DELIVERABLE 6.2
DATA MANAGEMENT PLAN (DMP)
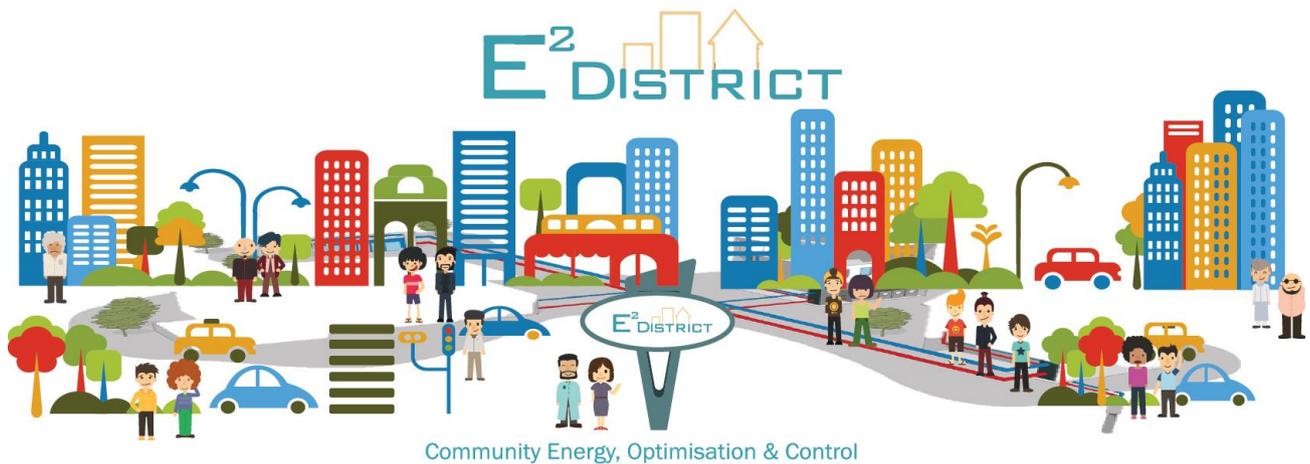
Community Energy, Optimisation & Control

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Abstract

This document is the E2District project Data Management Plan (DMP) outlining the data management life cycle for the data that is being collected, processed and/or generated by the E2District project.

Keyword list

data, H2020, open access, metadata, data management, energy, district heating and cooling, demand response.

Document History

Date	Revision	Comment	Author/Editor	Affiliation
9/12/2016	1	Draft structure	E. Twomey	CIT
16/12/2016	2	Addition to section 3.7	C. Beder	CIT
17/12/2016	3	Addition to section 3.6	J. Blanke	CIT
19/12/2016	4	Review of document. Modifications in all sections	E. Twomey, C. Beder, M. Klepal	CIT
21/12/2016	5	Addition to section 3.10	J. C. Esteban	Acciona
21/12/2016	6	Addition to sections 3.8 and 3.9	K. Kouramas	UTRC-I
29/12/2016	7	Review of document. Modifications in section 1.5 - Dataset Description table	E. Twomey	CIT
3/2/2017	8	Addition to sections 3.3, 3.4 and 3.5	V. Partenay	CSTB
7/3/2017	9	Addition to sections 3.1 and 3.2	V. Le Rhun	Veolia
8/3/2017	10	Review of document. Modifications in section 1.5	E. Twomey, M. Klepal, C. Beder	CIT

EXECUTIVE SUMMARY

The European Commission (EC) is enabling access to, and reuse of, research data generated by Horizon 2020 projects through the Open Research Data Pilot (ORD Pilot) as part of its ambition to make research data and publications openly available with a view to accelerating scientific progress, aiding the validation of project outcomes, and making scientific research more transparent in general.

As the E2District project is participating in the ORD Pilot, project partners are required to deliver a Data Management Plan (DMP). The DMP is not a fixed document and will, therefore, evolve throughout the E2District project according to the progress of project activities. Subsequently, a mid-term DMP will be required and a final DMP when the project reaches completion.

Therefore, this deliverable provides the first version of the E2District Data Management Plan for the datasets captured or processed inside the project, according to the guidelines published by the EC. The purpose of the DMP is to identify how data collected or generated by the E2District project will be organised, stored and shared and to specify what type of data will be made publicly available by the project (open access) and how. Suitable public repositories to store the data will also be identified and, where necessary, tools that help others to use the data will be provided.

This report has been prepared by taking into consideration the template of the "Guidelines on Data Management in Horizon 2020",[1] guidance via DMP Online[2] and OpenAIRE/EUDAT webinar and presentations[3].
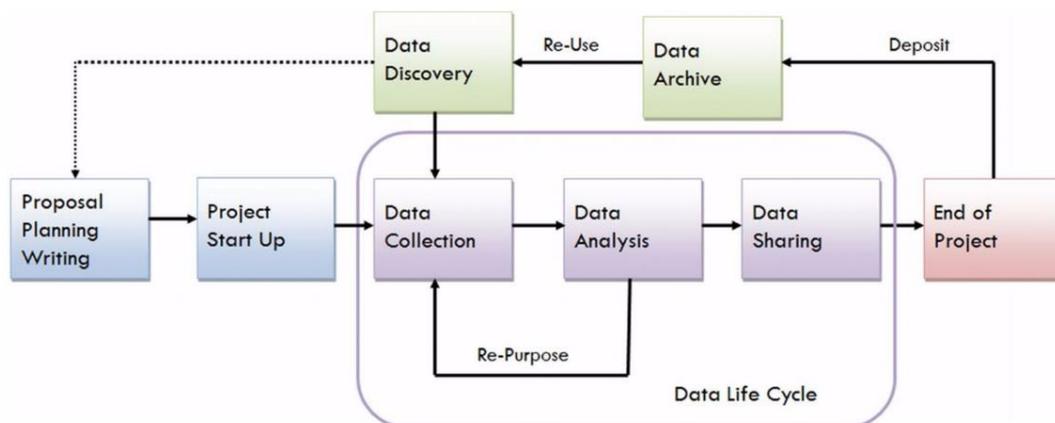

Figure 1: Steps in the data life cycle. Source: From University of Virginia Library, Research Data Services

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[1] http://ec.europa.eu/research/participants/data/ref/h2020/grants_manual/hi/oa_pilot/h2020-hi-oa-data- mgt_en.pdf; https://ec.europa.eu/research/participants/data/ref/h2020/grants_manual/hi/oa_pilot/h2020-hi-oa-pilot-guide_en.pdf
[2] https://dmponline.dcc.ac.uk/
[3] https://eudat.eu/events/webinar/joint-eudat-openaire-webinar-%E2%80%9Chow-to-write-a-data-management-plan%E2%80%9D

ACRONYMS AND ABBREVIATIONS

ACC	Acciona
API	Application Programming Interface
BMS	Building Management System
CIT	Cork Institute of Technology
CSTB	Centre Scientifique Et Technique Du Batiment
DHC	District Heating and Cooling
DHN	District Heating Network
DMP	Data Management Plan
DOI	Digital Object Identifier
DS	Dataset
DSP	District Simulation Platform
E2D	E2District
EC	European Commission
EVO	Efficiency Validation Organisation
FDD	Fault Detection & Diagnostics
IPMVP	International Performance Measurement and Verification Protocol
KPI	Key Performance Indicator
LoRa	Long Range
ORD Pilot	Open Research Data pilot
SVN	Subversion repository
UTRC	United Technologies Research Centre
VERI	Veolia Environnement Research and Innovation
WP	Work Package

CONTENTS

1 INTRODUCTION

1.1 AIMS AND OBJECTIVES OF THE DATA MANAGEMENT PLAN

The purpose of this deliverable is to describe the data management life cycle for all datasets that are being collected, processed and generated by the E2District research project and the specific conditions that are attached to them. The report outlines, as far as it is possible to do so at this stage, how research data will be handled during and after the project, what precise data will be collected, processed or generated, what methodology and standards will be applied, whether data will be shared/made open access and how it will be shared, and how the data will be curated & preserved.

1.2 INTENDED AUDIENCE

The E2District consortium partners are the primary audience for the DMP. The report aims to establish clear practices in relation to data management between the consortium's five partner organisations.

The second audience for this report comprises the E2District project dissemination target groups as identified by the E2District Dissemination and Communication Plan (D6.1). This group includes DHC managers, DHC operators, subscribers, end-users, DHC owners, local authorities, designers, technical providers, investors and the community of researchers involved in related projects/initiatives.

As a participant of the Horizon 2020 Open Data pilot, the project is committed to Open Access Publishing and is prioritising publication venues and promoting Open Access to its publications where possible. Where feasible, the project will openly make available through open access repositories, baseline data from the demo sites, statistics and measurements from experiments, business models and key stakeholder surveys and questionnaires. In conjunction with an espousal of FAIR DATA practice, the DMP's establishment of consistent data practices will increase the efficiency of data handling throughout the lifespan of the project. Thus, the data will reach more people, have a greater impact, avoid duplication of efforts and preserve data for future researchers.

1.3 UPDATING THE DATA MANAGEMENT PLAN

This is the initial DMP which will be updated throughout the project cycle whenever significant changes arise in the project such as (i) new datasets, (ii) changes in consortium policies and/or (iii) external factors.

A mid-term DMP will be released in M18 which will address a number of questions suggested in the Horizon 2020 guidelines[4] (EC DG R&I, 2015):

> 1. Discoverable
>
> Are the data and associated software produced and/or used in the project discoverable (and readily located), identifiable by means of a standard identification mechanism (e.g. Digital Object Identifier)?
>
> 2. Accessible

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[4] https://indico.cern.ch/event/444264/contributions/1950399/attachments/1197993/1741971/h2020-hi-oa-data-mgt_en_1.pdf

Are the data and associated software produced and/or used in the project accessible and in what modalities, scope, licenses (e.g. licensing framework for research and education, embargo periods, commercial exploitation, etc.)?

3. Assessable and Intelligible:

Are the data and associated software produced and/or used in the project assessable for and intelligible to third parties in contexts such as scientific scrutiny and peer review (e.g. are the minimal datasets handled together with scientific papers for the purpose of peer review, are data provided in a way that judgments can be made about their reliability and the competence of those who created them?).

4. Usable beyond the original purpose for which it was collected

Are the data and associated software produced and/or used in the project useable by third parties even long time after the collection of the data (e.g. is the data safely stored in certified repositories for long term preservation and curation; is it stored together with the minimum software, metadata and documentation to make it useful; is the data useful for the wider public needs and usable for the likely purposes of non-specialists)?

5. Interoperable to specific quality standards:

Are the data and associated software produced and/or used in the project interoperable allowing data exchange between researchers, institutions, organisations, countries, etc. (e.g. adhering to standards for data annotation, data exchange, compliant with available software applications, and allowing recombinations with different datasets from different origins)?

The mid-term DMP will be followed by a final report at the end of the project.

1.4 PURPOSE OF DATA COLLECTION/GENERATION & RELATION TO PROJECT OBJECTIVES

The main objective of the E2District project is to develop, deploy, validate, and demonstrate a novel cloud enabled District Management and Decision Support framework for DHC systems, which will deliver compound energy cost savings of 30%. A diverse range of data will be collected and generated by the E2District project for the purpose of achieving all of the project's objectives.

All of E2District's work packages except WP1 and WP7 are dependent, to varying degrees, on data collection and generation:

- WP1 will specify, gather and document requirements and use-cases for the E2District framework that capture realistic expectations and required features from the stakeholder point of view. These requirements will be used in WP2, WP3, WP4 and WP6 to develop the individual E2District technologies, platform architecture and business models. There is no dataset currently defined for WP1 as any related data will be defined and collated in WP2, WP3, WP4 and WP6.

- WP2 will address SMART Objective 1[5] by developing and validating a District Simulation Platform that consists of physical and numerical simulation models of production and demand assets, which will be used as an Asset Portfolio Decision Support tool. WP2 will require the collection and generation of a variety of data including semantic information files that will be used to ensure interoperability between simulation platforms (District Simulation Platform, Supervisory Controllers and Production Scheduling Optimiser), District Simulation Platform parametric study results and District Information Files for demonstration sites comprising data relating to building geometry, thermal properties, HVAC systems, energy sources, heating/cooling schedules, lightings, district heating production, storage, occupancy profiles and weather data. Data relating to the Veolia demonstration sites including any DHN historical monitoring data, any data concerning the DHN design and equipment, any DHN operation rules and practices and any data generated through the tools developed in the project (eg. optimisation tools) will not be available for use in publications.

- WP3 will focus on the development and validation of all the key control, optimisation, diagnostics and prosumer engagement algorithms and modules for reducing the energy consumption of a DHC system based on the historical data and real measurements, real prices and flexible assets, and for influencing the demand to be more efficient at the user level. Hence, it directly addresses SMART Objectives 2 & 3. As such, WP3 requires the collection and generation of a variety of data including DSP data, BMS data, weather data, matlab data and behavioural model calibration survey data. As with data collected and generated in relation to Veolia demonstration sites for WP2, all data collected and generated for WP3 relating to Veolia sites will not be used in publications.

- WP4 will address SMART Objective 4[6] by developing and validating a scalable District Operation System that will integrate all key control, optimisation, diagnostics and prosumer engagement modules into a cloud-enabled DHC management platform. A variety of sensor data relating to the CIT testbed site will be collected and generated during the execution of this work package.

- WP5 will focus on the integration and deployment of the developed district simulation platform and operation system (and respective modules) to the E2District demonstration site. It validates and analyses the energy savings achieved from the demonstration, and the experience and lessons learned to WP6 to develop business models and replication studies. Thus, it addresses the deployment requirements of SMART Objectives 2[7], 3[8] and 4. Fulfilment of WP5 requires the collection and generation of a variety of data including baseline data, KPI's, electricity consumption data, gas consumption data, heat data, building/areas set point data, monitoring data.

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[5] Objective1: 'Development of District Simulation Platform, which will be used as an Asset Portfolio Decision Support tool to optimise DHC asset configuration and utilisation targeting >5% energy reduction'.

[6] Objective 4: 'Development of a flexible District Operation System for the efficient, replicable and scalable deployment of DHC monitoring, intelligent control, FDD and prosumer engagement & analytics tool.'

[7] Objective 2: 'Development of intelligent adaptive DHC control and optimisation methods targeting an energy cost reduction between 10 and 20%, including flexible production, storage and demand (prosumer) assets, and system-level fault detection and diagnostics algorithms for physical and operational fault root cause identification and analysis supporting cost-effective DHC maintenance.

[8] Objective 3: 'Development of a behaviour analytics tool for learning and continuously refining the demand behaviour models, and development of prosumer engagement tools and user interfaces that keep the human end user in the loop, targeting overall energy savings of 5%.'

- WP6 will, first, address SMART Objective 5[9] by developing new business models and services for the operators, designers and integrators of DHC systems and will provide studies and guidelines for the replication of the E2District technology. Secondly, it will develop dissemination, exploitation and awareness-raising, based on a global dissemination approach (dissemination targets, channels and instruments), to openly discuss, validate, and disseminate the results to the wider stakeholder and scientific community. WP6 requires the collection and generation of a variety of data including DHN historical monitoring data, data concerning the DHN design and equipment and data generated through the tools developed in the project (eg. economic evaluation tools). Data collected and generated in WP6 that is relative to Veolia sites will not be used in publications.

1.5 DATASET DESCRIPTION

The following datasets have been identified by the E2District project partners. This list may be adapted in future versions of the DMP as the project develops.

#	Dataset (DS) name	Responsible Partner	Related WP
1	VeoliaSites_Data	VERI	WP2-T2.3/WP3-T3.2/WP3-T3.5
2	VeoliaSites-BusinessModels_Data	VERI	WP6-T6.3
3	Data Templates for Simulation Interoperability	CSTB	WP2-T2.1
4	District Simulation Platform Parametric Study Results	CSTB	WP2-T2.2 & WP3
5	District Information Files for Demonstration Sites	CSTB & ACC	WP2-T2.3
6	Behavioural Model Calibration Survey Data	CIT	WP3-T3.4
7	Supervisory Control and Production Scheduling Optimisation Simulation-based Evaluation Data	UTRC	WP3-T3.5
8	Simulation Data and Use-cases of the Existing District System (baseline simulation)	UTRC	WP3-T3.5
9	CIT Sensor Data	CIT	WP4
10	Acciona Baseline and Performance Evaluation	ACC	WP5

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[9] Objective 5: 'Development of novel business models for district heating and cooling operators, integrators and designers, including lessons learned and guidelines for achieving energy efficient districts.'

1.6 ETHICS

The E2District partners will comply with the ethical principles as set out in Article 34 of the Grant Agreement, which asserts that all project activities must be carried out in compliance with:

    (a) Ethical principles (including the highest standards of research integrity - as set out, for instance, in the European Code of Conduct for Research Integrity[10] - and including, in particular, avoiding fabrication, falsification, plagiarism or other research misconduct)

    (b) Applicable international, EU and national law.

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[10] http://www.esf.org/fileadmin/user_upload/esf/2-Code_of_conduct_ESF-EN.pdf

2 DATA SHARING

2.1 BACKGROUND DATA

With regard to Background data, the E2District Consortium Agreement states as follows:

'According to the Grant Agreement (Article 24) Background is defined as "data, know-how or information (…) that is needed to implement the action or exploit the results". Because of this need, Access Rights have to be granted in principle, but parties must identify and agree amongst them on the Background for the project.

2.1.1 PARTY 1: (CSTB)

As to CSTB, it is agreed between the parties that, to the best of their knowledge, the following background is hereby identified and agreed upon for the Project. Specific limitations and/or conditions, shall be as mentioned hereunder:

Describe Background	Specific limitations and/or conditions for implementation (Article 25.2 Grant Agreement)	Specific limitations and/or conditions for exploitation (Article 25.3 Grant Agreement)
District Simulation Platform (DIMOSIM, v2.03) This platform includes several modules: • A graphical district editor (to create or edit district configuration files) • A citygml import function for importing existing data on districts • A simulation kernel • Import and export functions from and to excel (load profiles, results …) • A global performance analysis (energy, environment and costs) • A classification module for comparing and classifying different energy concepts and parameters on an existing or new district • A data exchange module for coupling any district controller or optimiser Functions of DIMOSIM, v2.03: • Import of all building parameters and generation of building models: ▪ Building parameters: floor, window and wall area, orientation, etc. ▪ Building system parameters: consumer, prosumer, local storage or production, etc. • Import of all district parameters and generation of district model: ▪ Hydronic network parameters: connections and distances ▪ Electric network parameters:	CSTB grants a free license of use to all E2DISTRICT partners for the use of a partial or full compiled version (executable) of the DIMOSIM simulation platform, as well as an access right to the user guide.	

connections and distances
- Import of Energy HUB parameters and generation of HUB model:
  - Central thermal and electrical production (configuration and sizing)
  - Central thermal and electrical storage (configuration and sizing)
- Generation of building electrical load profiles (therefore, a tool available at CSTB, based on statistical data, is used):
  - Each building is divided in sublevels (e.g. apartments), for which a load profile is generated
  - From the sublevels, a general load profile for each building is generated from the sum of all sublevels. These load profiles are then connected to the electrical grid model.
- Sizing of the thermal system and network
  - Based on the nominal heat demand of each building, the tool sizes all network connections automatically, based on expert rules, using a database of district heating pipes and insulation
  - The Energy HUB is also sized automatically based on the heat load of the heating district network.
- Sizing of the electric grid
  - All grid connections are sized automatically, based on expert rules

2.1.2 PARTY 2: (ACCIONA)

As to **ACCIONA**, it is agreed between the parties that, to the best of their knowledge, the following Background is hereby identified and agreed upon for the Project. Specific limitations and/or conditions shall be as mentioned hereunder:

Describe Background	Specific limitations and/or condition for implementation (Article 25.2 Grant Agreement)	Specific limitations and/or conditions for exploitation (Article 25.3 Grant Agreement)

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Background that is covered under specific research agreements and confidentiality agreements and therefore subject to third party rights.	Right for using the Background within the Project	This Background shall not be used until an exploitation agreement is signed, which will reflect the conditions on which royalties are provided
All knowledge, technical information and experience related to other construction and research project in which ACCIONA is or has been involved	Right for using the Background within the Project	This Background shall not be used until an exploitation agreement is signed, which will reflect the conditions on which royalties are provided
Know-how and experience on energy efficient buildings design and passive strategies integration.	Right for using the Background within the Project	This Background shall not be used until an exploitation agreement is signed, which will reflect the conditions on which royalties are provided
Knowledge about implementation of Renewable Energy systems in buildings, integration of systems to generate electricity and new energy distribution systems by electrical and thermal micro-grids	Right for using the Background within the Project	This Background shall not be used until an exploitation agreement is signed, which will reflect the conditions on which royalties are provided
Background in patents and current applications	Right for using the Background within the Project	This Background shall not be used until an exploitation agreement is signed, which will reflect the conditions on which royalties are provided
Know-how relating to production (renewable), demand, control and storage systems at building level	Right for using the Background within the Project	This Background shall not be used until an exploitation agreement is signed, which will reflect the conditions on which royalties are provided
Background of software tools developed for the energy management of buildings	Right for using the Background within the Project	This Background shall not be used until an exploitation agreement is signed, which will reflect the conditions on which royalties are provided

Know-how on façade structures design backed up by previous real projects and those co-financed by EC where Acciona take active part or coordinate, on composite and aluminum façade multifunctional systems and including also knowledge in connexion between different parts.	Right for using the Background within the Project	This Background shall not be used until an exploitation agreement is signed, which will reflect the conditions on which royalties are provided

2.1.3 PARTY 3 (VEOLIA)

As to VEOLIA, it is agreed between the parties that, to the best of their knowledge, the following Background is hereby identified and agreed upon for the Project. Specific limitations and/or conditions shall be as mentioned hereunder:

Describe Background	Specific limitations and/or conditions for implementation (Article 25.2 Grant Agreement)	Specific limitations and/or conditions for exploitation (Article 25.3 Grant Agreement)
Technical characteristics of VEOLIA sites and its components/assets	Restricted to project implementation needs and to its duration	Not usable for exploitation
VEOLIA heating and cooling sites working/historical data	Restricted to project implementation needs and to its duration	Not usable for exploitation
VEOLIA heating and cooling sites operational KPIs and their calculation methods	Restricted to project implementation needs and duration	Not usable for exploitation
VEOLIA models corresponding to components of heating and cooling networks	Restricted to project implementation needs and duration	Not usable for exploitation
Veolia current and classical business models general characteristics and principles	Restricted to project implementation needs and duration	Not usable for exploitation

2.1.4 PARTY 4 (CIT)

As to CIT, it is agreed between the parties that, to the best of their knowledge, the following Background is hereby identified and agreed upon for the Project. Specific limitations and/or conditions shall be as mentioned hereunder:

Describe Background	Specific limitations and/or conditions for implementation (Article 25.2 Grant Agreement)	Specific limitations and/or conditions for exploitation (Article 25.3 Grant Agreement)
NICORE: Application Enablement Platform based on Generic Event Driven System Architecture combined with dynamic Service composition and invocation principles.	Restricted to project implementation needs and to its duration. Excluded: NICORE: all elements of source code.	Not usable for exploitation.

2.2 OPEN ACCESS

According to article 29.2 of the Grant Agreement:[11]

E2District, as a Horizon 2020 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, the E2District project must:
- 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 research data needed to validate the results presented in the deposited scientific publications must be deposited at the same time.
- Ensure open access to the deposited publication - via the repository - at the latest: on publication, if an electronic version is available for free via the publisher, or within six months of publication (twelve months for publications in the social sciences and humanities) in any other case.
- Ensure open access - via the repository - to the bibliographic metadata that identify the deposited publication.

As outlined in article 29.2 of the Grant Agreement, all E2District bibliographic metadata will be in a standard format and will 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.

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[11] Grant Agreement No: 696009 - E2District - H2020-EE-2014-2015/H2020-EE-2015-2-RIA. Associated with document ref. Ares(2016)231558 - 15/01/2016

In accordance with the above guidelines, E2District, as a participant of the Horizon 2020 Open Data pilot, is committed to Open Access Publishing and is prioritising publication venues and promoting Open Access to its publications where possible. Where feasible, the project will openly make available through open access repositories, baseline data from the demo sites, statistics and measurements from experiments, business models and key stakeholder surveys and questionnaires.

2.3 OPEN DATA

The Data Management Plan establishes the approach of the project in relation to open research data as much as it is possible to currently define and further detail will be provided in the mid-term and final plans.

As stated in article 2.2.2 of the Grant Agreement:

E2District is voluntarily participating in the Horizon 2020 Open Data pilot[12]. Therefore, the project will openly make available, baseline data from demo sites, statistics and measurements from experiments, business models and key stakeholder surveys and questionnaires, except when the release of datasets collected from the project is considered to:

- Impact results that are expected to be commercially or industrially exploited
- Be incompatible with the need for confidentiality in connection with security issues.
- Be incompatible with existing rules on the protection of personal data.
- Would jeopardise the achievement of the main aim of the action.
- Be incompatible with existing rules on the protection of personal data.
- Would jeopardise the achievement of the main aim of the action.
- Create other legitimate reason to not take part in the Pilot.

In conjunction with an espousal of FAIR DATA practice[13], this Data Management Plan's establishment of consistent data practices will increase the efficiency of data handling throughout the lifespan of the project and ensure that the data will reach more people, have a greater impact, avoid duplication of efforts and be preserved for future researchers.

2.4 ACCESSIBILITY

Specifically, the data generated and collected by E2District will be accessible to the consortium through the CIT NICORE platform, using the available APIs and web-services. In addition, the data will be available through the consortium's SVN repository. The consortium will also follow the dissemination validation process (see D6.1 Dissemination and Communication Plan, Section 6.3) to validate and approve for the

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[12] http://www.fosteropenscience.eu/sites/default/files/pdf/153.pdf
[13] http://ec.europa.eu/research/participants/data/ref/h2020/grants_manual/hi/oa_pilot/h2020-hi-oa-data-mgt_en.pdf

public dissemination of the data. The data will then be shared publicly on the E2District website.

3 DATA MANAGEMENT PLAN

3.1 DATASET 1: (VEOLIA) VEOLIASITES_DATA

VEOLIA	
Work Package/Task Nos. re: dataset **Data Manager**	WP2-T2.3 (validation of the model) / WP3-T3.2 / WP3-T3.5 VERI
Dataset reference and name	VeoliaSites_Data
Data set description	Any DHN historical monitoring data, any data concerning the DHN design and equipment, any DHN operation rules and practices, any data generated through the tools developed in the project (eg. optimisation tools) relative to the VEOLIA sites. This data will not be used in publications.
Availability	Project partners needing an access to these data during the project
E2District Project Metadata	
Metadata specific to dataset	Historical DHN sites and DHN sites design data located on VEOLIA IT platform; Generated data located on VEOLIA IT platform
Standards	Not defined
Data Sharing	Data will be accessible to project partners needing an access to these data during the project through VERI IT platform
Archiving and Preservation (including storage and back-up)	Not communicated

3.2 DATASET 2: (VEOLIA) VEOLIASITES-BUSINESSMODELS_DATA

Description	
Work Package/Task Nos. re: dataset **Data Manager**	WP6-T6.3 VERI
Dataset reference and name	VeoliaSites-BusinessModels_Data
Data set description	Any DHN historical monitoring data, any data concerning the DHN design and equipment, any data generated through the tools developed in the project (eg. economic evaluation tools) relative to the VEOLIA sites. This data will not be used in publications.
Availability	Project partners needing an access to these data during the project
E2District Project Metadata	
Metadata specific to dataset	DHN sites design data located on VEOLIA IT platform, generated data located on VEOLIA IT platform
Standards	Not defined
Data Sharing	Data will be accessible to project partners needing an access to these data during the project through VERI IT platform
Archiving and Preservation (including storage and back-up)	Not communicated

3.3 DATASET 3: (CSTB) DATA TEMPLATES FOR SIMULATION INTEROPERABILITY

	Description
Work Package/Task Nos. re: dataset **Data Manager**	WP 2 - Task 2.1 Data Manager: Vincent Partenay (CSTB)
Dataset reference and name	Data Templates for simulation interoperability
Data set description	Templates of semantic information files that will be used to ensure interoperability between simulation platforms (District Simulation Platform, Supervisory Controllers and Production Scheduling Optimizer) Two types: 1) District Information File, which is based on a semantic tree structure allowing to gather only district topology, building and system properties to allow energy simulation 2) Co-simulation Data File, which is also based on a semantic tree structure but only to exchange data dynamically between coupled platforms of the project.
Availability	Consortium
E2District Project Metadata	European Union; H2020; Energy Efficiency Optimised District Heating and Cooling'; E2District; GA696009
Metadata specific to dataset	Data template / interoperability / co-simulation
Standards	For District Information File: based on citygml international standard (http://www.citygml.org/) For Co-simulation Data File: XML schema
Data Sharing	Through Nicore Even potentially accessible to all the partners, these data mainly concern the groups involved in running the simulation platforms
Archiving and Preservation (including storage and back-up)	According to Nicore architecture Preservation period: inherently subject to time constraints of the simulation platform operation

3.4 DATASET 4: (CSTB) DISTRICT SIMULATION PLATFORM PARAMETRIC STUDY RESULTS

	Description
Work Package/Task Nos. re: dataset Data Manager	WP 2 - Task 2.2 (also relevant to WP3) Data Manager: Vincent Partenay (CSTB)
Dataset reference and name	District Simulation Platform Parametric Study Results
Data set description	In WP2, task 2.2, several elementary physical models are being developed and integrated into the District Simulation Platform. Once this modelling task done, a global parametric study for different system configurations and various climate zones shall be carried out. The data set in this case are the results of this parametric study as load time series (hourly, on an annual basis) and final integrated values relative to KPI's calculation defined in WP1.1
Availability	Consortium and Open Access
E2District Project Metadata	European Union; H2020; Energy Efficiency Optimised District Heating and Cooling'; E2District; GA696009
Metadata specific to dataset	The district information file (using template elaborated in WP2.1) for each simulated configuration
Standards	XML or JSON
Data Sharing	Through Nicore
Archiving and Preservation (including storage and back-up)	To be stored at least along the project life

3.5 DATASET 5: (CSTB) DISTRICT INFORMATION FILES FOR DEMONSTRATION SITES

	Description
Work Package/Task Nos. re: dataset **Data Manager**	WP - Tasks 2.3 Data Manager: ACCIONA + CSTB
Dataset reference and name	District Information Files for Demonstration Sites
Data set description	For each demonstration site, a District Information File will be filled accordingly from their specific properties for simulation objectives. These data will be inherited from intrinsic data that will be at disposal, but also from monitoring systems (for calibration)
Availability	Consortium; Open Access only for CIT test site data
E2District Project Metadata	European Union; H2020; Energy Efficiency Optimised District Heating and Cooling'; E2District; GA696009
Metadata specific to dataset	Building geometry, thermal properties, HVAC systems, energy sources, heating/cooling schedules, lightings, district heating production, storage, occupancy profiles, weather data
Standards	Based on citygml international standard (http://www.citygml.org/) and ADE Energy
Data Sharing	Through Nicore
Archiving and Preservation (including storage and back-up)	To be stored as long as controlling systems (deployed on demonstration sites requiring these calibrated district information models) will be operating

3.6 DATASET 6: (CIT) BEHAVIOURAL MODEL CALIBRATION SURVEY DATA

	Description
Work Package/Task Nos. re: dataset **Data Manager**	WP 3/T 3.4 Julia Blanke
Dataset reference and name	Behavioural Model Calibration Survey Data
Data set description	This dataset contains the survey data collected on the CIT campus for the purpose of calibrating the behavioural model.
Availability	Private
E2District Project Metadata	European Union; H2020; Energy Efficiency Optimised District Heating and Cooling'; E2District; GA696009
Metadata specific to dataset	Behavioural survey data
Standards	
Data Sharing	Access to this data will be restricted - to be used for model calibration only - in order to protect the personal data of the survey participants.
Archiving and Preservation (including storage and back-up)	The data will be stored in Excel files on CIT servers.

3.7 DATASET 7: (CIT) CIT SENSOR DATA

	Description
Work Package/Task Nos. re: dataset **Data Manager**	WP4 Christian Beder
Dataset reference and name	CIT Sensor Data
Data set description	This dataset contains all the sensor data collected on CIT campus during the E2D project. Data is collected from the main campus BMS, the Nimbus BMS, as well as through LoRa based sensors distributed across the campus. Each data point comprises of a time-stamp, the sub-system the data was collected from, the name of the particular data point, as well as its value. The semantics of the data stream is such, that each data point remains valid until a new data point is indicating a change in value.
Availability	Consortium; Open Access for subsets
E2District Project Metadata	European Union; H2020; Energy Efficiency Optimised District Heating and Cooling'; E2District; GA696009
Metadata specific to dataset	BMS data, sensor data
Standards	MongDB database, key-value pairs
Data Sharing	Data will be accessible to the E2D consortium through the NiCore platform. This platform provides access through a variety of services, including SOAP WebServices, subscription to live data via AMQP, or by directly accessing the MongoDB database through its API.
Archiving and Preservation (including storage and back-up)	The data is stored on a MongoDB database on a server at CIT

3.8 DATASET 8: (UTRC) SIMULATION DATA AND USE-CASES OF THE EXISTING CIT DISTRICT SYSTEM (BASELINE SIMULATION)

	Description
Work Package/Task Nos. re: dataset **Data Manager**	WP3/T3.5 Kostas Kouramas
Dataset reference and name	Simulation data and use-cases of the existing CIT district system (baseline simulation)
Data set description	A record of heating use-cases for the CIT demo-site and data generated from running simulations on the DSP platform for these use-cases.
Availability	Consortium and Open Access
E2District Project Metadata	European Union; H2020; Energy Efficiency Optimised District Heating and Cooling'; E2District; GA696009
Metadata specific to dataset	DSP data; BMS data; Weather data
Standards	Matlab mat files; CSV files; Excel Sheets; NICORE data-base (?)
Data Sharing	The data will be accessible to the consortium through the CIT NICORE platform, using the available APIs and web-services. In addition, the data will be available through the consortium SVN repository. The consortium will also follow the dissemination validation process (see D6.1 Dissemination and Communication Plan, Section 6.3) to validate and approve for the public dissemination of the data. The data will then be shared publicly on the E2District web-site.
Archiving and Preservation (including storage and back-up)	The data will be store in the NICORE platform data-base, E2District SVN repository and the project web-site for the duration of the project.

3.9 DATASET 9: (UTRC) SUPERVISORY CONTROL AND PRODUCTION SCHEDULING OPTIMISATION SIMULATION-BASED EVALUATION DATA

	Description
Work Package/Task Nos. re: dataset **Data Manager**	WP3/T3.5 Kostas Kouramas
Dataset reference and name	Supervisory control and Production Scheduling Optimisation simulation-based evaluation data
Data set description	Comparison data of the Energy consumption cost, heating generation and demand (kW), comfort (deg. C) from the simulation-based analysis and comparison with baseline of the control and optimisation algorithms, for a number of use-case scenarios that will be determined as part of the work in T3.5.
Availability	Consortium
E2District Project Metadata	European Union; H2020; Energy Efficiency Optimised District Heating and Cooling'; E2District; GA696009
Metadata specific to dataset	DSP data; Matlab data; BMS data; Weather data
Standards	Matlab mat files; CSV files; Excel Sheets; NICORE data-base
Data Sharing	The data will be accessible to the consortium through the CIT NICORE platform, using the available APIs and web-services. In addition, the data will be available through the consortium SVN repository.
Archiving and Preservation (including storage and back-up)	The data will be available for the duration of the project through the above data-sharing means.

3.10 DATASET 10: (ACC) ACCIONA BASELINE AND PERFORMANCE EVALUATION

	Description
Work Package/Task Nos. re: dataset **Data Manager**	WP5 Jose C. Esteban
Dataset reference and name	Acciona Baseline and Performance Evaluation.
Data set description	The dataset is the collection of calculated items related to the description of the behaviour in the baseline situation and after the implementation of the E2District measures into the Cork demonstration; they are based on cross-compared data extracted from the dataset of BMS and sensor of the CIT (WP4 collection). The standards of the IPMVP (International Performance Measurement and Verification Protocol) of the EVO (Efficiency Validation Organization) are used to follow the improvements.
Availability	Consortium
E2District Project Metadata	European Union; H2020; Energy Efficiency Optimised District Heating and Cooling'; E2District; GA696009
Metadata specific to dataset	Baseline, KPI; Electricity consumption; Gas consumption; Heat; Building/Areas Set Point Data; Monitoring data.
Standards	IPVMP. BacNet for BMS integration ModBus in some meter readings Analysis of metering data to be stored in .csv, .xls or .xlsx format
Data Sharing	Data are available for the E2District consortium, through the data sharing platform, Tortoise SVN Platform.
Archiving and Preservation (including storage and back-up)	Daily export of measurement, metering and set point data, to configure a monthly summary file. Update and storage of the baseline and performance verification minimum every three months, and upload to the SVN platform.

4 CONCLUSION

This document has established the E2District project's approach to data management for the datasets captured or processed inside the project, according to the guidelines published by the EC. The plan has identified how data collected or generated by the E2District project will be organised, stored and shared and has specified what type of data will be made publicly available by the project (open access) in so far as it is possible to do so at this stage of the project. Suitable public repositories to store the data have also been identified.

This Data Management Plan is not a fixed document and will, therefore, evolve throughout the E2District project according to the progress of project activities.

5   REFERENCES

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