



reschool

Creation, growing and management
of energy communities

Data Management Plan

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Executive Summary

The data collected and/or generated in RESCHOOL is essential in order to meet the main objective of the project, which is to facilitate the creation, growth and management of energy communities and co-producing tools for the efficient management of energy and trading at individual and aggregated levels.

The datasets collected within the project are mainly observational, i.e. data captured from smart meters and energy assets, and data collected by surveys and questionnaires, all coming from the four pilots participating in RESCHOOL (Girona, Amsterdam, Stockholm and Athens).

In this context, the RESCHOOL project will ensure that research data is Findable, Accessible, Interoperable and Reusable (FAIR data principle) to make it possible for knowledge to be shared and available for re-use in future research and projects. This data management plan mainly addresses i) the identification and definition of the types and format of data and research outputs, ii) how the data will be managed and documented, iii) how the data will be made available and stored, also considering future data preservation and re-use in trustworthy repositories (e.g Zenodo or institutional OPENAIRE compliant repositories) and iv) cost analysis regarding the allocation of resources to carry out these previous activities. The data management plan will also take into consideration any ethical and data protection concerns and will comply with privacy and security issues as rules by the applicable regulation.

The Data Management Plan is a live document. This first version was submitted in June 2023(M6). At this stage of the project (M6), there are some details on data in the different pilots that are still unknown and it has been indicated in this document accordingly. An updated version will be published in September 2024 (M21), with those significant changes or information updates arisen during project execution.

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1 Introduction

1.1 Objectives

This Data Management Plan (DMP) aims to ensure that the data produced in the context of the RESCHOOL project, and not subjected to commercial exploitation or access restrictions, will be made available as open data, following the FAIR (Findable, Accessible, Interoperable and Reusable) principles. Replicability, scalability and benchmarking of validated results of RESCHOOL and particularly those presented in scientific publications will be detailed in the different sections of this deliverable. Whenever there are no legal restrictions, RESCHOOL will provide open access (OA) to research outputs to make them available in future research and projects. In particular, this deliverable addresses the following objectives based on the data generated by the four pilots of the project (Girona, Amsterdam, Stockholm and Athens):

- Identification and definition of the types and format of data and research outputs to be generated in the four pilots during the project life span, including typology, origin, size, etc.
- Explanation of how the data will be organized, managed and documented guaranteeing the good quality of the data and making them uniquely findable.
- Explanation of how the data will be made accessible during the project execution and future data preservation and reutilization in trustworthy repositories such as Zenodo.
- Costs analysis regarding the allocation of resources to keep data preservation and storage.

1.2 Contribution of partners

Table 1 Contribution of partners to this deliverable

Partner	Contribution
UdG	Main editor of the deliverable and contribution on the social data of the Spanish pilot and sections related to own procedures in terms of repository usage, security and other research outputs.
KMO, DdG	Contribution on detailed data of the Spanish pilot
RESF,AMS,OR	Contribution on detailed data of the Dutch pilot
ELEC	Contribution on detailed data of the Swedish pilot
COEN	Contribution on detailed data of the Greek pilot
CERTH, EREF, ESCI, RISE, UiS	Contribution on sections related to own procedures in terms of repository usage, security and other research outputs.

1.3 Report Structure

This document follows the Data Management Plan Template (Version 1 05/May 2021) provided by the European Commission (EC). Core sections in D7.3 are organized as follows:

- Chapter 2 mainly describes the summary of the data that have been generated/collected in the project, particularly in the four pilots. It explains the purpose of the data generation/collection and its relationship with the objectives of the project, including also its origin, types and formats, etc.
- Chapter 3: it includes all the questions referred to make the data findable, accessible, interoperable and reusable through the proposed repositories such as Zenodo.
- Chapter 4: it explains if other research outputs (such as software, workflows, protocols, m) have been generated in the execution of the project.
- Chapter 5: it explains the allocation of resources and cost, if any, related to make data and other research outputs FAIR in RESCHOOL



- Chapter 6 and 7: these sections address data recovery, security provision as well as secure storage and transfer of sensitive data (ethical considerations).

2 Data summary

2.1 What is the purpose of the data generation or re-use and its relation to the objectives of the project?

The data collected and/or generated in RESCHOOL is essential in order to meet the main objective of the project, i.e. to facilitate the creation, growth and management of energy communities and co-producing tools for the efficient management of energy and trading at individual and aggregated levels.

With this aim, the data coming from the 4 pilots (Girona, Amsterdam, Stockholm and Athens) participating will serve (during the project and after it) to achieve the following purposes of the project:

- Definition, implementation and validation of a set of intergenerational training and engagement programmes to promote local energy communities.
- Co-design and further validate gamification strategies oriented to increase individual awareness of the energy use.
- Validation of a data model for the management of energy communities
- Development and validation of results of a suite of services to support energy management and trading in energy communities, ready to operate with flexibility markets.

Collection and publication of the data for further re-utilization shall also help establishing a durable repository of research results that can help documenting the advances at both social and technical level in the energy communities' context, to allow other researchers to validate the results independently.

2.2 What types and formats of data will the project generate or re-use?

The datasets collected within the project are mainly **observational and simulated**, mainly data captured from smart meters and energy assets, and data collected by surveys, all coming from the four pilots participating in RESCHOOL:

- PILOT 1: LOCAL ENERGY COMMUNITIES LED BY MUNICIPALITY (Girona in Spain)
- PILOT 2: AMSTERDAM EASTERN DOCKLANDS ENERGY-FLEX COMMUNITY, THE FLEX-CITY PILOT (Amsterdam in The Netherlands)
- PILOT 3: HAMMARBY SJÖSTAD 2.0, MICROGRID PROJECT (Stockholm in Sweden)
- PILOT 4: COLLECTIVE ENERGY COOPERATIVE (Athens in Greece)

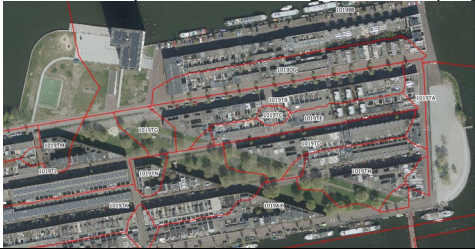
Tables below include the type and format of the different data collected for the four RESCHOOL pilots.

Table 2 PILOT 1 Data: LOCAL ENERGY COMMUNITIES LED BY MUNICIPALITY (Girona in Spain)

Type of Data	Format
<p>OBSERVATIONAL. Consumption-generation data collected from the smart meters (Wibeee), with a 15-minute granularity. The data are available through the Wibeee API.</p> <p>At the same time, the generation data can be made available directly from the inverter API.</p>	<ul style="list-style-type: none"> - From Sentinel they are available as tables (xlsx, csv) or graphics (png, svg). - Direct access: it is possible to directly have all the data. - Direct access: data from the Wibeee/inverter API

OBSERVATIONAL. Consumption historical data can also be collected. They will be downloaded from Datadis database, or in some cases, when available, from historical data collected through the smart meters (max 1 year of data collected). The data are available through the Datadis API.	- Datadis: available as tables (xml, csv) or graphics (json). - Wibeec: available as tables (Csv, xls, xlsx), graphic (png, jpeg, svg, pdf) - Direct access: data from the Datadis API
OBSERVATIONAL. Batteries (Under analysis at this stage (M6))	Under analysis at this stage (M6)
OBSERVATIONAL. Data collected through surveys to the participants, during the activities in schools (before and after implementation)	Text (surveys sent to the participants)
OBSERVATIONAL. Data on the engagement and interaction of participants (HLUC 1 and HLUC 8)	Directly retrieved from the application developed.
SIMULATION. Weather data from meteorological models and forecasts.	Sentinel Solar: weather forecasts available from the Solar PV forecasting tool. Directly obtain the data with the API: https://solarforecasting.energydata.info/%23/add-new?lat=41.695638369091775&lng=2.8920989337340868 If not, local database are the following: - Spanish level: https://opendata.aemet.es/centrodedescargas/inicio - Regional level: https://apidocs.meteocat.gencat.cat/
OTHER: Other data coming from the apps and tools developed during the project.	Unknown at this stage of the project (M6)

Table 3 PILOT 2 Data: AMSTERDAM EASTERN DOCKLANDS ENERGY-FLEX COMMUNITY, THE FLEX-CITY PILOT (Amsterdam in The Netherlands)

Type of Data	Format
OBSERVATIONAL. Submeter data from Earn-e submeters will collect energy data from the participants, both production and consumption.	CSV
Actions by the participants through the data from Earn-e submeters and devices	Under analysis at this stage of the project (M6)
OBSERVATIONAL. Annual Postcode 6 (a geographic area) data from the DSO (Distribution System operator) regarding electricity use which is online available from Liander.	Under analysis at this stage of the project (M6) 
SIMULATION. Weather data from meteorological models and forecasts.	Under analysis at this stage of the project (M6)
OBSERVATIONAL. Liander is measuring the energy flow in the Sporenburg transformation station. This data will be used to provide day-ahead energy profiles for the CPO (Equans) for every 15 minutes of the 24 hours.	Not Known at this stage of the project (M6)

OBSERVATIONAL. Data from the neighbourhood monitoring tool	Not Known at this stage of the project (M6)
OBSERVATIONAL. Sporenburg transformation station	Not Known at this stage of the project (M6)
OBSERVATIONAL. Building metadata (address, number of floors, number of apartments, geo-spatial data, etc.)	Not Known at this stage of the project (M6)

Table 4 PILOT 3 Data: HAMMARBY SJÖSTAD 2.0, MICROGRID PROJECT (Stockholm in Sweden)

Type of Data	Format
OBSERVATIONAL. Building metadata (address, number of floors, number of apartments, geo-spatial data, energy resources etc.)	xml, xlsx
OBSERVATIONAL. Current and Historical Energy Performance Certificates	xml
OBSERVATIONAL. Current and historic electricity data	xml, xlsx
OBSERVATIONAL. Current and historic district heating data	xml
OBSERVATIONAL. Energy price data	xml
OBSERVATIONAL. Computational data on relevant efficiency measures	xml
OBSERVATIONAL. Community messages	xml
OBSERVATIONAL. Data collected through surveys to measure satisfaction rate of participants.	Text, xlsx
OBSERVATIONAL. Data collected from participants through surveys related to school activities.	Text, xlsx
OTHER: Other data coming from the apps and tools developed during the project.	Unknown at this stage of the project (M6)

Table 5 PILOT 4 Data: COLLECTIVE ENERGY COOPERATIVE (Athens in Greece)

Type of Data	Format
OBSERVATIONAL. Smart metering data will be generated from selected dwellings and small enterprises that are members of the community. Power consumption data from households will be produced.	Real Time Data: MQTT (Payload in text) Historical Data: CSV
OBSERVATIONAL. Storage Device data from the 3kW/10kWh battery energy storage system which is already installed in a member's house.	Real Time Data: MQTT (Payload in text) or API Historical Data: CSV
OBSERVATIONAL. Data from data logger of a solar power plant of 100kW which is under construction	Text: json/CSV (tentative)
OTHER: Other data coming from the apps and tools developed during the project.	Unknown at this stage of the project (M6)

2.3 Will you re-use any existing data and what will you re-use it for?

RESCHOOL pilots will generate their own datasets (see section 2.2). In principle, no external data is expected to be re-used in the project. Only the Pilot of Stockholm and Amsterdam will re-use additional data coming from on-going or past projects, after signing agreement with data owners.

Table 6 Re-use of data. Pilot of Amsterdam.

Datasets reused (if any)	Source	Intellectual Property Rights (IPR) issues if any or N/A
EV charging data	Own measurements and data from clients	Agreement with data owners
Prosumer data	Measurements in previous projects	Agreement consent forms with data owners

Table 7 Re-use of data. Pilot of Stockholm.

Datasets reused (if any)	Source	Intellectual Property Rights (IPR) issues if any or N/A
Existing data from ongoing projects in the scope of the study on energy communities and energy management in buildings will be used.	Project; System change with locally shared energy	Agreement with data owners
Building metadata (address, number of floors, number of apartments, geo-spatial data, etc.)	Oden Platform	-
Current and Historical Energy Performance Certificates	Oden Platform	-
Current and historic electricity data	Ellevio, Submetering companies like Infometric, Potential data hubs	-
Current and historic district heating data	Stockholm Exergi, Potential data hubs	-

2.4 What is the origin/provenance of the data, either generated or re-used?

The following tables include the origin of the data collected and/or generated in the four pilots.

Table 8 Origin of data. Pilot of Girona

Data indicated in sections 2.2 and 2.3	Origin/provenance
Consumption-generation data collected from the smart meters (Wibeee)	Smart meters.
Consumption historical data can also be collected. They will be downloaded from Datadis database, or in some cases, when available, from historical data collected through the smart meters or in case of generation from the inverter (max 1 year of data collected). The data are available through te API.	Partner's preexisting data, collected during the operation of the community with the explicit consent of the participants.

OBSERVATIONAL. Batteries (Under analysis at this stage (M6))	Under analysis at this stage (M6)
Data collected through surveys to the participants, during the activities in schools (before and after implementation)	New data, generated during the project development through customized surveys in 20-25 schools in the province of Girona (at this stage of the project the final number is not definitive)
Data on the engagement and interaction of participants (HLUC 1 and HLUC 8)	New data, generated during the project development as a result of the accounting of the interaction with the notifications received by members or through customized surveys
Weather data from meteorological models and forecasts.	Simulations. New data, generated within the project.
OTHER: Other data coming from the apps and tools developed during the project.	RESCHOOL tools

Table 9 Origin of data. Pilot of Amsterdam

Data indicated in sections 2.2 and 2.3	Origin/provenance
Submeter data from Earn-e submeters, both production and consumption.	Smart meters
Actions by the participants through the data from Earn-e submeters and devices	NA
Annual Postcode 6 (a geographic area) data from the DSO regarding electricity use which is online available from Liander	Liander
SIMULATION. Weather data from meteorological models and forecasts.	Not know at this stage of the project (M6)
Liander is measuring the energy flow in the Sporenburg transformation station. This data will be used to provide day-ahead energy profiles for the CPO (Equans) for every 15 minutes of the 24 hours.	Liander
Energy data from the neighbourhood monitoring tool	The data and information is generated by Resourcefully and displayed by the AECL: https://aecl.nl/sporenburg/
The data on the Sporenburg transformation station gathered earlier for the thesis from Daniel and the Resourcefully Dashboard making prognosis for 2030	RESF
Building metadata (address, number of floors, number of apartments, geo-spatial data, etc.)	Various
EV charging data	City of Amsterdam
Prosumer data	Prosumers (consent form)

Table 10 Origin of data. Pilot of Stockholm

Data indicated in sections 2.2 and 2.3	Origin/provenance
Building metadata (address, number of floors, number of apartments, geo-spatial data, etc.)	Oden Platform
Current and Historical Energy Performance Certificates	Oden Platform
Current and historic electricity data	Ellevio, Submetering companies like Infometric, Potential data hubs
Current and historic district heating data	Stockholm Exergi, Potential data hubs
Energy price data	Home owner association
User data (name, email, password)	End-user
Data collected through surveys to measure satisfaction rate of participants.	End-user

Data collected from participants through surveys related to school activities.	End-user
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Table 11 Origin of data. PILOT of Athens

Data indicated in sections 2.2 and 2.3	Origin/provenance
Consumption data	Household smart meters
Storage Device data	Device's data logger
Solar power plant production data	Device's data logger (not yet procured)

2.5 What is the expected size of the data that you intend to generate or re-use?

At this stage of the project (M6), the size of the data is not known in the case of the Pilot of Girona and not precisely known for Amsterdam, Stockholm and Athens. The tables below indicate an estimation of the volume of the data for the Dutch, Swedish and Greek pilots, but it can change in the future and will be revisited in M21, where a new version of the Data Management Plan will be published.

Table 12 Size of data. Pilot of Amsterdam.

Data indicated in sections 2.2 and 2.3	Size (if Known)
Submeter data from Earn-e submeters both production and consumption	Unknown at this stage of the project (M6)
Actions by the participants through the data from Earn-e submeters and devices	Not applicable
Annual Postcode 6 (a geographic area) data from the DSO regarding electricity use which is online available from Liander	Unknown at this stage of the project (M6)
Weather data from meteorological models and forecasts.	Unknown at this stage of the project (M6)
Liander is measuring the energy flow in the Sporenburg transformation station. This data will be used to provide day-ahead energy profiles for the CPO (Equans) for every 15 minutes of the 24 hours.	Unknown at this stage of the project (M6)
Energy data from the neighbourhood monitoring tool if we cannot use the DSO grid-data.	Unknown at this stage of the project (M6)
Data on the Sporenburg transformation station	Unknown at this stage of the project (M6)
Building metadata (address, number of floors, number of apartments, geo-spatial data, etc.)	Unknown at this stage of the project (M6)
EV charging data	Unknown at this stage of the project (M6)
Prosumer data	Unknown at this stage of the project (M6)

Table 13 Size of data. Pilot of Stockholm.

Data indicated in sections 2.2 and 2.3	Size (if Known)
Building metadata (address, number of floors, number of apartments, geo-spatial data, etc.)	Less than 20 MB
Current and Historical Energy Performance Certificates	Less than 20 MB
Current and historic electricity data	Less than 10 GB
Current and historic district heating data	Less than 10 GB
Energy price data	Less than 20 MB
User data (name, email, password)	Less than 20 MB



Computational data on relevant efficiency measures	Less than 20 MB
Community messages	Less than 20 MB
Data collected through surveys to measure satisfaction rate of participants.	Unknown at this stage of the project (M6)
Data collected from participants through surveys related to school activities.	Unknown at this stage of the project (M6)

Table 14 Size of data. Pilot of Athens

Data indicated in sections 2.2 and 2.3	Size (if Known)
Consumption data	Approx. 2MB per month
Storage Device data	Approx. 20MB per month for data of 1min resolution
Solar power plant production data	Unknown at this stage of the project (M6)

2.6 To whom might your data be useful ('data utility'), outside your project?

The data from the four pilots could be useful both within and outside the consortium. Within the consortium, the data could be used as the working baseline to produce scientific publications, to verify and validate the results through repeated experiments at different energy communities. Outside the consortium, several stakeholders who could benefit from RESCHOOL data. The collected data may be useful to:

- Citizens and community members that are interested in their own and the community's energy data. They will be able to understand their consumption trends and to see how their behaviour changes can affect them (and their economic and environmental consequences).
- For research academia purposes that performs cohort studies on energy who may require to use it. Researchers that might be interested in studying topics related to these ones and could build their research on the results obtained from this project.
- Government Agencies at the regional or national level who are interested in the energy data
- Energy companies that use the data to monitor energy production, etc.
- Energy communities' promoters (either private, municipal, or independent) interested in developing new communities; these data can support the motivation of these groups, facilitating the potential members to get interested in the project and to better understand its potentialities.
- European entities that coordinate and promote energy communities (for example the EU Energy Community Hub, REScoop), and to other existing and future European Projects on this topic.
- Environmental agencies who are concerned with the impact of energy related issues.
- Technology providers: entities developing digital technologies for energy communities' management, energy management systems, BMS, etc.

3 Fair data

3.1 Making data findable, including provisions for metadata

3.1.1 Will data be identified by a persistent identifier?

Data will be made open through AIRE compatible repositories. Identification of data in such repositories is given by unique and persistent HANDLE. A RESCHOOL project repository was created on ZENODO: <https://zenodo.org/communities/reschool/>

ZENODO helps researchers to receive credit by making the research results citable and through OpenAIRE integrates them into existing reporting lines to funding agencies like the European Commission. Citation information is also passed to DataCite and onto the scholarly aggregators.



RESCHOOL will make research outcomes accessible early and without paywalls. To that end, partners will ensure open access to their research publications. In the process of selecting the journals in which to publish, a careful review of the journals' open access policies will be made, giving absolute preprints of the research works will be also uploaded to ZENODO. This will be done in line with the FAIR principles, to ensure that researchers can find, access and re-use each other's data.

In addition to ZENODO, some partners of the consortium may use their own institutional OPEN AIRE compliant repositories.

In the case of University of Girona, its institutional repository Dugidocs, "<https://dugi-doc.udg.edu/>", assigns a unique and persistent URL to access the document and dataset following the format:

i) <http://hdl.handle.net/10256/16678> (for publications) or

ii) <https://dataverse.csuc.cat/dataset.xhtml?persistentId=doi:10.34810/data19> (for datasets).

University of Stavenger will use its institutional repositories:

i) UiS Open Research Data (for data)

ii) Cristin repository (for publications)

RISE may use ZENODO or SND (Swedish National Dataservices).

In the case of UU, data will be deposited in YoDa repository for long-term preservation (for at least 10 years). The Faculty of Geosciences provides a data archiving infrastructure, i.e., the Data Archive for Geosciences (DAG), where the data can be stored for a long term at no cost after the completion of research projects.

Finally, the partners who do not have own institutional repository will use the cited RESCHOOL space created in ZENODO.

3.1.2 Will rich metadata be provided to allow discovery? What metadata will be created? What disciplinary or general standards will be followed?

The Zenodo deposition metadata domain model which is based on DataCite's metadata schema minimum and recommended terms will be used for open data generated by the project and deposited in an appropriate repository. ZENODO metadata is stored in CERN Data Center. Both data files and metadata are kept in multiple online and independent replicas. ZENODO will take all reasonable measures to protect the privacy of its users and to resist service interruptions, intentional attacks, or other events that may compromise the security of the ZENODO website(see Personal Data Policy table in <https://about.zenodo.org/privacy-policy/>).

In the case of UdG institutional repository (CORA.RDR) the metadata standards proposed to describe the dataset will be the Dublin Core and Datacite Schema, as they are flexible and commonly used standards and are also the ones adopted by the European Open AIRE repository.

YoDa, the Utrecht University Data Management tool, will be used to DataCite v4 metadata, a popular metadata format for sharing data packages. The metadata is stored persistently along with the research data.

3.1.3 Will search keywords be provided in the metadata to optimize the possibility for discovery and then potential re-use?

Data sets and all open project results deposited in ZENODO or equivalent repositories have to be findable easily, rapidly and identically. This can include the definition and use of naming conventions, search keywords, version numbers, metadata standards and standard data identifiers. With respect to potential keywords, the following list is proposed at this stage (M6) of RESCHOOL execution: Energy Communities, Prosumers, electricity, solar PV, Intergenerational training, Social, Schools, Gamification, Flexibility, Aggregator, EMS, energy balancing, forecasting, Energy regulation/market, Sustainability, Energy Transition, Energy business models, EV charging, local renewable energy system, self consumption, Social Return on Investment (SROI).

3.1.4 Will metadata be offered in such a way that it can be harvested and indexed?

Each file associated with data will be accompanied with unique specified metadata in order to allow ease of access and re-usability. Standards such as the Dublin Core and Datacite following the guidelines recommended by OpenAire. Datasets published in CORA.RDR will be harvested and indexed using the Open Archives Initiative Protocol for Metadata Harvesting (OAI-PMH). They will be also indexed in OpenAIRE, RECOLECTA, Google Dataset Search and Mendeley Data.

3.2 Making data openly accessible

3.2.1 Which data produced and/or used in the project will be made openly available as the default?

In general, data produced will be made openly available in an anonymous and aggregated format, always preserving pilot members' privacy and integrity. The tables below include the openly data as the default in the four pilots.

Table 15 Data openly available in the Pilot of Girona

Data indicated in sections 2.2 and 2.3	Description of whether and how data will be shared, including access procedures, embargo periods (if any), and definition of whether access will be wide open or restricted to specific groups
Consumption-generation data collected from the smart meters (Wibeee)	It can be made public, in an anonymous and aggregated format.
Consumption historical data can also be collected. They will be downloaded from Datadis database, or in some cases, when available, from historical data collected through the smart meters (max 1 year of data collected). The data are available through the API.	It can be made public, in an anonymous and aggregated format.
Batteries	It can be made public, in an anonymous and aggregated format.
Data collected through surveys to the participants, during the activities in schools (before and after implementation)	It can be made public, in an anonymous and aggregated format.
Data on the engagement and interaction of participants (HLUC 1 and HLUC 8)	It can be made public, in an anonymous and aggregated format.
Weather data from meteorological models and forecasts.	It can be made public, in an anonymous and aggregated format.
OTHER: Other data coming from the apps and tools developed during the project.	Same as before.

Table 16 Data openly available in the Pilot of Amsterdam

Data indicated in sections 2.2 and 2.3	Description of whether and how data will be shared, including access procedures, embargo periods (if any), and definition of whether access will be wide open or restricted to specific groups
Submeter data from Earn-e submeters both production and consumption	Under analysis at this stage of the project (M6)"
Actions by the participants through the data from Earn-e submeters and devices	Under analysis at this stage of the project (M6)"

Annual Postcode 6 (a geographic area) data from the DSO regarding electricity use which is online available from Liander	Under analysis at this stage of the project (M6)''
Weather data from meteorological models and forecasts.	
Liander is measuring the energy flow in the Sporenburg transformation station. This data will be used to provide day-ahead energy profiles for the CPO (Equans) for every 15 minutes of the 24 hours.	Under analysis at this stage of the project (M6)''
Energy data from the neighbourhood monitoring tool if we cannot use the DSO grid-data.	Under analysis at this stage of the project (M6)''
Data on the Sporenburg transformation station	Under analysis at this stage of the project (M6)''
Building metadata (address, number of floors, number of apartments, geo-spatial data, etc.)	Under analysis at this stage of the project (M6)''
EV charging data	Under analysis at this stage of the project (M6)''
Prosumer data	Under analysis at this stage of the project (M6)''

Table 17 Data openly available in the Pilot of Stockholm

Data indicated in sections 2.2 and 2.3	Description of whether and how data will be shared, including access procedures, embargo periods (if any), and definition of whether access will be wide open or restricted to specific groups
Building metadata (address, number of floors, number of apartments, geo-spatial data, etc.)	To preserve the integrity of the building owners, only aggregated district level KPIs will be publicly available on a web-page, in a format that is not downloadable.
Current and Historical Energy Performance Certificates	Same as above.
Current and historic electricity data	Same as above.
Current and historic district heating data	Same as above.
Energy price data	Same as above.
User data (name, email, password)	Same as above.
Computational data on relevant efficiency measures	Same as above.
Community messages	Same as above.

Table 18 Data openly available in the Pilot of Athens

Data indicated in sections 2.2 and 2.3	Description of whether and how data will be shared, including access procedures, embargo periods (if any), and definition of whether access will be wide open or restricted to specific groups
Consumption data	Providing the data are anonymized they can be made available through the platforms and tools developed and tested during WP3 and WP4. Data will be stored at a database owned by COEN and access will be made available as DB extract or downloadable file.
Storage Device data	Same as above
Solar power plant production data	Same as above

3.2.2 How will the data be made accessible (e.g., by deposition in a repository)?

As it was indicated in sections 3.1.1 and section 3.1.2 in this document, RESCHOOL will make research outcomes accessible via trusted repositories such as ZENODO or equivalent.

3.2.3 What methods or software tools are needed to access the data?

The research data deposited in ZENODO and the cited institutional repositories will be made available in text files ('xlsx', 'csv', 'xml', 'json' or similar), easily accessible with any text editor, spreadsheet software or read commands available in any software environment. With respect to the access to devices (e.g., smartmeters), the data will be accessed via standard protocols and APIs and instructions provided by the device manufacturers and/or platform providers. Finally, for access to existing databases, standard query languages will be used for this purpose.

3.2.4 Is it possible to include the relevant software (e.g. in open source code)?

The partner OR develops its software 100%open source and jointly with UU have proposed to create a RESCHOOL GitHub repository as a working repository.

3.2.5 Where will the data and associated metadata, documentation and code be deposited?

During the project execution, the internal documentation is shared through the EMDESK platform (<https://emdesk.eu>). The datasets will be internally shared in a DATASETS folder and every dataset will be accompanied by the readme.txt indicated in section 3.4.1 and included in Annex A. In the case of source code, at M6 of the project execution, the partner OR and UU proposed to create a RESCHOOL GitHub repository as a working repository.

For on-line simultaneous work, using either open google docs or MS Office tools and/or Teams site in SharePoint, provided by Utrecht University, could be considered as an option.

Regarding the research results, as indicated in sections 3.1.1 and 3.1.2, a RESCHOOL project repository was created on ZENODO: <https://zenodo.org/communities/reschool/>.

The final decision about the repository where the data and publications will be deposited has been agreed to be selected by every partner. As a general rule, the partners who do not have an institutional repository will use ZENODO. Others will use their own repository. For example, UdG will use its institutional repository: <https://dugi-doc.udg.edu/> for the publications and <https://dataverse.csuc.cat/> for the data sets. UiS plans to use UiS Open Research Data and RISE will consider to use ZENODO or SND, since RISE also has a repository for publications: DIVA <https://ri.diva-portal.org/smash/search.jsf?dswid=-5655>). For the case of the Swedish pilot, since there are multiple data-solutions, the data will be distributed in an eco-system. However, the district level KPIs that will be made publicly available, can be made available on Zenodo

3.2.6 Have you explored appropriate arrangements with the identified repository?

ZENODO and the institutional repositories have been identified as trusted because they fulfil all the essential characteristics required – policy, (open) access and PID assignment, metadata requirements", according to the study, which was prepared for the European Research Council Executive Agency, regarding the examination of the repositories that comply with the open science requirements of the Horizon Europe Model Grant Agreement (Jahn et al., 2023).

3.2.7 If there are restrictions on use, how will access be provided?

According to the articles 17 of the Grant Agreement, each beneficiary must ensure open access (free of charge online access for any user) to all peer-reviewed scientific publications relating to its results. Depositing in a research data repository, the data, including associated metadata, is needed to validate the results presented

in scientific publications as soon as possible. Data may be used by third parties under the proposed CCBY license taking into account that these data will be used under data protection law according to the agreements achieved whenever necessary.

3.2.8 Are there well described conditions for access (i.e. a machine readable license)?

Yes, Zenodo provides [well-described conditions for access](#).

In the case of the institutional repository of UdG (DUGiDocs), all metadata are published without any reuse restrictions and under [Creative Commons CCO 1.0 Universal \(CCo 1.0\), Public Domain Offer license conditions](#). However, if any data published in DUGiDocs is re-used, the source should be cited and it should not alter its sense.

The policy of access for UiS Open Research Data is per 13 June 2023 available [here](#).

3.2.9 How will the identity of the person accessing the data be ascertained?

The identity of the person accessing the data will not be directly ascertained. However, we expect users to follow the standard norms of scientific citation and the use of the data in this context will be tracked through scientific citation.

3.3 Making data interoperable

3.3.1 Specify what data and metadata vocabularies, standards or methodologies you will follow to make your data interoperable to allow data exchange and re-use within and across disciplines?

The data produced in RESCHOOL will be interoperable as the datasets will adhere to standardised formats: ASCII, txt, csv, xml, tiff, etc.

As mentioned in section 3.2.6, ZENODO and the institutional repositories have been identified as trusted because, also in terms of interoperability and metadata vocabularies.

In the case of UdG repository final data will be published in CORA.RDR, the repository of Consorci de Serveis Universitaris de Catalunya (CSUC). This repository follows the Open Archives Initiative model, which allows interoperability with the OAI-PMH metadata transmission protocol (Open Archive Initiative - Protocol for Metadata Harvesting). This protocol allows visibility of the documents from different platforms and collectors: Google Scholar, BASE, CORE, etc. This data repository is OpenAIRE compliant and meets all the requirements of metadata required by the European Commission. Persistent IDs are provided for each document (DOI) and author identifiers (ORCID) are included in the metadata. The metadata standard used to describe the dataset is the DDI's metadata schema compatible with the Dublin Core, a flexible and commonly used standard that is also adopted by the European OpenAIRE repository. On the other hand, UiS Open Research Data, which uses descriptive metadata, covers interoperability by supporting and complying with the international FAIR principles.

3.4 Increase data re-use (through clarifying licenses)

3.4.1 How the documentation needed to validate data analysis and facilitate data re-use will be provided?

Metadata information (included in a readme.txt file, see annex A, will accompany the datasets in order to describe, contextualise and facilitate external users to understand and reuse the data.

3.4.2 How the data will be licenced to permit the widest reuse possible, in line with the obligations set out in the Grant Agreement

The same policies for both ZENODO and institutional repositories indicated in section 3.2.8 apply to potential re-utilization of data.

3.4.3 Are the data produced and/or used in the project useable by third parties, after the end of the project? If the re-use of some data is restricted, explain why.

As a rule, in the RESCHOOOL project data may be used by third parties under the proposed CCBY license taking into account that these data will be used under data protection law according to the agreements achieved whenever necessary. As indicated in section 3.2, it can be made public, in an anonymous and aggregated format.

On the other hand, protection of personal data is treated in detail in Deliverable D7.2 Ethics and therefore will not be considered in this section. In any case, there will be no sensitive information shared. Personal data that the project will collect in the form of questionnaires or forms addressed to project partners and end-users during workshops and surveys may contain personal or confidential information and will be anonymised before being shared.

Particularly in the case of the Swedish pilot, to make the district level KPIs available in a fair format, we see no issue at the current time. If there are business sensitive KPIs regarding the energy community, we will need to omit it, but we do not foresee that now. In addition, the disaggregated data relates to the home owner associations energy performance data, and this is a metric that is associated with property values. As such, this data cannot be shared across the project unless there is a specific need and that the home owner association(s) grant permission to circulate their energy data for that specific use.

3.4.4 How the provenance of the data will be documented using the appropriate standards?

Provenance of data will be also documented in the readme.txt mentioned in section 3.4.1 and annex A in this document.

3.4.5 Are data quality assurance processes described?

The data quality is ensured in RESCHOOOL by different measures at pilot level.

In the case of the Pilot of Girona, the quality of the dataset is guaranteed by the platform functioning. The smart meters manufacturer certificates the reliability of data, as well as the platform developers. We will perform additional checks on the data read between smart meters data and historical consumption data (from Datadis) 30 days after (once the Datadis data are updated).

For the Pilot in Stockholm, metering data does come with gaps and may be intermittent. To manage this, the pilot has alarms and flags for this type of data loss. If it is small, it extrapolates between the time stamps with available data, and mark those lines as extrapolated. If it is larger, it will try to manually re-extract data from that meter if possible. If not possible, it will revert to extrapolating. If too many data points are missing for a meter, the pilot responsible would remove that meter from the results.

Only the pilot of Athens has not yet defined these measures, but in any case, partners dealing with data (specially in WP3) will apply data pre-processing procedures for cleaning data (missing values, repair of abnormal values, outliers avoided, etc...), and appropriate storage in files are proposed for this purpose.

4 Other research outputs.

4.1 Will there be other research outputs that may be generated or re-used throughout their project?

At this stage (M6), no other research results are expected to those already planned in the DoA, i.e. data, software codes, machine learning codes, software codes, articles, reports, etc. In any case, the consortium does not discard if one or multiple derivative outputs are generated based on the results or intermediate results of RESCHOOL. This issue will be revisited, if any update, in M21.

5 Allocation of resources.

5.1 What will the costs be for making data or other research outputs FAIR in your project?

In principle, at M6, there are no costs associated to the described mechanisms to make the database FAIR and long term preserved. Zenodo is an external repository with no maintenance costs for the partners using it. For those partners who will use their institutional repository, it is a structural service, and therefore, no extra cost is expected. Only the pilot of Stockholm indicates that in order to make the district level KPIs available in a fair format may have a minor cost (not estimated at this stage), which would be factored in the package pricing.

5.2 How will these be covered?

Not applicable at this stage

5.3 Who will be responsible for data management in your project?

The project coordinator, supported by data providers, has the responsibility for the preparation and update of this Data Management Plan (D7.3) in the project. Moreover, the project coordinator will be the liaison between the data owners and EC, if needed. However, the ultimate of responsibility about the validation, registration and data sharing through open access repositories, and the respect to the procedures and policies stated in this document is responsibility of the partner that owns, generates and/or processes the data.

5.4 How will long term preservation be ensured?

At this stage of the project (M6), regarding the question of long-term data preservation, no specific arrangements have been done in the consortium yet

6 Data security

6.1 What provisions are or will be in place for data security (including data recovery as well as secure storage/archiving and transfer of sensitive data)?

In short to medium term, as it was indicated in section 3.2.5, the collaborative project management platform EMDESK is utilised as a communication and data project exchange tool. The privacy policy of EMDESK and the RESCHOOL website can be found here: <https://www.emdesk.com/privacy-policy> and here <https://www.reschool-project.eu/privacy-policy/>, respectively.

In addition, every partner has its own security provisions:



Regarding the institutional repository at UdG, a full copy is backed up 4 times a year using corresponding exportation and backups systems. In addition, there're several periodical backups on demand, and also before and after main System and applications updates. Data collected from the eXiT research group will be digitised and stored on the University's which is subject to regular back-up that is controlled by the University's IT personnel. The IT department performs operations by type: mission-critical (user data, virtual machines, scientific results, etc.) and static (scientific data sets, intermediate files, etc.). Content will be checked regularly to preserve its integrity, security, and durability. These procedures are designed, set and applied in order to fully comply with personal data as ruled by Directive 95/46/EC (General Data Protection Regulation) and other current national legislation and institutional regulations. Research team members will have an appropriate access level according to their role in the project. At this stage, the pilot of Girona is considering adapting to UdG's strategy.

The UiS data repository is part of a Norwegian repository that is managed by UiT Arctic University of Norway, and according to as of 25 May 2023 "Datasets deposited [...] utilize the centralized back-end storage and management services at UiT".

UU YODA repository implements default security measures of the institution networked research storage.

Data collected from the project research is stored on EREF's IT system, with high data security standards and in compliance with Regulation (EU) 2016/679 (General Data Protection Regulation) and other relevant Belgian legislation and institutional regulations. Only team members assigned to the project will have access to data.

For the Swedish pilot, their servers within Europe and all the communications are encrypted. For the cloud solutions, they will ensure that they are redundant. In addition, having access controls such as strong passwords and authentication methods will help in the prevention of unexpected access.

In the case of CERTH, the data will be stored in their premises. As the data security (confidentiality, integrity and availability) level, according to Article 5 par.1 (f) GDPR, is based on the defined risks for the data subjects (in case of unauthorised access or disclosure, accidental deletion or destruction of the data), the security measures for the research datasets will be proportionate to the foreseen risks. State-of-the-art IT security measures and CERTH's policies mitigate most of the risk of illegitimate access, contributing to the ability to detect promptly an incident and thus restore the data (data availability).

The security measures, which are adopted by CERTH, include: i) The servers are securely located and monitored in the main building of the Information Technologies Institute of CERTH. ii) The local network is firewall protected from all external traffic and access to CERTH's servers is granted through password-protected SSH with only selected trusted employees maintaining privileged accounts.

RISE has indicated that when gathering data from other partners and storing it on RISE servers they will only use systems/servers that are appropriate for the respective data classifications (specific data information classification needs to be carried out first in order to classify accordingly); having appropriate backup in central storage (i.e. not storing information and data on personal devices). Moreover, when using the Hopsworks platform (hosted as a service on RISE datacentres in Northern Sweden), the Hopsworks platform ensures secure multi-tenancy and project-based restricted access (enabling sensitive datasets to be hosted on a shared cluster) with full encryption (at-rest, in-motion).

Finally, for the Pilot in Athens, even though they do not have a formal strategy yet, currently data is stored in a database located in a server at COEN's premises. Backups are taking place regularly.

6.2 Will the data be safely stored in trusted repositories for long term preservation and curation?

After the project has been concluded, ZENODO repository will assume the role of the central RESCHOOL repository where everyone with the access rights can access the data. For published data, open access will be provided in line with FAIR principles. The longevity of the RESCHOOL data deposited in ZENODO will adapt to ZENODO policies (<https://about.zenodo.org/policies/>)



Partners who have expressed the use of Institutional repositories (UdG, UiS, UU and RISE) will keep them according to its internal policies and measures in terms of long-term preservation. In the case of UdG the following list describes their security settings:

- Versions: Data files are versioned. Records are not versioned. The uploaded data is archived as a Submission Information Package. Derivatives of data files are generated, but original content is never modified. Records can be retracted from public view; however, the data files and records are preserved.
- Replicas: All data files are stored in the CSUC Centre, primarily in Barcelona, with replicas in Consorcio Madroño in Madrid. Data files are kept in multiple replicas in a distributed file system, which is backed up to tape on a nightly basis.
- Retention period: Items will be retained for the lifetime of the repository. The RDR has defined a lifetime for the repository of the next 10 years minimum.
- Functional preservation: The RDR makes no promises of usability and understandability of deposited objects over time.
- File preservation: Data files and metadata are backed up nightly and replicated into multiple copies in the online system.
- Fixity and authenticity: All data files are stored along with an MD5 checksum of the file content and the tabular file is stored with Universal Numerical Fingerprint (UNF).
- Files are regularly checked against their checksums to assure that file content remains constant.
- Succession plans: In case of closure of the repository, a guarantee has been made from RDR to migrate all content to suitable alternative institutional and/or subject-based repositories.

7 Ethics

7.1 Are there, or could there be, any ethics or legal issues that can have an impact on data sharing?

All the activities carried out under RESCHOOL comply with ethical principles and relevant national, EU and international legislation. All the personal data collected in the project will be subject to the PODP regulation in the European Union, as well as each of the project partners' countries. No sensitive information nor personal data will be shared (see section 3.4.3). The ethical aspects are related to the use of personal data and are already addressed in the project in the deliverable D7.5.

7.2 Will informed consent for data sharing and long term preservation be included in questionnaires dealing with personal data?

As stated in D7.5 Reschool Ethical Guidelines, the project is based on informed consent and voluntary participation, ensuring that individuals providing data for research purposes fully understand the nature and objectives of the project, and that their participation is entirely voluntary, with the option to withdraw at any time. Consent forms will be included in all questionnaires and workshops collecting personal data in the four pilots.

8 Other issues

8.1 Do you, or will you, make use of other national/funder/sectorial/departmental procedures for data management?

At this stage, no other procedures for data management are considered by the consortium.

9 Further support in developing your DMP

As in other projects coordinated by the UdG (i.e. RESOLVD) This DMP has been created with the support tool "Pla de Gestió de Dades de Recerca", <http://dmp.csuc.cat>. Research Data Management Plan is a development of Digital Curation Center (DCC), adapted by the Consortium of Libraries Universities of Catalonia (CSUC). It is based on the open source DMPRoadmap codebase. These institutions work closely with research funders and universities to produce a tool that generates active DMPs and caters for the whole lifecycle of a project, from bid-preparation stage through to completion.

10 Conclusions

This deliverable has provided details about the data management plan envisioned within the RESCHOOL project. It is structured according to the data that will be collected and/or generated in the four pilots: i) Local energy communities led by municipality (Girona in Spain), ii) Amsterdam Eastern Docklands energy-flex community (Amsterdam in The Netherlands), iii) Hammarby Sjöstad 2.0, Microgrid project (Stockholm in Sweden) and iv) Collective Energy Cooperative (Athens in Greece).

The Data Management Plan is a live document. This first version is submitted in M6 (2023 June) and an updated version will be published in M21, with those significant changes or information updates arisen during project execution.

11 Acronyms and abbreviations

Table 19 Deliverable Acronyms

API	Application Programming Interface
BMS	Building Management System
CSUC	Consortium of Libraries Universities of Catalonia
DCC	Digital Curation Center
DMP	Data Management Plan
DoA	Document of Action
DSO	Distribution System Operator
EC	European Commission
EV	Electric Vehicle
FAIR	Findable, Accessible, Interoperable and Reusable
GB	GigaByte
HLUC	High Level Use Case
KPI	Key Performance Indicators
IPR	Intellectual Property Rights
MB	Mega Byte
NA	Not Applicable
OA	Open Access
PV	Photovoltaic Panel
SROI	Social Return on Investment



Annexes

a) README.TXT

[The instructions in this document are in square brackets and include the level of obligation of each section at the beginning of everything.]

[Fill in as many sections of this document as possible to make it easier to reuse your dataset.]

[This template was created by the University of Girona Library based on the template developed by Research Data Services at Oregon State University.]

[This template is published under a CC0 license. You can reuse, redistribute, and modify it as you wish.]

This file was generated on 2020-11-06 by Marc Cañigueral

GENERAL INFORMATION

1. Title of Dataset:
2. Author Information (repeatable):

Name:
Institution:
Email:
ORCID:

DESCRIPTION

1. Abstract for the dataset
The dataset consists on X files:
 - TBC
 - TBC
2. Date of data collection:
XXXX-XX-XX
3. Geographic location of data collection:
4. Funding sources that supported the collection of the data (repeatable):
European Commission, Horizon Europe

Funding: 5,593,570€
Project code: GA 101096490

ACCESS INFORMATION

1. License Creative Commons /restrictions placed on the data:



[Mandatory | The recommended license is CC-0. See the recommended CC licenses in (pending license group. At the moment you can consult <http://www2.udg.edu/projectesbiblioteca/BibliotecaiRecerca/PropietatIntellectual/CreativeCommons/tabid/21008/language/ca-ES/Default.aspx>)]
CCBY

2. Dataset Digital Object Identifier (Handle/DOI):
[Mandatory | included by the Library]

3. Publications related to the dataset

DOI/URL:

4. Links to other publicly accessible locations of the data (repeatable):
[Recommended if Applicable |Ex. other data sets of the same project: websites, Zenodo, Figshare, etc.)]

DOI/URL:

5. Limitations to reuse:
[Mandatory if Applicable | in case of not being open data]

VERSIONING AND PROVENANCE

1. Last modification date:
XXXX-XX-XX

2. Links/relationships to other versions of this dataset:
Yes/No

METHODOLOGICAL INFORMATION

1. Description of methods used for collection/generation of data:
TBC

2. Methods for processing the data:
TBC

3. Software specific information needed to interpret the data:
TBC

FILE OVERVIEW

1. List of all files included in the DataSet
Filename:
Short description: TBC

Filename:
Short description: TBC

2. Relationship between files:
TBC

3. File formats:

OTHER INFORMATION YOU CONSIDER RELEVANT:

TBC