



DESOLINATION

Deliverable D9.6



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Deliverable D9.6
Data Management Plan



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DELIVERABLE 9.6 – VERSION 01

WORK PACKAGE N°9

Nature of the deliverable		
R	Document, report (excluding the periodic and final reports)	X
DEM	Demonstrator, pilot, prototype, plan designs	
DEC	Websites, patents filing, press & media actions, videos, etc.	
OTHER	Software, technical diagram, etc.	

Dissemination Level		
PU	Public, fully open, e.g. web	X
CO	Confidential, restricted under conditions set out in Model Grant Agreement	
CI	Classified, information as referred to in Commission Decision 2001/844/EC	

Quality procedure			
Date	Version	Reviewers	Comments
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Executive summary

This document describes how the data and documents generated during the DESOLINATION project will be managed. The security of the system to guarantee the safety of the information is also described. Finally, the type of data obtained during the project is described and listed.

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1. Introduction

This report details the DESOLINATION Data Management plan, describing which data will be produced during project, their management strategy, and their diffusion level. The security issues are also addressed. The present deliverable describes the Data Management strategy as agreed by the consortium at M6 of the project: improvements to further optimize the strategy may occur during the project lifetime. If this should happen, this document will be updated accordingly.

2. Data management strategy

A project private repository is built within intranet of the website with a dedicated account for the project members allowing to store all relevant project information (reports, deliverables, presentations, meeting minutes, etc) and simplifying the communication among consortium members. The naming convention for the documents uploaded in the repository is outlined in Deliverable D10.2.

As the project must guarantee open access to public research data, also a dedicated account in an open data repository (*Zenodo*) which comply with the FAIR principles (Findability, Accessibility, Interoperability and Reusability: <https://about.zenodo.org/principles/>) is created.

2.1. Data format

Most of the data are available in standard readable formats (.xlsx, .docx, .txt, .csv, .pdf), apart from the data generated by specific commercial software that use proprietary formats (e.g. Aspen Plus files, Modelica files). The data collected on pilot sites may require entering the laboratory supervision software. This task is performed only by habilitated employees of the company. Raw data generated by experimental devices and model could require dedicated software, but the processed outcome will be made available through standard readable formats. All the public data are provided in standard readable formats, without licensing. Standard vocabulary and nomenclature will be used in the documents and databases, where possible.

2.2. Conservation policy and access options

In the project the following data conservation policies are adopted:

- **PR – Cloud project repository**

The cloud solution for data share inside the consortium for DESOLINATION project is a reserved password-protected repository on Microsoft Teams/share point, exploiting security and backup services of the platform. The access to the folder is reserved to the project partners. Specific naming rules (DESOLINATION_WP number_description_date) and folder structure (dedicated WPs folders, calls and meetings folder, templates folder, website updates folder) has been defined to allow document classification by date and reference WP.

- **CR – Cloud repository of the company/Institution**

Each institution/company uses cloud data storage solutions that must comply with the cybersecurity rules of the company. The access is limited to the company/institution workers.

- **LR – Local repository of the company/Institution**

Each institution/company uses off-line data storage solutions that must comply with the cybersecurity rules of the company. The access is limited to the company/institution workers.

- **OR – Open Access repository**

The project makes use of an Open Access repository for complying with the requirement of long-term open access to the public results of the project (<https://zenodo.org/>). In particular Zenodo complies with the FAIR principles: Findability, Accessibility, Interoperability and Reusability. A dedicated community has been created (https://zenodo.org/communities/desolination_project/)

- **WS – Website of the project**

The public data generated by the project (dissemination and communication materials, public deliverables, ...) are published in open access on the project website (www.desolination.eu). The project website will remain online at least 2 years after the project conclusion.

- **EU – European commission website (CORDIS)**

Public deliverables and public results of DESOLINATION project are made available on the dedicated portal of EU commission (CORDIS).

Each partner is responsible of his own data (security measurements depending on the company/university's rules). Centralization, sharing in the consortium, and open access publication of data is in charge of POLIMI and EUROQUALITY.

Some of the produced data (**non-confidential and open data**) will be discoverable with metadata (project title, authors, type of data/analysis, ...). In particular, the data in public open access databases will follow the metadata rules of the database itself, providing keywords for optimizing further re-use.

Non-public (confidential) data will be not identifiable and locatable by means of a standard identification mechanism. They will not be usable by third parties after the end of the project.

Metadata are provided in a table at the beginning of each document, including history of modification for clear versioning. The following information are provided in each document:

- Author(s);
- Project references (title, IDs);
- WP(s) to which the data refer;
- Date and version history;
- Summary of the contents.

A decision regarding IP protection will be made before releasing open access data, according to the specific procedure defined by the Consortium.

2.3. Ethical issues

No ethical issues are expected from the data generated in this project.

3. Data Generated during the project

3.1. General Description

The DESOLINATION project will generate data on the performance of an innovative system for water desalination based on Forward Osmosis integrated with a Concentrated Solar Power plant. A Demo plant will be built and run at KSU and some of the main components (e.g CO₂ blend, FO and MD membranes) will be preliminary tested at lab scale. Data about the overall plant and about components operating conditions and performance will be generated by the partners, resulting new and exclusive for DESOLINATION project.

In addition, the consortium will produce data about plant techno-economic optimization, LCA and social impact of the system, technology replicability and technology scale-up. These data represent as well novel data generated by the DESOLINATION project.

3.2. Detailed Description

In Table 1 is reported a preliminary screening of the data generated by each partner, with details about the format of the data, about the access rights and about the conservation Policy. The following table may be updated during the project lifetime with newly generated data.

Partner	Data Description	Format	Access	Conservation
ALL	Public Deliverables	pdf file	PU	EU, WS, PR, CR, LR,
ALL	Non Public Deliverables	pdf file	CO	PR, CR, LR,
ALL	Project OA journal papers	pdf file	PU	EU, WS, OAR, PR, CR, LR,
POLIMI	Thermodynamic points of different plant layouts	xls file	PU	OAR, PR, CR, LR,
POLIMI	Code for the thermodynamic simulation of the overall CSP+D plant	Aspen File	P	CR, LR,
EQY	Public project results	word file	PU	WS, PR, LR,
EQY	Public information on the partners' organization and/or researchers	word file	PU	WS, PR,
EQY	Communication and dissemination materials (posters, leaflets, rolls up, etc.)	pdf/paper file	PU	WS, PR, LR,
UNIBS	CO ₂ blends thermal stability tests	xls file	PU	OAR, PR, CR, LR,
UNIBS	CO ₂ blends material compatibility	xls file	PU	OAR, PR, CR, LR,
LUT	Life cycle inventories and results	xls file	CO	PR,
LUT	CFD validation results	pdf file	PU	OAR, PR, LR,
LUT	Heat exchanger modeling and measurement results	xls file	CO	PR, LR,
Fraunhofer	membrane measurement data	xls file	CO	LR,
Fraunhofer	membrane stability results	xls file	CO	PR, CR, LR,
Fraunhofer	public information on membrane performance	pdf file	PU	WS, OAR, PR, CR, LR,
BH	Performance curves of pump and expander	xls file	CO	CR, LR,
BH	report on pump and expander FAT	pdf file	CO	CR, LR,
TUE	Recipes for FO membrane preparation (composition, preparation parameters)	xls file	PU	OAR, CR, LR,

TUE	Data on FO membrane characterization (porosity, thickness, water flux, salt flux, hydrophilicity, charge)	xls file	PU	OAR, CR, LR,
TUE	Data on FO performance (flux, selectivity, stability, durability)	xls file	PU	OAR, CR, LR,
TEKNIKER	Data on FO coated membrane characterization (composition, thickness, ...)	xls file, tif, pfd file	CO	CR, LR,
TEMISTH	CFD models for supercritical CO2 heat exchangers	pdf file	PU	WS, OAR, CR, LR,
TEMISTH	Heat exchangers design	stl file	P	CR, LR,
TEMISTH	Detailed heat exchangers performance	xls file	CO	PR, CR, LR,
TEMISTH	Public heat exchangers performance	xls file	PU	WS, CR, LR,
TEKNIKER	Models and library for sCO2 cycle components dynamic modelling	mo file	P	CR, LR,
TEKNIKER	Models and library for the desalination system dynamic modelling	mo file	P	CR, LR,
TEKNIKER	Digital twin of the CSP+D concept and multilayer control design	mo file	P	CR, LR,
CRANFIELD	sCO2 cycle model & performance map (design) for selected CO2 blends	xls / pdf file	PU	WS, OAR, PR, LR,
CRANFIELD	sCO2 cycle performance map (off-design) for selected CO2 blends	pdf file	PU	WS, OAR, PR, LR,
CRANFIELD	sCO2 transient model and analysis	Dymola /pdf file	P	PR, CR, LR,
CRANFIELD	Brine treatment options towards zero liquid discharge	pdf file	PU	EU, WS, OAR, PR, CR, LR,
CRANFIELD	Data collection for LCA of system	xls/pdf	PU	EU, WS, OAR, PR, CR, LR,
CRANFIELD	Social impact data re: CSP & desalination technologies derived from workshops/interviews with local communities, policy makers and utilities	pdf file	PU	EU, WS, OAR, PR, CR, LR,
KSU	Model of the performance of the microturbine	EES file	PU	OAR, PR, CR, LR
KSU	Integrated system testing data	xls	PU	OAR, PR, CR, LR
UM	Water flux and reverse salt flux of different draw solutions	xls	PU	OAR, PR, CR, LR
UM	Polymer characterization (E.g. Molecular Weight, Lower Critical Solution Temperature)	xls	PU	OAR, PR, CR, LR

Table 1: Preliminary screening of the data generated by the DESOLINATION project partners. Access could be either public (PU), limited to the members of the consortium (CO, confidential) or limited to the members of the specific institution (P, private). Conservation policy acronyms refer to paragraph 2.2 of the present deliverable

4. Conclusion

This deliverable D9.6, Data Management Plan, provides a complete overview of the data generated during the DESOLINATION project, of their nature and of the management strategies (conservation policy, access rights, formats, ...). The implemented solutions allow a fluent and efficient data exchange among the partners for exploiting the project tasks. The public results of the project are made available with specific open access solution, in order to maximize the dissemination and the communication of the project outcomes.

Appendix: example of open data format

In the appendix an example of 2 set of data generated by different partners is reported.

Mixture thermodynamic properties (UNIBS)

In the experimental activity, the measurement starts from the (P,T) condition of the mixtures along an isochoric transformation, before heating of the fluid (a.k.a. virgin mixture) up to the maximum temperature of interest.

Blend 1

%mol CO2	80
%mol Dopant	20
Mixture amount (g)	15
Mix density (kg/m3)	33
Sample cylinder volume (cm3)	200
Sample cylinder material	Inconel 625

Isochoric line			Thermal stress		
T (°C)	ΔT_{step} (°C)	Time _{step} (min)	T (°C)	ΔT_{step} (°C)	Time _{step} (h)
20 ÷ 250	20 for T ≤ 120 10 for T > 120	15	300 ÷ 550	50	100

Isochoric lines			
<i>Virgin Mixture</i>			
T	u(T)	p	u(p)
°C	°C	bar	bar
20	-	3	
40	-	4.6	
60	-	6.7	
<i>after thermal stress test at 300 °C</i>			
20	-	3.1	
40	-	4.7	
60	-	6.7	

Plant schematic thermodynamic points (POLIMI)

The .xlsx file will contain the information about the main thermodynamic points of different CSP+D plants studied by Polimi. The different thermodynamic points will be obtained using Aspen Plus and applying the most suitable EOS for the given mixture.

Point Nr	Description	T (°C)	P (bar)	h (kJ/kg)	Composition	
					%mol CO ₂	%mol dopant
1	Pump inlet	50	80			
2	Pump outlet					
3	High pressure Recuperator inlet					