Yes		printed version available at Institute for Energy Systems and Thermodynamics
10	20/9/19	Supercritical CO2/Alternative Fluid Blends for Efficiency Upgrade of Solar Power Plant	Presentation at the 3rd European Supercritical CO2 Conference	Con	7		POLIMI	Yes	Link to paper: https://duepublico2.uni-due.de/receive/duepublico_mods_00048892 Link to presentation: https://sco2.eu/fileadmin/user_upload/presentations/2019/ID-141.pdf	Paris, 19th and 20th of September 2019
11	1/10/19	Writing successful proposals for the H2020 programme: SCARABEUS	Presentation at the Infoday for the 2020 - SC3 Secure, Clean and Efficient Energy	Gen	7		USE	No		Panel session. David Sánchez panelist Seville, Spain
12	1/10/19	Supercritical Carbon Dioxide / Alternative Fluid Blends for Efficiency Upgrade of Solar Power Plants	25th SolarPACES conference	Con	7		POLIMI	No		Poster session
13	8/10/19	Interview with Prof. Manzolini	Interview by Maurizio Melis for Smart City, broadcasted nationally by Radio 24	Gen	7		POLIMI	Yes		Podcast available for download
14	22/11/19	Charakterisierung der Wärmeübergangseigenschaften von superkritischem CO2	Bachelor thesis; author: Paul Schwarzmayr; title translated in English: 'characterisation of heat transfer of supercritical CO2'	Gen	6		TUW	Yes		Printed version (German language) available at Institute for Energy Systems and Thermodynamics; results will be shown in paper soon
15	27/11/19	Presentation of the project and synergies discussion with other EU projects	Attendance to the CSP workshop arranged by the EU commission	Gen	1		POLIMI	Yes		
16	4/12/19	Mean-line design of a supercritical CO2 micro axial turbine	Paper submitted to ASME Turbo Expo 2020	Con	3		CITY	On-request		Conference paper. Withdrawn and prepared for journal submission.
17	24/12/19	Experimental and analytical procedure for the characterization of innovative working fluids for power plants applications	Applied Thermal Engineering	Jou PR	2	2.1	UNIBS	Yes	Link to repository: http://hdl.handle.net/11379/531838 Link to publisher: https://www.sciencedirect.com/science/article/pii/S1359431120329951	Gold Open Access
18	31/1/19	Überblick und Ergebnisse bestehender sCO2 Forschungsanlagen	Term paper; author: Philip Bukovcan	Gen	6		TUW	On-request		Title translated to English: 'Overview and results of existing sCO2 test rigs'
19	17/2/20	Wärmeübergangseigenschaften von superkritischem CO2	Term paper; author: Paul Schwarzmayr	Gen	6		TUW	On-request		More theoretical work of bachelor thesis
20	2/4/20	Blended sCO2 fluids could slash CSP costs, early data shows	Article in New Energy Update	Jou NPR	7		USE	Yes	Article publised online in the New Energy Update journal. Unk: https://analysis.newenergyupdate.com/csp-today/blended-sco2-fluids-could-slash-csp-costs-early-data-shows	Article publised online in the New Energy Update journal. Link: https://analysis.newenergyupdate.com/csp-today/blended-sco2- fluids-could-slash-csp-costs-early-data-shows
21	22/4/20	Modelling and simulation of CSP systems	Workshop	Gen	5		USE	On-request		Workshop for MSc and PhD students interested in the topic. Delivered at USE during the 2nd Progress Meeting (CANCELLED due to COVID-19)
22	22/4/20	Role and challenges for CSP in the future energy landscape	Networking event	Gen	7		USE	On-request		Networking event jointly organised by SCARABEUS and SOCRATCES. Co- located with the 2nd Progress Meeting at USE (April 21st 2020) (CANCELLED due to COVID-19)
23	29/4/20	CO2-based mixtures for transcritical cycle in CSP applications	Master Thesis dissertion	Gen	2		POLIMI	No		Master thesis dissertion
24	30/4/20	Cost of Electricity of Concentrated Solar Power Plants Using Supercritical Carbon Dioxide Power Cycles	Journal paper for Applied Themal Engineering's special issue on sCO2 technologies	Jou PR	5	T5.1.1	USE	Yes	Under review	Under review
25	6/6/20	Thermodynamic models for CO2 based mixtures : application in transcritical cycles for concentrating solar power plants	Master Thesis dissertion	Gen	2		POLIMI	No		
26	1/7/20	Influence of CO2 based mixture transport properties on the design of heat exchangers	Master Thesis dissertion (start)	Gen	2		UNIBS	On-request		
27	14/7/20	Corrosion behavior of metallic alloys used in sCO2 power cycles	Master Thesis dissertion	Gen	2		UNIBS	On-request		
28	22/7/20	Potential of Supercritical Carbon Dioxide Power Cycles to Reduce the Levelised Cost of Electricity of Contemporary Concentrated Solar Power Plants	Journal paper for Applied Sciences's special issue on sCO2 technologies	Jou PR	5	T5.1.1	USE	Yes	Link to repository: https://idus.us.es/handle/11441/102126 Link to oublisher: https://www.mdpi.com/2076-3417/10/15/5049/htm	Open Access
29	23/7/20	Mean-line design of a supercritical CO2 micro-axial turbine	Journal paper for Applied Sciences's special issue on sCO2 technologies	Jou PR	3		CITY	Yes	Link to publisher: https://www.mdpi.com/2076-3417/10/15/5069/htm	Open Access
30	28/7/20	Assessment of the relative importance of boundary conditions on the performance of a cascade of axial compressor blades operating on ideal and non-ideal working fluids	Bachelor thesis	Gen	3 & 5		USE	Yes		In Spanish. Available upon request.
31	13/8/20	Thermal efficiency gains enabled by using supercritical CO2 mixtures in Concentrated Solar Power applications	Paper submitted to the 4th European sCO2 Conference for Energy Systems	Con	5	T5.2	USE	Yes	Link to presentation: https://sco2.eu/fileadmin/user_upload/presentations/2021/Crespi- Thermal_efficiency_gains_enabled_by_usins_zuperritical_CO2_mixtures-141_c.pdf Link to paper: https://duepublico2.uni-due.de/receive/duepublico_mods_00073942	Paper slected for journal publication Energy. Joint activity by USE, POLIMI, UNIBS and LEAP
32	13/8/20	Binary interaction parameter uncertainty in the optimisation of a transcritical cycle: consequences on turbine design	Paper submitted to the 4th European sCO2 Conference for Energy Systems	Con	3		CITY	No	Link to presentation: https://sco2.eu/fileadmin/usr_upload/presentations/2021/Aqel- Binary_interaction_parameter_uncertainty_in_the_potImisation=126_c.pdf Link to paper: https://duepublico2.uni-due.de/receive/duepublico_mods_00073959	
33	1/9/20	SCARABEUS project page on Quantis website	Dissemination through website	Gen	5		QUA	Yes	Available on company's website	Available on company's website
34	25/9/20	Influence of the Equations of State on the performance of CO2+C6F6 as innovative working fluid in transcritical cycles	Journal paper submitted to Energy	Jou PR	2		UNIBS	Yes	Available when published (Gold Open Access)	Available when published (Gold Open Access)
35	1/10/20	Adoption of CO2 blended with C6F6 as working fluid in CSP plants	Paper presented to SolarPACES	Con	2 & 5		POLIMI	No	Link to publication not available yet	Oral presentation at SolarPACES 2020 (online), September 28 - October 2 Joint activity by POLIMI, UNIBS and USE
36	1/10/20	Comparison of CFD Predictions of Supercritical Carbon Dioxide Axial Flow Turbines Using a Number of Turbulence Models	Paper submitted to ASME Turbo Expo 2021	Con	3		CITY	No		Paper accepted for publication.

37	3/10/20	Sensitivity of transcritical cycle and turbine design to dopant fraction in CO2-based working fluids	Journal paper for Applied Themal Engineering's special issue on sCO2 technologies	Jou PR	3		CITY	Yes	Link to publisher: https://www.sciencedirect.com/science/article/pii/S1359431121002489	Gold Open Access
38	7/10/20	Supercritical CO2 blends for Concentrated Solar Power plants: H2020 SCARABEUS project	Live webinar: Supercritical CO2 cycles - Theory and applications	Spk	5		ABE	Yes		Invited spearker to live webinar sponsored by KTH Energy Platform, October 7 2020
39	7/10/20	Modifications to the conductance-ratio methodology to enable transient performance assessment of heat exchangers of unknown geometry	Master thesis dissertation	Gen	4 & 5		USE	Yes		Master thesis by POLIMI Erasmus student at USE. Joint development by USE and POLIMI (cancelled due to COVID pandemic)
40	16/3/21	Influence of Working Fluid Composition on the Optimum Characteristics of Blended Supercritical Carbon Dioxide Cycles	Paper submitted ASME Turbo Expo 2021	Con	5	T5.1.2	USE	Yes		Paper accepted for publication. Paper will classify as Gold Open Access when presented at conference
41	15/4/21	Dynamische Simulation und Analyse des Wärmeübergangs eines Kohlenstoffdioxid Kreisprozesses	MSc thesis	Gen	6		TUW	Yes	https://repositum.tuwien.at/handie/20.500.12708/17365	In German
42	4/5/21	The Potential of Supercritical Cycles Based on CO2 Mixtures in Concentrated Solar Power Plants: an Exergy-Based Analysis	Paper submitted to the th International Seminar on ORC Power Systems	Con	5	T5.1.2	USE	On-request		Abstract accepted
43	17/5/21	Thermal Efficiency Gains Enabled by Using Supercritical CO2 Mixtures in Concentrated SolarPower Applications	Paper submitted to Energy	Jou PR	5	T5.1.2	USE	Yes		Paper under review