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frESCO

New business models for innovative energy services bundles for residential consumers

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Deliverable D1.3
Data Management Plan

Deliverable number	D1.3
Deliverable name	Data Management Plan
Lead beneficiary	CIRCE
Description	This deliverable is related to Task 1.3. it sets the basis for the Dissemination and exploitation but also the procedures for the sharing of project data. This is the first version to be revised during the project.
WP	WP1
Related task(s)	Task 1.3
Type	Report
Dissemination level	Public
Delivery date	30.09.2021.
Main author	Leon Nielsen (CIRCE)
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ABBREVIATIONS

Abbreviation	Name
CIM	Common Information Model
D	Deliverable
DMP	Data Management Plan
EC	European Commission
FAIR	Findable, accessible, interoperable and reusable
GDPR	General Data Protection Regulation
GA	Grant Agreement
H2020	Horizon 2020 The EU Framework Programme for Research and Innovation
IPR	Intellectual Property Right
WP	Work package

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EXECUTIVE SUMMARY

This data management plan forms the general procedures and minimum requirements that specific data management procedures in each WP, Task, or organisation should be built upon. It is written with the consortium and public audience in mind, however prior knowledge from other publicly available sources of the frESCO project is assumed. All research, development, and engineering tasks have associated data needs. The deliverable seeks to address these needs by expanding on the following points.

- The types of open and non-open data that will be generated or collected by the consortium, via experimental work and research, during the project's lifespan;
- The technologies and infrastructures that will be used to securely preserve the data long-term;
- The standards used to encode the data;
- The data exploitation plans;
- The sharing/access policies applied to data-sets.

Specific attention is drawn to the importance of the technical treatment of data to ensure its interoperability within the project and usability out of the project, and data protection under GDPR, especially given that many activities include data that could be considered personal (but not sensitive) in nature.

This data management plan covers the procedures for handling of primary and secondary (meta) data during and after the end of the project. The data management plan and associated deliverables discuss the nature of data that will be collected, and the intended usage, as well as how the data will be collected, processed, shared and stored, and for how long it will be stored. It considers the data from the technical angle, considering easing its use in current and future research; and from the privacy angle, considering where data subjects (under GDPR) or consortium partners due to commercial reasons require restrictions on the freedom of data. This leads to the simplifying definition of data being as open as possible, as closed as necessary. It is also important to note that the frESCO grant agreement does not specifically call for open access to research data though it does under article 29.2 call for open access to scientific publications.

Within the frESCO project, sensitive data (e.g. health, religiosity, sexual practices) will not be collected, and personal data from internal sources (within the consortium) and external to the

consortium will be collected and treated appropriately according to European and national laws, and current best practice. This requires informed consent for all data collection from data subjects, the right to withdraw consent, and limitations on the life of the data. Sharing of data between specific partners, strictly for the informed reasons communicated when requesting consent, should be of anonymised data whenever possible.

Individual organisations within the frESCO consortium should have a designated Data Protection Officer when required by law, and as specified in the consortium and grant agreements. A person or persons should be assigned to take on the role of data controller ensuring compliance with applicable laws and regulations, typically GDPR and other national requirements.

The data management plan is subject to change and therefore this is a living document that can be altered according to the changing internal needs of the consortium or due to changing external factors, such as legislation. The next delivery date is set at M36 project end, but where required important updates will be made before then.

1 INTRODUCTION AND OBJECTIVES

1.1 Objectives and scope

The objective of D1.3, Data Management Plan, is to look at data from the perspectives of: Compliance with GDPR obligations and any other ethical considerations; An overview of the technical nature and use of data in frESCO; And openness in so far as is possible to maintain the commercial interests of partners and allow use of data in further research and validation of results. D1.3 doesn't seek to provide specifics for all the different data uses, data interactions, and output that could come about in the project; but should provide a distillation of the information that is of interest to a public audience.

In general, it responds to the following points:

- The types of open and non-open data that will be generated or collected by the consortium, via experimental campaigns and research.
- Data set referencing and naming.
- Data set descriptions.
- Standards and metadata.
- Data sharing and handling during and after the end of the project.
- Archiving and preservation, during and after project end.

In the frESCO project it is important to note that participation in the open research data pilot is voluntary.

frESCO is a project with data at its centre, which requires careful attention to the related themes, but also requires a degree of confidentiality as the data handling is central to some of the key exploitable results. As a general rule, enough data to validate results should be made open, especially for those results presented in publications. Data should be presented in accordance with FAIR principles (findable, accessible, interoperable, and reusable).

All legislation relating to data privacy both at national and at European level under the GDPR must be considered and complied with in carrying out frESCO activities.

1.2 Interactions

The data management plan is part of the full range of deliverables under the management work plan, and specifically falls under T1.3. As it will be released publicly it is a document that can be considered in conjunction with other public deliverables with no other knowledge required; however consortium partners can consider it in combination with other management deliverables and ethics deliverables; D9.1 the introductory deliverable on protection of personal data; D9.2 informing on the justification for data processing, security measures and required equipment; D9.3 related to informed consent procedures for data subjects and other stakeholders interviewed within the project; and correct processing and treatment of any sensitive and/or personal data that may be collected in the project.

It is also related to D2.4 Data Handling Plan and Data Progress Report which constituted a first pass on these themes, here the useful content will be related for a public audience.

The Common Information Model (CIM) will be described in D4.1 which will outline the higher-level data models and data relations.

Under WP4 Big data collection and management, automation, privacy, and interoperability there are also a number of other public deliverables of which D4.3 Data Collection, Security, Storage and Management Services Bundles could be seen to have a close relation to themes in the data management plan though directed at the project objectives.

2 DATA SUMMARY

2.1 Overall infrastructure and obligations

As data is central to the project, a CIM and an integrated data platform, as well as other data infrastructure will be developed for all the demonstrator data and to underpin the functioning business models proposed. The integrated data platform will store raw data sets, following a specific naming convention with accompanying metadata. Data sets will be mapped to the CIM and will be searchable and findable for the needs of the project and proposed business models. It is not an open data platform as it will have confidential data sets stored on it but will aid in data retrieval and reuse and it´s security protocols can allow secure controlled data access. Specifically, section 5 details infrastructure for archiving and preservation.

The grant agreement specifies under clause 29.2 that as part of providing open access (free of charge online access for any user) to scientific publications, the beneficiary must aim to deposit at the same time the research data needed to validate the results presented in the scientific publications.

The timeline for open access is immediately upon final publication according to the below text from the grant agreement, under 29.2 Open access to scientific publications. [1a]

"Each beneficiary must ensure open access (free of charge online access for any user) to all peer-reviewed scientific publications relating to its results.
In particular, it must:
(a) as soon as possible and at the latest on publication, deposit a machine-readable electronic copy of the published version or final peer-reviewed manuscript accepted for publication in a repository for scientific publications; Moreover, the beneficiary must aim to deposit at the same time the research data needed to validate the results presented in the deposited scientific publications.
(b) ensure open access to the deposited publication — via the repository — at the latest:
(i) on publication, if an electronic version is available for free via the publisher, or
(ii) within six months of publication (twelve months for publications in the social sciences and humanities) in any other case.
(c) ensure open access — via the repository — to the bibliographic metadata that identify the deposited publication. The bibliographic metadata must be in a standard format and must include all of the following:
- the terms "European Union (EU)" and "Horizon 2020";
- the name of the action, acronym and grant number;
- the publication date, and length of embargo period if applicable, and
- a persistent identifier."

Grant clause 29.3 relating to open data is not applicable to the frESCO project so while the aim should be to make data freely available, ideally in an online context, it is not mandatory. Of course, where other legal or commercial restrictions apply open access does not need to be given, and no specific open data repository is required for the project however there is ample information produced by the EC which can aid partners to allow open access to data.[1][1]

Open data sets at the time of publication of this deliverable are listed and described in Annexes section 10.2.

2.2 Purpose of the Data

frESCO relies heavily on data collection, generation and use/re-use. Data-collected, represents all available "raw material" collected as part of the frESCO actions (i.e. interventions) taking place during the project's runtime, while data-generated is defined as the frESCO outcomes which will contribute towards the successful deployment of the frESCO project.

The most visible forms of data use are those in dissemination and communication actions; such as public deliverables, scientific reports, articles and any other publicly available communication on frESCO activities. All these publicly facing actions can be found in the dissemination deliverables and function to more widely communicate the work being carried out and results of the project.

Within the consortium, a wide range of data is shared for management purposes, from email to financial reporting data. Of course, the majority of these management related activities are confidential and closed, available only to the specific parties involved.

For the development of the technical activities, research and experimental data is used initially in characterisation of user and stakeholder needs and opinions as well as the characterisation of the demonstrator sites. This information is further used to inform the interventions required at the demonstrator sites and the development of infrastructure and creation of service and business models required for the running of the chosen business models.

[1] h2020-hi-erc-oa-guide_en.pdf (europa.eu) - https://ec.europa.eu/research/participants/data/ref/h2020/other/hi/oa-pilot/h2020-hi-erc-oa-guide_en.pdf

Moving into the demonstrator phase, data is produced from the running of the demonstrator activities. This validates the efficacy of the interventions and data infrastructure as well as the proposed business models.

The data collection should ultimately lead to quantitative measurement of progress towards or attainment of, the project objectives.

Personal data is applicable in all demonstrators where households are involved. Personal data will only be used for the purposes of contacting house holders in relation to frESCO activities, such as the installation and maintenance of sensors and related equipment, and to provide personalised services in the context of the project. This is further considered in section 7 ethical aspects.

2.3 Types formats and size

frESCO project covers many activities with varied data needs across the four demonstrator, such as relevant statistics, results of experiments, measurements, observations resulting from fieldwork, survey results, interview recordings and images, deliverables, publications, etc.

Each partner will consider the data needs of their own use and of other partners use in the activities they lead; as well as open access and regulatory restrictions, when considering the types and formats of data to be used. In general, data should be made open, unless there are specific reasons for not doing so. These reasons may be among others, contractual, commercial, or legal.

Partners should also consider the overall data architecture of the frESCO project. All experimental data from the demonstrators will be ingested into the integrated data platform. In general, some of the types and/or formats of data to be used and/or collected in the frESCO project are identified below.

2.3.1 Types

Existing time series with varying formats, for example of parameters of existing systems (electricity demand, Photovoltaic production etc.) or natural phenomenon (temperature, sunlight etc.)

Generated time series with varying formats, either simulated or collected data from physical experiments or demonstration monitoring. (actual real time demand and generation, real

time air quality, temperature and other sensor readings, forecast electricity generation and demand etc.)

Numerical, quantitative, data defining specific characteristics or values for variables. Either existing or generated. (Physical characteristics of demonstrator buildings, number of occupants, price signals or other market data, data to define existing regulatory conditions, etc.)

Derived data, that arises from data analytics or further processing of raw data, such as that might be generated by the algorithms developed in the project, or any data processing in research or in the various data infrastructures.

Qualitative data relating to user or other stakeholder perceptions. For example the end user surveys and stakeholder interviews carried out in the demonstrators.

Personal information, for the management of interactions with households in relation to the running of the demonstrators. Personal/contact information for further interactions with stakeholders.

Project Management data, such as meeting attendance and minutes, contact lists, financial information, and other data on the project activities.

2.3.2 Formats

Where possible common formats readable with readily available software will be used.

For example;

- Microsoft Office Suite formats readable in Excel, Word, PowerPoint (doc, .docx, .xls, .xlsx, .ppt, .pptx.etc)
- General file types readable by a range of software (e.g .csv and .txt)
- Document formats such as pdf for deliverables and other written documentation.
- Photographic and graphic formats readable in common software such as pdf, jpeg, tiff etc.
- Audio and audio-visual files in commonly readable formats.
- Other specific formats that pertain to specific software packages available for purchase.
- Other formats dictated by the data creator (not part of frESCO consortium), where data is being reused.

Formats that are not widespread or not supported by commonly available software should be avoided if possible. Where unavoidable an attempt should be made to facilitate their reuse within the project.

2.3.3 General Rules for generated/collected data

Where data is generated/collected, it should use a common data format, as described above or other accessible data format.

Data generated by and/or for specific existing software packages or software or tools created within the project will where possible be in a standard format that is readable by excel or other common basic data analytics software. Especially where the tool or software is being created within the project. Of course some proprietary software used by partners during project activities may have a software specific format, open for users of that software package.

For generated data to be accessible it must be labelled logically and clearly with sufficient detail to identify the units, source etc. This requires careful labelling of columns and naming of data archives. If calculations on said data are carried out in a data archive and are deemed accessible, then they should be sufficiently explained to be obvious to a suitably qualified third party without interrogation of the underlying operations. This requires sufficiently detailed explanation of the underlying operations used in the data archive.

In general, any data set generated/collected through the frESCO project should be thoroughly described, including the following information as required:

- Definition of the purpose of the data, providing a unique dataset ID
- Description of the relation to the objectives of the project
- Detail on the types and formats of data collected/ generated
- Specify if existing data is being re-used (if any)
- The identification of the re-used data, i.e. frESCO identifier
- State the origin of the data
- State the expected data size (if known)
- Outline the data utility: to whom will it be useful
- Provide the data privacy characterization (public or confidential)
- Identify the need for anonymization (where applicable)

2.3.4 General rules for naming, meta data and standardisation

Within the frESCO project a common information model (CIM) will collate some information on metadata and other data aspects. The basics will be captured in a future revision to the DMP and in D4.1 frESCO Common Information Model which will be publicly available.

Specifically a naming scheme with a simple hierarchical structure will be used, consisting of: the WP number associated with the dataset;

- the name of the demo site where the dataset was collected, followed by the name of the city, the district and the building block as required;
- the acronym of the partner responsible for creating/collecting and managing the dataset;
- a descriptive data set name;
- a numerical data set sub index (starting from 1) so as to identify data sets created/collected at different times with individual metadata.

The proposed format to be followed for naming the data sets and a naming example is shown below:

frESCO_[WPnumber]_[Demo_siteCountry]_[Responsible_Partner]_[Description]_[Data_set_Sub_Index]

Example: frESCO_WP6_Spain_COMSA_CO_2 Emissions_1

The proposed naming convention will enable identification of the data sets internally and when published as Open Data in different open data portals.

Deliverables files should have an alphanumeric code included in the name which identifies the version number and date of creation of the version.

Metadata is usually presented in two formats – contextual information about the data in a text based document and ISO 19115 standard metadata in an xml file. These two formats for metadata provide a full explanation of the data (text format) and ensure compatibility with international standards (xml format).

For publications where possible, Digital object identifier (DOI) should be used to identify content and provide a persistent link to its location on the Internet, if it is an accessible online archive. DOI is a unique alphanumeric string assigned by a registration agency (the

International DOI Foundation). The publisher assigns a DOI when an article or online resource is published and made available electronically.

Where they are available it is recommended to include DOIs for both print and electronic sources. The DOI is typically located on the first page of the electronic journal article, near the copyright notice. The DOI can also be found on the database landing page for the article. The DOI system has been standardised through the International Standards Organisation, ISO (within the responsibility of committee ISO TC46/SC9, Identification and documentation) as ISO 26324, Digital Object Identifier System.[2]

2.3.5 Existing data and reuse

Much data is sourced from various existing open and/or closed, private and/or public databases, such as time series for existing electrical systems or weather data, or market data. Or simply referencing and use of existing academic publications and knowledge or techniques. Other existing data has its origin within the different consortium partners, where the data can come from previous research including from public funded projects or other research data. Within the CIM and related activities much effort will be made to ease re-use of the different data streams for the project activities.

2.3.6 Data size

Project data is generally foreseen to be of a manageable size when output data and input data only are considered. Large amounts of data will be generated by the project activities but will be stored in cloud facilities, useful output data should be of a manageable size and anyway further tools will be developed in the project to allow the use of big data. Access to useful data outputs will be possible with a normal PC and in some cases mobile devices.

With regard to written documents such as deliverables the size should be limited to 15Mb wherever possible. Though online repositories such as Microsoft TEAMS can handle larger files where they may be required.

In general file sizes that are as small as possible for the intended use are preferred.

2.4 Data Utility

The completion of the activities and attainment of the project's objectives are the main drivers for the use of data within the frESCO project. Ranging from data sharing between tasks, to the output data from the demonstrators. However, the main point is to test a system infrastructure that would be required for the business models, and to validate the savings from the demonstrators to test the viability of the business models.

During and after the project, the disseminated results have utility to many different stakeholders; chiefly the business actors, ESCOs and Aggregators who could run the business models. Still, other business actors and of course the consumers and prosumers in frESCO project could find them useful. The data presented in dissemination (such as in public deliverables and media activities) will generally not be of primary use for further academic study. The publications made by frESCO partners in relevant open scientific journals will however fill that gap allowing further research to build on the work developed in the frESCO project.

Of course, where possible and practical and according to the FAIR principles and aims of open data, data related to the published results will be made available, and may be of interest and use, for professionals for research, investigation, planning etc.

As the project progresses and the issue of exploitation becomes clearer, the data and findings will be of use in furthering the exploitation aims of the partners, through validation of the potential exploitable results.

3 FAIR DATA (DATA THAT IS FINDABLE, ACCESSIBLE, INTEROPERABLE, REUSABLE)

Although open access to research data is not required by the frESCO grant agreement it is recognised as best practice; and is required where it is necessary to validate the results of a scientific publication. Scientific publications themselves are subject to open access guidelines with practical information in section 3.2. Where making data open is compatible with other grant agreement articles and doesn´t constitute additional cost (ie, it is outside the budget constraints) it should be considered.

There are also many public reports to be published during the project, and links to the scientific publications and .pdf versions of the public deliverables are also made available on

the frESCO website[2] as well as on the CORDIS results website[3] for the project which are further described in section 6.

Following FAIR principles aids in data use/reuse within the consortium to complete the actions required under the grant agreement, and also aids reuse beyond the frESCO project.

It is important to note that as part of the project, technical data from different activities will be brought together. The CIM will deal in greater detail with many of the themes related to FAIR data, such as naming, meta data, searchability etc; there will also be an integrated platform for ingestion of data required for the demonstrator functioning, however, these will be the subject of future deliverables as explained in the introduction. A flow chart for pursuing FAIR data is presented Figure 1. It identifies the key decision points in the process of making data FAIR under the 4 key areas of findability, accessibility, interoperability and reusability.

[2] frESCO project website - https://www.fresco-project.eu/

[3] New business models for innovative energy service bundles for residential consumers | frESCO Project | H2020 | CORDIS | European Commission (europa.eu) -https://cordis.europa.eu/project/id/893857/results

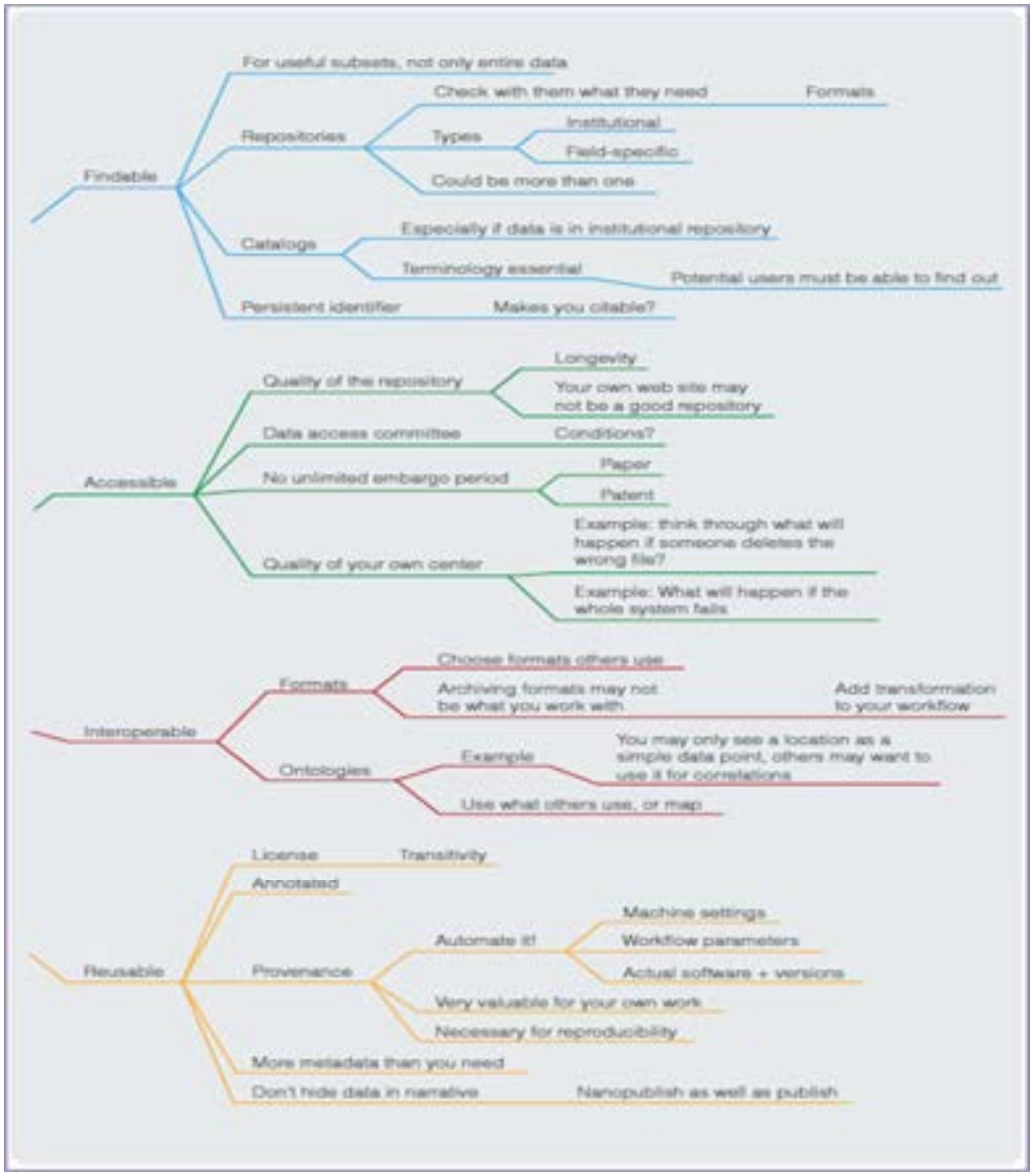

Figure 1: Research Data Management according to FAIR principles (Source Elsevier)

3.1 Findable Data

In order to make data findable, consistent metadata, that is persistent and with unique identifiers should be used. This metadata will obviously depend on the specific data sets used/generated by consortium members for their different project tasks. The decision process and actions should address the following issues:

- Defining how the data can be discovered (including metadata provisions)
- Defining how the data can be identified referring to a standard identification mechanism
- Defining the naming conventions to be used
- Defining the method towards search keywords
- Defining the method for versioning control
- Defining the standards for metadata generation (if any).

More practically, data and meta data should be assigned a globally unique and persistent identifier, for example descriptive name and full date including provision for versions; Data should have sufficiently rich meta data to describe and/or summarise it(e.g., use of keywords); Data should be registered or indexed in a searchable resource(e.g., with the creation of a CIM or the use of searchable online databases).

With regard to metadata, the mechanism for capturing and storing information should be described, since metadata could be used to identify the description and location of data sets stored in a database with links to each item. This will be further assessed in future work.

3.2 Openly Accessible Data

In order to make data open the following guidelines on data openness will help.

- Data are retrievable by their identifier using a standard method (protocol). The method is open, free, and universally implementable. Searchable using a web browser for example.
- The method allows for authentication and authorization, where necessary. Registering and sign in.
- Metadata remains accessible, even when the data is no longer available. Data descriptions remain even if the timeline for the storage of data has passed.
- Given that frESCO project is not contractually obliged to make data open we have produced the following description of when we should consider making data open.
- Data related to open publications should be open to aid transparency (where making it open does not conflict with other contractual obligations), this is also related to the obligations of the grant agreement.

Wherever practical, without additional associated costs, or where making data open is not in conflict with other contractual obligations, data should be made open.

Reasons why data may not be made open are listed below.

- Privacy or ethical reasons, including legal limitations.
- Contractual reasons including those related to the grant and consortium agreements.
- In the context of it not being a requirement under the grant agreement, where the resources required to make it openly accessible place an unreasonable burden on the controller/owner of the data.

In general for publicly available reports and other documents related to the project, the frESCO project website[2] as well as the CORDIS results website[3] will serve as the repositories.

Publications can be uploaded on open access platforms, such as OpenAIRE[4] or other platforms that may be discipline specific, such as online journals. There also exists the possibility to allow open access through organisations own solutions such as via direct links to papers. Open access data can (with previous discussion and agreement of partners) be archived on zenodo, see Annexes section 10.3. Section 6 has more in depth information on the archiving infrastructure used in frESCO.

Open access project documentation (deliverables) are listed in Annexes section 10.2 and further open data lists and descriptions will be added as the project progresses. Public dissemination activities are listed in the publicly available dissemination deliverables, on the project website or CORDIS website above.

Specific process for deciding on open access to data

Here we define the thought process when deciding on open access for data sets. A similar process can be used when deciding on open access for scientific publications or other information that partners may have a need to disclose. Consortium partners under section 10 of the consortium agreement have also signed an agreement on the Non-disclosure of information to protect the data interests of each other and involved parties, this should be taken into consideration when deciding on disclosure of information.

[4] OpenAIRE - https://www.openaire.eu/

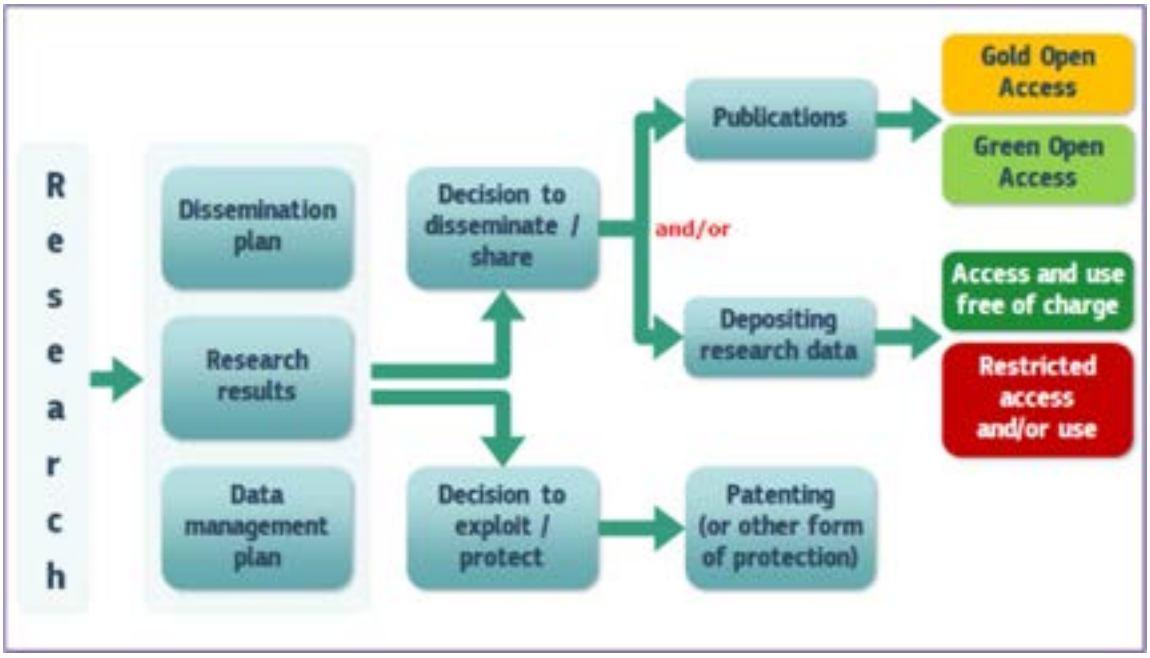

Figure 2: Open Access strategy for publications and scientific data (Open Access 2019)

Following the methodology of the Open Access strategy in Figure 2 above towards defining which data are to be made openly accessible; we present a simple structural approach formed by a list of simple (but important) questions that must be answered to classify the different datasets or information as part of the DMP:

Q1: Does a result provide significant value to others or is it necessary to understand a scientific conclusion?

If Yes, then the result is classified as public (i.e. granted for open access). If the answer to Q1 is No, the result is classified as non-public. (e.g. code that is very specific to a platform (e.g. a database initialization) is usually of no scientific interest to anyone, nor does it add any significant contribution.

Q2: Does a result include personal information that is not the author's name?

If Q2 is answered with Yes, the result is classified as non-public. Any personal information further than the name must be removed if it should be published according to the ethics management plan of the project.

Q3: Does a result allow the identification of individuals even without the name?

If Q3 is answered with Yes, the result is classified as non-public. This is also covered by the frESCO's ethics management plan addressed through deliverables D9.1 - D9.2 - D9.3, towards

anonymizing a single user's identity, e.g. abstraction, dummy users, or non-intersecting features.

Q4: Can a result be abused for a purpose that is undesired by society in general or contradict with societal norms and the project's ethics?

If Q4 is answered with Yes, the result should be classified as non-public. This is also managed by the ethics management plan of the project.

Q5: Does a result include business or trade secrets of one or more partners of the project?

If Q5 is answered with Yes, the result should be classified as non-public. Any business or trade secrets need to be deleted in accordance to all partners' requirements prior to being published.

Q6: Does a result name technology that consist of an ongoing, project-related patent application?

If Q6 is answered with Yes, the result should be classified as non-public. The result can be published once a patent has been filed.

Q7: Does a result break security interests for any project partner?

If Q7 is answered with Yes, the result should be classified as non-public.

Upon classification of the different datasets generated/collected by each individual partner, the following responsibilities should also be met towards disseminating the project's outcomes.

- Define how data will be made available
- Define the methods or software required to access such data; whether a documentation is necessary about the software and if possible, include the relevant software (e.g. in open source code)
- Define the depository of the data and associated metadata, documentation and code
- Data that will be considered safe in terms of privacy, and useful for release, will be made available for download under the ODbL License
- Define how access will be provided in case there are restrictions
- Define if and to which registry Open Data will be added

As a minimum, data sets will be made available on the frESCO partners' own servers. At the end of the project they may be uploaded to a public repository and submitted to the registry of open data repositories at https://www.re3data.org/

Specific process for open access to publications

Procedurally the process to be followed when it is decided that open access to publications is required is outlined in the following text. It forms the practical steps and thought processes required when deciding on level of openness and pathway to openness.

Open Access to scientific publications can be achieved via two routes:

- Self-archiving / "Green" open access: the published article or the final peer-reviewed manuscript is archived in an online repository before, at the same time as, or after publication. Some publications can be delayed, and open access be granted only after an embargo period has elapsed (usually 6 months)
- Open access publishing / "Gold" open access: the article is immediately published in open access mode. Therefore, publication costs are not borne by subscribing readers, instead, the publication costs are usually borne by the entity (university, institute, etc.) funding the research. In other cases, the costs of open access publishing are covered by subsidies or other funding models.

Within the context of frESCO, "Green" open access to the data will be initially adopted. Once more information is available for the data to be collected, the "Gold" Open Access model for specific publications could also be adopted in case the authors wish to cover the publication costs. Figure 2 above, also presents the strategy to be followed towards defining Open Access for publications.

3.3 Interoperable Data

Within the project many different data sets will be dealt with that have different interoperability needs. Which data and metadata vocabularies, standards or methodologies will be followed to enable interoperability should be informed by the guiding principles presented below. In addition, and conforming to the guiding principles, standard vocabularies should be defined for all data types present in the dataset in order to allow inter-disciplinary interoperability.

The guiding principles to aid interoperability of data are presented below:

- Data and meta data should use a formal, accessible, shared, and broadly applicable language for knowledge representation. This depends on the audience but for H2020 projects English should be used unless addressing a local audience in their native

language. This also however refers to the choice of software, file format, or standards/best practice on which metadata are based. This can be discipline specific. Choosing file formats that can be opened and edited by free software, and using commonly understood meta data standards are key aspects of interoperability. If the data are part of a domain with well-known open formats that are in common use, these common well-known open formats should be used. If the data does not fall in the previous category, an open and easily machine-readable format should be selected.

- Data and meta data use vocabularies that follow FAIR principles, for example are written and presented in a way that use open and freely understandable language. So not overusing jargon; and using commonly accessible words and software. Data and meta data include qualified references to other data. That is that data and data sets are not just linked by association but by a descriptive association.

The common information model (CIM) will deal specifically with the interoperability problem of data arising from the demonstrators, collating information on metadata and other data aspects and carrying out operations which will help standardise data formats for use. These activities form the basis of making the data interoperable within the project for the direct needs of consortium partners. Even though it will not be an open data platform it will conform to the other FAIR principles.

3.4 Re-use of Data

Future discussion in this deliverable and other public deliverables will attempt to define the usable life of data, the methods for re-use and the storage methods to allow re-use for the defined periods. This brings up licensing, quality assurance and other issues. As previously identified the demonstrator data will be stored on the integrated platform and further discussion on access to that data within the consortium and externally will be undertaken. Whenever possible, as previously described the datasets will be saved in open formats or formats that are readable with open-source tools in order to promote easy reading, conversion, and reuse of the data.

The discussion within the consortium during the project will seek to answer some key questions on the data stored in the platform and more generally by partners:

- How will the data be licensed to permit the widest re-use possible?

- When will the data be made available for re-use?
- Are the data produced and/or used in the project useable by third parties, in particular after the end of the project?
- How long is it intended that the data remains re-usable?
- Are data quality assurance processes described? (This question relates to quality assurance external to the integrated platform, as it will have its own checking procedures.)

Re-use of the information generated in the project should be an aim, from the perspective of furthering the project objectives, and furthering the exploitation aims of the partners. The CIM and integrated platform along with other data infrastructure will facilitate re-use within the project, helping link the demonstrators and storing data for potential re-use in further research and investigation.

During the project lifetime and beyond, data licenses and other agreements could help permit the widest re-use of all the available data.

Initially, the open source code will be made available in the frESCO repository, see section 6, and upon the end of the project data will be made available in a public repository such as Zenodo and GitHub also described in section 6.

4 ALLOCATION OF RESOURCES AND RESPONSIBILITIES

Here we address issues related to costs and responsibilities. Principally what are the costs for making the data FAIR and or open and how will the costs be covered, and Identification of responsibilities for the data management of the project.

Individual partners and the consortium as a whole are responsible for data management in the frESCO project. The hierarchy of responsibility starts with the initial data generator or contact point with data subjects. They can request the assistance or advice of the data protection board, to which there are appointed members from each of the steering committee organisations (partners who lead work packages) in the frESCO consortium. This is described in more detail under section 4.1.1. The chair of the board is the coordinator (CIRCE). Resourcing in terms of the specific tasks requiring description, ingestion and reuse of data within the consortium are resourced specifically within the consortium agreement.

Other costs related to make data FAIR/open in the project as well as open access to research data are eligible as part of the Horizon 2020 grant (if compliant with the Grant Agreement conditions).

Resources for long term preservation, associated costs and potential value, as well as how data will be kept beyond the project and for how long, will be discussed by the whole consortium during General Assembly meetings as the data value and reuse potential becomes clearer. But specific provisions within the grant agreement must be resourced by partners using the budget allocations under the agreement.

4.1 Responsibilities and Decision making

Prior to identifying an output as a something for public dissemination a decision process is to be followed. We define within this section the individual responsibilities of the FRESCO consortium partners in regard to data management and the process [9].

- In general, each frESCO partner has to respect and agree to the policies defined in the DMP.
- Each individual partner should identify own project results which are suitable for publication.
- All datasets must be created, managed and stored appropriately and in line with applicable legislation. Validation and registration of datasets and metadata is the responsibility of the partner that generates the data in the Work Package.
- The Backing up of data for sharing through Open Access repositories is the responsibility of the partner possessing the data.
- When datasets are to be updated, the partner that possesses the data has the responsibility of versioning control; ensuring that the latest version is available in the case of publicly available data.
- Prior to publishing data in the open domain that can be associated to an exploitable result, all partners must, consult/be granted permission, from the concerned partner(s). See section 3.2.
- The relevant nominated position holder (e.g. The Data Protection Officer, Coordinator, should prepare and lead related discussions at the relevant project meetings and to

maintain the channels for dissemination of project outcomes. A dedicated time slot will be reserved at each project plenary meeting and, if required, at selected consortium teleconferences.

- EC and project reviewers will be informed about related work done and publications.
- The Exploitation Manager and the Dissemination Manager, should identify data collected by the project and any technical project outcomes suitable for publication.

4.1.1 Data Protection Board

Towards an efficient project operation and ensuring a proper data management control within the frESCO project, the project's consortium mutually agreed on a data protection board and the below roles and individual responsibilities for data management.

Project Coordinator (PC): the PC will coordinate all relevant discussions and will be responsible for the management of the data/document repository. The project coordinator also has the responsibility to oversee the quality management of the project activities.

Responsible Partner: CIRCE, Representatives:

- Juan Aranda (Technical Coordinator), jaaranda@fcirce.es
- Leon Nielsen (Project Manager), lnielsen@fcirce.es;

Data Protection Officer (DPO): the DPO in each partners organisation will oversee the procedures on data control and processing and advise on matters of data privacy and security of data. (The nominated individuals (e.g. data controller, data processor) of each individual partner are responsible for ensuring the integrity of the datasets and compatibility for use during the project lifetime by the different partners. For any issues that arise they can refer to the project's Data Protection Board, which consists of a DPO from each organization involved in the project. The role and the main functions of the DPB are described extensively in the following paragraphs.

According to Articles 37 to 39 and Recital (97) of the GDPR, the main functions of the Data Protection Officer (DPO) in each organisation are the following:

- inform and advise the controller or processor, as well as their employees, of their obligations under data protection law;

- monitor compliance of the organisation with all legislation in relation to data protection, including in audits, awareness-raising activities as well as training of staff involved in processing operations;
- provide advice where a Data Privacy Impact Assessment (DPIA) has been carried out and monitor its performance;
- act as a contact point for requests from individuals regarding the processing of their personal data and the exercise of their rights;
- cooperate with Data Protection Agreements (DPAs) and act as a contact point for DPAs on issues relating to processing;

As already described in D9.1 (D9.1 POPD – Requirement No. 1), the frESCO consortium decided to appoint a Data Protection Board (DPB). The DPB consists of at least one representative per demo site (VERD, VOLT, KRK, COMSA and LCTE), KONKAR-KET and Suite5. The DPB is chaired by CIRCE (the project coordinator). Contact details of DPB are made available for all data subjects that will be involved in the research.

The DPB, chaired by the Project Coordinator (PC), will coordinate data management issues. Demo case partners will report periodically to the coordinator with regard to any changes in data protection issues relevant to each demo. They will also foresee and manage possible risks that may arise and propose contingency plans in agreement with data protection regulations, Finally, the DPB will also have the responsibility to address any ethical issues that might arise in data handling, and perform the respective ethical management activities.

In the case of using personal data (use of sensitive data as defined by GDPR is not envisioned), prior consent will be requested and information on the Data protection Board (DPB), will be delivered to data subjects. The members of the Data Protection Board that would participate in this research and whose contacts would be delivered to the data subjects, are presented as follows:

• CIRCE: Vanesa Krun, protecciondatos@fcirce.es

• S5: Dimitrios PANOPOULOS, dimitris@suite5.eu

• KONČAR KET: Leila Luttenberger, leila.luttenberger@koncar-ket.hr

• KRK: Dean Kosic, dean.kosic@ponikve.hr

• COMSA: Daniel Sanchez Gil, daniel.sanchez@comsa.com

• LCTE: Tania Castro Molina, proyectos@lacorrientecoop.es

• VOLT: Olivier Cassoudebat <olivier.cassoudebat@voltalis.com

• VERD: Giannis Georgopoulos, gg@elinverd.gr

Other roles with responsibilities related to data management are outlined below:

Innovation & Exploitation Manager: Responsible for efficient knowledge management, including the management and protection of important Results within the Project, and defining related processes. The Innovation & Exploitation manager is also responsible for capturing and identifying exploitable results within the Project and defining related internal processes. The Innovation & Exploitation Manager will also be responsible for the replication activities involved in this Project.

Responsible Partner: ELIN VERD, Representative: Dr. Panagiotis Papadopoulos

Communication and Dissemination Manager: Will be responsible for identifying the means and channels for communicating the project's results. In addition, identify which publications are suitable for publication in the considered repositories and maintain FRESCO inputs for the Open Access.

Responsible Partner: RINA-C, Representative: Iris Xhani

4.1.2 Data Controller

In addition to the roles identified in 4.1.1, all individual partners should identify their own project results suitable for publications and perform data management according to this DMP. This includes the validation and registration of the individual datasets and metadata generated by each partner and versioning of the data.

If any problems or questions arise, partners should consult with the wider consortium and DPB prior to any publishing of data on the open domain. The following organizations form the frESCO project consortium and will jointly act as data controller in their domains:

CIRCE: FUNDACION CIRCE CENTRO DE INVESTIGACION DE RECURSOS Y CONSUMOS ENERGETICOS, Spain

S5: SUITE5 DATA INTELLIGENCE SOLUTIONS LIMITED, Cyprus

EI-JKU: ENERGIEINSTITUT AN DER JOHANNES KEPLER UNIVERSITAT LINZ VEREIN, Austria

CARTIF: FUNDACION CARTIF, Spain

UBITECH: GIOUMPITEK MELETI SCHEDIASMOS YLOPOIISI KAI POLISI ERGON PLIROFORIKIS ETAIREIA PERIORISMENIS EFTHYNIS, Greece

UBE: UBITECH ENERGY, Belgium

KONCAR KET: KONCAR - INZENJERING ZA ENERGETIKUI TRANSPORT DD, Croatia

KRK: PONIKVE EKO OTOK KRK DOO ZA KOMUNALNE DJELATNOSTI, Croatia

COMSA: COMSA INSTALACIONES Y SISTEMAS INDUSTRIALES SA, Spain

LCTE: LA CORRIENTE SOCIEDAD COOPERATIVA, Spain

VOLT: VOLTALIS SA, France

VERD: ELIN VERD ANONYMI ETAIRIA AEIFORON PROIONTON KAI YPIRESION, Greece

IOSA: IOANNIS SARANTIS-TOURISTIKAIXENODOCHEIAKAI-KTIMATIKAI- TECHNIKAI KAI GENIKAI EPICHEIRISEIS ANONYMOS ETAIRIA, Greece

RINA C: RINA CONSULTING SPA, Italy

5 DATA SECURITY

Within frESCO, Data Collection security will be ensured by adequate (manual) procedures for collecting the data, by registering them into protected electronic systems and securely destroying the physical copies as soon as they are not required anymore. Both electronic data collection and integrity of data transfer will be guaranteed by utilizing state-of-the-art software frameworks, libraries and protocols. When gathering data, especially when it is considered private under GDPR or otherwise confidential, the minimum amount of data required in order to perform the required activities should be gathered. This helps data security by limiting sensitive and commercial data in storage to the minimum.

The provisions for data security and recovery should be ensured by the partners running their respective databases. An encrypted storage and recovery policy will be applied by every partner involved in data storage, where all data will be anonymized as soon as possible, preferably before uploading them in any kind of electronic storage and prior to sharing. Additionally if confidential data needs to be shared, the minimum data required for the purposes of the activity should be shared.

Prior to making data open or allowing specific access, consider the grant agreement and consortium agreement limitations as well as other legal limitations and follow the procedures outlined in section 3.2above . Some security aspects relating to GDPR are further discussed under ethics.

At the end of the project, the consortium will decide if a long-term preservation of the data is required. The selection of an adequate repository should consider the EU's OpenAIRE suggestions. Since the datasets will be managed by the respective partners, Data Protection Officer duties will also be carried out by the Data Protection Officers of each partner separately. This policy may change in the future; if so, the updated policy will be included in updated versions of the Data Management Plan.

The project’s compliance with the GDPR regulations will be managed by the respective partners’ officers; this includes initial data protection impact assessments by the partners collecting personal data. A detailed impact assessment will be carried out when concrete information from the demo sites and the associated data is known. The results of the impact assessment will be included in the release of future versions of the DMP, D1.3.

Regarding data security in the tools used by the project and developed in the project the following details are provide. The data infrastructures developed in the frESCO project will have security built in to prevent unauthorised access to the services themselves and to specific data streams. The online repositories used by the consortium such as Microsoft TEAMS also have user access control and anyway are for sharing of data that can be viewed by all frESCO project partners, not confidential for the partners. In partners own organisations user access control should also apply to all frESCO project data. These measures should help prevent unauthorised access to frESCO data. Backups of data will also be used across these platforms and developed infrastructures to ensure data retrieval in the case of loss. Data destruction techniques when used with the tools and infrastructures must be permanent and irreversible, the method depending on the medium.

6 DATA ARCHIVING AND PRESERVING INFRASTRUCTURE

Some of the tools that will be used to preserve and share data during the project lifetime are outlined below. Note that the specific infrastructures created as a result of project activities have their own dedicated deliverables and so are not detailed below.

6.1 frESCO Project Repository

frESCO document sharing and collaborative working will be undertaken on a dedicated team created in Microsoft Teams software, which will be available during the project's duration for authorised consortium members.

In respect to its file structure, Microsoft Teams displays the following metadata:

- Type
- Name
- Date (of modification)
- Modified By (Name of person modified the file)
- Size.

In addition, Team channels can communicate with outside services via Connectors; which already exist to push updates from GitHub, Evernote, Zendesk, MailChimp, SAP SuccessFactors and Salesforce to Teams' channels, while an API framework is also available to allow more to be built, also allowing businesses to link their own internal apps (Heath 2019).

Figure 3: frESCO repository in Microsoft Teams below provides a screenshot of the selected frESCO repository, Microsoft Teams.

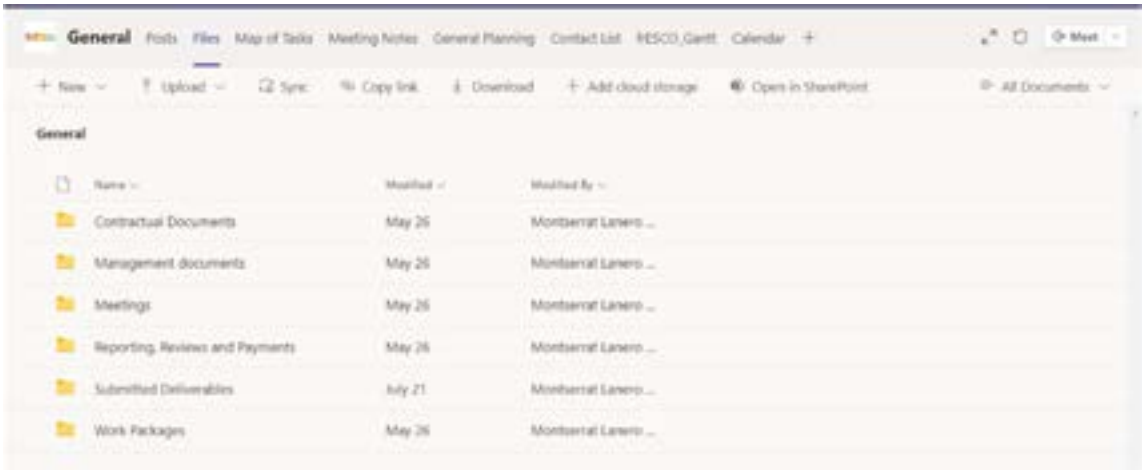

Figure 3: frESCO repository in Microsoft Teams

6.2 frESCO Website[2]

Towards enabling a wider dissemination of the frESCO project mission and raising public awareness on its scope, a dedicated webpage was set up which is mobile compatible. The frESCO webpage intends to become the hub for the project's replication, communication, and dissemination activities. Through the website, the frESCO project mission and objectives will be described and any posts/news, press releases and updates on the development status of frESCO project will be openly published. With links to material hosted elsewhere also being present.

More specifically the frESCO website incorporates the following features:

- Presentation of the project and the consortium partners;
- Individual subpages with information regarding the demo sites, showcasing visually all elements incl. solutions and results of the project online, including an animation of the progress of the project results;
- A results & public reports section, where all public deliverables produced within the project, will be uploaded. It will regularly be updated, in order to make all the public reports approved by the European Commission, accessible to potential stakeholders and the general public;

- A latest news & events section, which will include articles about all the dissemination activities performed by the project consortium;
- A “contact us” section, that will provide the public audience with contact points, in order to gather more information about the project
- A “follow us” section, through which all the potential stakeholders identified by the frESCO consortium will have the possibility to subscribe to the newsletter, by providing their name/surname, institution, country, type of institution and email

The webpage was designed by the consortium partner RINA-C and was launched after review by the whole frESCO consortium. The webpage’s privacy policy can be reached via a link and it explains how RINA-C handles the personal data collected through the website. This policy does not apply to information that RINA-C collects offline, neither to data collected from other social media activities, which follow their own privacy policy guidelines that can be found under specific links (PPL).

frESCO’s webpage will be available throughout the project’s duration, acting as the main communication tool for the project, allowing access to all the publishable developments of frESCO, including videos, deliverables, the status of the project, the final results and other non-Intellectual Property and non-Sensitive Information and results.

6.3 Open Research Europe

The recent launch of the European Commission Platform for open access publishing may be of assistance.[7] It is a scholarly publishing platform providing a full open access peer reviewed publishing service for Horizon 2020 and Horizon Europe beneficiaries at no cost to them, during and after the end of their grants. The platform enables rapid publication times and publication outputs that support research integrity, reproducibility and transparency and enable open science practices.

The authors will have the opportunity to choose what they want to publish in the platform, since the publication of a wide range of outputs (from standard research articles to data notes,

[7] Open Research Europe | Open Access Publishing Platform | Beyond a Research Journal (europa.eu) - https://open-research-europe.ec.europa.eu/

from new insights to confirmatory or negative results), is supported. Also, the transparent open peer review process will facilitate open and constructive discussion with reviewers specifically to help the authors improve their research and to provide credit for the reviewer's expertise.

Open Research Europe is expected to be in line with the FAIR principles adopted in the frESCO project, analysed in section 3, thus enabling the reanalysis, replication and reuse of research results, improving reproducibility and increasing transferability of knowledge and impact.

6.4 Research Gate

Further to the establishment of the project's portal, a dedicated frESCO channel will also be established within ResearchGate, towards promoting the dissemination of the project's scientific publications. All Open Access documents will be published in portable document format (PDF), while the downloads will be enriched with simple metadata information such as:

- Title
- Short description
- Type of the document

The frESCO ResearchGate channel will be managed by partner RINA-C, while all consortium partners should periodically update the material.

- The link for accessing frESCO ResearchGate channel will be provided in the upcoming version of this deliverable.

6.5 Zenodo Project Repository

The consortium will investigate the use of the Zenodo service for the dissemination of frESCO datasets a detailed tutorial is included in Annexes section 10.3, although other online repositories exist that meet the requirements and may be more discipline specific. Using discipline specific websites makes sense in increasing visibility for the target audience, and so reuse.

Zenodo is an open data repository, which enables archiving and usability of research outputs in all scientific disciplines. Zenodo is compliant with the open data requirements of Horizon

2020, the EU Research and Innovation funding programme and OpenAIRE[4] i.e. the EC-funded initiative supporting Open Access policies in the European Union.

Zenodo repository offers publication both of scientific papers and of any structured research data (e.g. using XML), while it provides a connector to GitHub (see 0) enabling open collaboration for source code and versioning for all kinds of data.

All uploaded results are structured by using metadata, such as:

- Contributors' name
- Date
- Keywords
- Location
- Type of document
- License

All metadata is licensed under CC license- Creative Commons 'No Rights Reserved' (Creative Commons - CC0 2009)), while the property rights or ownership of a result does not change by uploading it to Zenodo. Regarding the language of textual metadata items, English is preferred.

A tutorial on the use of Zenodo is provided in Annexes section 10.3. Should the frESCO project make use of the Zenodo platform for long-term storage and open access of all public results generated/collected then links will be provided in this public deliverable.

6.6 GitHub

Towards promoting the re-use of data to be generated during the frESCO project, its outcomes are expected to be disseminated as Open Source products. Following many other open-source projects, frESCO will utilise GitHub[8] to share its source-code components (those deemed as public) for free, enabling open collaboration of source code. These will also be linked with the Zenodo account of the project.

GitHub is a development platform supporting distributed source code development, management, and revision control. It enables worldwide collaboration between developers

[8] GitHub: Where the world builds software · GitHub - https://github.com/

and is mainly used for source code data, also providing some features to work on documentation and to track issues. GitHub is provided both in paid (private) and free service plans. Free service plans can have any number of public Open Access repositories with unlimited collaborators, while Private, non-public repositories require a paid service plan.

GitHub uses metadata to structure the projects and their results such as:

- Contributors' nicknames
- Keywords
- Time
- Data file type

For textual metadata items, English is preferred. According to its terms of service state, no intellectual property rights are claimed by the GitHub Inc. over the provided material and is hosted by GitHub Inc. GitHub is using a rented Rackspace6 hardware infrastructure where data is backed continuously to different locations.

As the project evolves, a dedicated link to the frESCO open source code will be made available.

7 ETHICAL ASPECTS

In general, the frESCO project does not introduce any critical ethical issues or problems apart from those related to general data protection. We don´t expect the data from results to be useful for purposes that are ethically problematic, such as for use by terrorists or in illegal activities. However this will be monitored continually.

The main ethical consideration within the project is the collection of the personal data of users in the frESCO demonstrators and the related energy data collection in residential buildings. This personal data comes from surveys with end-users and stakeholders at the demo sites, under Work Package 2; and at least, one workshop to be organised in each demo site. It is not expected that sensitive data (as defined by the GDPR) will be collected, and personal data will be initially processed to anonymise the data prior to sharing with other partners. Where non anonymised data is required by multiple partners then this must be clearly communicated to the data subjects and the data must not leave the consortium. The Informed Consent Procedure is analysed further below and the respective Consent Forms can be found in Annexes section 10.4.

As this topic forms part of the activities of WP9 - Ethics requirements, for more information (subject to confidentiality) consortium members are referred to deliverables D9.1- POPD - Requirement No. 1, D9.2- POPD - Requirement No. 2 and D9.3 - H - Requirement No. 3 which describe in detail the 'ethics requirements' that the project must comply with.

7.1 Collection Storage and protection of personal data.

The consortium partners will ensure compliance with Regulation (EU) 2016/679 (GDPR) and its application at national and regional level in the member states involved in frESCO. The partners and consortium as a whole will also aim to ensure compliance with other national laws where they may be stronger than the application of the EU regulation.

In compliance with the grant agreement a Data Protection Board was set up at the beginning of the project with the respective Data Protection Officers outlined in section 4.1.1 above. CIRCE is the chair of the board, which is tasked with discussing and resolving data protection issues that arise during the project.

Additionally partners directly involved with the use of personal data have prior experience and expertise sufficient to carry out the activities of the project in compliance with GDPR.
These issues have previously been dealt with separately in both the ethics deliverables and the direction of action (DoA) forming part of the grant agreement however a summary of key actions points is:

- • Personal data will be stored in secure server systems and will be anonymised prior to upload wherever possible, data access will be restricted to only those directly using the data for project purposes, usually the partner with initial contact with the users. But in any case a data controller/responsible must be assigned.
- • Where data sharing related to activities with specific users is required, data will be anonymised prior to sharing. With the user being represented only by an anonymised ID.
- • Personal or confidential data will be kept for an absolute minimum of time, being destroyed when no longer required for project activities or partner follow up activities, but never exceeding the legal limits.

7.2 Personal data storage and security.

Personal or sensitive data must be stored on secure servers with protected user access control. Given that this data is usually held only by the original partner, the partner responsible should have its own secure storage.
Personal or sensitive data should be destroyed at the earliest opportunity (depending on use, or legitimate continued use for which permission has been granted by the subject).

7.3 Methodology & Guidelines for the delivery of Informed Consent

Informed consent requires the enrolment of people who voluntarily declare their consent to participate in the data collection and related project activities of the project. The consortium and contacting partner must take the appropriate action for ensuring that:
1. Data cannot be collected without the explicit informed consent of people under observation; therefore no person unable to express a free and informed consent for age-related reasons, on-going medical and / or psychological conditions, mental incapacity, should be enrolled in any study/activity. Consent should be freely given, specific, informed and

unambiguous by way of a request presented in clear and plain language. Consent should be given by an affirmative act, such as checking a box online or signing a form. Individuals have the right and must be informed of their right to withdraw consent at any time.

2. Personal/Sensitive Data collected cannot be sold or used for any purposes outside the frESCO project. When someone consents to the processing of their personal data, the processing of data must be strictly for the purposes for which consent was given.

3. Any data, which is not strictly necessary to accomplish the study/activities, won't be collected; data minimisation policy will be adopted at all levels of the project and will be followed by the ethical/privacy component of the project.

4. Any shadow (ancillary) personal/sensitive data obtained in the course of the observation will be immediately and permanently deleted.

Collection of sensitive data as it is defined in the GDPR is not required and should not be undertaken.

Note that in Annexes section 10.4 we include examples of some of the documentation used to get informed consent from the users.

The informed consent procedure will be performed as follows:

- Initial communication from the pilot-responsible partner to the potential participants to present the project and explain in detail the data collection purposes, the data that will be collected, the privacy risks and the final outcome of the processing of collected data
- Exclusion of contacted participants that have explicitly declared that they do not wish to be informed or voluntarily participate in the demonstration activities of the project involving data collection processes
- Collecting potential participants contact details on a list must be approved by them
- Provision of the consent form to the participants that have declared that they would consider their participation in the demonstration activities and data collection processes of frESCO, ensuring that they are given enough time to read and sign it. The consent form will be provided in their local language to facilitate understanding and remove language barriers that may be introduced due to poor knowledge of English (which will be the language that the consent form will be originally drafted)

A comprehensive general informed consent form template in English can be found in Annexes section 10.4.

7.4 Consortium agreement on GDPR.

The frESCO partners under section 10.9 General Data Protection Regulation (GDPR) have signed an agreement on GDPR copied below.

"Each Party of this Consortium Agreement shall be responsible for the personal data referred to their employees, collaborators, trainees, and/or other possible categories of data subjects, while the Consortium Agreement is in force.

In this sense, regarding the personal data made available to the rest of Partners on the occasion of the execution of the Project, the Partners shall reciprocally guarantee-in their condition of assignors -duly fulfil all the obligations under the General Data Protection Regulation, Regulation (EU) 2016/679 of the European Parliament and of the Council of 27 April 2016, to their processing and subsequent communication to the rest of Partners and to third parties, such as granting entities, control bodies and any other competent authorities, in relation to the granting and justification of the Project.

In view of the above, the Partners shall not be liable in any case for any possible breaches on Data Protection Regulation in which the rest of the Partners may have incurred regarding the personal data conveyed. Therefore, the Partners shall hold harmless themselves of any consequence which may arise from such breaches, including the possible sanctions imposed by the competent control authority.

Likewise, the Partners shall undertake to keep the strictest confidentiality of the personal data to which they have access with the occasion on the Project, and they shall maintain secrecy and shall not be entitled to communicate nor cease them to the rest of the Partners of the Project, unless necessary for Project implementation. Personal data shall not be disclosed in any case to any third party or published without the prior written consent by the person concerned.

Lastly, given the monitoring and control obligations to which all the parties are subject to, in the frame of the project, the parties will be obliged to graphically document the works carried out and the meetings held on the occasion of the project, with the aim to implement promotion

and dissemination actions required by the entities and control bodies. To that effect, each Party shall have informed their employees or collaborators who take part in the Project about the fact that the work meetings, formative and/or dissemination of Project activities in which them may participate, may be filmed and photographed. The parties may be entitled to publish these videos and images in its Web Site and social networks, as well as to send them to the Media. Each Partner shall obtain the prior and express consent of their employees and collaborators in order to use their images to the aforementioned effects." [9]

In conclusion the actions during frESCO project must be carried out in compliance with ethical considerations and the relevant laws and legal agreements related to them.

8 CONCLUSIONS

The data management plan sets the basis for good data management and allows specific reporting on data sets and procedures that have been created and used.

Consideration of the themes and use of the procedures described in this data management plan will aid in compliance with the objectives of describing the data, making it FAIR, secure, and using the data ethically.

Specifically, the document presents the appropriate methodology for the handling of the scientific outcomes of the project, the specification of data types that the project generates and/or collects, the standards that will be used, the process of how this data will be exploited and/or shared/made accessible for verification and re-use, the data preservation and maintenance processes etc.

It establishes the guidelines for data collection from the demo sites and the processing and handling of this data to ensure compliance with the GDPR and national laws.

The project is data intensive so further issues, detail or information relating to data collection, reuse, and interactions between different data sets is expected to be included in at least one follow up version at project end. Though intermediate issues may be necessary.

However the current version of the DMP sets a firm basis for the development to follow during the project, and resolution of potential issues. It will be used by the consortium in conjunction with other deliverables and their updates such as to D2.4 Data Handling Plan and Data Progress Report; D4.1 frESCO Common Information Model; D4.3 Data Collection, Security, Storage and Management Services Bundles; and the ethics deliverables to ensure adequate data management underpins progress towards the project objectives.

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10 ANNEXES

10.1 Annex 1: Data standards

The following best practices and guidelines for dealing with Open Data are considered:

- Open Data Foundation, focusing on global metadata standards and the development of open-source solutions promoting the use of statistical data. (http://www.opendatafoundation.org/)
- Open Knowledge Foundation, seeking to improve people's access to key information and the ability to use it. (https://okfn.org/about/)

Meta data standards used in frESCO project for data assets.

- Metadata Standards Directory provided by the Research Data Alliance, can be searched for discipline-specific standards and associated tools.
- EUDAT B2SHARE tool includes a built-in license wizard that facilitates the selection of an adequate license for research data.

10.1.1 Methodology for capture of frESCO metadata for data assets.

Here we list the way we will provide descriptions of data sets and metadata (to make data findable & interoperable).

10.1.1.1 frESCO Research Datasets

Within frESCO context, datasets can be divided into Public and Confidential (i.e. data that should not be shared outside the consortium). Here we will only be dealing with data that will be publicly available.

In order to identify all data assets that are already available in the demo sites and will be utilized for the activities of the frESCO project, as well as data assets that will be generated as a result of the implementation efforts, a methodology to collect this information is defined and will be analysed below.

By the time of writing this document, no datasets have been collected/generated in the context of frESCO project. Forthcoming versions of this DMP, will describe the upcoming datasets by utilising the template presented in Annexes section 10.2.1.

10.1.1.2 Methodology of the identification of frESCO Research Datasets

The methodology defined, is based on the utilization of a template in the form of a Microsoft Excel file, that will serve as a living document to capture the data assets. The template will be shared with the pilot partners and based on the instructions and with the provision of helpful examples provided by the task leader, it will be used to collect information related to the data assets, covering a wide range of parameters.

For the needs of the Data Management Plan, four types of research data assets will be considered:

- Already available data sets that will be utilized for the needs of the frESCO project, such as energy generation related data from already available generation assets
- Datasets that are not yet available and will be introduced as part of activities that will take place for the needs of the frESCO project, such as energy generation data from newly installed energy generators.
- Datasets collected for the needs of frESCO, by utilizing public sources, such as weather data or local specific information, complementing the available data towards the achievement of the planned goals
- Datasets that will be generated because of the analysis of available data, such as the outcomes of the analytics activities.

The Excel file template is structured to capture an enhanced variety of data asset characteristics, covering:

- Basic Information of the Data Assets, such as the unique ID of the dataset, the title that it can be found under, the data asset title and eventually, an overview of the data asset explored.

Basic Information			
Dataset ID	**Demo Case-relation or Demo Case ID**	**Data Asset Title**	**Description**
[Unique identifier following the convention "Country_Partner#no"]	*[Unique identifier following the convention "DA_Country_Partner_DC#no"]*	*The title of the data asset*	*A brief description of the data asset - At least 2-3 lines to give an overview of the data*

- Data Asset features, such as the availability of previous data, the temporal coverage, the locations that the data have been produced, the language in which they are available and ultimately the relevant standards that they comply with.

Data Asset Features				
Historical Data Availability	**Temporal Coverage**	**Spatial Coverage**	**Language**	**Relevant Standards**
[Y/N]	*[From ... To...]*	*[Locations]*	*[e.g. English, Italian, German, Greek, ...]*	*[List the international standards to which a data asset complies]*

- Data Asset availability, such as who provides the data asset, how it can be accessible, how frequently it is updated and under which actions the data asset remains updated.

Data Asset Availability			
Data Asset Provider	**Accessibility Method**	**Frequency of Updates**	**Update Strategy**
The name of the data asset provider in frESCO	*[Through API, As downloadable file, As database extract, Other]*	*[Real-time, Every X minutes / hours, Daily, Weekly, Monthly, Yearly, other]*	*[Append new data / Replace existing data / other]*

Data Asset Rights, such as privacy status (Confidential, Proprietary, Private, Public), type of licensing and the individual sharing mode of each of those Data Assets.

Data Asset Rights		
Privacy	**License**	**Sharing Mode**
[Confidential (not to be shared at all) / Proprietary (to be shared with appropriate licensing with the demonstrator partners) / Private (to be shared with appropriate licensing within the demonstrator & potentially to be traded with other stakeholders in frESCO) / Public (available to all)]	*[Exact Licence that is currently applied, e.g. CC Attribution-NonCommercial-ShareAlike (CC BY-NC-SA), or Case-by-Case Bilateral Agreement]*	*[Encrypted Data Sharing / Unencrypted Data Sharing / Secure Multi-party Computations (with data always on-premise at providers' side) / Encrypted Intelligence Sharing / Unencrypted Intelligence Sharing]*

- Data Asset Assessment, such as the accuracy of the available datasets, the completeness of the data provided, the difference between data capture and the real-world event being captured and how is that relevant to specific demonstrators.

Data Asset Assessment			
Accuracy	**Completeness**	**Timeliness**	**Relevance to specific demonstrator**
[Measure of correctness and precision, e.g. whether the dataset is effor-free, Ranked 1 (Low) - 5 (High)]	*[Degree to which a data asset is sufficient in scope, depth, Ranked 1 (Low) - 5 (High)]*	*[How long a data asset remains up-to-date]*	*[How relevant a data asset is for the specific demonstrator, Ranked 1 (Low) - 5 (High)]*

The datasets information that will be gathered from the pilot partners using the template in section 10.2.1, will be the basis to populate the sections under Annexes section 10.2.

10.2 Annex 2: Open Data Lists and Description

Below are some tables outlining open data coming from the project. These tables will be added to over the project lifetime. Table 1 below lists the open deliverables.

Table 1 open deliverables

Public (Open) Deliverables	Type	Available Yet
D1.3 - Data Management Plan	Report	Yes
D2.2 - Overview of the regulatory and market framework for energy services in the residential sector	Report	Yes
D2.5 - Report on the FRESCO conceptual architecture	Report	Yes
D3.1- Definition of the novel energy services for residential consumers	Report	Yes
D3.2- Mapping of the interactions between stakeholders and accompanying cash flows	Report	Yes
D3.3- New business models for ESCOs/aggregator for energy services in the residential sector	Report	No
D3.4- Definition of the frESCO PMV methodology	Report	No
D3.6- Report including the annotated templates for contract models	Report	No

D4.1 - frESCO Common Information Model	Report	No
D4.2 - frESCO Building Gateway & Extensions for integration with legacy equipment	Other	No
D4.3 - Data Collection, Security, Storage & Management Services Bundles	Other	No
D4.4 - frESCO Integrated Platform – Alpha, Mock-ups Release	Other	No
D4.6 - frESCO Integrated Platform – Beta Release	Other	No
D5.1 - Monitoring, forecasting, energy management analytics, flexibility analytics and optimisation mechanisms	Report	No
D5.8 - frESCO multi-service package toolkit	Report	No
D6.2 - frESCO Evaluation and Impact Assessment Framework	Report	No
D6.3 - Report on frESCO demonstrator activities	Report	No
D6.5 - frESCO Implementation Guidelines and Recommendations	Report	No
D7.3 - Standardisation analysis for the next generation of energy services	Report	No
D7.4 - Roadmap for the replication of frESCO developments	Report	No
D7.5 - Report on future trends and market potential for frESCO solutions	Report	No
D7.6 - Report on adaptive measures to mitigate risks to project exploitation from possible future market trends	Report	No
D8.1- Project Website and visual identity	Other	Yes
D8.2 - Communication, Dissemination Toolkit	Report	Yes
D8.3 - Communication, Dissemination Plan	Report	Yes
D8.4 - First Communication, Dissemination Report	Report	No
D8.5- Final Communication, Dissemination Report	Report	No
D8.6- First Stakeholders' vision document and outcomes of Workshops	Report	No
D8.7- Final Stakeholders' vision document and outcomes of Workshops	Report	No
D8.8- Final Publishable Report	Report	No

Open deliverables become available on the project website[3] as well as the CORDIS[3] website after being approved. + - indicates openly available scientific publication communicating outcomes; refer to publicly available communication deliverables for details.

The following Table 2 lists the closed deliverables and the reason for them being closed.

Table 2 closed deliverables

Confidential (Closed) Deliverables	Type	Reason
D1.1 - Project Handbook	Report	CON
D1.2 - Project Management collaborative space guide	Report	SEC, CON
D1.4 – Progress Report	Report	CON
D2.1 - Report on the technical and energy characterisation of the 4 pilot sites	Report	SEC, CON
D2.3- Set of stakeholders' and end-user requirements: Results of external surveys	Report	CON
D2.4 - Data handling plan and Data progress report	Report	CON
D3.5 - Results of the estimated business models feasibility performance	Report	COS
D4.5 - frESCO Baseline Data Analytics – Draft Release	Other	COS
D4.7 - Fine-tuning and final release of frESCO integrated platform	Other	COS
D5.2 - Release of the set of monitoring, forecasting, analytics and optimisation modules	Other	COS
D5.3 - Algorithms for Human- Centric automation tool	Report	COS
D5.4 - Release of the Human- Centric automation module	Other	COS
D5.5 - Definition of blockchain mechanisms enabling smart contract monitoring	Report	COS
D5.6 - Release of the module for Smart Contract monitoring and management	Other	COS
D5.7 - Fine-tuning and final release of frESCO multi-service package toolkit	Other	COS

D6.1 - Demo Site Implementation Plan and Pre-Intervention Monitoring	Report	SEC, COS
D6.4 - Socio-economic, environmental and technological impact assessment	Report	COS
D7.1 - First Version of the Exploitation Plan and exploitation strategy seminar outcomes	Report	COS
D7.2 - Final Version of the Exploitation Plan	Report	COS
D9.1 - POPD-Requirement No. 1	Ethics Report	CON
D9.2 - POPD-Requirement No. 2	Ethics Report	CON
D9.3 - H-Requirement No. 3	Ethics Report	CON

Reasons: Confidentiality (CON), Commercially sensitive information (COS), Security Concerns (SEC). + Openly available scientific publication communicating outcomes; refer to publicly available communication deliverables for details.

Other open data sets are to be listed below with a brief description and the access method in Table 3. They are to be organised by the responsible partner or original data controller. These should be clearer after the initial activities of data related work packages and further demonstrator development. Currently the table is empty.

Table 3: Other open data sets

Data set name	Description	Access Method

Open scientific publications, and all other publicly available dissemination actions are listed in the publicly available dissemination deliverables as identified in the tables above.

At the time of writing this deliverable, no publications have been submitted yet by the consortium partners in scientific journals and conference events, though the frESCO Data template in Annexes, section 10.2.1 will be used for the management of the scientific publications.

10.2.1 frESCO Data Templates for Description

The following template is to be used by all partners when collecting or producing datasets/deliverables/scientific publications for the description of their results. The provided template is adjusted to comply with the FAIR principles and suit the purposes of frESCO project; further details on the content of the original can be found in the Guidelines on FAIR Data Management in Horizon 2020 (*H2020 Programme Guidelines on FAIR Data Management in Horizon 2020*, 2016).

<table>
<tr><td colspan="2">Data Summary</td></tr>
<tr><td>Unique Identifier and name</td><td>ID n.o & name of dataset/deliverable/code</td></tr>
<tr><td>DMP Responsible Partner</td><td>Partners Name</td></tr>
<tr><td>Revision History</td><td><table><tr><td>Date</td><td>Partner</td><td>Description</td></tr><tr><td></td><td></td><td></td></tr></table></td></tr>
<tr><td>Purpose/Description</td><td>Short description of the purpose of the dataset,deliverable.</td></tr>
<tr><td>Relation to frESCO</td><td>Relation to the frESCO objectives</td></tr>
<tr><td>Type / Formats</td><td>Specify type (Publication, Image, Dataset, Software, Presentation, Poster, Other, Video) and file format of data/deliverable (eg. Pdf, Zip, Xml, Csv, etc.)</td></tr>
<tr><td>Size</td><td>State the expected size of the data (if known)</td></tr>
<tr><td colspan="2">FAIR Data</td></tr>
<tr><td colspan="2">Making Data Findable, including metadata provisions</td></tr>
<tr><td>Metadata provision</td><td>Outline the discoverability of data</td></tr>
<tr><td>Metadata standards</td><td>Outline the identifiability of data and refer to standard identification mechanism.</td></tr>
<tr><td>Unique identifier</td><td>Specify use of persistent and unique identifiers such as DiGital Object Identifiers, URL etc</td></tr>
<tr><td>Naming conventions</td><td>Outline naming conventions used</td></tr>
<tr><td>Search keywords</td><td>Outline the approach towards search keyword</td></tr>
</table>

Version control	*Outline the approach for clear versioning.*
Metadata provision	*Specify standards for metadata creation (if any). If none, describe what type of metadata will be created and how*
Making data Openly Accessible	
Classification	*Specify the access right of the data/deliverable (Open, Closed, Restricted, Embargoed). If data are not kept open please provide rationale for doing so.*
Sharing and Access regimes	*Specify how the data will be made available.*
Needed method/software	*Specify methods or software tools required to Access the data. Is documentation about the software needed to Access the data included? Is it possible to include the relevant software (e.g. in open source code)?*
Repository	*Specify where the data and associated metadata, documentation and code are deposited.*
Access authorisation	*In case of restriction, specify how access will be provided. (eg. Contact the author (add email) for password and more information)*
Making data Interoperable	
Data/metadata vocabularies and other I/O standards	*Assess the interoperability of your data. Specify what data and metadata vocabularies, standards or methodologies will be followed to ensure interoperability*
Mapping to common ontologies	*Specify whether you will be using standard vocabulary for all data types present in your data set, to allow interdisciplinary interoperability. If not, will you provide mapping to more commonly used ontologies?*
Increase data Re-use	
Licence	*Specify how the data will be licensed to permit the widest reuse possible.*

Re-use availability schedule	*Specify when the data will be made available for re-use. If applicable, specify why and for what period a data embargo is needed*
Re-use by third parties	*Specify whether the data produced and/or used in the project is usable by third parties, in particular after the end of the project. If the re-use of some data is restricted, explain why.*
Quality assurance	*Describe data quality assurance processes.*
Availability period	*Specify the time for which the data will remain reusable.*

10.2.2 – frESCO Published Deliverables Description

Data Summary	
Unique Identifier and name	Deliverable D1.3 Data Management Plan
DMP Responsible Partner	CIRCE
Revision History	30-09-2021, CIRCE, First official submission
Purpose/Description	The Data Management Plan will set the basis for the Dissemination and exploitation but also the procedures for the sharing of data of the project. This is the first version to be revised during the course of the project.
Relation to frESCO	T1.3, D2.4, WP4
Type / Formats	Publication/ PDF File
Size	2.5 MB
FAIR Data	
Making Data Findable, including metadata provisions	
Metadata provision	Metadata is added manually and includes the type, name, date modified, modified by.
Metadata standards	N.A
Unique identifier	N.A

Naming conventions	N.A
Search keywords	N.A
Version control	Use of Version no, Date, Author, Description of change.
Metadata provision	N.A
Making data Openly Accessible	
Classification	published openly
Sharing and Access regimes	Will be published on the frESCO webpage (following EC review and approval).
Needed method/software	N.A
Repository	All final versions of the document are archived in the frESCO internal repository, Microsoft Teams; the most recent final version will be published on frESCO webpage (following EC review and approval).
Access authorisation	N.A
Making data Interoperable	
Data/metadata vocabularies and other I/O standards	N.A
Mapping to common ontologies	N.A
Increase data Re-use	
Licence	N.A
Re-use availability schedule	Available throughout the project's duration and for a period of 3 years after the end of the Project
Re-use by third parties	N.A
Quality assurance	N.A
Availability period	Available throughout the project's duration and for a period of 3 years after the end of the Project

Data Summary	
Unique Identifier and name	Deliverable D2.2 Overview of the regulatory and market framework for energy services in the residential sector
DMP Responsible Partner	CIRCE
Revision History	26-02-2021, CIRCE, First official submission
Purpose/Description	Summary of the EU, national and regional legislation affecting energy and flexibility services and their implications on the residential sector. Assessment of the market conditions in the demonstrator countries regarding energy and flexibility services (e.g. number of energy providers) and opportunities for deploying the services to the residential sector. Analysis of standardisations needs for technologies enabling the provision of energy services
Relation to frESCO	T2.2
Type / Formats	Publication/ PDF File
Size	2.5 MB
FAIR Data	
Making Data Findable, including metadata provisions	
Metadata provision	Metadata is added manually and includes the type, name, date modified, modified by.
Metadata standards	N.A
Unique identifier	N.A
Naming conventions	N.A
Search keywords	N.A
Version control	Use of Version no, Date, Author, Description of change.
Metadata provision	N.A
Making data Openly Accessible	
Classification	published openly

Sharing and Access regimes	Will be published on the frESCO webpage (following EC review and approval).
Needed method/software	N.A
Repository	All final versions of the document are archived in the frESCO internal repository, Microsoft Teams; the most recent final version will be published on frESCO webpage (following EC review and approval).
Access authorisation	N.A
Making data Interoperable	
Data/metadata vocabularies and other I/O standards	N.A
Mapping to common ontologies	N.A
Increase data Re-use	
Licence	N.A
Re-use availability schedule	Available throughout the project's duration and for a period of 3 years after the end of the Project
Re-use by third parties	N.A
Quality assurance	N.A
Availability period	Available throughout the project's duration and for a period of 3 years after the end of the Project

Data Summary	
Unique Identifier and name	Deliverable D2.5 Report on the FRESCO conceptual architecture
DMP Responsible Partner	UBITECH
Revision History	25-05-2021, UBITECH, First official submission

Purpose/Description	Description of the modular components of frESCO overall solution (big data platform and toolkit for services providers), their specifications, communication protocols and the interaction between each of them, including a workflow diagram
Relation to frESCO	T2.5
Type / Formats	Publication/ PDF File
Size	2.0 MB
FAIR Data	
Making Data Findable, including metadata provisions	
Metadata provision	Metadata is added manually and includes the type, name, date modified, modified by.
Metadata standards	N.A
Unique identifier	N.A
Naming conventions	N.A
Search keywords	N.A
Version control	Use of Version no, Date, Author, Description of change.
Metadata provision	N.A
Making data Openly Accessible	
Classification	published openly
Sharing and Access regimes	Will be published on the frESCO webpage (following EC review and approval).
Needed method/software	N.A
Repository	All final versions of the document are archived in the frESCO internal repository, Microsoft Teams; the most recent final version will be published on frESCO webpage (following EC review and approval).
Access authorisation	N.A
Making data Interoperable	

Data/metadata vocabularies and other I/O standards	N.A
Mapping to common ontologies	N.A
Increase data Re-use	
Licence	N.A
Re-use availability schedule	Available throughout the project's duration and for a period of 3 years after the end of the Project
Re-use by third parties	N.A
Quality assurance	N.A
Availability period	Available throughout the project's duration and for a period of 3 years after the end of the Project

Data Summary	
Unique Identifier and name	Deliverable D3.1 Definition of the novel energy services for residential consumers
DMP Responsible Partner	CIRCE
Revision History	30-04-2021, CIRCE, First official submission
Purpose/Description	Description of the characteristics of each energy services studied, indicating the value offered to the end-users, the energy assets involved, new systems that must be installed for the provision of the services and terms and conditions of the service delivered
Relation to frESCO	T3.1
Type / Formats	Publication/ PDF File
Size	1.5 MB
FAIR Data	
Making Data Findable, including metadata provisions	

Metadata provision	Metadata is added manually and includes the type, name, date modified, modified by.
Metadata standards	N.A
Unique identifier	N.A
Naming conventions	N.A
Search keywords	N.A
Version control	Use of Version no, Date, Author, Description of change.
Metadata provision	N.A
Making data Openly Accessible	
Classification	published openly
Sharing and Access regimes	Will be published on the frESCO webpage (following EC review and approval).
Needed method/software	N.A
Repository	All final versions of the document are archived in the frESCO internal repository, Microsoft Teams; the most recent final version will be published on frESCO webpage (following EC review and approval).
Access authorisation	N.A
Making data Interoperable	
Data/metadata vocabularies and other I/O standards	N.A
Mapping to common ontologies	N.A
Increase data Re-use	
Licence	N.A
Re-use availability schedule	Available throughout the project's duration and for a period of 3 years after the end of the Project
Re-use by third parties	N.A

Quality assurance	N.A
Availability period	Available throughout the project's duration and for a period of 3 years after the end of the Project

Data Summary	
Unique Identifier and name	Deliverable D3.2 Mapping of the interactions between stakeholders and accompanying cash flows
DMP Responsible Partner	CIRCE
Revision History	25-08-2021, CIRCE, First official submission
Purpose/Description	List of all relevant stakeholders for the provision of the each of the services defined in D3.1 (including services providers, end-users and other intermediaries such as technology/ICT providers) and their direct and indirect interactions. Recommendations of possible payment flows among these stakeholders for ensuring the remuneration of all of them
Relation to frESCO	T3.2
Type / Formats	Publication/ PDF File
Size	3.7 MB
FAIR Data	
Making Data Findable, including metadata provisions	
Metadata provision	Metadata is added manually and includes the type, name, date modified, modified by.
Metadata standards	N.A
Unique identifier	N.A
Naming conventions	N.A
Search keywords	N.A
Version control	Use of Version no, Date, Author, Description of change.
Metadata provision	N.A
Making data Openly Accessible	

Classification	published openly
Sharing and Access regimes	Will be published on the frESCO webpage (following EC review and approval).
Needed method/software	N.A
Repository	All final versions of the document are archived in the frESCO internal repository, Microsoft Teams; the most recent final version will be published on frESCO webpage (following EC review and approval).
Access authorisation	N.A
Making data Interoperable	
Data/metadata vocabularies and other I/O standards	N.A
Mapping to common ontologies	N.A
Increase data Re-use	
Licence	N.A
Re-use availability schedule	Available throughout the project's duration and for a period of 3 years after the end of the Project
Re-use by third parties	N.A
Quality assurance	N.A
Availability period	Available throughout the project's duration and for a period of 3 years after the end of the Project

Data Summary	
Unique Identifier and name	Deliverable D8.1 Project Website and Visual Entity
DMP Responsible Partner	RINA-C

Revision History	
Purpose/Description	Description of the set-up of the frESCO website and its main features and the creation of the project social media
Relation to frESCO	T8.1 and T8.3
Type / Formats	Publication/ PDF File
Size	5.7 MB
FAIR Data	
Making Data Findable, including metadata provisions	
Metadata provision	Metadata is added manually and includes the type, name, date modified, modified by.
Metadata standards	N.A
Unique identifier	N.A
Naming conventions	N.A
Search keywords	N.A
Version control	Use of Version no, Date, Author, Description of change.
Metadata provision	N.A
Making data Openly Accessible	
Classification	D8.1 will be published openly
Sharing and Access regimes	Will be published on the frESCO webpage (following EC review and approval).
Needed method/software	N.A
Repository	All final versions of the document are archived in the frESCO internal repository, Microsoft Teams; the most recent final version will be published on frESCO webpage (following EC review and approval).
Access authorisation	N.A
Making data Interoperable	
Data/metadata vocabularies and	N.A

other I/O standards	
Mapping to common ontologies	N.A
Increase data Re-use	
Licence	N.A
Re-use availability schedule	Available throughout the project's duration and for a period of 3 years after the end of the Project
Re-use by third parties	N.A
Quality assurance	N.A
Availability period	Available throughout the project's duration and for a period of 3 years after the end of the Project

Data Summary	
Unique Identifier and name	Deliverable D8.2 Communication, Dissemination Toolkit
DMP Responsible Partner	RINA- C
Revision History	30-11-2021, RINA-C, First official submission
Purpose/Description	Description of the official project promotional material (brochure, poster, poll-up and infographic)
Relation to frESCO	T8.1 and T8.3
Type / Formats	Publication/ PDF File
Size	2.5 MB
FAIR Data	
Making Data Findable, including metadata provisions	
Metadata provision	Metadata is added manually and includes the type, name, date modified, modified by.
Metadata standards	N.A
Unique identifier	N.A
Naming conventions	N.A

Search keywords	N.A
Version control	Use of Version no, Date, Author, Description of change.
Metadata provision	N.A
Making data Openly Accessible	
Classification	D8.2 will be published openly
Sharing and Access regimes	Will be published on the frESCO webpage (following EC review and approval).
Needed method/software	N.A
Repository	All final versions of the document are archived in the frESCO internal repository, Microsoft Teams; the most recent final version will be published on frESCO webpage (following EC review and approval).
Access authorisation	N.A
Making data Interoperable	
Data/metadata vocabularies and other I/O standards	N.A
Mapping to common ontologies	N.A
Increase data Re-use	
Licence	N.A
Re-use availability schedule	Available throughout the project's duration and for a period of 3 years after the end of the Project
Re-use by third parties	N.A
Quality assurance	N.A
Availability period	Available throughout the project's duration and for a period of 3 years after the end of the Project

Data Summary

Unique Identifier and name	Deliverable D8.3 Communication, Dissemination Plan
DMP Responsible Partner	RINA-C
Revision History	Date: 30.11.2020 / Partner: RINA-C / Description of change: First Official submission
Purpose/Description	Identification of marketing objectives, definition of key-messages, identification of target groups and audiences, content formats, Key Performance Indicators and definition of the plan of activities.
Relation to frESCO	T8.1 and T8.3
Type / Formats	Publication/ PDF File
Size	8 MB
FAIR Data	
Making Data Findable, including metadata provisions	
Metadata provision	Metadata is added manually and includes the type, name, date modified, modified by.
Metadata standards	N.A
Unique identifier	N.A
Naming conventions	N.A
Search keywords	N.A
Version control	Use of Version no, Date, Author, Description of change.
Metadata provision	N.A
Making data Openly Accessible	
Classification	D8.3 will be published openly
Sharing and Access regimes	Will be published on the frESCO webpage (following EC review and approval).
Needed method/software	N.A

Repository	All final versions of the document are archived in the frESCO internal repository, Microsoft Teams; the most recent final version will be published on frESCO webpage (following EC review and approval).
Access authorisation	N.A
Making data Interoperable	
Data/metadata vocabularies and other I/O standards	N.A
Mapping to common ontologies	N.A
Increase data Re-use	
Licence	N.A
Re-use availability schedule	Available throughout the project's duration and for a period of 3 years after the end of the Project
Re-use by third parties	N.A
Quality assurance	N.A
Availability period	Available throughout the project's duration and for a period of 3 years after the end of the Project

10.3 Annex 3: Tutorial on Zenodo – Open digital repository

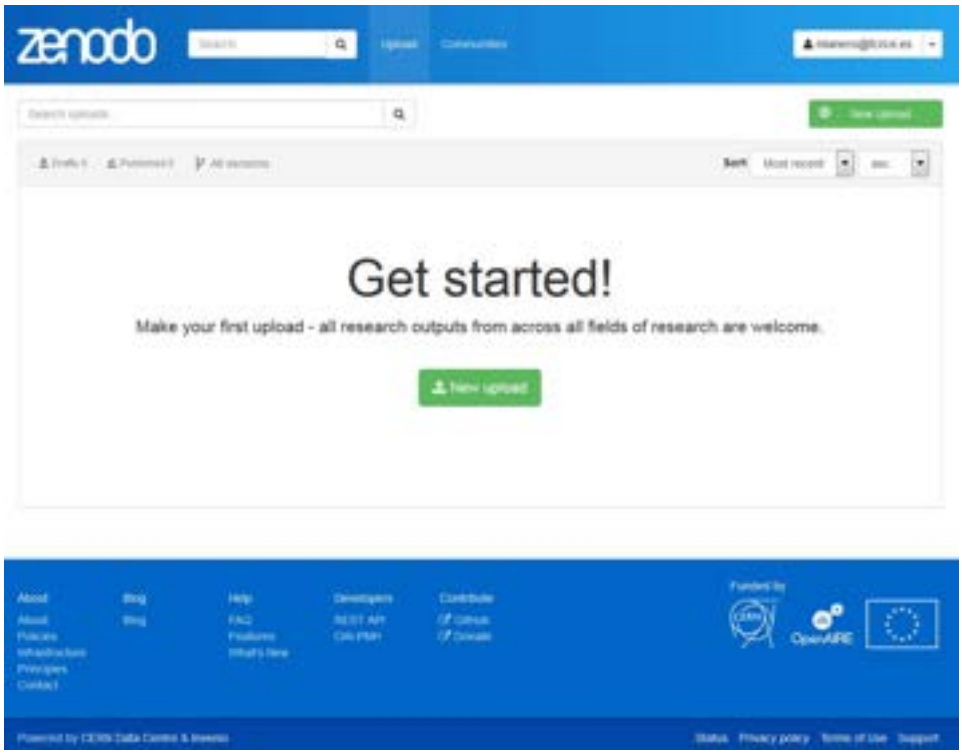
10.3.1 Brief introduction

The portal enables researchers, scientists and institutions to share research data and results in a wide variety of formats including text, spreadsheets, audio, video. To each submitted data-set is attached a unique DOIs that enables referencing the data in research and institutional contexts. The OpenAIRE project, in the vanguard of the open access and open data movements in Europe was commissioned by the EC to support their nascent Open Data policy by providing a catch-all repository for EC funded research.

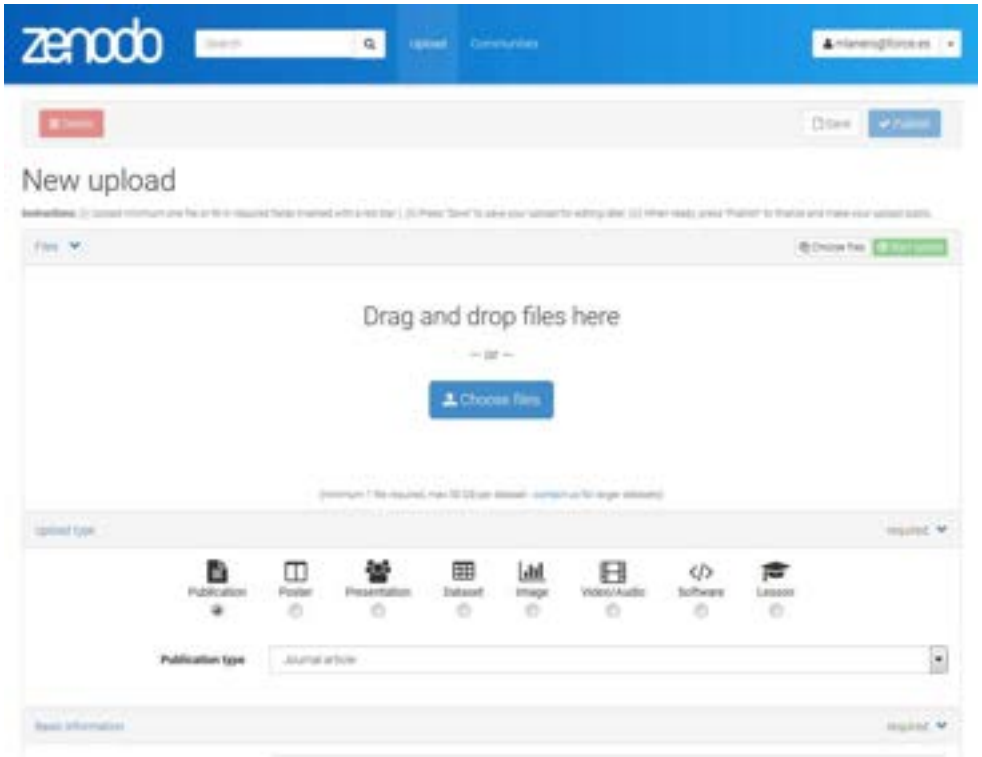
10.3.2 Submitting research data

The submission of research data to Zenodo can be done through the following steps:

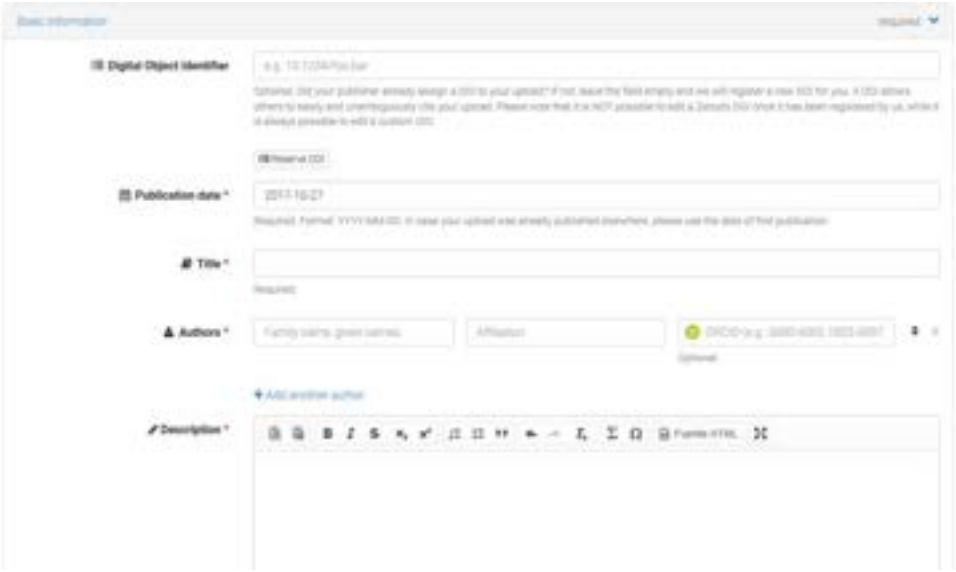
1. The upload procedure starts by prompting the user to select the files that will be part of the data-set and need to be uploaded:

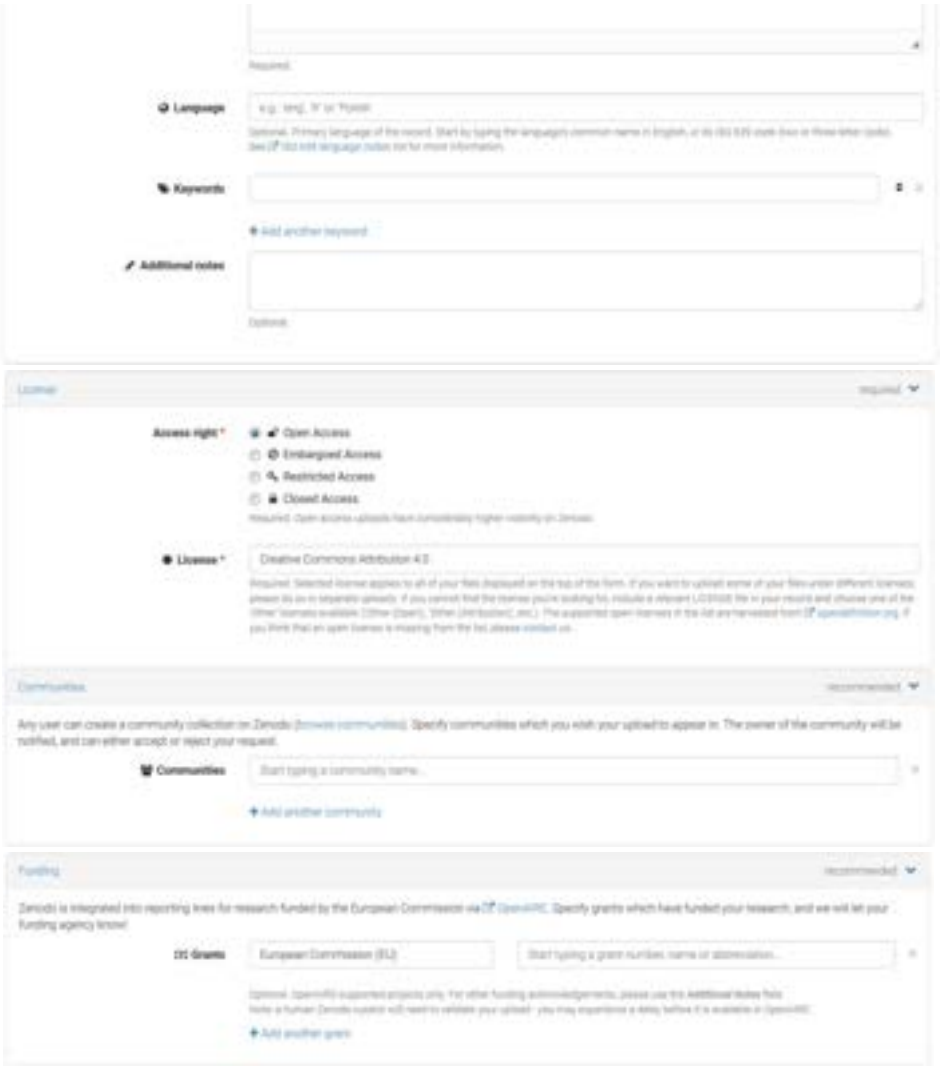


2. Successively the data must be classified according to given categories such as: dataset (i.e., tables of numerical data), image and others:



3. Finally, the portal prompts for additional metadata such as authorship of data and sharing policies. The structure of the data-set must be specified here as well:





10.4 Annex 4: Example Forms used to advise data subjects in demonstrators

INFORMATION AND CONSENT FORM

1 Preamble

This Informed Consent Form relates to personal data provided by you to

[NAME],

a **[COMPANY TYPE]**,

with registered seat at **[ADDRESS]** (hereinafter “We” or “Us”).

We process certain personal data provided by you for a list of pre-determined purposes. We now wish to ask your additional consent for sharing your Personal Data with participants and

members of the consortium in order to validate use cases developed by Us together with other members of the consortium (the **"Purpose"**).

2 Information on the project frESCO

Despite the large economic energy saving potential in the EU the energy service companies (ESCOs) market for residential buildings is much less developed than in other demand sectors (e.g. the industry or public/service sectors). Energy performance contracting (EPC) providers have been most active in the services and the public buildings sector, since they are mainly targeting energy contracting offerings to large customers, partly explained by the large transaction costs of energy performance contracts. As a result, very few ESCOs work in the residential market, mainly targeting large multi-family and public housing facilities.

Besides sector cross-cutting barriers (e.g. low energy prices, lack of information and awareness, lack of appropriate forms of finance) there are specific barriers which make a large-scale application of the ESCO model for residential buildings particularly difficult (e.g. lack scale or lack the necessary energy intensity to justify investment within the structure of present-day EPC model).

In this context, frESCO aims to engage with ESCOs and aggregators and enable the deployment of innovative business models on the basis of novel integrated energy service bundles that properly combine and remunerate local flexibility for optimizing local energy performance both in the form of energy efficiency and demand side management. Such new service and business models will bring under common Pay for Performance Contracts (extended form of current EPCs) two currently differentiated service offerings to enable the realization of next-generation smart energy service packages.

The strong presence of the industry in the consortium (2 ESCOs, 2 aggregators, 3 ICT and technology providers and 2 engineering companies) and the end-users (1 Cooperative and 1 Hotel), supported by 3 knowledgeable RTOs, will ensure the market uptake of frESCOs new business models. frESCO's new business models will be demonstrated in 4 different pilots (Spain, France, Croatian and Greece) with complementary characteristics in terms of building typology (single-/multi-family), climate, regulation, energy consumption, energy assets, consumer groups, etc., thus facilitating the replicability of frESCO's solutions across Europe.

Overall, frESCO aims to directly achieve a primary savings of 464 MWh/yr and a reduction of 108 tCO2/yr and trigger 28.3M€ investment during the replication

To this end, you are asked to participate as a pilot user in frESCO project and provide project relevant information, in order to be able to analyze this data and extract some statistics and indicators. That information will further facilitate the demonstration of the benefits of frESCO activities and foster continuous information, experience, knowledge and best practices exchange within the project.

Participants will be able to quit the platform at any point, if they wish, without any consequences. In addition, the participants can exercise their right to access, correct and delete his/her data at any moment.

Duration of the Research Activities: The Research Activities last from June 2020 to November 2023.

Risks or Inconveniences: No risks are foreseen. You are only requested to be available to participate.

Privacy and Confidentiality: As a voluntary participant in the frESCO project activities, your recorded data will not include any personal identification; hence it will not be possible to identify you afterwards. Information will be held and used on an anonymous basis only for the purpose of the project frESCO activities.

Benefits: The EU-funded frESCO project will deploy innovative business models by engaging with ESCOs and aggregators. The goal is to integrate energy service bundles that properly combine and remunerate local flexibility for optimising local energy performance, both in the form of energy efficiency and in demand-side management. The project's new business models will be tested in Spain, France, Croatia and Greece.

Data destruction: After the end of the project the data will be only accessible to the European Commission until a 5 year period has passed. After this period the data will be destroyed.

Contact: If you have any further questions or any complaints, you can contact the head of our data protection board on the following e-mail address: protecciondatos@fcirce.es at the attention of Vanesa Krun. (Include names and e-mails of local representatives)

3 Declaration of consent

By signing this Informed Consent Form, you agree to the processing and/or sharing within the purpose of the following personal data relating to you:

[name],

[address],

[e-mail address].

-----*please adjust based on the relevant personal data that is being shared.*-----

Study Information [will be inserted by Demo Partners]

1. Study Information

Location of study	
Pilot spaces that affect the participants	Residential/Commercial
Representative of the study	

Participant's Questionnaire

I have been informed about the purpose, the expected duration and the procedures of the study from the study manager.	**Yes**	**No**
I have read and understood the project information	**Yes**	**No**
I have been informed about the potential benefits of the study.	**Yes**	**No**
I have been informed about my right to deny participating or to quit from the study and about the corresponding consequences (as documented in the ethics management document).	**Yes**	**No**
I have been informed that participation in the demonstration phase will not result in more work.	**Yes**	**No**
I have been informed about the contact person in case that I have questions and queries about the study.	**Yes**	**No**
I have been given a copy of my consent.	**Yes**	**No**
I had adequate time to make my decision concerning my participation in the study.	**Yes**	**No**

I have been given the opportunity to ask questions	**Yes**	**No**
I comprehend that I can opt-out from the study at any time without having to justify my decision.	**Yes**	**No**
From the moment of the opt-out, all my personal data collected will be deleted	**Yes**	**No**
I have been informed about potential effects, difficulties and dangers from the study manager	**Yes**	**No**
I have been informed about the sensors equipment which will be installed to my workplace for collecting data	**Yes**	**No**
I have been informed about the security of the study data and results, along with the procedures regarding confidentiality.	**Yes**	**No**
I have been informed about the mechanisms the researchers have put in place to protect my privacy through processes of anonymization and data storage and security.	**Yes**	**No**
I have been explained about the use of data in research, publications, sharing and archiving	**Yes**	**No**
I have been ensured about the confidentiality of my personal information. Publications of the study results do not allow the personal data recognition, due to the principle of anonymity. In addition, the main goal of the project is business driven monitoring and thus no special further processing of data collected from individuals is considered.	**Yes**	**No**
I have been ensured that the data will be used within the scope of the project and no incidental findings are expected within the project.	**Yes**	**No**
I have been informed that no extra work is required through my participation and the overall involvement is part of my daily activities.	**Yes**	**No**

I understand that other researchers will have data access only if they agree to preserve the confidentiality of the data and to the terms specified in this form	**Yes**	**No**

I agree to participate in the study.	**Yes**	**No**

Date: _____ Signature:_____

OPT OUT FORM

frESCO Participant´s Opt Out Form

Complete this form to opt-out (decline participation) from the frESCO project.

Please print or type clearly.

Section 1: Participant Information

Name of Participant: _____

E-mail: _____

Section 2: Participant Acknowledgement and Signature

By signing this form, I have exercised my rights as the frESCO Participant to OPT OUT from the project without any consequences.

I have read the information and understood the above form; I hereby confirm my election to NOT participate in the frESCO project.

Date: _____ Signature: _____