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# DATA MANAGEMENT PLAN



SOLAR ENERGY FOR A CIRCULAR ECONOMY



## Solar Energy for a Circular Economy

### **Deliverable D3.4**

#### Data Management Plan (DMP)

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## EXECUTIVE SUMMARY

The Data Management Plan (DMP) presents the main elements of the data management policy used by the Consortium during the CSA project and will evolve during the lifespan of this project to include additional datasets, and to adapt to changes, thereby providing at the end the basis for the data management of future actions. It describes the types of data, how they will be preserved and if they are shared or confidential. The DMP provides an overview of the datasets. Initially data management will build on the existing infrastructure with the partners. Data produced by the consortium will be made available through the SUNRISE website and on the PLAZA intranet, maintained by project management. The publication and data repository for the project outcomes consortium will be gradually shifted to [ZENODO](https://zenodo.org/) hosted at CERN by partner ICIQ as the project evolves. At the end of the CSA there will be a consolidated repository for the medium and long term that will be up and running to support future actions.



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## 1. INTRODUCTION

The purpose of the Data Management Plan (DMP) is to provide an overview of the main elements of the data management policy that will be used by the Consortium concerning the project data. The DMP is not a fixed document but will evolve during the lifespan of the project, a new version will be created whenever important changes to the project occur due to inclusion of new data sets, changes in consortium policies or other external factors.

The DMP covers the complete research data life cycle. It describes the types of research data that will be collected, processed or generated during the project, how the research data will be preserved and what parts of the datasets will be shared or kept confidential.

This document includes an overview of the datasets to be produced by the project and the specific conditions that are attached to them. The next version of the DMP will be updated in Month 12, at the end of the CSA project, it will contain extended information regarding the DMP of a European large-scale research initiative.

This Data Management Plan describes the **SUNRISE** strategy and practices regarding the provision of Open Access to scientific publications, dissemination and outreach activities, public deliverables and research datasets that will be produced.

Categories of outputs that **SUNRISE** will give Open Access (free of charge) and will be agreed upon and approved by the Management Board (MB), during the CSA period, include:

- Project reports and publications (publications, conference proceedings, workshops, etc.)
- Dissemination and Outreach material (leaflets, roll-ups, infographics, videos, etc.)
- Deliverables (public)

Any dissemination data linked to exploitable results will not be put into the open domain if this compromises its commercialization prospects or has inadequate protection. Intellectual Property (IP) issues and results protection will be in accordance with the Innovation Plans and agreements developed in WP2 (Innovation & Exploitation). This will be especially important for research results within a future large scale research initiative.

Treatment of personal data will be done following the General Data Protection Regulation (GDPR) [1] and will not be made public without written consent.

### 1.1. **SUNRISE** strategy and practices

The decision to be taken by the project on how to publish its documents and data sets will come after the more general decision on whether to go for public dissemination directly or to seek first protection by registering the developed IP. Open Access must be granted to all scientific



publications resulting from Horizon 2020 actions. This will be done following the Guidelines on Open Access to Scientific Publications and Research Data in Horizon 2020 (15 February 2016) [2].

**Concerning publications**, the consortium will provide open access if there is any scientific publication coming out of the action. Open access will be guaranteed following the 'Gold' model: an article is immediately released in Open Access mode by the scientific publisher. A copy of the publication will be deposited in a public repository, OpenAIRE, and ZENODO or those provided by the host institutions, and available for downloading from the **SUNRISE** webpage. The associated costs will be covered by the author/s of the publication.

**Concerning research data**, the main obligations of participating in the Open Research Data Pilot are:

1. To make it possible for third parties to *access, mine, exploit, reproduce* and *disseminate* - free of charge for any user - the following:
  - (i) the published data, including associated metadata, needed to validate the results presented in scientific publications, as soon as possible
  - (ii) other data, including raw data and associated metadata, as specified and within the deadlines laid down in the data management plan; and
2. To provide information about *tools* and *instruments* at the disposal of the beneficiaries and necessary for validating the results.

**SUNRISE** follows the Guidelines on Data Management in Horizon 2020 (15 February 2016) [3].

The consortium has chosen [ZENODO](#) as the central scientific publication and data repository for the project outcomes. Released documents and data will be progressively added to the database. This repository has been designed to help researchers based at institutions of all sizes to share results in a wide variety of formats across all fields of science. The online repository has been created through the European Commission's [OpenAIREplus](#) project and is hosted at CERN.

ZENODO enables users to:

- easily share the long tail of small data sets in a wide variety of formats, including text, spreadsheets, audio, video, and images across all fields of science
- display and curate research results, get credited by making the research results citable and integrate them into existing reporting lines to funding agencies like the European Commission
- easily access and reuse shared research results
- define the different licenses and access levels that will be provided

Furthermore, ZENODO assigns a Digital Object Identifier (DOI) to all publicly available uploads, to make content easily and uniquely citable.



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## 2. DATA COLLECTION

### 2.1 Use of existing and third party data

SUNRISE CSA will use abundant existing and third-party data to generate the six main project outputs:

- **Vision (D1.1).** Consolidated vision: SUNRISE technical report with: (i) quantitative S&T targets on the short (2022), mid (2025) and long term (2030); (ii) definition of instruments and benchmarks to assess the impact of SUNRISE on the economy, the environment and the society; (iii) description of the technological demonstrators and their expected evolution over time, also beyond 2030.
- **Roadmap (D1.2).** Global Roadmap for the large scale research initiative
- **Blueprint (D1.3)** The SUNRISE map: a public document identifying the necessary S&T resources, state-of-the-art EU facilities, available infrastructure & funding, and the criteria to make an open and inclusive initiative.
- **Governance Plan (D4.1) and Terms of Reference (D4.2)** Proposal for the organizational structure and processes of the Large Scale Research Initiative and Terms of reference for the governance of the Large Scale Research Initiative.
- **Innovation and Exploitation plan (D2.3).** Innovation and Exploitation plan fully developed and including IPR consortium guidelines.

Together with the dissemination and RRI plan, and an executive summary in the form of a manifesto, this provides a comprehensive description of the prospective large scale research initiative.

To produce these documents, previous publications, and reports from partners, supporters and other actors in the field will be taken into account. Therefore, the consortium will connect to several databases containing the reference documents. Depending on the needs of the different working groups in charge of each project's output document, the information exchange will be done through different channels, for instance using free online sharing and editing tools (i.e. Dropbox, Google Drive, etc.). Nevertheless, the main channel for information exchange and data storage within consortium partners will be the intranet [PLAZA](#). Access to this archive system is provided to all partners by the company in charge of the project's management M2i (Materials Innovation Institute).

Furthermore, the consortium has a wide interaction with different stakeholders forming part of the SUNRISE community. Communication with supporters and followers is based on social media and e-mails and/or newsletters sent using e-mail marketing service [MailChimp](#) (see section 4).

The consortium has collected input from the different partners and supporters to create Priority Research Directions (PRD) among the three main research approaches, see table 1. These documents will be useful during the road mapping process, which will imply further interactions with the supporting community.

**Table 1. List of PRDs collected within SUNRISE CSA**

<b>Approach 1. <i>Electrochemical conversion with renewable power</i></b>	Generic PRD Approach 1
	Hydrogen PRD
	CO <sub>2</sub> to chemicals
	Ammonia
	Jet Fuels
<b>Approach 2. <i>Direct conversion via integrated artificial photosynthetic systems</i></b>	Electrifying chemical synthesis
	Generic PRD Approach 2
	Complex molecular systems
	Photon management
	Hydrogen
	CO <sub>2</sub> to chemicals
<b>Approach 3. <i>Direct conversion via biological and biohybrid systems.</i></b>	Ammonia
	Jet Fuels
	Generic PRD Approach 3
	Biocatalysts
	Biohybrid systems
	Hydrogen
	CO <sub>2</sub> to chemicals
<b>Key Enabling Technologies</b>	Ammonia
	Jet Fuels
<b>Key Enabling Technologies</b>	Modeling
	Quantitative Sustainability Assessment (QSA)

## 2.2 Data collection and creation mechanisms

For the creation of new documents such as deliverables from the project, the responsible people in charge will collect the corresponding bibliography documents needed to compare and contrast relevant information. Following documents' analysis and partners' and supporters' expertise, new data will be generated and collected in the resulting action documents, according to the project's objectives.

Several members of the consortium have been selected as the contact person to receive and collect inputs from interested supporters to be included in the PRDs and other project documents as the Vision and Roadmap.

Databases containing the contact information of official supporters, newsletter subscribers, and social media followers will also be generated during the CSA period.

Also, dissemination and communication material will be created:

- Conferences: all academic partners of **SUNRISE** will attend the most relevant conferences and present the project and its objectives through oral talks and/or posters.
- Workshops: two workshops will be organized in M4 and M12 to promote awareness of the **SUNRISE** objectives and results (data produced: presentations and posters).



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- Dissemination material: flyers, videos, public presentations, **SUNRISE** newsletter, press releases, tutorials, etc.
- Communication material: website, social media, press releases, audiovisual material. Outreach activities for the project's promotion to the general public.

Finally, input and opinion of the different audiences reached by the different SUNRISE organized events will be collected, for instance by surveys (*i.e.* surveys for outreach activities and exhibitions, surveys after meetings/workshops, etc.), these will preferably be anonymous and created in a case-by-case scenario using free online tools (such as Google forms, formsite, etc.)

### 3. DATA STORAGE AND SECURITY

#### 3.1 Measures to comply with the security requirements and mitigate data risks

The main storage tool will be the project website: [www.sunriseaction.eu](http://www.sunriseaction.eu). The current website is hosted in the internal servers of the work package 3 (WP3) leader, ICIQ. The current policy for back-ups consists of daily recovery of the full server (that contains around 30 webpages) in case there is any technical problem and it needs to be restored. The website will be open and accessible free of charge for all the duration of the CSA and at least, until 3 years after, including all the information and documents publicly available.

On the website, there is also a [direct link](#) to the intranet site PLAZA. As mentioned before, this is the main tool for internal information exchange within the different working groups of the project. The site is managed by M2i, the current policy is to arrange for daily back-ups and deleted files are kept in a separate folder so that they can be recovered without the need to mount a backup structure or file system. Also, there are weekly, 4-week and 6-month backups kept. Currently, the site stores relevant information for the SUNRISE partners, such as the generated working documents, data related with the project's implementation, minutes and agendas of meetings, data about related projects, results, etc., information about supporters' names and contacts and copies of letters of support. This information is only accessible to designated contacts from each of the partner institutions. A login page needs to be filled in for access, requiring an identified e-mail address and a personalized random password. This protection is needed for confidentiality issues, especially related to the protection of personal data and any intellectual property.

The PRDs and any other confidential information to be shared with the stakeholders can be accessed through a password-protected site on the project's website: <https://sunriseaction.com/priority-research-directions-prd-vision/>.

The documents associated with all the public deliverables defined in the Grant Agreement (Table 2), will be accessible through the project's website free of charge. The present document, the **SUNRISE** Data Management Plan, is one of the public deliverables that after submission to the European Commission and approval will be released in open access mode in the **SUNRISE** webpage, CORDIS website (<https://cordis.europa.eu/project/rcn/221651/factsheet/en>) and ZENODO.

**Table 2. List of Public Deliverables**

<b>Deliverable (number)</b>	<b>Deliverable name</b>	<b>WP</b>	<b>Short name of the lead participant</b>	<b>Type</b>	<b>Dissemination Level</b>	<b>Delivery date (in months)</b>
<b>D1.1</b>	Vision	1	CEA	Report	Public	2
<b>D1.2</b>	Roadmap	1	UCL	Report	Public	6
<b>D1.3</b>	Blueprint	1	ULEI	Report	Public	12
<b>D2.1</b>	Process	2	Fraunhofer	Other	Public	2
<b>D2.2</b>	Structure	2	JM	Other	Public	6
<b>D2.3</b>	IE Plan	2	SIEMENS	Report	Public	12
<b>D3.1</b>	Dissemination Plan	3	ICIQ	Report	Public	6
<b>D3.2</b>	Website & App	3	ICIQ	Other	Public	2
<b>D3.3</b>	Resources	3	UNIWARSAW	Report	Public	8
<b>D3.4</b>	Data Management Plan	3	ULEI	ORDP: Open Research Data Pilot	Public	6
<b>D4.1</b>	Governance Plan	4	CEA	Report	Public	8
<b>D4.2</b>	Terms of Reference	4	CEA	Report	Public	12
<b>D5.1</b>	Midterm Review	5	ULEI	Other	Public	6
<b>D5.2</b>	Symposium	5	ULEI	Other	Public	11
<b>D5.3</b>	Final Report	5	ULEI	Report	Public	12

In the case of scientific publications through the CSA period, the “Gold Open Access” policy will be followed in addition to uploading them into open access repositories (i.e. ZENODO, OpenAIRE, institutional repositories). The Open Access publications will be available for downloading from the **SUNRISE** webpage ([www.sunriseaction.eu](http://www.sunriseaction.eu)) and also stored in the ZENODO/OpenAIRE repository. Moreover, during the CSA and as part of the Dissemination and Communication strategy, a new smartphone app will be created to enable partners to share their latest publications. The application is now under validation (<http://events.tickaroo.com/projectsunrise/>), consortium partners can share their important publications offering quick access to novelties in the field, this system will be tested among partners during the CSA and an open version will be created in future actions based on the feedback of first users. This feedback will also be important to decide if such an App might also be used in the future as an outreach platform to reach the general public.

All the dissemination and communication material will be available (during and after the project) on the SUNRISE website and ZENODO.



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## **4. DATA DOCUMENTATION**

### 4.1 Dataset Description

Whenever needed, instructions to name files and folders will be delivered to ensure data control and future re-use. For instance, in the PLAZA site, all documents related to the different work packages can be found under the Implementation folder.

For PRDs, specific templates and names have been provided to ensure information exchange and versions management while collecting input from numerous authors.

When the data is collected in a public deliverable this format will be used:

***D.X.Y SUNRISE\_ Title of the Deliverable***

### 4.2 Digital Object Identifier (DOI)

The DOI uniquely identifies a document. This identifier will be assigned by the publisher in the case of scientific publications in journals. In the case of other publications or documents (deliverables, dissemination and communication materials) uploaded into the ZENODO repository, an automatic DOI will be created by the system. Items deposited in ZENODO, including all the scientific publications, will be archived and retained for the lifetime of the repository, which is currently the lifetime of the host laboratory CERN (at least for the next 20 years).

## **5. DATA ACCESS, SHARING, AND REUSE**

### 5.1 General Data Protection Regulation (GDPR)

The main restriction for the sharing of data generated during the CSA comes due to GDPR. All data related to personal information, mainly person contact names from partners and supporters and e-mail addresses, will be kept under the password-protected intranet site, only reachable for selected individuals related to the project, upon invitation by M2i. Additionally, contact details could be stored in personal folders from the partner institutions or temporarily in folders that are shared online while an event is organized, as long as these data are not made public, only shared with authorized personnel from the consortium and not used for commercial purposes.

The amount of personal data collected will be kept to a minimum, is in most cases only names, employing institutions and e-mail addresses. Whenever this kind of information is requested, explicit consent will be required from users. For instance, the following statements are used:

- Filling formularies or registration forms: a mandatory option to be filled is included, for example:



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**I am aware that the organization committee will not share my data with any third party nor use it for commercial purposes. \***

Yes

- Making public a registration list: explicit consent is requested by an optional option to be filled in the registration form, for example:

**I authorize the organization committee to include my name and organization in the list of attendees available at the workshop.**

Yes

- Getting new subscribers to the SUNRISE public newsletter or contact by new possible supporters: a mandatory option needs to be ticked before the contact information can be sent when subscribing via the SUNRISE website:

**I have read and accepted the GDPR policy**

Interested users have access to read the GDPR policy described in the website:

*“Marketing Permissions*

*SUNRISE Project will use the information you provide on this form to be in touch with you and to provide updates on our activity by e-mail. To comply with the General Data Protection Regulation (GDPR) we need your approval. Please let us know if you would like to hear from us by ticking the following button: "Please, keep me updated on SUNRISE news and events".*

*You can change your mind at any time by clicking the unsubscribe link in the footer of any email you receive from us, or by contacting us at [contact@sunriseaction.eu](mailto:contact@sunriseaction.eu). We will treat your information with respect. By clicking below, you agree that we may process your information in accordance with these terms.*

*We use Mailchimp as our marketing platform. By clicking below to subscribe, you acknowledge that your information will be transferred to Mailchimp for processing. Learn more about Mailchimp's privacy practices [here](#).”*

In addition to ask for user's approval, information about the marketing platform used (Mailchimp) is also provided. This platform is used for sending newsletters and informative e-mails to partners, supporters, followers and other related contacts.

To comply with the regulations governing cookies under the GDPR and the ePrivacy Directive, users will also find a pop-up message at the beginning of the website session, which can be either accepted or ignored. It reads as follows:

*This website uses cookies to provide you with the best browsing experience. Find out more or adjust your settings.*



## 5.2 Data sharing and reuse

As explained in previous sections, public free-of-charge access to deliverables and documents generated through the project will be done through:

- The **SUNRISE** website, after approval by the quality and impact assurance team. If the document is subsequently updated, the original version will be replaced by the latest version.
- The CORDIS website, will host all public deliverables as submitted to the European Commission.
- ZENODO repository.

These websites will also provide access to communication and dissemination materials.

## 6. DATA PRESERVATION AND ARCHIVING

Open Access, through the **SUNRISE** public website will be maintained for at least 3 years after the project completion.

All public deliverables will be archived and preserved on ZENODO and will be retained for the lifetime of the repository.

Internal information kept in the intranet site PLAZA will be available to consortium partners for at least 6 months after the project finishes, then important information will be kept in an internal server and a hard copy by the project coordinator in Leiden University. In the case that there is no continuation of the project, any personal data collected will be deleted after this period.

## 7. RESPONSIBILITY FOR THE IMPLEMENTATION OF THE DMP

The consortium will make a selection of relevant information, ensuring that the data generated will be carefully analysed before giving open access to it in order to be aligned with the exploitation policy described in the Consortium Agreement (CA). Therefore, data sharing in open access mode can be restricted as a legitimate reason to protect results expected to be commercially or industrially exploited. Approaches to limit such restrictions will include agreeing on a limited embargo period or publishing selected (non-confidential) data.

Each partner of the consortium will be responsible for the storage and backup of the data produced in their respective host institutions. Furthermore, each partner is responsible for uploading all the relevant data produced during the project to the **SUNRISE** intranet PLAZA (restricted to the members of the consortium). ICIQ as leader of the Dissemination, Communication and Education Work Package (WP3) will be in charge of collecting all the public documents and upload them in the **SUNRISE** public website and ZENODO. The final responsibility to ensure that guidelines within this Data Management Plan are correctly pursued lies with the coordinator, Leiden University.



## 8. FUTURE ACTION

A continuation of the CSA preparative action will include a DMP based on the **SUNRISE** strategy and practices described in point 1.1. Main points are:

- Specific guidelines about making public or not documents and data from a following **SUNRISE** action will be collected in future Consortium Agreements, including specific Innovation & Exploitation and IPR sections. Data sharing in open access mode can be restricted as a legitimate reason to protect results expected to be commercially or industrially exploited.
- Any research project within a large scale European research action will need to comply with the relevant European guidelines on Open Access for scientific publication and research data.
- Concerning publications, the consortium in charge of any research project following **SUNRISE** CSA will guarantee open access within the embargo periods foreseen by the European Commission (EC). Copies of the publications will be deposited in public repositories, being ZENODO the main option.
- Concerning research data, any data needed to validate the results presented in scientific publications, including metadata, will be made public in accordance with the European guidelines of the moment. ZENODO will be the central data repository. In particular, regarding computational data coming from simulations, several large material databases containing properties of millions of existing and hypothetical materials have already been identified within the modelling PRD that will provide an autonomous platform for accelerated material design, development and system integration (within key-enablers). These databases are currently freely accessible:
  - the AFLOW distributed materials property repository
  - the Harvard Clean Energy Project Database
  - the Materials Cloud
  - the Materials Project (including the use of MPContribs)
  - the NoMaD (Novel Materials Discovery) Repository
  - the Open Quantum Materials Database
  - the Computational Materials Repository
  - the Data Catalyst Genome
  - the ioChem-BD Platform

New concepts for materials on demand will be made available to the public for R&D.

- Concerning personal data, the amount of personal data collected will be kept to a minimum and mainly related to contact databases. Nevertheless, in the context of a broader initiative, social sciences studies might also need access to further data. In all cases, GDPR policies will be strictly followed and appropriate access permissions and security measures will be put in place.
- Specific measures for data sharing and data archiving and preservation will be defined for each research project.



## 9. REFERENCES

[1] Regulation (EU) 2016/679 on the protection of natural persons with regard to the processing of personal data and on the free movement of such data. This text includes the corrigendum published in the OJEU of 23 May 2018.

Available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:02016R0679-20160504&from=EN>

[2] Guidelines on Open Access to Scientific Publications and Research Data in Horizon 2020, 15 February 2016.

Available at:

[http://ec.europa.eu/research/participants/data/ref/h2020/grants\\_manual/hi/oa\\_pilot/h2020-hioa-pilot-guide\\_en.pdf](http://ec.europa.eu/research/participants/data/ref/h2020/grants_manual/hi/oa_pilot/h2020-hioa-pilot-guide_en.pdf)

[3] European Commission, Guidelines on Data Management in Horizon 2020, 15 February 2016. Available at:

[http://ec.europa.eu/research/participants/data/ref/h2020/grants\\_manual/hi/oa\\_pilot/h2020-hioa-data-mgt\\_en.pdf](http://ec.europa.eu/research/participants/data/ref/h2020/grants_manual/hi/oa_pilot/h2020-hioa-data-mgt_en.pdf)

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