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Deliverable 1.5

Data Management plan

| | |
|-----------------------------|------------|
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List of abbreviations

| Abbreviation | Definition |
|--------------|-------------------------------|
| DMP | Data Management Plan |
| DSO | Distribution System Operators |

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1. Introduction

This deliverable aims to present a first version of the plan for the management, collection, generation, storage and preservation of data related to Flexi Grid project activities. In this action, we will encounter three different types of data: data related to the pilot cases, data coming from publications and data coming from public deliverables.

Each project dataset is then described in the present deliverable using a standardised template. Finally, conclusions are drawn, and references presented.

The document presents, following the EC template [1], how these different types of data will be collected, who the main beneficiaries are, and how these data will store and manage them, and if the project will make them accessible, findable and re-usable.

1.3 Relations to other activities in the project

The DMP is a component of WP1 Task 1.5 and the leader of this task is IMCG. The DMP will be updated over the course of the project whenever significant changes arise. All WPs directly contribute to the implementation of the DMP with partners responsible according to their relevant activities.

1.4 Updating the Data Management Plan

This report is an initial version of the DMP, prepared at the outset of the project. During the project this deliverable will be updated due to the fact that not all data are defined. This deliverable will be a living **document** in which information can be made available during the project period and when the significant changes occur such as:

- new data sets
- changes in consortium policies (e.g. innovation potential, decision to file for a patent)
- changes in consortium composition and external factors (e.g. new consortium members joining or old members leaving).

1.5 Approach to Data management

DMP provide a positive stimulus to thinking about how the data generated within a project will be stored, managed, and safeguarded, and it is an important part of the research process from the outset. As the project progresses, the data generated may change in type and volume. It is therefore useful to envisage a DMP as a dynamic framework, which should be maintained and modified as the research advances. Good data management will save time, safeguard information and increase the visibility and impact of the research outcomes.

The **main sections** to be covered by the DMP are:

- Data Summary
- FAIR data management
- Allocation of resources
- Data Security
- Ethical aspects
- Other issues (Refer to other national/funder/sectorial/departmental procedures for data management that you are using – if any)

This first version of the DMP will pay attention to data summary. Specifically, it will consider:

- data collection process: each partner will provide information about what data will be collected, processed or generated during the project
- data reference/name
- data set format
- mandatory metadata
- dataset specific metadata
- data set description
- re-use of any existing data and how
- origin of the data
- standards
- data sharing

- archiving and preservation (storage/ back-up)

2. Data Summary

2.1 Data related to the pilots

The main scope of this section is to establish what the purpose is of the collection and generation of data in FLEXIGRID pilot cases, which are the sources of this data.

So, in this purpose were built two questionnaires in order to gather the information regarding cybersecurity and privacy and overall datasets which will be handled in the project

2.1.1 Cybersecurity and Privacy survey

A survey was prepared and sent to each pilot manager to gather information regarding cybersecurity and privacy. The received surveys are presented on the next tables.

At this moment we have a data evaluation for:

- **Demo Areas 1** Location-Sweden: Grid monitoring, control and flexibility intervention
- **Demo Area 2** Location- Sweden: Local energy market: exchange of energy / grid services
- **Demo Area 3** Location- Turkey: P2P market platform, with smart contract and smart billing based on block-chain technology
- **Demo Area 4** Location-Turkey: Flexibility measures and electricity grid services provided by local energy storage, P2G and EVs and distributed RES

The next version of the deliverable will be supplemented with information as it will be clarified by the managers of each pilot.

In the following tables are presented the information from the mentioned Demo areas regarding cybersecurity and privacy and a short description of the datasets and data flows.

Table 1 – Sweden pilot. Information about cyber security and data description for Demo Areas 1 and 2

| | |
|--|--|
| <p>Pilot & Data Manager</p> | <p>Pilot: Chalmers Campus Data manager: AH-Rene Frydensbjerg</p> |
| <p>Dataset description: brief description of the dataset and data flows</p> | <p>Pilot Energy Management data including controlling data coming from measurement system and controlling system. This data is collected to a system called Webport and further via IOT system to Flexigrid system. See also separate flow diagram</p> |
| <p>Data security (acquisition, transmission/storage/access): (mechanisms/protocols used or available to ensure secure data handling; certifications)</p> | <p>Monitoring network, essentially a wire solution uses a secure protocol to transfer data to a cloud server. Local access protected by basic authentication.</p> |
| <p>Personal data: (ways in which the collected or processed data can become personal or “sensitive” considering the recently adopted EU General Data Protection Regulation if needed.</p> | <p>Monitoring data may be susceptible to be considered personal. In particular disaggregated electrical energy consumptions, although it is being collected on a building. For this reason, this matter will be analysed in detail and the necessary development to protect the privacy of the works and users of the building will be done in accordance with EU Directive on Data Protection</p> |
| <p>Data privacy (acquisition, transmission/storage/access): (mechanism/protocols used or available to ensure data privacy including encryption, anonymization, aggregation</p> | <p>Disaggregated data is available only to authenticated end users; no anonymization is in place yet.</p> |
| <p>Auditing: (mechanisms used or available to record data processing and handling operations)</p> | |
| <p>Certification: (applicable standards, regarding both privacy and cyber security, and sought certifications already in place or expected in the near future if needed)</p> | <p>At this time, we are not looking for any particular certification but that might change during the course of the project.</p> |

Table 2 – Turkey pilot. Information about cyber security and data description for Demo Areas 3 and 4

| | |
|---|---|
| <p>Pilot & Data Manager</p> | <p>Pilot: OEDAS are the electricity distribution company of the five different cities of Turkey including Eskisehir, Bilecik, Afyonkarahisar, Kutahya and Usak. The pilot area will be one of these cities.</p> <p>Data Manager: OEDAŞ has the authority of data management of SCADA, OMS, DMS, GIS systems. INAVITAS has the authority of data management of distributed generation and power quality analyzer data.</p> |
| <p>Dataset description: brief description of the dataset and data flows</p> | <p>Energy consumption, PV energy production, Storage and EV systems data.</p> <p>Measurement data is collected, stored and transferred to a cloud server.</p> |
| <p>Data security (acquisition, transmission/storage/access): (mechanisms/protocols used or available to ensure secure data handling; certifications)</p> | <p>Monitoring network uses a secure protocol (https) to transfer data to the cloud server. Local access protected by basic authentication (username/password).</p> <p>S2S VPN tunnel gateway between points is used in OEDAS.</p> <p>Standard IT data transmission protocols (Modbus RTU, RP-570, Profi-Bus, Can-Bus) are used in communication between SCADA-IT.</p> <p>Web based management services secured by basic authentication (username/password).</p> |
| <p>Personal data: (ways in which the collected or processed data can becomes personal or “sensitive” considering the recently adopted EU General Data Protection Regulation if needed.</p> | <p>This topic will be important for gathering the data from OEDAS network. We can only monitor (cannot share) the energy consumption data of end-user and PV production data of PV systems owner because these are determined as a personal data in Personal Data Protection Law in Turkey.</p> |
| <p>Data privacy (acquisition, transmission/storage/access): (mechanism/protocols used or available to ensure data privacy including encryption, anonymization, aggregation</p> | <p>The data is available only to authenticated end users; no anonymization is in place yet</p> |
| <p>Auditing: (mechanisms used or available to record data processing and handling operations)</p> | <p>System detailed operation is maintained on text logs.</p> |
| <p>Certification: (applicable standards, regarding both privacy and cyber security, and sought certifications already in place or expected in the near future if needed)</p> | <p>We have a TS ISO / IEC 27001: 2013 certification. Regarding the execution of electricity distribution services, the certification is about ensuring the information security of the information technologies infrastructure of the corporate information system and industrial control systems.</p> |

2.1.2 Datasets survey

This section contains the dataset description per work packages in FLEX-GRID. Datasets are numbered according to their primary work package number, as laid out in the project Implementation chapter. At this moment we have a data evaluation for the following work packages:

- WP3: Datasets Integrated process for observability, flexibility determination and dispatch
- WP4: Datasets Cross-functional Platform integration and Communication Platform
- WP5: Datasets Demonstration of grid monitoring, control and flexibility intervention
- WP6: Datasets Demonstration of a local energy market for exchange of energy and grid services

For the first data evaluation all the consortium partners completed a dataset template describing the overall data collected for a work package. However, it is anticipated that these dataset templates for each WP will be modified and classified according to data types. Next versions of DMP deliverables will provide more detailed information and task-oriented details for mentioned WPs, together with refined descriptions and information for all other WPs and tasks.

2.1.2.1 Template: Dataset

Information about each dataset has been collated in the format presented below.

Table 3: Dataset Template

| | |
|-------------------------------------|--|
| WP / Task & Data Manager | <i>Work Package and/or Task numbers related to the dataset, and the Data Manager who takes responsibility.</i> |
| Data collection process | <i>Purpose of the data collection and how the data will be collected</i> |
| Dataset reference / name | <i>Dataset number and name</i> |
| Data set format | <i>For each type of data will be presented the format and the origin of the data</i> |
| Mandatory Metadata | <i>European Union H2020 Enabling flexibility for future distribution grid – FlexiGrid GA 864048</i> |
| Dataset Specific Metadata | <i>Keyword(s) that categorize data to make it linked/searchable</i> |

| | |
|---|--|
| Data set description | <i>Data description, origin, nature, scale, if it underpins a publication, who useful to, existence of similar data, possibilities for reuse.</i> |
| Standards | <i>Reference to existing standards in topic area governing data collection, aggregation, storage and sharing</i> |
| Data sharing | <i>How the data will be shared, identification of repository, existence of embargo period if any, identification of software or tools necessary for reuse.</i> |
| Archiving and preservation (storage/backup): | <i>The procedure for long-term preservation, length of preservation, an estimation of costs and how this will be covered.</i> |

2.1.2.2 WP3. Datasets Integrated process for observability, flexibility determination and dispatch

| | |
|---|--|
| WP / Task & Data Manager | WP3. Integrated process for observability, flexibility determination and dispatch |
| Data collection process | For research purpose/ data will be collected via sensor |
| Dataset reference / name | - |
| Data set format | It is time-series data of Power, Voltage, Current |
| Mandatory Metadata | European Union H2020 Enabling flexibility for future distribution grid – FlexiGrid GA 864048 |
| Dataset Specific Metadata | - |
| Data set description | Time-series data of power, voltage, current at Strijp-S substation/ 1 second time resolution/ it useful for who working in system monitoring |
| Standards | - |
| Data sharing | It just for research purpose only. |
| Archiving and preservation (storage/backup): | - |

2.1.2.3 WP4. Datasets Cross-functional Platform integration and Communication Platform (WP4)

| | |
|-------------------------------------|---|
| WP / Task & Data Manager | WP4. Datasets Cross-functional Platform integration and Communication Platform |
| Data collection process | In WP4 the application will be integrated into an IoTplatform and the data received will be displayed |
| Dataset reference / name | <ul style="list-style-type: none"> • Software packages • Integration plan • test plan, test cases, regression test plan • testing reports • deployment plan • small scale and large scale pilots (plan, test, evaluate) |
| Data set format | <p>The following formats were identified until now:</p> <ol style="list-style-type: none"> 1. csv, xls 2. raw (PSS/E), xls 3. pdf, exe |
| Mandatory Metadata | <p>European Union</p> <p>H2020</p> <p>Enabling flexibility for future distribution grid – FlexiGrid GA 864048</p> |
| Dataset Specific Metadata | Keyword(s) that categorize data to make it linked/searchable |
| Data set description | It contains information which will be used for developing the IoT platform |
| Standards | No specific standards |
| Data sharing | A part of data will be stored in the platform and a part will be stored in the pilot's data base |

| | |
|---|---|
| Archiving and preservation (storage/backup): | The data will be stored in the IoT data base and in the pilot's data base |
|---|---|

2.1.2.4 WP5 .Datasets Demonstration of grid monitoring, control and flexibility intervention (WP5)

| | |
|-------------------------------------|--|
| WP / Task & Data Manager | WP5. Demonstration of grid monitoring, control and flexibility intervention Data manager: AH-Rene Frydensbjerg |
| Data collection process | In WP5 the data will be collected from Chalmers demo-site to support and evaluate the demonstration of the use cases. The data will mainly include electricity measurements as well as generation, consumption and weather forecasts. The data will be collected via AH webport by exploiting the IoT platform developed in WP4. |
| Dataset reference / name | <ol style="list-style-type: none"> 1. Customer demand/metering data 2. Electrical distribution grid data. 3. Output data in different WPs 4. Results, publications |
| Data set format | <ol style="list-style-type: none"> 1. csv, xls 2. raw (PSS/E), xls 3. pdf, exe |
| Mandatory Metadata | European Union H2020 Enabling flexibility for future distribution grid – FlexiGrid GA 864048 |
| Dataset Specific Metadata | Keyword(s) that categorize data to make it linked/searchable |
| Data set description | Data that are already available from previous projects will be used. For example the electrical distribution grid data of Chalmers demo-site used in other on-going projects at Chalmers will be re-used. Chalmers electrical distribution grid data will be provided by AH. |
| Standards | Reference to existing standards in topic area governing data collection, aggregation, storage and sharing |
| Data sharing | All partners will have access to WP5 related data. |

| | |
|---|--|
| | WP5 related publications will be published as open access |
| Archiving and preservation (storage/backup): | The procedure for long-term preservation, length of preservation, an estimation of costs and how this will be covered. |

2.1.2.5 *WP6. Datasets Demonstration of a local energy market for exchange of energy and grid services (WP6)*

| | |
|-------------------------------------|--|
| WP / Task & Data Manager | WP6. Demonstration of a local energy market for exchange of energy and grid services Data manager: AH-Rene Frydensbjerg |
| Data collection process | In WP6 the data will be collected from Chalmers demo-site to support and evaluate the demonstration of the use cases. The data will mainly include electricity measurements as well as generation, consumption and weather forecasts. The data will be collected via AH webport by exploiting the IoT platform developed in WP4. |
| Dataset reference / name | 1. Customer demand/metering data 2. Electrical distribution grid data. 3. Output data in different WPs 4. Results, publications |
| Data set format | 1. csv, xls 2. raw (PSS/E), xls 3. pdf, exe |
| Mandatory Metadata | European Union H2020 Enabling flexibility for future distribution grid – FlexiGrid GA 864048 |
| Dataset Specific Metadata | Keyword(s) that categorize data to make it linked/searchable |
| Data set description | Data that are already available from previous projects will be used. For example the electrical distribution grid data of Chalmers demo-site used in other on-going projects at Chalmers will be re-used. Chalmers electrical distribution grid data will be provided by AH. |

| | |
|---|--|
| Standards | In Chalmers pilot we use the local standards. |
| Data sharing | All partners will have access to WP6 related data. WP6 related publications will be published as open access |
| Archiving and preservation (storage/backup): | In Chalmers test site we save data for easy pick up in 36 month. We also save data for 120 month. Not so easy pick up. |

3. Data Availability and Open Access

Open access (OA) means free access of the research community and not only to the scientific information and data associated to FLEXI-GRID project. In the DMP will be detailed those data and information which can be available to the research community, civil society.

As the “Guidelines on Open Access to Scientific Publications and Research Data in Horizon2020” [ECD17] outline, more open access to scientific publications and data serves a number of purposes. The Europe 2020 strategy for a smart, sustainable and inclusive economy underlines the central role of knowledge and innovation in generating growth. Broader access to scientific publications and data therefore helps to:

- **build on previous research results** (improved quality of results)
- **encourage collaboration and avoid duplication of effort** (greater efficiency)
- **speed up innovation** (faster progress to market means faster growth)
- **involve citizens and society** (improved transparency of the scientific process).

The FLEXI-GRID partners will ensure the open access to all peer-reviewed scientific publications relating to the results of the project using institutional repositories (e.g. www.digital.csic.es or www.hal.archives-ouvertes.fr) or other available tools that will be identified during the project. Open access to scientific publications means free online access for any user.

3.1 Classification of Data Availability

In this stage of the Flexi GRID project, the following 4 categories of data were identified:

- **Open Data** – these types of data can be re-used
- **Confidential**, used only by the Grant beneficiaries for the purpose of the demonstrations, with client consent: Metering data used during the demonstrations
- **Disseminated data upon decision of the interested parties:** Technical and economic data underlying the business models built during the project
- **Private data**, these will be maintained and exploited by each partner.

The project will seek to openly disseminate its research findings, except in cases where there are defined exploitable outcomes, privacy concerns or there will be a high administrative burden for a dataset or limited worth to other users. The two main aspects of this dissemination approach are open access to scientific publications and open access to research data. Each is considered in the following sections.

3.2 Open Access publishing

In the Grant Agreement is stated the legal requirements in order to provide access to scientific publications “each beneficiary must ensure open access to all peer-reviewed scientific publications”.

“Peer-reviewed publications are those assessed by other scholars. Peer review is typically, though not exclusively, organised by the journal or publisher to which an article or manuscript is submitted. However, new approaches are expected to become more prevalent in years to come. The dominant type of scientific publication is the journal article”.

To achieve this objective in the FLEXI-GRID project we will perform the below steps according to EU Directive:

1. **Depositing publications in repositories** - Beneficiaries must deposit a machine-readable electronic copy of the published version or final peer-reviewed manuscript accepted for publication in a repository for scientific publications. This must be done as soon as possible and at the latest upon publication.
2. **Providing open access to publications** - After depositing, publications beneficiaries must provide open access to those publications through repositories.

3.2.1 Open Data

One of the main purposes of the FLEXI-GRID Project is to ensure the open access of scientific publications and data in order to provide the necessary information for the scientific community and in this way the impact will be higher through re-use the results of the project.

The open data will be defined using the following characteristics:

1. **Findable:** data will receive a unique, persistent ID, located in a searchable resource, and documented with metadata.
2. **Accessible:** data will be easy identified and retrieved using common methods and protocols, metadata is accessible even if the data is not.
3. **Interoperable:** in the FLEXI-GRID Project will be defined common data formats.
4. **Re-useable:** data has clear licences, and accurate metadata according to the relevant community standards

The data management plan establishes how this approach will be realised in practice with the initial plan presenting an overview and greater detail will be provided in the interim and final reports as the work packages proceed.

3.2.2 Copyright Licenses

When material is, widely shared, copyright licences protect the authors of work and grant specific rights to publishers and others to use this work. The European Commission encourages authors to retain their copyright whilst disseminating it as open access.

At this initial stage it is not possible to define the copyright arrangement for each project dataset. The most appropriate licensing arrangements for each of the project datasets will be investigated as they are better characterised by their respective work packages.

4.Resources, Security and Ethical Aspects

4.1 Allocation of resources

FLEXI GRID project does not foresee additional needs for resources beyond the duration of the action to handle data or making the data FAIR.

4.2 Data Security and Protection

FLEXI GRID project will ensure that the General Data Protection Regulation (GDPR), which has entered into force in May 2018.

4.3 Ethical Aspects

The basis of ethical research is the principle of informed consent. This data will be pseudo anonymized (**or anonymised in some case if needed**) and reported as aggregated data (when relevant) in the documents related to the evaluation of FLEXIGRID outcomes. The ethical aspects will be detailed in work package 9/ Task 9.1

5. Archiving Data and Preserving Infrastructure

5.1 Data Storage & sharing

Taking into account the type of data which will be used in the project, until now in the project were identified the data storage and sharing facilities as such:

- **Private** - will be stored locally in the organisational networks and assets.
- **Consortium** – IMCG created a local repository for project’s documentation. For the source code, all the Open Source Components will be maintained in a public Git based web repository, where they will be in the disposal of the community for exploitation and expansion. Closed Source Components can be stored into private repositories. Git is a distributed version control system and as such, it is promoting sharing and collaboration among users but also offers the creator versioning control.
- **Open**
 - ✓ **Data related to scientific research** – FlexiGrid will publish scientific publications in conferences and journals as part of the planned dissemination activities. Scientific publications’ data are made available often using accessible PDF files. The metadata to be used will be compliant with the format requested by OpenAIRE as well as the one requested by the repository where the papers are to be deposited.
 - ✓ **Public deliverables** - All information and material related to the public, such as public deliverables, brochures, posters and so on will be freely available on the project website in the form of accessible PDF files

6. Conclusions

This document has introduced the plan that the FLEXI-GRID project will take to data management identified the datasets that will be collected or generated and described how they will be stored and shared. It has specified which data will be open access and which will be confidential within the consortium, as far as it is possible to do so at this stage.

7. References

1. Guidelines to the Rules on Open Access to Scientific Publications and Open Access to Research Data in Horizon 2020 – https://ec.europa.eu/research/participants/data/ref/h2020/grants_manual/hi/oa_pilot/h2020-hi-oa-pilot-guide_en.pdf
2. DCC (2004-2017) Horizon 2020 DMP Template and Guidance, <https://dmponline.dcc.ac.uk/>,