Reversible solid oxide Electrolyzer and Fuel cell for optimized Local Energy miX

Data Management Plan
Deliverable D7.6

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Abstract

The Open Research Data Pilot aims to make the research data collected, processed or generated by Horizon 2020 projects accessible with as few restrictions as possible, while at the same time protecting sensitive data from inappropriate access and respecting Intellectual Property Rules.

As REFLEX project is part of H2020, all the consortium members have to assume stakeholder role in "Open access to scientific publications" policy.

The REFLEX project data management plan is a "living" document presenting, at each moment of the project, how data collected or generated will be handled during and after the project.

The Data Management Plan (DMP) will include:

- Accounting for IPR, commercial and security issues, the definition of the REFLEX project data that will be shared/made open access.
- The definition of the repository to handle the data during and after the end of the project.
- A description of the methodology, including standards, used to curate and preserve data collected, processed or generated.

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1. Introduction

Sound data management is a part of research best practice that the European Commission has decided to promote by mean of Open Research Data (ORD) Pilot project. ORD pilot aims to improve and maximize access to and re-use of research data collected, generated or processed by all Horizon 2020 projects and so REFLEX project.

Present document, deliverable D7.6 Data Management Plan (DMP), is a part of REFLEX WP7: Exploitation & Dissemination. REFLEX project started in January 2018 and consequently participates in ORD Pilot that means the project has to provide a first version of DMP six month after the beginning.

The DMP is not a fixed document, but it is likely to evolve during the whole lifespan of the project, serving as a working document. This document will be updated as often as needed during the Project General Assemblies.

The purpose of the current deliverable is to present the first version of the Data Management Plan of the REFLEX project. The deliverable has been compiled with the collaborative work among the coordinator and the consortium partners who were involved in data collection, production and processing. It includes detailed descriptions of all datasets that will be collected, processed or generated in all Work packages during the course of the 36 months of REFLEX project. The deliverable is submitted through the latest guidelines: The Open Research Data Pilot (ORD Pilot). For the methodological part, the latest EC guidelines[1] have been adopted for the current deliverable.

The deliverable is structured into the following sections:

1. An introduction to the deliverable and a brief description on how Data Management is approached in Horizon 2020 (H2020) program along with the importance of it.
2. A description of the methodology used, an analysis of the chapters of the provided template

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[1] http://ec.europa.eu/research/participants/data/ref/h2020/grants_manual/hi/oa_pilot/h2020-hi-oa-data-mgt_en.pdf

and last the methodological steps followed in REFLEX.

3. A description of the datasets to be used in REFLEX.
4. A DMP revision timetable
5. A summary table with all the datasets included in first REFLEX DMP.

2. Data management in H2020 programs

First of all, it seems necessary to remind that a fundamental distinction has to be made, in the frame of H2020 programs, between peer-reviewed publications, for which open access is an obligation, and open research data, that could be open or closed.

For open research data the commission is running a flexible pilot: Open Research Data pilot that helps H2020 beneficiaries to make their research data Findable, Accessible, Interoperable and Re-usable (FAIR), to ensure it is soundly managed.

Initially limited to some research areas, the Open Research Data pilot has been extended since 2017 to cover all the thematic areas of Horizon 2020 (H2020). Consequently it has to be applied to REFLEX project started in 2018.

The aim of ORD pilot is to improve and maximize access to and re-use of research data collected/ generated/ processed in the frame of H2020 projects. Nevertheless, the goal is not to necessarily open all the research data, but rather to follow the principle "as open as possible, as closed as necessary". ORD pilot deals with the need to balance openness and protection of scientific information, Intellectual Property Rights (IPR), privacy concerns, security, as well as data management and preservation issues.

A Data Management Plan (DMP) is a key point to reach the goal of producing FAIR data. A DMP describes the data management life cycle for the data to be collected, generated or processed and should include at least information about: (i) how handle research data during and after the end of the project, (ii) what data will be collected, processed, generated, (iii) what data will be opened and what will remain closed and for what reason, (iv) which methodology and standards will be applied, (v) how data will be curated and preserved (including after the end of the project).

Notice that ORD pilot applies primarily to the data needed to validate the results presented in scientific publications. Other data can be provided on a voluntary basis as stated in the DMP.

The DMP remain overall a 'living" document that has to be kept up to date as the project is running.

A periodical review of the DMP is necessary and has to be defined and discussed between consortium partners.

3. Methodology

3.1 DMP Template

In order to assist the beneficiaries with the completion of the DMP, the EC produced and provided a template that acts as a basis for data description. The template contains a set of questions that beneficiaries should answer with a level of detail appropriate to the project. If no related information is available for a given dataset, then the phrase "*Non-applicable*" or N/A will be used. In the following paragraphs, the main sections and proposed contents of the template are listed and presented, along with the way REFLEX reflects these sections. Finally the table provided in appendix 1 summarizes main issues expressed in the template.

3.1.1 Data summary

In this section, beneficiaries are asked to describe (a) the purpose of the data collection or generation and how this purpose reflects the objectives set in the project as a whole, (b) the types and formats of data that will be generated or collected, (c) the origin of the data, (d) the expected size of the data, and also (e) whether existing data will be re-used and (f) the usefulness of the described datasets.

3.1.2 FAIR data

a)   Making data findable, including provisions for metadata

This section includes a description of metadata and related standards, the naming and keywords to be used. In the context of REFLEX the following naming convention will be used for all the datasets of the project. First the project name : REFLEX, then the work package number will be placed, then the date using YYYYMMDD (format that insures direct correspondence between chronological and alphabetical orders), then the ID of the partner who produced the data, then the serial number of the dataset within this work package and last the dataset title, all separated with underscore (REFLEX_Data_<WPno>_YYYYMMDD_< data producer ID >_<serial number of dataset (2 digits)>_<dataset title>). Notice that serial numbering will be performed by 2 digits to make consistent alphabetical and chronological filing

An example can be the following: *REFLEX_Data_WP2_20181222_DTU_01_ State of the art cell testing _data*.

However, it has to be noted that this naming convention describes only the general dataset that can contain files of different size and format. The naming of each separate file follows a different naming convention that is proposed by the partner who creates the files.

The use of a standard identification mechanism for the datasets of REFLEX will be decided by the project consortium. If it turns out to be necessary, the use of the Guidelines and standards provided by the International DOI Foundation (IDF) and the DOI system and ISO 26324[2] will be considered.

b)   Making data openly accessible

Which data produced or used in the project has to be made openly available as the default? That is the main issue of the section. It also explains why some datasets cannot be made open due to possible, legal, contractual or ethical issues. It is possible that some beneficiaries have decided to keep their data closed. A description of the potential data repositories is also included along with the potential software tools required to access the data.

In the context of REFLEX, the following options for open repositories of data, metadata, documentation or code will be considered: (a) The Registry of Research Data Repositories[3], (b) Zenodo[4], (c) OpenAIRE[5],

In the context of the REFLEX DMP, no arrangement has been made with an identified repository. This will be discussed by the consortium during the upcoming meeting.

c)   Making data interoperable

In this section, data interoperability is detailed for every dataset of REFLEX. Issues such as the allowing of data exchange between researchers, institutions or even countries are covered along with all the technicalities including standards for formats or metadata vocabularies.

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[2] https://www.doi.org

[3] http://www.re3data.org/

[4] https://zenodo.org/

[5] https://www.openaire.eu/

The issue of interoperability will be discussed among the consortium members in the next project meeting.

d) Increase data re-use (through clarifying licenses)

This section describes the licenses, if any, under which data will be re-used in REFLEX. It includes provisions regarding the period when data will be available for re-use and if third parties will have the option to use the data and when.

e) Allocation of resources

FAIR data management in REFLEX project is led by the project coordinator CEA under WP7 – Communication, Dissemination and Exploitation of project results. All costs related to FAIR data management that will occur during project implementation will be covered by the project budget. Any other cost that may relate to long term data preservation will be discussed among consortium members.

f) Data security

Data security is of major importance in the REFLEX project. Special attention will be given to the security of sensitive data. The protection of data will be ensured through procedures and appropriate technologies. If data will be kept in a certified repository, then the security standards of that repository will apply.

g) Ethical aspects

With respect to the H2020 ethics self-assessment, the REFLEX proposal and the use case scenarios to be defined will not be concerned with any ethical issue.

h) Other issues

In this section, other issues not included above can be covered such as the use of other national/funder/sectorial/departmental procedures for data management.

3.2 Methodological steps in REFLEX

For the 1st version of REFLEX DMP, the following methodological steps were followed:

1. The coordinator, responsible for the implementation of DMP in the frame of WP7 – Communication, Dissemination and Exploitation of project results - sent to all partners an email notifying them about the upcoming deliverable. Contribution was asked from all partners that were involved in any data collection in each task of the WPs. They were asked to answer a questionnaire on which data they were expecting to produce and collect during the project.
2. In parallel, the latest guidelines from the EC regarding data management were sent to all partners to be informed.
3. The project team collaborated efficiently and contributed with the needed information.

The first version of the REFLEX DMP is intended to provide an initial screening of the data to be collected, processed and produced within REFLEX. It is also the first attempt to collect the vision and input from all the partners involved in any data management option. During the upcoming Project Meeting in January 2019 special attention will be given to data management in order to provide further clarifications and conclusions on data management.

4. DMP review timetable

DMP is a living document that have to be adjusted all along the project lifetime. Plenary meeting periodicity seems to be adapted to update the data management plan and ensure its progress to its consolidation.

M6   D7.6 Open Data Management Plan v1
M18   D7.6 Open Data Management Plan v2 (shared between REFLEX partners),
M30   D7.6 Open Data Management Plan v3 (shared between REFLEX partners),
M36   D7.7 Consolidated Data Management Plan

At the end of the Project a consolidated Data Management Plan (D7.7) will be provided that will detail deeply the REFLEX project datasets and the way to access to the data.
This final document will be fully open to public access.

5. REFLEX datasets

Following tables, one for each work package that uses, generates or processes data, address the data management plan issues detailed in present document appendix 1.

5.1 Work package 2: Cell and stack development for flexible operation

DMP component	REFLEX_data_WP2
1. Data summary	Purpose: performance and durability of cells and stacks in rSOC operation; validation of improvements performed in the project Data format: xlsx; docx; jpg and png Re-use of existing data and if yes, how? Yes. Data available at testing partners for comparison Origin of data: Performance and durability tests performed in the frame of REFLEX, according to protocols defined and obtained on the test stations at different partners laboratories Expected size of data: Approx. several Gb To whom might it be useful? Scientific community, private industrial actors
2. FAIR Data	
2.1 Making data findable, including provisions for metadata	Description of the data: Naming will be WP2__YYYYMMDD_<Producer ID>_xx_test results_data
2.2 Making data openly accessible	Tests on cells and stacks after optimization will be made public. Tests performed on intermediate versions of cells and stacks won't be public, but shared between partners as required to ensure optimal progress in the project

DMP component	
2.3 Making data interoperable	Public data of the project for this thematic are interoperable by nature.
2.4. Increase data re-use (through clarifying licenses)	N/A
3. Allocation of resources	All costs related to the data collection and processing are covered by the project budget under WP7
4. Data security	Sensible and non-public data will be stored on a SharePoint or sftp folder available only for the consortium members
5. Ethical aspects	No ethical aspects for REFLEX
6. Other	N/A

5.2   Work package 3: Power electronics

DMP component	REFLEX_data_WP3
1 Data summary	Purpose: Power electronics and electrochemical storage specification, numerical simulations and emulations. Data format: docx, pdf, xlsx, pptx, m, mat, fig, jpeg,.. Re-use of existing data and if yes, how? Yes. Documentation related to state of the art components and design. Origin of data: Specification, design report, layouts, models and simulations Expected size of data: GBs To whom might it be useful? Scientific community, private industrial actors, potential customers
2 FAIR Data	
2.1 Making data findable, including provisions for metadata	Description of the data: Naming will be _WP3_YYYYMMDD_<Producer ID>_01_field tests
2.2 Making data openly accessible	Design and engineering documents will not be public. The documentation will be available within the consortium
2.3 Making data interoperable	Public data of the project for this thematic are interoperable by nature
2.4. Increase data re-use (through clarifying licenses)	N/A
3 Allocation of resources	All costs related to the data collection and processing are covered by the project budget under WP7
4 Data security	Sensible and non-public data will be stored on a SharePoint or sftp folder available only for the consortium members
5 Ethical aspects	No ethical aspects for REFLEX
6 Other	N/A

5.3   Work package 4: System integration and manufacturing

DMP component	REFLEX_data_WP4
1 Data summary	Purpose: System components specification, system modeling, factory acceptance tests, in field tests. Data format: docx, pdf, xlsx, pptx, m, mat, fig… Re-use of existing data and if yes, how? Yes. The REFLEX Smart Energy Hub belongs to a Sylfen product line strategy. Parts of the documentation will be generic and adapted to the REFLEX system. Origin of data: Specification, modelling and design phase of the REFLEX program. Factory acceptance test phase Expected size of data: some GB To whom might it be useful? Scientific community, private industrial actors, potential customers
2 FAIR Data	
2.1 Making data findable, including provisions for metadata	Description of the data: Naming will be WP4___YYYYMMDD_<Producer ID>_xx__System specification
2.2 Making data openly accessible	Specification of the system will be public Modelling results, thermal components specifications, Balance Of Plant, production documents and FAT report won't be public
2.3 Making data interoperable	Public data of the project for this thematic are interoperable by nature.
2.4. Increase data re-use (through clarifying licences)	N/A
3. Allocation of resources	All costs related to the data collection and processing are covered by the project budget under WP7
4.Data security	Sensible and non-public data will be stored on a SharePoint or sftp folder available only for the consortium members
5. Ethical aspects	No ethical aspects for REFLEX
6. Other	N/A

5.4   Work package 5: Installation and field test

DMP component	REFLEX_data_WP5
1 Data summary	Purpose: ENIVIPARK site preparation, REFLEX system installation and in-field operations, system performance assessment.

		Data format: docx, xlsx Re-use of existing data and if yes, how? No Origin of data: system installation and permissions, deliverable and data analysis report. Expected size of data: some GBs To whom might it be useful? Advisory board, final utilities, private industrial actors, scientific community, potential customers
2	FAIR Data	
	2.1 Making data findable, including provisions for metadata	Description of the data: Naming will be _WP5_YYYYMMDD_<Producer ID>_xx_field tests
	2.2 Making data openly accessible	How will the data be made accessible? Selected relevant data from the in-field operation will be accessible. The user could have an identification to enter: user/password, so the REFLEX partners could have identification of the user. What method or software tools are needed to access the data? Instrumentation data will be exported as binary data. It will be possible to export part of them in Excel format to be published as open data. How will the identity of the person accessing the data be ascertained? Information about company, activity will be requested during first access.
	2.3 Making data interoperable	Public data of the project for this thematic are interoperable by nature
	2.4. Increase data re-use (through clarifying licences)	N/A
3	Allocation of resources	All costs related to the data collection and processing are covered by the project budget under WP7
4	Data security	Sensible and non-public data will be stored on a SharePoint or sftp folder available only for the consortium members
5	Ethical aspects	No ethical aspects for REFLEX
6	Other	N/A

5.5 Work package 6: Economical and scale-up studies

DMP component	REFLEX_data_WP6

1	Data summary	Purpose: Evaluate CAPEX, OPEX, LCOE of the technology, scale up the concept to 1MWe in SOFC, and evaluate associated CAPEX and OPEX. Feed the business model of Sylfen with technical and economical results. Perform techno-economic analysis based on other power-to-power technologies. Data format: .xlsx, .docx Re-use of existing data and if yes, how? Yes. Reference data for comparison with other technologies Origin of data: techno-economic calculations Expected size of data: MB To whom might it be useful? Potential end-users of the Smart Energy Hub, stakeholders
2	FAIR Data	
	2.1 Making data findable, including provisions for metadata	Description of the data: Naming will be _WP6_YYYYMMDD_<Producer ID>_xx_techno_eco
	2.2 Making data openly accessible	Selected relevant data will be made accessible on the REFLEX website. Regular office software will be sufficient to access to them. How will the identity of the person accessing the data be ascertained? Information about company, activity will be requested during first access.
	2.3 Making data interoperable	Public data of the project for this thematic are interoperable by nature.
	2.4. Increase data re-use (through clarifying licences)	N/A
3	Allocation of resources	All costs related to the data collection and processing are covered by the project budget under WP7
4	Data security	Sensible and non-public data will be stored on a SharePoint or sftp folder available only for the consortium members
5	Ethical aspects	No ethical aspects for REFLEX
6	Other	N/A

5.6 Work package 7: Exploitation and dissemination

DMP component	REFLEX_data_WP7
1 Data summary	Purpose: Insure highest possible impact for REFLEX, Insure the dissemination of the REFLEX results both targeting scientific audience and a broader public audience, managed the produced knowledge generate industrial protection actions and publications. Data format: Formats for web-publicing, pdf, image file formats (e.g. jpg, png etc.), txt, docx, pptx. In general data distributed from WP7 to the public will be web-formats, pdf and similar Re-use of existing data and if yes, how? Yes. Similar exploitation and dissemination data from partners involvement in other research project will be used for inspiration and comparison Origin of data: Processed experimental data from partners, presentation and articles from partners as well as press releases from partners Expected size of data: In the range of MB to GB To whom might it be useful? Scientific community including students, stake holders from industry and in specific cases also the broader public
2 FAIR Data	
2.1 Making data findable, including provisions for metadata	Description of the data: Internally in the project the naming will follow the guideline _WP7_YYYYMMDD_<Producer ID>_event For publications, conference presentations etc. journal name and/or conference name will be included in the name along with at least first author name.
2.2 Making data openly accessible	How will the data be made accessible? Via the projects homepage www.reflext-energy.eu , via newsletters to Advisory Boards, via conference home pages (presentations/posters) and scientific journals (open access) What method or software tools are needed to access the data? No additional software or tools than standard software and tools on laptops Have you explored appropriate arrangements with the identified repository?

		Hosting of homepage is arranged and will be hosted by DTU throughout the project Information about company, activity will be requested during first access.
	2.3 Making data interoperable	Public data of the project for this thematic are interoperable by nature
	2.4. Increase data re-use (through clarifying licences)	Raw data gathered in and/or as product of/generated by WP7 will be stored and remain re-usable in form of raw data (draft of publications, press releases, presentations etc.) being stored at the project Sharepoint and stored for 5 years after finalizing the REFLEX project. Re-use of data after end of the project by project members and by third parties will be possible if/when partners provide their written accept for the re-use of data generated as part of WP7, except for data already public
3	Allocation of resources	The costs will be covered by the project budget for this WP. License to sharepoint is covered by DTU. DTU will be responsible for the data management when received from partners and prior to publishing
4	Data security	Data, news, press-release, articles, presentations will be stored on a Sharepoint site only open for project members until agreed to be published DTU ensures safety of data storage for long-term preservation and curation in WP7
5	Ethical aspects	No ethical aspects for REFLEX
6	Other	N/A

Appendix 1: How to fill REFLEX dataset table

Following table summarizes the main issues listed in "H2020 template: Data management plan" that have to be addressed for each work package dataset.

DMP component	REFLEX_data_WPx_YYYYMMDD_<Producer ID>_xx_<Data ID>
1. Data summary	Purpose: What is the purpose of the data and its relation to the objectives of the project? Data formats: Will you re-use any existing data and how? What is the origin of the data? What is the expected size of the data? To whom might it be useful ('data utility')?
2. FAIR Data	Findable, Accessible, Interoperable, Re-usable
2.1 Making data findable, including provisions for metadata	- Is there any protocol or standard identification mechanism that make the data discoverable with metadata, identifiable and locatable Description of the data: - Naming convention, - Versioning management, - Is metadata creation considered? If so, metadata description.
2.2 Making data openly accessible	- Describe the data that will be made openly available. In case of restrictions detail the reasons separating legal and contractual reason from voluntary restrictions. - Specify the repository - Define how data will be accessible (repository, secure platform…) - Define the software or methods needed to access the data and if some specific documentation or procedure is needed. - Can the relevant software be included to the data? - Is an appropriate arrangement concluded with the identified repository - How access will be provided in case of restrictions? - Is there a need of data access committee? - Are conditions for access clear and accessible? - How will be identity of the persons accessing the data be ascertained?
2.3 Making data interoperable	- Are the data produced in the project interoperable, that is allowing data exchange and re-use between researchers, institutions, organisations, countries, etc. (i.e. adhering to standards for formats, as much as possible compliant with available (open)

	software applications, and in particular facilitating re-combinations with different datasets from different origins)?
	- What data and metadata vocabularies, standards or methodologies will you follow to make your data interoperable?
	- Will you be using standard vocabularies for all data types present in your data set, to allow inter-disciplinary interoperability?
	- In case it is unavoidable that you use uncommon or generate project specific ontologies or vocabularies, will you provide mappings to more commonly used ontologies?
2.4. Increase data re-use (through clarifying licences)	- How will the data be licensed to permit the widest re-use possible?
	- When will the data be made available for re-use?
	- If an embargo is sought to give time to publish or seek patents, specify why and how long this will apply, bearing in mind that research data should be made available as soon as possible.
	- Are the data produced and/or used in the project useable by third parties, in particular after the end of the project?
	- If the re-use of some data is restricted, explain why.
	- How long is it intended that the data remains re-usable?
	- Are data quality assurance processes described?
3. Allocation of resources	All costs related to the data collection and processing are covered by the project budget with dedicated person months under WP7.
	- What are the costs for making data FAIR in your project?
	- How will these be covered?
	- Who will be responsible for data management in your project?
	- Are the resources for long term preservation discussed (costs and potential value, who decides and how what data will be kept and for how long)?
4. Data security	- What provisions are in place for data security (including data recovery as well as secure storage and transfer of sensitive data)?
	- Is the data safely stored in certified repositories for long term preservation and curation?
5. Ethical aspects	- Are there any ethical or legal issues that can have an impact on data sharing?
	- Is informed consent for data sharing and long term preservation included in questionnaires dealing with personal data?
6. Other	N/A

Appendix 2: Questionnaire sent to REFLEX Partners

Task No	Task Title	Lead Participant Short Name	Describe the generated Data	Data provider	File types Examples of type of format: *.xlsx , *.mp3,*.doc,*.pdf, Jpeg, Audio	Openly accessible: Yes No N/A
T2.1	Cell optimization	ELCOGEN, DTU	Modified production process to improve electrochemical characteristics of cells and increase active area from 100 up to 196 cm^2	ELCOGEN	.docx, .pdf, .jpg,	No
T2.2	Stack optimization	CEA, SYLFEN	Modified design to increase its operation in rSOC and to integrate 200 cm² cells	CEA	Solidworks, .docs, .pdf	No
T2.3	Cell and stack testing protocols	DTU	Harmonized testing protocols for the evaluation of cell and stacks in terms of performance and durability in rSOC	DTU, CEA, ELCOGEN	.docx, .pdf	No; unless specifically agreed between involved partners
T2.3	Cell testing	DTU	Performance and durability test in rSOC conditions, feedback data for T2.1 Mapping of conditions corresponding to threshold above which degradation occur	DTU	xlsx, .docx, .pdf, txt	No; unless specifically agreed between involved partners
T2.4	Stack testing	CEA, DTU	Performance and durability test in rSOC conditions, Definition of the best set points for the demonstrator	CEA	.xlsx, .docx, .pdf,.txt	No, except final validation tests on optimized stack
T2.5	Cell/stack manufacturing for the demonstrator	CEA, ELCOGEN	Celles and stacks produced; associated procedures and methods Lab validation of the stacks before delivery	CEA	.xlsx, .docx, .pdf	No
T3.1	Power electronics and electrochemical storage specification	GPTECH, SYLFEN,USE	Power electronics and electrochemical storage specification	GPTECH, SYLFEN,USE	.xlsx, .docx, .pdf	Yes

T3.2	Electrical design of the Smart Energy Hub power electronics	USE, GPTECH,SYLFEN	System electrical design	USE, GPTECH,SYLFEN	.xlsx, .docx, .pdf, .dwg	No
T3.3	Simulated and emulated scenarios for the validation of the power strategies	USE, GPTECH,SYLFEN	System simulations and use cases	USE, GPTECH,SYLFEN	.xlsx, .docx, .pdf, .m, .c, .psc	No
T3.4	Power and electrochemical storage manufacturing and delivery	GPTECH, SYLFEN	Systems Manufacturing and Assembly	GPTECH, SYLFEN	.xlsx, .docx, .pdf, .sldprt, .sldasm,. .dwg	No
T3.5	Lab validation of key systems and components	GPTECH, USE	Systems tests and validation: FAT	GPTECH, USE	.xlsx, .docx, .pdf	No
T4.1	System specification	SYLFEN, CEA,GPTECH,USE,VTT,ENVIPARK	Specification of the REFLEX Smart Energy Hub.	SYLFEN	.docx,.pdf	Yes
T4.2	System modelling	VTT,SYLFEN, ENVIPARK	Static modelling of the REFLEX Smart Energy Hub, specification of components	VTT	.docx, .xlsx, .pdf, .pptx, .jpg, .png, .fig, .m, .mat	No
T4.3	Heat management components design	SYLFEN,CEA	From the modelling task, the key heat management components will be specified by Sylfen then sub contracted (design and supply).	SYLFEN	.docx, .xlsx, .pdf	No
T4.4	Balance of plant of the SHE	SYLFEN,USE,GPTECH	Supplied of all the components except: The stacks (WP02), the power electronics (WP03)	SYLFEN	Xlsx, docx, pdf	No
T4.5	System manufacturing and integration	SYLFEN, CEA, VTT , GPTECH,USE	System available; associated procedures and methods; factory acceptance test report before shipping	SYLFEN	.docx, .xlsx, .pdf	No
T5.1	Site preparation and installation	ENVIPARK,SYLFEN, ENGIE,GPTECH, USE	information on permissions and installation procedures	ENVI	docx, pdf	Yes
T5.2	Configurations tests	ENVIPARK, SYLFEN	description of different configurations	ENVI	docx, pdf	Yes
T5.3	REFLEX tests in real environmental conditions	ENVIPARK, SYLFEN, ENGIE	following the needs of the Park	ENVI	.xlsx	No, the user has to ask

					authorization
T5.4	Data analysis	ENVIPARK, SYLFEN, ENGIE	The possible simulation vs. experimental data comparison will include simulated data from VTT.	VTT	.xslx, .docx, .pdf, .pptx,	Yes for selected relevant data
T6.1	Identification of the product technical specifications with respect to the several addressable markets	ENGIE, SYLFEN, VTT, ENVIPARK	Criteria for system specification System specifications	ENGIE, SYLFEN, VTT, ENVIPARK	.docx, .xlsx	No
T6.2	Determination of the requirements for CAPEX/OPEX and LCOE for each addressable market	ENGIE, SYLFEN	Result of CAPEX/OPEX/LCOE	ENGIE, SYLFEN	.xlsx, .docx	Yes, for selected relevant data
T6.3	Scale-up studies to identify cost-reduction curves	SYLFEN, ENGIE, ENVIPARK	Definition of Smart Energy Hub from kW class to MW scales	SYLFEN	.docx, .xlsx, .ppt, .pdf	No
T6.4	Market qualification and quantification	ENGIE,ENVIPARK	Identification of markets addressable	ENGIE,ENVIPARK	.docx, .pptx, .xlsx	No
T7.1	Communication platform	DTU, ELCOGEN, SYLFEN, ENGIE, CEA,GPTECH,USE,VTT,ENVIPARK	Communication tools (logo, templates, leaflet, newsletter, website	all	.docx, .pptx, .pdf, .jpg	Yes
T7.2	Dissemination and interactions	DTU, ELCOGEN, SYLFEN, ENGIE, CEA,GPTECH,USE,VTT,ENVIPARK	Scientific papers, conference proceedings, posters, flyers,	CEA	.pptx, Docx, .pdf	Yes
T7.3	Exploitation, IPR and business plan	SYLFEN, DTU, ELCOGEN, ENGIE, CEA,GPTECH,USE,VTT,ENVIPARK	Definition of the business roadmap of the whole value chain for the REFLEX energy storage solution	SYLFEN	.docx, .pdf	No