

D7.1 – First Dissemination and Communication Plan



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WP 7: Dissemination, Communication and Exploitation

Task 7.2: Dissemination

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¹ 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)

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Executive Summary

This document provides information about the Dissemination & Communication Plan of SCARABEUS. To this end, the document is structured in a number of Sections.

Sections 1 to 3 introduces the objectives of the project, to which dissemination and communications activities are inherently linked, and the scope of this deliverable report. Also, for the sake of clarity, precise definitions of the terms Dissemination, Communication and Exploitation are provided, as defined in the documents issued by the European Commission. Section 4 complements the foregoing information with the Contractual Obligations of the partners set forth in the Grant Agreement. Additional references to this information are given in Section 5.

Section 6 outlines the governance and managerial structure of the project, including the contact details of the key consortium members involved.

Section 7 provides the details of the Dissemination and Communication Plan of SCARABEUS. This includes the overall strategy and key stakeholders targeted by the consortium as well as the channels that will be used to reach out to them. Specific dissemination activities are also listed, including the commitments of each consortium member put forward in the Grant Agreement. Section 7 also includes the metrics that will be used to assess the effectiveness of the implementation of the Dissemination and Communication plan, and a schedule (calendar) of dissemination and communications activities to be developed by the consortium in the first eighteen months of the project.

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Nomenclature/Acronyms

| | |
|--------|---|
| ABE | Abengoa |
| BoS | Board of Stakeholders |
| CapEx | Capital Costs |
| CITY | City, University of London |
| CSP | Concentrated Solar Power |
| DCP | Dissemination and Communication Plan |
| DM | Dissemination Manager |
| ESTELA | European Solar Thermal Electricity Association |
| EXY | Exergy |
| GOA | Gold Open Access |
| IMB | Innovation Management Board |
| IPR | Intellectual Property Right |
| KAIST | Korea Advance Institute of Technology |
| KEL | Kelvion |
| LCoE | Levelized Cost of Electricity |
| NREL | National Renewable Energy Laboratory |
| OpEx | Operating Costs |
| PC | Project Coordinator |
| PMT | Project Management Team |
| POLIMI | Politecnico di Milano |
| PP | Restricted to other programme participants (including the Commission Services) |
| PU | Public |
| QUA | Quantis |
| QUT | Queensland University of Technology |
| RE | Restricted to a group specified by the consortium (including the Commission Services) |
| RES | Renewable Energies |
| R&I | Research and Innovation |
| RM | Risk Manager |
| TUW | Vienna University of Technology |
| UNIBS | University of Brescia |
| USE | University of Seville |
| WP | Work Package |
| WPL | Work Package Leader |

Introduction

1 Project Objectives

SCARABEUS is framed in call H2020-LC-SC3-2018-RES (topic LC-SC3RES-11-2018) of the Horizon 2020 programme, whose specific challenge and expected impact are as follows:

- Specific challenge: Achieving or maintaining global leadership in renewable energy technology requires that the innovative solutions are also affordable. Therefore, cost reductions remain a crucial necessity for existing or new technologies. This specific challenge is in line with the sectorial cost reduction targets stated in the respective Declarations of Intent of the SET Plan, where applicable.
- Expected impact: The proposed solution will reduce the CAPEX and/or OPEX of energy generation from any of the mentioned renewable sources making it comparable to generation costs from competing fossil fuel sources.

With these features of the work programme in mind, the project is aimed at demonstrating that the application of supercritical CO₂ blends to CSP plants has the potential to reduce Capital Cost (CapEx) by 30% and Operating Cost (OpEx) by 35% with respect to state-of-the-art steam cycles, thus exceeding the reduction achievable with standard supercritical CO₂ technology. Such accomplishment would ultimately translate into a LCOE lower than 96 €/MWh, which is 30% lower than currently possible, as depicted in Figure 1. Also, a unique feature of the project is that it will demonstrate the innovative fluid and newly developed heat-exchangers at a relevant scale (300 kWth), for 300 h and in a CSP-like operating environment.

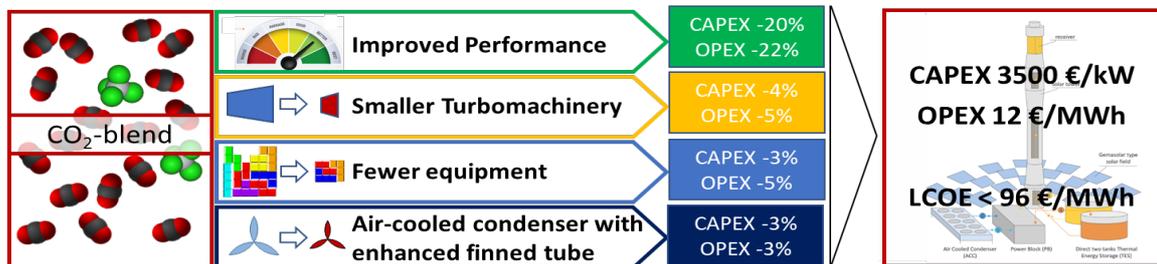


Figure 1 – Breakdown of cost reduction potential of SCARABEUS

The stepwise approach to this large cost reduction is illustrated in Figure 2 where the CapEx and OpEx reduction from state-of-the-art CSP plants based on steam turbines to the proposed SCARABEUS is shown.

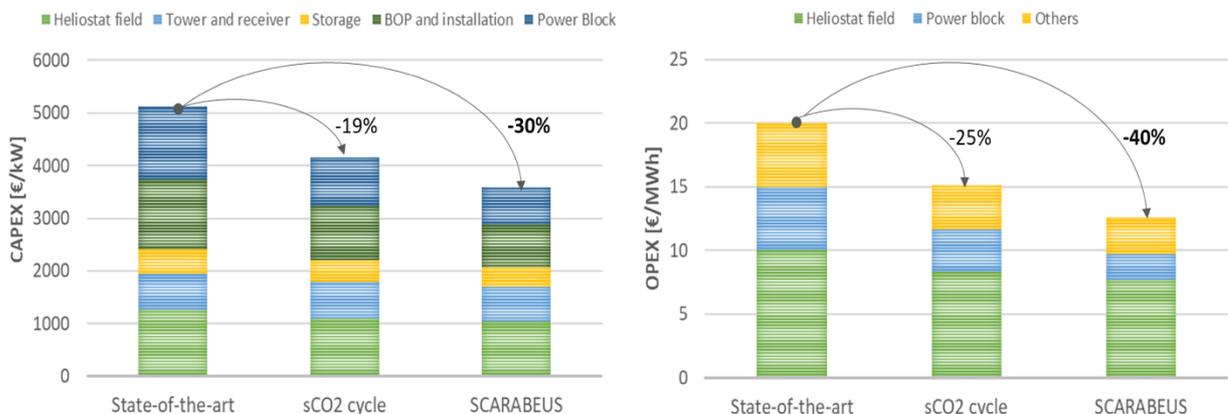


Figure 2 – Comparison of the cost reduction potential of SCARABEUS and standard sCO₂

2 Scope of the Document

This Deliverable Report D7.1 presents the Preliminary Dissemination and Communication Plan whose scope is defined in Annex 1 of the Grant Agreement: *The Dissemination and Communication Plan will contain the information regarding overall dissemination activity: type of activities, schedule, who's who information (roles and responsibilities) of both the past and future dissemination activities. This is devised as a roadmap to any information produced by the project.* Being a preliminary version of the DCP, deliverable D7.1 presents the dissemination and communication activities that will be used throughout and a schedule of the activities planned for 2020. Activities that are foreseen at a later stage will not be scheduled. Further updates of the plan (D7.7) will add this information.

3 Definitions

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 research¹.

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.

The differences between Dissemination, Communication and Exploitation are shown in Figure 3. 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 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.

¹ The European IPR Helpdesk, 2015, *Making the Most of Your H2020 Project*, H2020 programme, Grant Agreement No. 641474.

| Communication | Dissemination | Exploitation | |
|---|--|---|---|
| <p>“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.”</p> <p>(Source: EC Research & Innovation Participant Portal Glossary/Reference Terms)</p> | <p>“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.”</p> <p>(Source: EC Research & Innovation Participant Portal Glossary/Reference Terms)</p> | <p>“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.”</p> <p>(Source: EC Research & Innovation Participant Portal Glossary/Reference Terms)</p> |  Definition |
| <p>Reach out to society and show the impact and benefits of EU-funded R&I activities, e.g. by addressing and providing possible solutions to fundamental societal challenges.</p> | <p>Transfer knowledge & results with the aim to enable others to use and take up results, thus maximising the impact of EU-funded research.</p> | <p>Effectively use project results through scientific, economic, political or societal exploitation routes aiming to turn R&I actions into concrete value and impact for society.</p> |  Objective |
| <p>Inform about and promote the project AND its results/success.</p> | <p>Describe and ensure results available for others to USE → focus on results only!</p> | <p>Make concrete use of research results (not restricted to commercial use.)</p> |  Focus |
| <p>Multiple audiences beyond the project’s own community incl. media and the broad public.</p> | <p>Audiences that may take an interest in the potential USE of the results (e.g. scientific community, industrial partner, policymakers).</p> | <p>People/organisations including project partners themselves that make concrete use of the project results, as well as user groups outside the project.</p> |  Target Audience |
| <ul style="list-style-type: none"> • Rules for Participants • RIA & IA Proposal Template 2.2 b) • Grant Agreement Art. 38.1 | <ul style="list-style-type: none"> • Rules for Participants • RIA & IA Proposal Template 2.2 a) • Grant Agreement Art. 29 | <ul style="list-style-type: none"> • Rules for Participants • RIA & IA Proposal Template 1.1, 2.1, 2.2 a) • Grant Agreement Art. 28 |  Formal Obligations |

Figure 3 – Communication, Dissemination, Exploitation. Definitions¹.

4 Contractual Obligations of the Partners

The aforementioned report “*Making the Most of Your Horizon 2020 Project*” issued by the European IPR Helpdesk project provides a summary of the contractual obligations of the partners in regards to dissemination and communications activities. Indeed, this report states that “a number of obligations related to communication, dissemination and exploitation are formally outlined in different Horizon 2020 documents; such as the Rules of Participation, the proposal template for Research & Innovation Actions (RIA)/Innovation Actions (IA), or the respective Model Grant Agreement”. These obligations can thus be found in the Grant Agreement of SCARABEUS:

- Promote the action and its results, by providing targeted information to multiple audiences (including the media and the public), in a strategic and effective manner and possibly engaging in a two-way exchange (Article 38 of the Model Grant Agreement).

- Disseminate results — as soon as possible — through appropriate means, including in scientific publications (Article 29 of the Model Grant Agreement).
- Ensure open access (free of charge, online access for any user) to all peer-reviewed scientific publications relating to its results (Article 29 of the Model Grant Agreement).
- Take measures aiming to ensure ‘exploitation’ of the results — up to four years after the end of the project — by using them in further research activities; developing, creating or marketing a product or process; creating and providing a service, or using them in standardisation activities (Article 28 of the Model Grant Agreement).
- Acknowledge EU funding in all communication, dissemination and exploitation activities (including IPR protection and standards) as well as on all equipment, infrastructure and major results financed by the action by using the wording and criteria specified in the Grant Agreement (Articles 27, 28, 29, 38).

5 Additional References

- [Horizon 2020 Participant Portal Inline Manual “Communicating Your Project”](#).
- [Guide: Communicating EU Research & Innovation](#).
- [Guide: The EU Guide to Science Communication](#).
- [Webinar: 60-minute Communication Workout](#).
- [H2020 Programme: Guidance - Social media guide for EU funded R&I projects](#).

Overview of Management Structure and Governance

6 Management Structure

The management of SCARABEUS is devised around a number of features ensuring the overall success of the proposal. Internally (within the consortium), this means that the management structure must ensure the autonomy and effectiveness of each partner, the timely exchange of information between them, especially when working in different Work Packages, the clear definition of the responsibilities and scope of the tasks assigned and others. Externally, the management structure must make sure that the outreach of the project is maximized. This also implies aspects such as raising public awareness of the problems that SCARABEUS is attempting to resolve, making the project known to the scientific community and the administration, engaging the general public in bridging the usual gap between the industry and R&D communities and society at large...

To accomplish all these objectives, the consortium has developed the management structure presented in

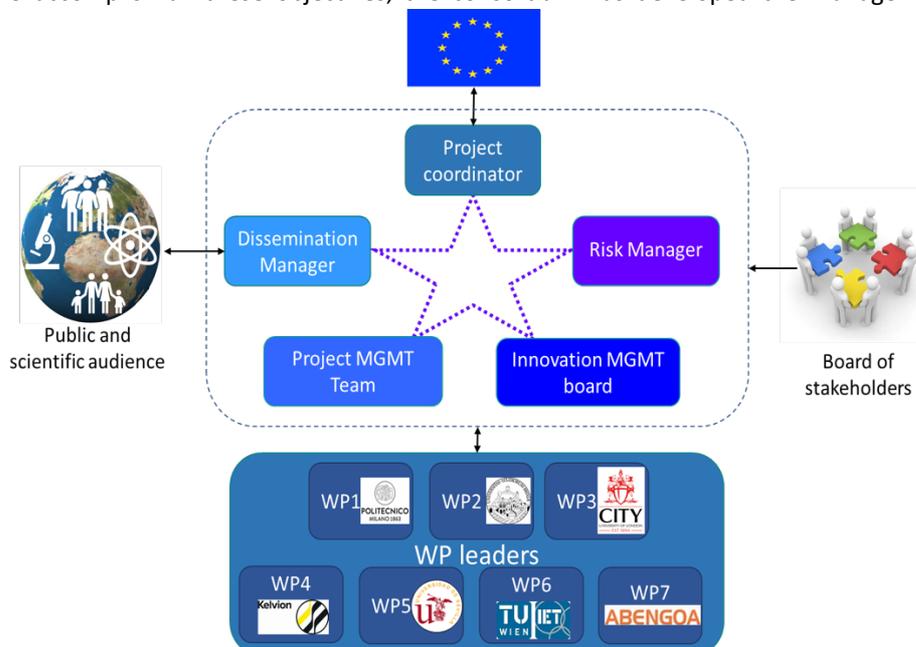


Figure 4.

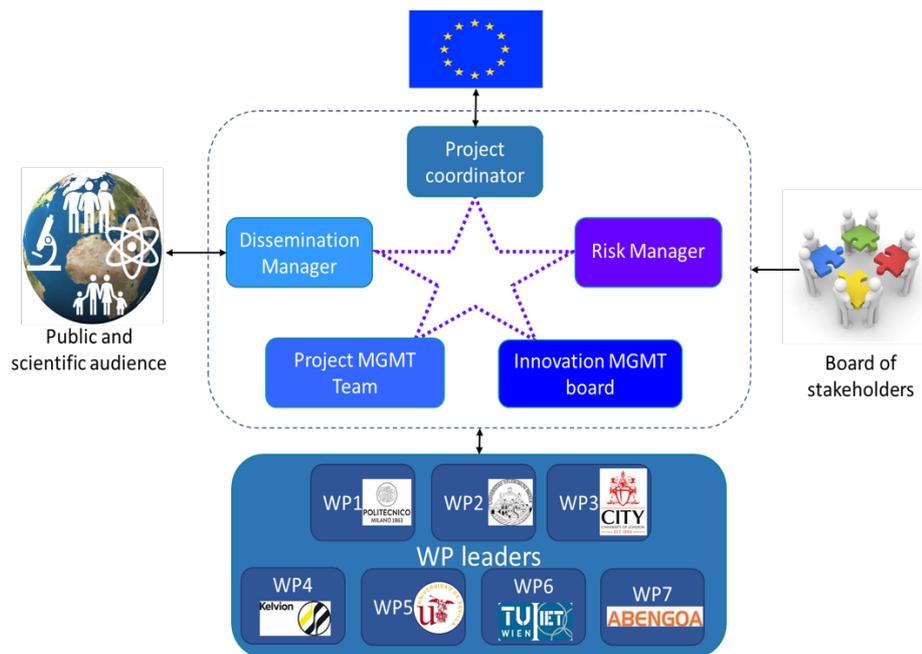


Figure 4 – Management structure of SCARABEUS

The management structure is comprised of the following key individuals and groups:

- The Project Coordinator (Prof. Giampaolo Manzolini, Politecnico di Milano) acts as the link between the Consortium and the European Commission in all matters concerning the project directly. The PC is responsible for the overall management of the project and, as such, he coordinates the deliverables and milestones and reports to the Scientific Officer of the European Commission. The PC informs the Project Management Team (see below) of all relevant exceptions and can also consult the Project Management Team, the Risk Manager, and the Innovation Management Board for advice.
- Project Management Team. The PMT is chaired by the PC and includes a representative from each partner in the project. The PMT is the ultimate decision-making body and it ensures a joint control of the work progress resulting in a rapid decision making. Amongst the responsibilities of the PMT, the following can be found: make budget-related decisions, critical decision-making in application of the Risk Management Plan, authorize exceptions from the project plan, keep the Risk Manager (see below) and the Innovation Management Board (see below) informed of project highlights and exceptions, voting
- Innovation Management Board. The IMB is comprised of a representative from each industrial partner (Kelvion, Abengoa Energía, Exergy and Quantis). The IMB advises the PMT on the best strategies to manage the innovative results of the project with a market-oriented approach aiming at the mid and long-exploitation of the project results. In addition, the IMB keeps track of developments outside the project that may be relevant to SCARABEUS or that may be conflicting in terms of intellectual property rights.
- Dissemination Manager (Prof. David Sánchez, University of Seville). The role of the DM is to ensure that the results and findings of the project become known by a community as wide as possible, not only scientists but also institutions, industry and society in general. To this end, the DM (i) ensures that each partner disseminates its results in the most accessible (for instance using open-access tools) and effective (high impact) way possible within the target community of primary interest, (ii) liaises with the project partners to design the most effective Dissemination Plan possible, and (iii) coordinates the organization of the academic workshops held at each academic partner and the two general workshops at the demonstration site.
- Risk Manager (Dr. Cristina Prieto, Abengoa Energía). The activity of the RM is three-fold. First, she oversees transversal risks that may rise in the course of development of the project. Second, she collates the risks stemming in each work package, which must be sent to her by the corresponding WP leader. Third, she is responsible for maintaining an up to date risk register necessary for carrying out such a large project. The RM reports to the PC at regular intervals and co-ordinates the risk mitigation strategy throughout the project.

- Work package leaders (WPL). WPLs are responsible for achieving the objectives, targets, milestones, and deliverables in their Work Packages, as defined in Annex I of the Grant Agreement. This implies that they are also responsible for the detailed co-ordination, planning, monitoring and reporting of their WP.
- Board of Stakeholders (BoS). The external BoS, steered by the IMB (in month M6 of the project at the latest), has the main duty to assist and facilitate the decisions made by the PMT and to provide an external (therefore independent) assessment of the progress made by the report on an annual basis. The BoS is comprised of reputed individuals known worldwide for their knowledge and experience in the area of CSP and representing all the potential regional markets in the world: North America, Europe, Australia and Asia.

The individual roles in the project and the composition of each governance structure are listed in

Table 1 below.

Table 1 – Roles in SCARABEUS

| Role/Body | Name | Affiliation | Contact |
|-----------------------------|---------------------|--|--|
| Project Coordinator | Giampaolo Manzolini | POLIMI | giampaolo.manzolini@polimi.it |
| Innovation Management Board | Emanuel Pesatori | EXY | E.Pesatori@exergy.it |
| | Xavier Guerif | KEL | Xavier.Guerif@kelvion.com |
| | Arnaud Dauriat | QUA | arnaud.dauriat@quantis-intl.com |
| | Cristina Prieto | ABE | cristina.prieto@abengoa.com |
| Project Management Team | Giampaolo Manzolini | POLIMI | giampaolo.manzolini@polimi.it |
| | David Sánchez | USE | ds@us.es |
| | Abdulnaser Sayma | CITY | a.sayma@city.ac.uk |
| | Andreas Werner | TUW | andreas.werner@tuwien.ac.at |
| | Paolo Iora | UNIBS | paolo.iora@unibs.it |
| | Emanuel Pesatori | EXY | E.Pesatori@exergy.it |
| | Xavier Guerif | KEL | Xavier.Guerif@kelvion.com |
| | Xun Liao | QUA | xun.liao@quantis-intl.com |
| Cristina Prieto | ABE | cristina.prieto@abengoa.com | |
| Project Coordinator | David Sánchez | USE | ds@us.es |
| Risk Manager | Cristina Prieto | ABE | cristina.prieto@abengoa.com |
| WP Leaders | WPs 1/9 | Giampaolo Manzolini | giampaolo.manzolini@polimi.it |
| | WP 2 | Paolo Iora | paolo.iora@unibs.it |
| | WP3 | Abdulnaser Sayma | a.sayma@city.ac.uk |
| | WP4 | Xavier Guerif | Xavier.Guerif@kelvion.com |
| | WP5 | David Sánchez | ds@us.es |
| | WP6 | Andreas Werner | andreas.werner@tuwien.ac.at |
| | WP7 | Cristina Prieto | cristina.prieto@abengoa.com |
| | WP8 | Giampaolo Manzolini | giampaolo.manzolini@polimi.it |
| Board of Stakeholders | Luis Crespo | ESTELA | ds@us.es |
| | Craig Turchi | NREL | Craig.Turchi@nrel.gov |
| | Jeong Ik Lee | KAIST | jeongiklee@kaist.ac.kr |
| | Ted Steinberg | QUT | t.steinberg@qut.edu.au |

Dissemination and Communication Plan

7 Description of the Dissemination and Communication Plan

7.1 Aim and scope. Key stakeholders implied

The dissemination and communication activities are aimed at maximizing the impact of the project on a number of target stakeholders. This is outlined in Section 2.2. *Measures to Maximize Impact* of Annex 1 in the Grant Agreement and is briefly summarized here.

Dissemination, exploitation, communication and activities related to Intellectual Property Rights support the effective and timely development of the project they also look into the future in order to enable the further development of the technology; indeed, a long-term objective of SARABEUS is to bring together and streamline the skills and expertise in the field of CSP technology using CO₂ blends within Europe. To this end, maximizing the current and future impact on society, the Implementation Plan includes a complete Work Package (WP7) which is entirely dedicated to the exploitation/dissemination and IPR management of the knowledge gained in the project, in particular focusing on the communication to the general public, the dissemination of new knowledge both within and outside of the consortium, the implementation of the current EU research policy and the development of energy and associated policies. Within this WP, and in order to ensure that the knowledge generated within SCARABEUS is protected, disseminated and exploited to its full potential, the Consortium has appointed David Sánchez in the role of Dissemination Manager (see

Table 1).

The Dissemination and Communication Strategy of SCARABEUS is presented in Figure 5. It targets four main stakeholders, whose characteristics are:

- **General Public:** general public (sometimes termed society at large) is characterized by having a common environmental consciousness and a concern for sustainability. Therefore, even if this audience is considered to not have a scientific or technical background, it does have the capacity to judge the impact of the technology on the life of current and future generations.
- **Scientific Community:** this community has a strong scientific background, enabling a critical assessment of the information provided. This implies the analysis of the Key Performance Indicators reported and the achievements made by the consortium. Furthermore, it is in the interest of the scientific community to make use of the data produced by SCARABEUS to further advance science and technology.
- **Policy Makers:** at the local, regional, national and continental levels, policy makers are of primary interest for the SCARABEUS consortium given that they are responsible for setting the guidelines of the current and future energy policies that will affect the commercial feasibility of SCARABEUS. Although not necessarily having a technical background, this audience is knowledgeable about the impact of the resulting power generation technology onto the environment, the security of (energy) supply and the economic sustainability of the power industry.
- **Industry:** the power generation industry, especially if based on renewable energies, is the last target stakeholder. The industry is interested in the general technical features of the technology and, most importantly, also in the key economic indicators.

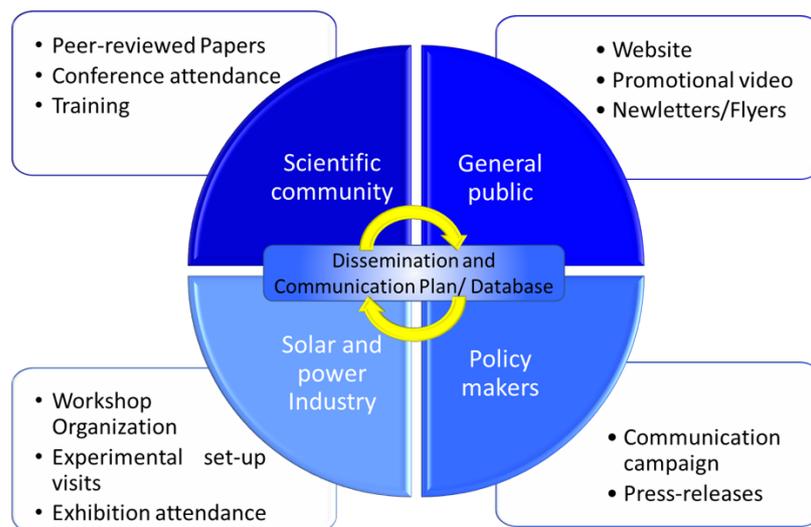


Figure 5 – Dissemination and Communication Strategy of SCARABEUS

As a concluding remark, it is worth noting that a unique feature of SCARABEUS is **the creation of a Dissemination and Communication Database** where all the dissemination activities of the project, past and future, will be stored electronically. The Dissemination and Communication Plan and Database will serve the twofold objective of (i) being a digital repository of all the carried out or planned dissemination activities of SCARABEUS at any time during the project and (ii) becoming a sort of logbook for future researchers who will be able to track all the dissemination activities developed in the project and, therefore, download any item of their interest. To enable this latter objective, the consortium is committed to keep the database in operation for, at least, five years after the completion of the project.

7.2 Implementation of the Dissemination and Communication Plan. Activities

The Dissemination and Communication Plan is devised as a tool to provide both the project partners and interested visitors to the project website with the overall dissemination strategy, schedule of activities, roles and responsibilities, definition of target groups and appropriate channels to convey messages to each audience type; to this end, this plan DCP will be updated regularly throughout the project lifetime.

In order to ensure an effective dissemination, the SCARABEUS consortium will make sure that a collaborative and interactive approach is adopted between the project partners and stakeholders from the very beginning of the project. Indeed, in line with the concept of “*Open Innovation*” promoted by the European Communication, attention will be paid to involving all stakeholders (see Figure 5) during the entire project lifespan and to ensuring that mechanisms are in place for engagement beyond the project lifetime. This will be facilitated through establishing routes to obtain feedback from each group to ensure that the SCARABEUS results respond to their needs and expectations, and to guarantee ownership of results by all the groups involved. These responsibilities will bear on the shoulders of a specifically appointed Innovation Management Board (see Figure 4) in the managing structure of SCARABEUS.

In this context, it is also worth highlighting that the consortium will reach out to persons within the target groups identified in the previous subsection and, once their interest has been attracted, the partners will include these people in a project database with the aim to keep them updated on the progress of the project via a biannual newsletter. They will also be invited to the following specific engagement and dissemination activities:

A) Dissemination activities:

Project progress and achievements will be disseminated through a variety of mechanisms both within the individual participants, the consortium’s Member States and the wider European industrial sector, through the channels identified below:

- 1) Organization of conferences: the project will participate in the organization of at least one conference in the field of Concentrated Solar Power technologies. To maximize the impact of the event, it is expected to organize a joint conference with other EU projects in the field of concentrated solar power (i.e. WASCOP project) or with the European Energy Research Alliance (EERA-CSP). In addition, University of Seville is currently discussing the possibility to organize the 6th International Seminar in Organic Rankine Cycle technology (September 2021), which is held every other year in Europe. This is the reference conference in the field of Organic Rankine Cycle technology, which also includes a strong track in supercritical CO₂ technologies. Attendance to the conference is in the order of 400 so it would be an excellent opportunity to disseminate the project activities.
- 2) Exhibition: the innovative test-rig at TU Wien is one of the key features of SCARABEUS. In correspondence with the inauguration of this set-up, an exhibition opened to both the scientific community, renewable energy and power industries and policy-makers will be carried out. In this way, potential investors will be able to familiarize with the CO₂ blend concept and the innovative heat exchanger technologies as well as to discuss with the partners/researchers involved in their development. Simultaneously, other researchers will be able to visit the test-rig, thus paving the way for new collaborations and knowledge-share.
- 3) Participation and presentations in conferences and publication of peer-reviewed papers: to maximize the impact on the scientific community, the consortium will publish relevant scientific results in peer-reviewed journals such as “Solar Energy”, “Journal of Solar Energy Engineering”, “Energy” or “Applied Energy”. A minimum of fourteen journal publications is foreseen (see Table 2). Efforts will be undertaken to ensure publication with *Gold Open-Access* (immediate, or at least after a short embargo period), which is the selected dissemination route for the project. Partners will use the open-access repository of the project (Dissemination and Communication Database) to grant access to the publications and to a bibliographic metadata in a standard format including information requested by the European Commission. Presentations at international scientific conferences are also considered to be a core dissemination activity as they enable presenting the latest results of the project while networking with other members of the scientific, governmental and industrial communities. Relevant conferences are, amongst others, “SolarPaces”, “ASME Energy Sustainability”, “CSPToday” and “The International

- Supercritical CO₂ Power Cycle Symposium”. A minimum of twelve conference presentations are foreseen (see Table 2).
- 4) Organization of Workshops: workshops are excellent opportunities for communication, networking and training. Two different types of workshops will be organized. Academic workshops at each academic partner will enable interaction between early stage researchers involved in SCARABEUS (MSc and PhD) and (under)graduate students at the said institutions, who will become familiar with the technology and network with members from other teams. The following workshops have already been agreed by the SCARABEUS partners:
 - i. Workshop No. 1: hosted by University of Seville in March 2020 (M12). ‘Modelling and simulation of CSP plants based on steam and sCO₂ technologies’. The workshop will include a visit to the solar complex operated by Abengoa near Seville.
 - ii. Workshop No. 2: hosted by City University in October 2020 (M19). ‘Aerodynamic design of turbomachinery for closed power cycles: ideal vs. non-ideal gas’.
 - iii. Workshop No. 3: hosted by University of Brescia in March 2021 (M24). ‘Characterisation of working fluids for closed power cycles: supercritical CO₂ and CO₂-blends’. The workshop will include a visit to the laboratory at UNIBS.
 - iv. Workshop No. 4: hosted by TU Wien in November 2021 (M32). ‘Testing of sCO₂ loops: experience’. The workshop will include a visit to the SCARABEUS rig at TU Wien. The Workshop will run in parallel with an exhibition where major stakeholders will have the opportunity to visit the SCARABEUS rig.
 - v. Workshop No. 5: hosted by Politecnico di Milano in March 2023 (M48). ‘SCARABEUS: enabling technology for the new generation of CSP power plants’. The workshop will run in parallel with another dissemination meeting with the major stakeholders of the project: government, industry and EU.Workshop.
 - 5) Joint activities H2020 projects: several partners of the project are involved in other EU H2020 projects dealing with solar energy, renewable energy, and turbomachinery development (i.e. sCO₂flex). SCARABEUS will take advantage of these synergies to perform activities fully aligned and consistent with other EU H2020 projects. To make sure that this will happen effectively, joint activities with other EU projects will be organized concentrating on the approach and procedures adopted as well as on the main achievements.
 - 6) Other: any other opportunity to effectively communicate the project results will be evaluated and performed during the project.

Table 2 – Particular dissemination actions planned in SCARABEUS (actions of the consortium as a whole not included)

| Partner | Journal Publications | OA | Conferences | | | Theses | | Pats. | Miscellaneous |
|---------|---|----|--|-----------------|-------------------------|--------|-----|-------|--|
| | | | Event | Poster | Oral | MSc | PhD | | |
| POLIMI | 1 Solar Energy 1 Applied Thermal Engineering 1 ASME Journal of Solar Energy Engineering | GL | SolarPACES ASME Conference on Energy Sustainability International sCO2 Symposium | 1 (2nd year) | 3 (3rd and 4th year) | 3 | 1 | 1 | Newsletter, Social media, promotional video |
| USE | 1 Solar Energy 1 Journal of Engineering for Gas Turbines and Power 2 Applied Energy | GL | ASME Turbo Expo International sCO2 Symposium | - | 3 (3rd and 4th year) | 2 | 2 | No | Web, newsletter, social media |
| UNIBS | 3 Applied Thermal Engineering | GL | SolarPACES ASME Conference on Energy Sustainability | 1 (2nd year) | 3 (3rd and 4th year) | 3 | 1 | 1 | |
| TUW | 1 Applied Energy | GL | SolarPACES International sCO2 Symposium | No | 2 (3rd and 4th year) | 2 | 1 | 1 | |
| CITY | 1 Journal of Turbomachinery 1 Journal of Engineering for Gas Turbine and Power 1 Applied Energy | GL | ASME Turbo Expo International Gas Turbine Conference | 2 (2nd year) | 2 (3rd and 4th year) | - | 2 | 1 | |
| AE | - | No | >1 conference attendance | >1 | - | - | - | 1 | |
| EXY | - | No | >1 conference attendance | >1 | - | - | - | 1 | |
| KEL | - | No | >1 conference attendance | >1 | - | - | - | 1 | |
| QUA | - | No | >1 conference attendance | >1 | - | - | - | - | |

Newsletter, social media

B) Dissemination channels and platforms:

The channels identified to ensure the effective communication of results to the right audiences using the best methods are listed below:

- 1) Press releases: several press-releases (>5) are planned to publicize the most important milestones and achievements of the project: i.e. beginning of the project, major achievements and inauguration of the test rig. Press release will be prepared by all the partners to target all the EU nations involved in the project.
- 2) Non-scientific and non-peer-reviewed publications: publications with a general description of the project and the targets achieved (>4) will be pursued as an activity. Previous participation of the partners in European projects showed the importance of preparing papers for newspapers and magazines in order to raise awareness of the importance of renewable energy exploitation and of how the development of CSP can tackle some of the most pressing issues.
- 3) Flyers/Newsletters: a newsletter will be issued every six months, making a total of 8 newsletters with relevant information about the project status and related activities. The newsletter will be made available on the project website, and subscribers will receive it automatically. In addition, the newsletter will be circulated through the social media such as LinkedIn, ResearchGate, and Twitter. A flyer with the most relevant information about the project (objectives, timing, consortium, funding body, contact) will be made and distributed at conferences and workshops.
- 4) Training: the SCARABEUS project supports the importance of training the next generation of engineers. Also, it is envisaged that early stage researchers within the academic institutions will be incorporated into the project team, hence developing research at the doctoral level for the complete duration of SCARABEUS (see later). In addition, students from the five universities involved in the project (US, TUW, UNIBS, CITY and POLIMI) will have the opportunity to visit partners where the experimental campaign will be performed (UNIBS and TUW), supporting data elaboration and performance assessment. In addition, training of technicians performing the experimental campaign is planned.
- 5) Website/Social media: Nowadays, most of the communication activities are performed on the internet. Therefore, SCARABEUS will dedicate significant efforts on (i) setting up the website to make it easily accessible, (ii) setting up the open LinkedIn page related to the project to get potential stakeholders involved and (iii) setting up the ResearchGate portal to share the project achievements with the scientific community. These instruments will be linked to the social media of all the partners and the CSP world in general, to keep the audience engaged, and they will be updated every month with the latest news related to the project. POLIMI's social media manager will support this activity to make the communication more effective and increase the impact of the profiles.
- 6) Communication Campaign: interviews in local television and radio stations will be pursued to reach a different type of audience with respect to the former activities and to increase the impact of dissemination. This activity will be undertaken by all partners so as to ensure that large communities in all the EU nations involved in the project are reached out.
- 7) Other events: the communication office of each institution participating in the project has several dissemination activities already planned. Each partner will make sure that the communication office is aware of the project so that its presentation can be added to other general or specific events that could be organized.
- 8) Video/film: YouTube is certainly a very effective way to communicate the project concept, ambition and achievements. Therefore, two dedicated videos will be prepared along to the project: the first one to present the SCARABEUS concept together with its main advantages and innovation. This video will be prepared along the first year of the project. The second video will be prepared in the last year of the project and will include the demonstration set-up and most significant results.
- 9) Other: any other opportunity to effectively communicate the project results will be evaluated and performed along the project.

C) Key stakeholders

As already depicted in Figure 5, the dissemination activities in the project will not only target the relevant scientific and industrial communities but also the public at large. Establishing a positive relationship with all stakeholders is hence crucial to disseminating the outcome of SCARABEUS. For this purpose, based on the techno-economic results and the social assessment produced in Work Package WP5, strategies to address

policy makers and engage the public will be identified. The following groups will be targeted, within the stakeholders listed in the previous subsection:

- Original equipment manufacturers of critical components (i.e., condenser, heat exchanger, turbomachinery);
- Research organizations and academic groups which are active in the field of sCO₂ technology;
- Research organizations and industries which are involved in CSP technology;
- European policy-makers at relevant institutions such as the European Commission, the European Environment Agency or the Innovation & Networks Executive Agency.

Error! Not a valid bookmark self-reference. shows the connection of the consortium participants to other networks. All these contacts will also be inserted in the contacts database of the project, so as to keep them regularly informed about SCARABEUS and in order to maximize collaboration.

Table 3 – Connection of the consortium participants to other networks

| Partner | Networks |
|---------|--|
| POLIMI | Member of the Italian Energy Cluster and part of a working task of SOLARPACES. LEAP, linked third party of POLIMI, is member of the High Technology Network of Regione Emilia-Romagna which includes a high-tech network comprised of industrial research labs, innovation centres, regional academic institutions and public research centres |
| TUW | TUW is a leading member in the frame of the Austrian Climate and Energy Fund, which defines and funds energy research in Austria. Within that organization, TUW is also a member of the Energy demonstration region NEFI: New Energy for Industry. TUW represents Austria within the VGB scientific committee and SOLARPACES executive committee and participates in working tasks related to particles and to storage |
| KEL | Member of EMC2 which is an innovation cluster including industrial companies, labs, academic institutions, public research centers |
| EXERGY | Member of the Italian Energy Cluster and of the Lombardy energy cleantech cluster |
| USE | Associated partner of the Joint Programme for Concentrated Solar Power of the European Energy Research Alliance (EERA-CSP), having collaborated to this platform through projects like STAGE-STE. USE is also a member of the European Turbine Network, the association gathering the whole supply chain of stationary gas turbines in Europe and worldwide (ETN Global), including turbomachinery operating on Supercritical Carbon Dioxide |
| CITY | Member of the European Turbine Network (ETN) and Professor Sayma is a member of the Project Board of the ETN. City is also the founder of the European Micro gas Turbine Forum and the current leader of its Advisory Board |
| QUA | Member of the LCA forum and part of the École Polytechnique Fédérale de Lausanne innovation Park |
| AE | Large network of customers and suppliers, and long-lasting, solid relationships with R&D centres and governmental institutions. In addition, Abengoa Energia is a member of ESTELA, the European Solar Thermal Electricity Association and PROTERMOSOLAR, the equivalent association in Spain |
| UNIBS | Member of the Italian Energy Cluster and of the Lombardy energy cleantech cluster |

D) Dissemination after the project conclusion:

Consortium members are committed to keeping the project website and project-dedicated social network tools updated for at least two years after the project completion. Furthermore, adequate IPR management and protection will be ensured after the project end-date. When not confidential, all the main project findings and dissemination deliverables will be made available through the Dissemination and Communication

Database along with all the dissemination activities/items and, shared with all main target groups as much as possible during and after the end of the project. Also, both during and after the project end-date, the partners will liaise with other internationally relevant research groups and R&D projects on the same or related topics, thus exchanging good practices and ideas to take innovation further and eventually contributing to the further development and sustainable exploitation of the results. The afore-mentioned EU relevant institutions will be kept updated during and after the project through: a) participation of EU partners in EU-level workshops and Info-Days on themes related to the project; b) invitation of representatives of EU institutions to project events; c) sending of the project newsletter to contacts in such EU institutions; d) inclusion of these e-mail accounts in the project contact database.

7.3 Dissemination and Communication Metrics

The Dissemination and Communication Plan presented in this document is certainly ambitious. Therefore, given also the large scale of the project also, it is mandatory to develop certain metrics upon which the success of the Plan can be measured. Such metrics of the Dissemination and Communication Plan are listed in Table 4 for each dissemination and communication activity.

Table 4 – Connection of the consortium participants to other networks

| Action | Metric | Success | | | |
|--|----------------------------|-----------|------------|-----------|-------|
| | | Excellent | Good | Moderate | Poor |
| Journal articles (1 st /2 nd quartile, peer-reviewed) | Number | x≥12 | 12>x≥8 | 8>x≥5 | x<5 |
| Conference papers (oral, international) | Number | x≥12 | 12>x≥7 | 7>x≥4 | x<4 |
| MSc thesis (in English) | Number | x≥9 | 9>x≥6 | 6>x≥4 | x<4 |
| PhD thesis (in English) | Number | x≥6 | 6>x≥4 | 4>x≥3 | x<3 |
| Patents (European) | Number | x≥4 | 4>x≥2 | 2>x≥1 | x=0 |
| Website | Visits (monthly) | x≥400 | 400>x≥250 | 250>x≥100 | x<100 |
| Newsletter (digital) | Subscribers | x≥250 | 250>x≥175 | 175>x≥100 | x<100 |
| Twitter | Posts (monthly) | x≥15 | 15>x≥10 | 10>x≥5 | x<5 |
| Twitter | Followers (mid project) | x≥500 | 500>x≥250 | 250>x≥100 | x<100 |
| Twitter | Likes (mid project) | x≥500 | 500>x≥250 | 250>x≥100 | x<100 |
| LinkedIn | Posts (monthly) | x≥15 | 15>x≥10 | 10>x≥5 | x<5 |
| Promotional videos | Views | x≥1000 | 1000>x≥650 | 650>x≥250 | x<250 |
| Workshops at partner Universities (MSc and PhD students) | Number | x≥10 | 10>x≥7 | 7>x≥4 | x<4 |
| Workshops at partner Universities (MSc and PhD students) | Attendees (per event) | x≥20 | 20>x≥10 | 10>x≥5 | x<5 |

8 Activities Scheduled in the First Eighteen Months

This section presents the activities that will be developed in the first year of the project (April 2019 – September 2020). The information is summarized in Table 5.

Table 5 – Schedule of Dissemination & Communication activities in the first 18 months of the project

| Activity | WP | Type | Dissemination Level | Lead Partner | Date (foreseen) | M1 | M2 | M3 | M4 | M5 | M6 | M7 | M8 | M9 | M10 | M11 | M12 | M13 | M14 | M15 | M16 | M17 | M18 | Comments |
|--|----|---------------------|---------------------|--------------------|-----------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--|
| | | | | | | Apr-19 | May-19 | Jun-19 | Jul-19 | Aug-19 | Sep-19 | Oct-19 | Nov-19 | Dec-19 | Jan-20 | Feb-20 | Mar-20 | Apr-20 | May-20 | Jun-20 | Jul-20 | Aug-20 | Sep-20 | |
| Press-Release: Kick-off Meeting | 7 | Press-Release | PU | USE | 11/04/2019 | x | | | | | | | | | | | | | | | | | | |
| Creation of project folder in ResearchGate | 7 | Network | PU | USE | 15/05/2019 | | x | | | | | | | | | | | | | | | | | |
| Website | 7 | Project Website | PU/CO | USE | 01/07/2019 | | | | x | | | | | | | | | | | | | | | |
| Creation of Social Media accounts | 7 | Social media | PU | POLIMI | 01/08/2019 | | | | | x | | | | | | | | | | | | | | |
| Organisation of the 3rd sCO2 workshop (participation) | 7 | Workshop | PU | POLIMI | 15/09/2019 | | | | | | x | | | | | | | | | | | | | |
| Main features and objectives of the SCARABEUS project at SOLARPACES 2019 | 7 | Conference paper | OA | POLIMI UNIBS | 01/10/2019 | | | | | | | x | | | | | | | | | | | | |
| Presentation of SCARABEUS and discussion about opportunities for collaboration | 7 | Workshop attendance | PU | POLIMI | 19/10/2019 | | | | | | | x | | | | | | | | | | | | |
| State of the art of CSP plants based on Central Receiver | 5 | Journal publication | GOA | UNIBS AE USE | 15/11/2019 | | | | | | | | x | | | | | | | | | | | Based on Deliverable D5.1 |
| Recent Advancement of Thermal Fluid Engineering in the Supercritical CO2 Power Cycle | 5 | Guest Editor | GOA | USE | 30/11/2019 | | | | | | | | x | | | | | | | | | | | |
| Economic Performance of sCO2 cycles | 5 | Journal publication | GOA | USE | 01/12/2019 | | | | | | | | | x | | | | | | | | | | Based on previous work at USE, to be used as benchmark for SCARABEUS |
| Approach to fluid selection | 2 | Journal publication | GOA | UNIBS | 15/12/2019 | | | | | | | | | x | | | | | | | | | | |
| Summary of SCARABEUS | 7 | Video | PU | POLIMI | 15/12/2019 | | | | | | | | | x | | | | | | | | | | |
| Modelling and simulation of CSP plants based on steam and sCO2 technologies | 5 | Workshop | PU | USE | 15/11/2020 | | | | | | | | | | | | | | | | | | | |
| Sensitivity study on effects of fluid blend on turbomachinery design parameters | 3 | Conference paper | PU | CITY | 30/03/2020 | | | | | | | | | | | | x | | | | | | | 7th International Supercritical CO2 Power Cycles Symposium |
| sCO2 R&D by European Academia - SCARABEUS | 5 | Panel discussion | PU | USE | 30/04/2020 | | | | | | | | | | | | x | | | | | | | |
| Preliminary turbomachinery design considerations for a sCO2 cycle operating with a fluid blend | 3 | Conference paper | TBD | CITY | 22/06/2020 | | | | | | | | | | | | | | x | | | | | ASME 2020 Turbo Expo |
| Heat transfer characteristics of pure sCO2 | 4 | Conference paper | GOA | TUW KEL | 01/07/2020 | | | | | | | | | | | | | | | x | | | | Based on Deliverable D4.3 |
| Performance of SCARABEUS - first CO2 blend | 2 | Journal publication | GOA | POLIMI | 15/07/2020 | | | | | | | | | | | | | | | x | | | | Based on preliminary analysis |
| Printed Circuit Heat Exchanger Technology | 4 | Seminar | PP | KEL | 01/10/2020 | | | | | | | | | | | | | | | | | | | |
| Project update presented at SOLARPACES 2020 | 7 | Conference paper | OA | POLIMI | 15/10/2020 | | | | | | | | | | | | | | | | | | x | |

Conclusions

This Deliverable report has presented the definition, scope and features of the Dissemination and Communication Plan along with the main dissemination and communication activities. The stakeholders targeted by the Dissemination Coordinator are clearly identified and the channels and platforms to reach out to them are also set.

The last section of the report provides the measurable objectives of the individual partners and the consortium as a whole and the metrics that will be used to assess the effectiveness of the dissemination and communication strategies.

Finally, the Dissemination and Communication Schedule for the first 18 months is provided as a route map for the consortium and for the individuals and institutions external to the consortium who become interested in being updated on the progress made by the project. This schedule will be updated and expanded regularly, with a profound renovation made in Month 24 of the project, at which time Deliverable Report D7.3 “*Dissemination, Communication & Exploitation Databases – Report of activities*” will be released.

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

| Date | Title | Description | Type | WP | Task | Lead | Available | Additional Info |
|------------|---|---|------|----|------|--------|-----------|--|
| 12/04/2019 | Kick-off meeting | SCARABEUS kick-off meeting | M | 1 | 1.1 | POLIMI | NA | Brussels |
| 01/07/2019 | 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 |
| 24/07/2019 | Abengoa announces its participation in the SCARABEUS project through its blog | Publication in the company blog | Gen | 7 | | ABE | Yes | General public communication action |
| 02/08/2019 | Investigating the effect of using different CO2 blends as working fluids on the turbine design for a 100 MWe Power plant | 7th International sCO2 Power Cycles Symposium | Con | 3 | | CITY | No | Abstract submitted March 30th to April 2nd 2020, San Antonio (TX) |
| 02/08/2019 | 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 March 30th to April 2nd 2020, San Antonio (TX) |
| 02/08/2019 | 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 | Abstract submitted March 30th to April 2nd 2020, San Antonio (TX) |
| 02/08/2019 | Supercritical CO2 power cycle research by European Academia: SCARABEUS | 7th International sCO2 Power Cycles Symposium | Spk | 5 | | USE | No | Invited speaker in a panel session March 30th to April 2nd 2020, San Antonio (TX) |
| 20/09/2019 | Supercritical CO2/Alternative Fluid Blends for Efficiency Upgrade of Solar Power Plant | Presentation at the 3rd European Supercritical CO2 Conference | Con | 7 | | POLIMI | Yes | Paris, 19th and 20th of September 2019 |
| 01/10/2019 | 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 |