Data management plan v2

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DELIVERABLE D8.9
Data Management Plan v2

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Executive Summary

The current report is the deliverable D8.9, which constitutes the second version of the project's Data Management Plan (DMP). The updated versions of the produced datasets are provided throughout the document, accompanied with the following information:

- Type and brief description of the datasets to be generated, gathered and handled;
- Research data management practices during and after the project completion;
- Metadata-related standards and formats;
- Information about data dissemination, exploitation and preservation.

Towards providing updates and additions regarding the required information, a dataset template, which was also provided in the previous version of the deliverable, was sent to partners who are responsible for specific components and their corresponding produced dataset, following the guidelines for reports related to "Pilot on Open Research Data in Horizon 2020".

The D^2EPC project will examine how effective the envisioned solution is by collecting and analysing data in six pilot sites in Greece, Germany, and Cyprus. It is noted that during the realization of the project procedures, ethical concerns may be raised regarding the privacy and confidentiality of data collection and processing and have been described in the first version of this deliverable under pilot ethical methodology and management plan sections. Data collection will be performed in full compliance with the European Union (EU) and national legislations, as described in Section 5 of this report.

The current version of the deliverable documents the further elaboration of the provided datasets and information on the templates, aligned with the progress of the project's tasks and pilot activities. The third and final version of the deliverable is due to be delivered on M36 and will include the complete information, concluding the work under Task 8.4 Ethics and data management.

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List of Acronyms and Abbreviations

Term	Description
CAPTCHA	Completely Automated Public Turing test to tell Computers and Humans Apart
CoAP	Constrained Application Protocol
DSGVO	Datenschutz-Grundverordnung
EPC	Energy Performance Certificate
GDPR	General Data Protection Regulation
HTTP(S)	HyperText Transfer Protocol (Secure)
HVAC	Heating Ventilation and Air Conditioning
IPR	Intellectual Property Rights
LED	Light Emitting Diode
MQTT	MQ Telemetry Transport
NDA	Non-Disclosure Agreement
SCP	Secure Copy Protocol
SFTP	Secure File Transfer Protocol

1   Introduction

1.1 Scope and objectives of the deliverable

This report is the second version of the D^2EPC Data Management Plan and aims to update the general principles and the necessary information, which have been formulated from the development of the project's tasks up to M18. During the gathering, organization, storage and sharing of the created datasets, D^2EPC partners should ensure the alignment with the aforementioned principles. These datasets have previously been created or will be created as part of the various project's activities.

In general, as in the previous version, the document presents two main categories of datasets. The first includes raw data, which are collected from the pilot sites' metering equipment, while the second one includes the processed data from the system's developed components. Such data might be used for future research conducted by third parties, provided that proper evaluation and post-processing of the datasets have taken place (i.e. anonymization, if necessary). To this end, the concept of Open Access, which is considered an important aspect in research projects, is briefly presented.

This document remains an ongoing process, and following the D^2EPC progress it will be finalized with its third version at M36, presenting any updated material.

1.2 Structure of the deliverable

The report is structured as follows:

- – **Chapter 2** introduces the general principles for the Data Management Plan, in terms of Open Access and FAIR compliance.
- – **Chapter 3** presents the D^2EPC Data Management Framework in detail, including information about the data collection, handling, storage, protection, retention, and destruction. This section also includes the updated list of the datasets that are expected within the D^2EPC project.
- – **Chapter 4** expands the datasets identified in the previous chapter and based on the template, elaborates on each one of them. This entails the update of the datasets included in the first version of the deliverable as well as the addition of other datasets description. The complete description of the all the datasets is expected along with the third and final version of the document, following the completion of the corresponding project tasks.
- – **Chapter 5** covers EU and National Legislation that affects directly or indirectly the Data (and Ethics) Management.
- – **Chapter 6** sums up the main conclusions and findings of this deliverable, and the next steps for the subsequent deliverable.

1.3 Relation to Other Tasks and Deliverables

The deliverable is an outcome of Task 8.4 Ethics and data management. The information provided can serve as input for tasks related to exploitation activities and work packages related to components' development activities. The included templates include a variety of exploitable data that should be managed properly, while the dataset type, the format, standards and data models can be utilized in WP2, WP3 and WP5 activities and expected deliverables.

2   General Principles for Data Management

2.1 Participation in the Pilot on Open Research Data

D^2EPC is a participant in the Pilot on Open Research Data, initiated by the European Commission along with the Horizon2020 program. The participants of the D^2EPC consortium respect the concepts and the values of open science and recognize the benefits of reusing and reviewing previously produced data for promoting and supporting European research and innovation projects. The data produced and collected throughout the duration of the project may be made publicly available in open access for future research. In order to ensure the proper usage of data, all necessary principles for data handling should be outlined. At the same time, the perspective of the D^2EPC partners will comply fully with the EU legislation and national regulations for data protection (more details in Section 5, EC legislation).

2.1.1 Data Availability and Handling

Open access (OA) refers to the free, online provision of re-useable scientific information to other users. The goal of publicly funded research and innovation projects is to encourage the improvement of different societal sectors while also meeting environmental, economic and social needs and goals. The advantages of open access to scientific results are described in the "Guidelines on Open Access to Scientific Publications and Research Data in Horizon 2020"[1] and are provided below:

- Existing scientific publications and results that are easily accessible constitute the foundation for effective peer-to-peer knowledge exchange and research quality improvement, lowering the required effort and drastically reducing repeated results;
- The efficient interaction between market and innovation actions is accelerated as a result of the information flow
- Transparency during research is guaranteed, while the advancement and the sharing of ideas are facilitated.

The D7.5 and D7.13 project deliverables, namely Exploitation Report and IPR Protection Plan v1 and v2, which are due to M24 and M36, respectively, will document the processes for identifying and managing exploitable results in regard to the IPR and patent issues, as well as the individual exploitation plan for each member of the consortium.

As listed below, data availability can be classified into three categories:

- **Open Data**: Data that are publicly shared for re-use and exploitation
- **Consortium:** Confidential data that are available only to member of the D^2EPC consortium and the EU Commission services and is subject to the project Non-Disclosure Agreement (NDA)
- **Private:** Data that are retained by individual partners for their own processes and tests

Within the D^2EPC project, datasets will be subdivided as follows:

- Pilot sites generated datasets shared between the Consortium partners (Consortium)
- Pilot sites generated datasets that are used for individual partner purposes (Private)
- Pilot sites generated datasets shared to the public (Open Data)
- Research findings and outcomes that should be publicly disseminated (Open Data)

In order to achieve the project's goals, consortium members will be able to share a number of generated datasets. To this end, NDAs have been considered and will be signed under defined terms among the interested parties, i.e. the data processors and controllers, before providing any of these

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

data to the consortium. In addition, under certain conditions, consortium members may provide open access to the public on completely anonymized datasets.

As mentioned, the data controllers and the data processors are the two main roles introduced by D^2EPC when it comes to data handling operations. The data controllers are the ones who set the goals and rules of data processing, while the processors are the ones that process the personal data on the controller's behalf. In D^2EPC, the Pilot Responsible and the Data Protection Officers (DPOs) act as data controllers, while all technical partners, who will need to perform pilot-related data analysis, are considered as data processors.
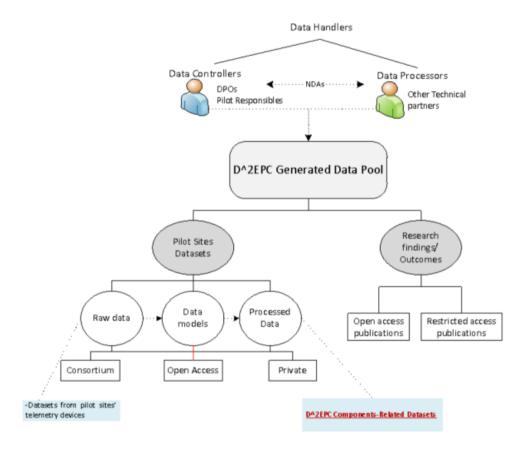

Figure 1. D^2EPC Data Management

2.1.2 Open Access to Scientific Publications

Open access constitutes a requirement for each beneficiary to provide free online access, for all users, to all peer-reviewed scientific publications linked to the findings of its research progress.

Consortium members can specify the background required in any way of their choice, omitting any part of it (not necessarily prior to signature of EC grant agreement). Background and foreground may be granted exclusive licenses if the other partners relinquish their access rights and based on past agreements. For ethical, competitiveness or security concerns, the EC retains the right to object to exclusive licenses being granted to third parties operating in non-associated third countries (where appropriate, a requirement to notify the EC will apply). Partners may agree to different access rights, than those provided in the consortium agreement.

At the early project stage, partners concurred on open access publishing. However, depending on the sort of information to be published, partners may opt for gold or green access[2] to peer-reviewed scientific publications that may emerge from the project in the future.

It is within the D^2EPC consortium vision to make available the outmost of its results, to the degree in which is allowed, on an open web repository. Selected scientific publications and public deliverables have been provided so far through the D^2EPC webpage[3]. The upload of the produced results to other web repositories (e.g. Zenodo) will be considered at the end of the project and documented in the third and final version of this deliverable.

2.1.2.1   Open Access to Research Data

The FAIR[4] acronym summarizes four fundamental aspects of open data:

- **Findable:** Data has a unique, persistent ID, stored in a searchable resource, and is accompanied by essential metadata.
- **Accessible:** Data are readily and freely accessible using common methods and protocols, metadata are acquirable even if the data are not.
- **Interoperable:** Data are provided in widely recognized standard formats, vocabularies, and languages.
- **Re-useable:** Data has clear licensing, and accurate essential metadata that identify its content and origin while also complying with relevant community standards.

As the project's pilots also involve residential buildings, users' datasets should be reviewed and evaluated regarding a possibly required aggregation or anonymization, for security or commercial reasons, prior to release.

2.1.3 IPR Management and Security

The D^2PC project completion will result in a number of software and hardware technology components, as part or related to the developed integrated platform. Intellectual Property will be formed following the development of the aforementioned components, which must be secured through patents or copyright[5], while remaining available for other consortium members for utilization during the project activities but also for further exploitation outside the project through appropriate licensing. The Consortium Agreement (CA), which is signed by partners, stipulates how the project knowledge and IPRs should be handled, while, in some cases, incorporates the terms and conditions specified in the Commission Contractual Rules. Individual and Joint Ownership of the knowledge, Protection of knowledge, Publication of results, Use and dissemination of knowledge arising from the project, access rights, Open Source and Standards and so on are all covered by the CA

D^2EPC, as an innovation action project, addresses mid to high TRL technologies with the goal of delivering market-oriented solutions by its end. Many academic and institutional organizations (CERTH, KTU, UNE, FRC, ASI, AEA), as well as private companies (GSH, CLEO, SEC, DMO, SGS, HYP) are members of the project's consortium. These partners will obviously retain Intellectual Property Rights on their technologies and data. As a result, before publishing any data, the D^2EPC consortium should consult with the relevant partners. More information on the IPR management is disclosed in Deliverables D7.5 and D7.13.

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[2] https://erc.europa.eu/content/erc-projects-what-do-terms-green-open-access-and-gold-open-access-mean-context-research

[3] https://www.d2epc.eu/en

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

[5] https://www.iprhelpdesk.eu/news/protection-database-our-company-has-developed-digital-database-cultural-heritage-how-can-it-be

D^2EPC will follow a holistic security approach, in order to ensure information security in terms of confidentiality, integrity and availability. The proposed approach entails the evaluation of security risks in a methodological manner as well as their impact assessment. This assessment will be implemented on the personal information and data handled by the envisaged solution, including the different steps and identified risks relevant to their processing.

Security measures are provisioned, including secure protocols (HTTPS and SSL), login procedures and protection against bots and other malicious attempts, e.g. CAPTCHA technology. Furthermore, the demonstration pilot case studies follow well monitored and controlled procedures for data collection, integrity and security. Personal information security (data protection and privacy) will involve anti-penetration safeguards in addition to physical protection of the critical system components and access control measures.

3 Data Management Framework

3.1 Format of Datasets

For each dataset the following characteristics will be specified throughout the project's activities:

Table 1. Dataset Identification Template

<DS-XX-Title>	
Data Identification	
Dataset Reference/ name	<Short name/outline of the dataset>
Dataset description	<Explain why and how data are collected and describe the content. Also, mention the related datasets (used as input), if any and if they contain future sub-datasets.> Related datasets:
Source of the data (e.g. device, evaluation surveys)	<From which device and how the dataset will be collected. Mention also the position of installation >
Related D^2EPC architectural component(s)	<Mention the name of the architectural component which is linked with the metering device >
Related D^2EPC objectives	<Mention the related D^2EPC objectives>
Partners services and responsibilities	
Partner(s) responsible for the data collection	<Partner short name>
Partner(s) responsible for the data storage	<Partner short name>
Partner(s) responsible for the data analysis (partners with access to the databases)	<Partner short name>
WPs and tasks	<The data will be collected within activities of WPX and TX e.g. WP3,T3.4>
Metadata, Pre-processing, Sharing and Expected Size	
Metadata info (Production and storage dates, places) and documentation	<Provide information about the discoverability of the dataset and if a documentation will be available>
External data used	<Mention the external data/database sources in case the dataset includes data from sources outside of D^2EPC project>
Data pre-processing steps	<Mention any pre-processing done to the dataset: E.g. anonymization, data interpolation, outlier cleaning etc.>
Sharing	<Consortium / Private / Open >
Licence type (e.g. Public Domain, Attribution, Non-commercial, No Derivatives, or other)	<Mention the type of licence>

Expected volume of data	<Mention the expected size of data: e.g. 200 MB or 1GB, etc.>
Format of data	<Mention the format of data, e.g. JSON, csv etc.>
Storage location (URI)	<Mention where dataset is stored: e.g. public URL, SVN path>
Exploitation	
Data exploitation (purpose/ use of the data analysis)	<Explain shortly the scope of the data collection/ generation>
Data Storage Duration	<Explain for how long the dataset will be kept and why>

3.2 Data Sharing

The D^2EPC partners may exploit and disseminate the gathered data in a variables of ways, including:

- Using them in future research activities (outside the current project)
- Developing, creating or marketing a product or process
- Creating and providing a service
- Using them in standardization activities

The Zenodo Online Repository[6] is being considered as the main sharing enabler of the datasets to be produced within the pilot activities. Zenodo was developed by researchers for researchers and not only, as part of the OpenAIRE project[7], to ensure that everyone can join in Open Science.

In addition to open sharing, a dedicated, secure repository has been deployed for the project, to serve the needs of the D^2EPC tools. Common industry protocols such as CoAP[8], MQTT[9] and HTTP(S) are considered for the implementation of secure application programming interfaces (APIs), which will be used for ensuring a reliable data flow among the different D^2EPC components and services. These APIs may also be handed to third parties (besides Zenodo) to enable their access to any resulted public/open datasets.

Towards data interoperability, the D^2EPC information exchange and specifically EPC related information will be built on well-known protocols and standards such as ETSI SAREF[10]. These are expected to be identified and extended if needed in the activities foreseen in *T2.5 D^2EPC Information Model* and *T3.3 Buildings digital twin for EPCs issuance.*

3.3 Data Collection, Archiving and preservation (including storage and backup)

Data shall be stored in the D^2EPC Repository, maintained by CERTH, in a secure format (e.g. applying encryption by using a string cryptografic protocol), as agreed within the project's consortium. This

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repository will also host and provide descriptive metadata. RAID and other standard backup technologies may be used to ensure data reliability while backups at local level may be created by pilot sites' responsibles, if necessary (e.g. using their SharePoint infrastructure, managed by the Microsoft exchange and 365 servers). There won't be performed any data collection or storage concerning personal information of the pilot participants (such as building occupants etc.).

3.3.1 Data Collection

The following general guidelines are being applied for the quality assurance of the collected data:

- When transferring data from field devices to other project repositories for further processing and analysis, specific technical measures are provisioned to be followed.
- Pilot sites are being equipped with suitable devices and mechanisms to enable secure meter/sensor/asset data collection.
- Usage of secure transfer protocols and tools including SCP (Secure Copy Protocol) and SFTP (Secure File Transfer Protocol).

3.3.2 Data Storage

Building data will be transferred and stored in the D^2EPC platform after anonymization and aggregation procedures while it is expected to keep user identification data on the system only for emergency cases and advising. Two aspects are perceived significant at this stage:

- If personal data is not being processed
- Data should be ideally anonymized, without any future identification potential

For keeping data safe, data encryption is considered a secure method data and a variety of open-source tools exist that can be adopted.

In any case, any data from the pilot use cases marked as confidential will be removed from storage after the completion of the project, maintaining as open only the public models and respective datasets that will be specified in the Data Management Plan.

3.4 Data protection

For the protection of the collected data, including unauthorised access to the D^2EPC repositories, only authenticated personnel (as clearly identified and agreed upon from the consortium) will be allowed to access the data collected from pilots. D^2EPC will follow a holistic security approach, in order to ensure information security in terms of confidentiality, integrity and availability. The proposed approach entails the evaluation of security risks in a methodological manner as well as their impact assessment. This assessment will be implemented on the personal information and data handled by the envisaged solution, including the different steps and identified risks relevant to their processing.

In order to protect the personal data of volunteer participants in the pilot sites, the items below will be considered:

- Any data that may be attributed to a recognizable person will be kept private;
- Individual data on participants will be utilized under strictly confidential conditions and will only be published as statistics (anonymously);
- Any data or information about a participant will be kept private, no matter how this information was obtained. Accordingly, information acquired incidentally within D^2EPC project will be dealt with confidentiality and will in no case substitute the mandatory

procedure, where each participant provides her/his explicit consent to researchers to obtain, store and use information about them;

- All personal data on individuals will be fully anonymised (or coded) and this will be done at the earliest convenience during data handling procedures;
- The obtained information will under no occasion be utilised for commercial reasons.

3.4.1 Measures for preventing malevolent/criminal/terrorist abuse of research findings

During the D^2EPC project and for the smooth handling and control of research findings and of access rights, management roles and responsibilities have been allocated. Partners responsible for data security per pilot case will directly inform to the quality board and the project coordinator. The research findings will be protected against malevolent/criminal/terrorist abuse by adhering to strict procedures, as they will be outlined by the Ethical Advisory Board.

3.5 Data Retention and Destruction

Following the Open Access principles described in the previous section while also complying with EU and national legislations and regulations, data that are deemed as Open Data will be published to online open repositories (i.e. Zenodo), whereas all other data will be deleted after the project's completion. Concerning data destruction, current methods for permanent and irreversible destruction will be employed (i.e. full disk overwriting and re-formatting tools), considering that computerized techniques (hard disk drives) will be utilised for storing data.

The guidelines below will be adopted for all cases for data protection and privacy:

- Protective principles against penetration will be followed;
- Physical protection of major system components and access control measures will be employed;
- Logging of D^2EPC system(s) and proper auditing of the peripheral components will be available.

3.6 Pilot Participant Recruitment Process for the execution of the Pilot Use Cases

Existing occupants/employees/residents of the selected buildings will participate in the D^2EPC Demonstration Case Studies along with volunteers desiring to be part of some of the Pilot Use Cases. The persons that will be actively taking part and or being involved/ associated with the realization of each Pilot Use Case, will undergo a thorough recruitment and informed consent procedure. This procedure is designed to be strict so that no kind of enforcement is applied. Pilot requirements will define the particular criteria based on which the volunteers will be selected, while a variety of roles will be determined for the participants.

In addition, in order to protect the people participating in pilot use cases from privacy/ confidentiality breach, particular actions will be adopted:

- *Confidentiality*: The actual naming of the employees involved in will never be disclosed in any record and their involvement will not be revealed to other pilot participants. In line with what has been explained above, all personal data stored during the pilot execution will be

completely and irreversibly anonymised and will be destroyed after the end of the D^2EPC Project. As a total minimum anonymised procedure, collected information will not include any of the following, or codes for the following:

- o Name, address, phone/fax. number(s), e-mail address, full postcode
- o Any identifying reference numbers, photographs, data about relatives.

- ***Right to get more information about the pilots:*** The pilot participants will be in complete liberty to request more details or raise any query at any time of the pilot execution phase. The corresponding pilot representative, member of the D^2EPC consortium, will always remain at the participants' disposal to respond to any queries, doubts or interests concerning the demonstration phase. Each pilot participant will be free to withdraw her/his participation without the obligation of providing further explanations or being affected for this decision in any manner.

- ***Informed Consent:*** Each pilot site will develop a detailed informed consent to be shared with the interested participants, highlighting the objectives and scope of the demonstration as well as defining the information to be collected and processed. The created consent forms are included in the Annex D.

3.7 Datasets List

The generated datasets are defined, considering certain interactions between the various modules of the D^2EPC architecture, as identified up to the current stage of the project. These interactions are bound to change in the future, when the development of the tools will be finalized and a clear description of the D^2EPC components interrelations will be available. More specifically, the datasets described in this section are classified into the following categories, in accordance with Figure 1, into:

i)   datasets belonging to the architecture components of D^2EPC (DS_01 - DS_11),
ii) raw datasets from the pilot sensors/meters (DS_12 – DS_17),
iii) open data / datasets to be made available for third party stakeholders (DS_18+).

Table 2. Dataset List

D^2EPC Dataset	Related Task(s)	Task Leader
Architecture Components		
DS_01_D^2EPC_Information_Model	WP2, WP3, WP4, WP5	KTU
DS_02_D^2EPC_Information_Management_Layer	T3.1, T3.3, T4.1, T4.3, T4.4, WP5	HYP
DS_03_Enriched_BIM_and_Digital_Twin	T3.3, WP4, WP5	CERTH
DS_04_GIS_Tool	T3.2, T3.3, T4.4, WP5	GSH
DS_05_Building_Performance_Module	T4.1, T4.2, T4.4, WP5	SEC
DS_06_Roadmapping_Tool_For_Performance_Upgrade	T4.2, T4.4, WP5	CERTH
DS_07_AI_Driven_Performance_Forecasts	T4.2, T4.4, WP5	CERTH
DS_08_Performance_Alerts_and_notifications	T4.2, T4.4, WP5	CERTH
DS_09_Building_Energy_Performance_Benchmarking	T4.3, T4.4, WP5	HYP
DS_10_Energy_Performance_Verification_and_Credibility	T4.3, T4.4, T3.1	HYP

DS_11_D^2EPC_Web_Platform	T4.4, WP5	SEC
Measurement Datasets		
DS_12_Case_Study_1_Thessaloniki_Greece	T3.1, T3.3, T4.4, WP5	CERTH
DS_13_Case_Study_2_Velten_Germany	T3.1, T3.3, T4.4, WP5	CLEO
DS_14_Case_Study_3_Berlin_Germany	T3.1, T3.3, T4.4, WP5	CLEO
DS_15_Case_Study_4_Nicosia_Cyprus	T3.1, T3.3, T4.4, WP5 leader in T2.3, T6.4 partner in T2.2, T2.4, T5.2, T5.3, T5.4, T6.2	FRC
DS_16_Case_Study_5_ Berlin_Germany	T3.1, T3.3, T4.4, WP5	SEC
DS_17_Case_Study_6_ Berlin_Germany	T3.1, T3.3, T4.4, WP5	SEC

4 Description of Datasets

In this Section, the preliminary assessment of the available D^2EPC datasets that was presented in the first version of the deliverable is furtherly elaborated. Updated information is provided for each dataset while a number of new datasets are documented, following the development of the corresponding project tasks. As the project progresses, additional work will be required as part of the technical activities within WP2, WP3 and WP4, as well as the pilot preparation within WP5, towards presenting more concrete information on all datasets, and in particular the pilot ones. The third and final version of this deliverable, which is due to M36, is expected to finalize the selection of the D^2EPC datasets and provide their complete context description.

4.1 Architecture Components

4.1.1 D^2EPC Information Model

DS_01_D^2EPC_Information_Model	
Data Identification	
Dataset Reference/ name	DS_01_IM
Dataset description	The data in tasks T2.1, T2.2, T2.3, T2.4 collected in order to analyse and define a set of indicators to be included in the next generation EPCs, including SRI, Human comfort, LCA and Economic indicators and considering user driven models (thermal/vision comfort, occupancy).
	Dataset includes smart readiness indicators (SRI) descriptions (D1.3), SRI integration in the dynamic EPC scheme. EPC SRIs will be classified in alignment with the EPBD directive.
	Human-comfort and well-being indicators dataset provides user profiles extracted from a customised sensor network designed and installed (T3.1) in the form of physical sensors deployed in the pilot buildings to capture the indoor environmental conditions and the occupant's activity.
	LCA indicators included in the dataset links it to the relevant guidelines.
	Economic indicators dataset enables the interpretation of the individual elements of buildings energy performance into monetary normalized values.
	Indicator calculation methodologies and their integration in to D2EPC scheme will be defined in WG1 and WG2 working groups and their integration scheme in to D2EPC information model will be defined in T2.5 task.

	Related datasets: DS_02_IML, DS_03_DT, DS_12_CS1 –DS_17_CS6
Source of the data (e.g. device, evaluation surveys)	Devices, sensors, literature review (for example: IEA EBC Annex 72, IEA EBC annex 56, Directive (EU) 2018/844, etc.), BIM model.
Related D^2EPC architectural component(s)	Technical requirements, specifications and Architecture presented in deliverable D1.4 which was submitted in (M7). T2.1, T2.2, T2.3 and T2.4.
Related D^2EPC objectives	Objectives 1,3, 4, 5, 6
Partners services and responsibilities	
Partner(s) responsible for the data collection	CERTH, KTU, CLEO, SGS, HYP, FRC, IsZEB
Partner(s) responsible for the data storage	CERTH, KTU, CLEO, SGS, HYP, FRC, IsZEB
Partner(s) responsible for the data analysis	CERTH, KTU, CLEO, SGS, HYP, FRC, IsZEB
WPs and tasks	The data will be gathered from activities of WP2, T2.1, T2.2, T2.3, T2.4, primary information gathered from the deliverables D1.3 and D1.4 of WP1 tasks T1.3, T1.4 also from WG1 and WG2 working groups.
Metadata, Pre-processing, Sharing and Expected Size	
Metadata info (Production and storage dates, places) and documentation	The dataset will be enriched with metadata defined by the identified standards and data models that will act as the foundation of the data model
External data used	TBD
Data pre-processing steps	TBD
Sharing	The dataset generated will be shared among project partners through D^2EPC SharePoint. Deliverable associated to these datasets (BIM model) declared "confidential". Thus, D^2EPC information model will be not shared with public, or with third parties without proper licensing (ex. Non-disclosure agreement). In case of diffusion (publications, demonstrations, etc.) the Consortium will determine which data shall be made publicly available.
	Reports of deliverables D2.1, D2.2, D2.3, D2.4 and D2.5 will be Public, and a part of D2.5 deliverable - D2EPC Information model for next generation EPCs will be confidential.
Licence type (e.g. Public Domain, Attribution, Non-commercial, No Derivatives, or other)	TBD.
Expected volume of data	TBD.
Format of data	JSON, csv, Ifc, dgn, dwg, xls.
Storage location (URI)	Public - https://www.d2epc.eu/en;

	Confidential - Consortium / Private information will be stored in D^2EPC share point - **https://www.d2epc.org/**.
Exploitation	
Data exploitation (purpose/ use of the data analysis)	To deliver D^2EPC Information Model for KPIs calculation and EPC issuance process.
Data Storage Duration	Duration of project except for data that will be deemed as Open Data

4.1.2 D^2EPC Information Management Layer

DS_02_ D^2EPC _Information_Management_Layer	
Data Identification	
Dataset Reference/ name	DS_02_IML
Dataset description	Indoor ambient conditions (Temperature, Relative Humidity, Illuminance), indoor air quality (CO_2, VOC, PM2,5/10, Radon, Benzene, Formaldehyde), energy metering and occupancy data sets collected from the sensoring equipment installed inside the building and transferred to the IoT Cloud component
Source of the data (e.g. device, evaluation surveys)	Sensors and smart meters installed locally at the pilot sites.
Related D^2EPC architectural component(s)	Information Management Layer
Related D^2EPC objectives	Objectives 4, 6
Partners services and responsibilities	
Partner(s) responsible for the data collection	HYP
Partner(s) responsible for the data storage	CERTH (D^2EPC repository)
Partner(s) responsible for the data analysis	CERTH, KTU, CLEO, SGS, HYP, FRC, IsZEB
WPs and tasks	The hardware to be deployed at the pilot site will be defined within T5.2 and the collection will take place in T5.3 within the project's demo activities.
Metadata, Pre-processing, Sharing and Expected Size	
Metadata info (Production and storage dates, places) and documentation	Swagger (API documentation)
External data used	Weather API
Data pre-processing steps	Data cleansing techniques (e.g. outlier detection/removal/replacement)
Sharing	Among project partners/confidential

Licence type (e.g. Public Domain, Attribution, Non-commercial, No Derivatives, or other)	Public Pass (Licence Type – TBD)
Expected volume of data	40-50 GB
Format of data	JSON
Storage location (URI)	N/A
Exploitation	
Data exploitation (purpose/ use of the data analysis)	Collect data from the pilot IoT infrastructure and stream to the D^2EPC common repository
Data Storage Duration	Duration of the project

4.1.3 Enriched BIM and Digital Twin

DS_03_Enriched_BIM_and_Digital_Twin	
Data Identification	
Dataset Reference/ name	DS_03_DT
Dataset description	The data in task T3.3 is collected in order to construct the D^2EPC Building Digital Twin, utilized for issuing the new generation EPCs. On the one side, the dataset includes building structural information, i.e. geometry, design materials, as well as underlying systems and installed equipment, which are critical for the development of the building information models, used for the calculation of the asset-based EPC rating (also described in DS_06_Building_Performance_Module dataset). On the other side, the dataset encloses close to real time information from the building's installed sensors and meters, in order to provide the calculation base for the corresponding KPIs derived from the WP2 tasks (also described in DS_01_D^2EPC_Information_Model dataset), as well as the operational EPC rating (also described in DS_06_Building_Performance_Module dataset). Related datasets: DS_02_IML, DS_13 – DS_18
Source of the data (e.g. device, evaluation surveys)	On-site sensors, meters, local building auditing from the pilot-responsible partners, existing building information models
Related D^2EPC architectural component(s)	Building Digital Twins Information Management Layer IoT Interfaces Building Performance Module Added Value Services Suite

	D^2EPC Repository
Related D^2EPC objectives	Objectives 3,4,5
Partners services and responsibilities	
Partner(s) responsible for the data collection	CERTH, IsZEB, KTU, CLEO, SEC, HYP, FRC, GSH, DMO
Partner(s) responsible for the data storage	CERTH
Partner(s) responsible for the data analysis	CERTH
WPs and tasks	T3.1, T3.3, T2.1, T2.2, T2.3, T2.4, T2.5
Metadata, Pre-processing, Sharing and Expected Size	
Metadata info (Production and storage dates, places) and documentation	Data defining the relationship between digital models and on-site sensor equipment (e.g. IDs, space IDs) will be produced and stored in the project's database as well.
External data used	Data from national standards for building categorization
Data pre-processing steps	Data in BIM files (IFC format) regarding the building information is parsed, verified and stored into distinct database tables. Data from on-site sensors and meters are stored directly, since pre-processing has been realized in the lower level (Information Management Layer).
Sharing	The BIM files generated will be shared among the project partners through the D^2EPC SharePoint. Deliverable D3.3, associated with the Building Digital Twin, will be public regarding its first version and openly accessed through the project's website. It will outline a generic model that the Digital Twin will be based on.
Licence type (e.g. Public Domain, Attribution, Non-commercial, No Derivatives, or other)	Will be evaluated and agreed within consortium
Expected volume of data	Volume of data will depend on the size of the existing building IFC files, the amount of data transmitted from the actual building and the resulted complexity of the building information model.
Format of data	Database table entries
Storage location (URI)	Will be stored in the D^2EPC database.
Exploitation	
Data exploitation (purpose/ use of the data analysis)	To deliver the building Digital Twins operational framework (MS6)
Data Storage Duration	Duration of project. A generic DT model may be stored after the end of the project the selected online repository of (e.g. Zenodo).

4.1.4 WebGIS Tool

DS_04_GIS_Tool	
Data Identification	
Dataset Reference/ name	DS_04_GIS
Dataset description	Nomenclature of territorial units for statistics – NUTS 2021 polygons (level-0: Countries, level-1: major socio-economic regions, level-2: basic regions for the application of regional policies and level-3: small regions for specific diagnoses) as collected from Eurostat. EPC statistics for each region from available EPCs issued through D^2EPC platform. BIM models for visualisation of buildings inserted in D^2EPC platform. Related datasets: DS_03_DT, DS_11_WP, DS_12_CS1 – DS_17_CS6
Source of the data (e.g. device, evaluation surveys)	Eurostat The data are collected and will be integrated in the GIS Tool solution
Related D^2EPC architectural component(s)	D^2EPC Web GIS
Related D^2EPC objectives	Objectives 1, 6
Partners services and responsibilities	
Partner(s) responsible for the data collection	GSH
Partner(s) responsible for the data storage	CERTH
Partner(s) responsible for the data analysis	GSH
WPs and tasks	The data are gathered as part of the activities of WP3 and T3.2
Metadata, Pre-processing, Sharing and Expected Size	
Metadata info (Production and storage dates, places) and documentation	The dataset contains the name, urban, coast and mountain type as well as the bounding box coordinates for the polygon and the Coordinate Reference System. In addition, a metadata file in xml format is provided.
External data used	NUTS 2021 from European Commission, Eurostat (ESTAT), GISCO
Data pre-processing steps	None
Sharing	Public
Licence type (e.g. Public Domain, Attribution, Non-commercial, No Derivatives, or other)	Non-commercial

Expected volume of data	10MB
Format of data	PostGIS, OGC WFS service
Storage location (URI)	The dataset will be stored in D^2EPC DB. Currently in local DB
Exploitation	
Data exploitation (purpose/ use of the data analysis)	The dataset is expected to provide statistical of Europe's regions and countries regarding dEPCs issued via the Dynamic EPC scheme of D^2EPC project.
Data Storage Duration	Selected data that are deemed as Open Data will be shared through the selected online repository (e.g. Zenodo)

4.1.5 Building Performance Module

DS_05_Building_Performance_Module	
Data Identification	
Dataset Reference/ name	DS_05_BPM
Dataset description	This dataset will include output data from the calculations realized in the Building Performance Module. This encloses the buildings' resulted asset/operational ratings as well as a set of selected indicators' values. Related datasets: DS_03_DT
Source of the data (e.g. device, evaluation surveys)	Generated from internal tool calculations utilizing the Building Digital Twin
Related D^2EPC architectural component(s)	D^2EPC Repository Building Digital Twin
Related D^2EPC objectives	Objectives 1, 3, 4, 5,
Partners services and responsibilities	
Partner(s) responsible for the data collection	SEC, CERTH
Partner(s) responsible for the data storage	CERTH
Partner(s) responsible for the data analysis	SEC, CERTH
WPs and tasks	T3.3, T4.1
Metadata, Pre-processing, Sharing and Expected Size	
Metadata info (Production and storage dates, places) and documentation	Data linking the buildings with the corresponding issued ratings and resulted indicators (e.g. building IDs, issuance timestamps)

External data used	Data from national standards for building categorization
Data pre-processing steps	Input data will be validated prior to the tool's calculations. Results will be validated prior to storage and display to the user.
Sharing	Among project partners/confidential
Licence type (e.g. Public Domain, Attribution, Non-commercial, No Derivatives, or other)	Will be evaluated and agreed within consortium
Expected volume of data	Few kilobytes, depending on the output of the tool to be defined
Format of data	Database table entries
Storage location (URI)	Will be stored in the D^2EPC repository.
Exploitation	
Data exploitation (purpose/ use of the data analysis)	To deliver the Building Performance Module (MS7)
Data Storage Duration	Duration of project

4.1.6 Roadmapping Tool for Performance Upgrade

DS_06_Roadmapping_Tool_For_Performance_Upgrade	
Data Identification	
Dataset Reference/ name	DS_06_RTPU
Dataset description	This dataset will include data regarding possible upgrades of the existing building infrastructure. Both qualitative as well as quantitative information will be provided as suggestions, based on building data included in the DS_03_DT dataset. Related datasets: DS_03_DT, DS_11_WP
Source of the data (e.g. device, evaluation surveys)	Generated from internal tool calculations utilizing BIM files through the building Digital Twins, EPC rating results from the Building Performance Module, evaluation surveys regarding possible building renovation actions and corresponding cost estimation
Related D^2EPC architectural component(s)	D^2EPC Repository Building Digital Twin Building Performance Module
Related D^2EPC objectives	Objective 6
Partners services and responsibilities	
Partner(s) responsible for the data collection	CERTH, DMO, HYP

Partner(s) responsible for the data storage	CERTH
Partner(s) responsible for the data analysis	CERTH
WPs and tasks	T3.3, T4.1
Metadata, Pre-processing, Sharing and Expected Size	
Metadata info (Production and storage dates, places) and documentation	Data defining the relationship between digital models and physical building elements (e.g. space IDs, structural elements IDs) will be produced and stored in the project's database in order to identify required actions for performance upgrade.
External data used	Building possible renovation-related actions and corresponding cost estimation
Data pre-processing steps	Data from the tool's calculations will be properly formatted in order to be presented to the user in an intuitive way
Sharing	Among project partners/confidential
Licence type (e.g. Public Domain, Attribution, Non-commercial, No Derivatives, or other)	Will be evaluated and agreed within consortium
Expected volume of data	Few kilobytes, depending on the output of the tool to be defined
Format of data	HTML block - list of possible renovation actions displayed to the user in an intuitive way
Storage location (URI)	Will be stored in the D^2EPC repository.
Exploitation	
Data exploitation (purpose/ use of the data analysis)	To deliver the Roadmapping Tool for Performance upgrade, as part of the Added Value Services Suite (MS7)
Data Storage Duration	Duration of project

4.1.7 AI Driven Performance Forecasts

DS_07_AI_Driven_Performance_Forecasts	
Data Identification	
Dataset Reference/ name	DS_07_AIPF
Dataset description	This dataset will include forecasted timeseries of energy data Related datasets: DS_03_DT, DS_12_CS1 – DS_17_CS6

Source of the data (e.g. device, evaluation surveys)	The data will be generated by the forecasting algorithms, which are based on historical data stored in the project's database. The latter is gathered from the on-site installed devices and sensors.
Related D^2EPC architectural component(s)	D^2EPC Repository Building Digital Twins IoT Interfaces Information Management Layer
Related D^2EPC objectives	Objective 6
Partners services and responsibilities	
Partner(s) responsible for the data collection	CERTH, HYP, SEC, CLEO, FRC
Partner(s) responsible for the data storage	CERTH
Partner(s) responsible for the data analysis	CERTH
WPs and tasks	T3.1, T3.3
Metadata, Pre-processing, Sharing and Expected Size	
Metadata info (Production and storage dates, places) and documentation	Data defining the relationship between generated time series and on-site sensor equipment (e.g. IDs, space IDs) will be produced and stored in the project's database.
External data used	Weather forecasts from external APIs
Data pre-processing steps	Additional historical data cleansing and verification is expected prior to applying forecasting algorithms. Data resampling may also be realized.
Sharing	Confidential/only among project partners
Licence type (e.g. Public Domain, Attribution, Non-commercial, No Derivatives, or other)	Will be evaluated and agreed within consortium
Expected volume of data	Continuously expanding as the prediction algorithms generate new timeseries.
Format of data	Numerical time series
Storage location (URI)	Will be stored in the D^2EPC repository.
Exploitation	
Data exploitation (purpose/ use of the data analysis)	To deliver the AI-driven Performance Forecasts Tool, as part of the Added Value Services Suite (MS7)
Data Storage Duration	Duration of project

4.1.8 Performance Alerts and Notifications

DS_08_Performance_Alerts_and_notifications	
Data Identification	
Dataset Reference/ name	DS_08_PAN
Dataset description	Alert context based on user characteristics for delivering personalised notifications. Based on survey results, a user profile will be kept towards translating the information extracted from other tools and presenting it to the targeted user in the most efficient way. Related datasets: DS_03_DT, DS_11_WP
Source of the data (e.g. device, evaluation surveys)	Surveys, literature, other components, user input
Related D^2EPC architectural component(s)	D^2EPC Repository AI-driven Performance Forecasts Performance alerts and Notifications
Related D^2EPC objectives	Objective 6
Partners services and responsibilities	
Partner(s) responsible for the data collection	SEC, CERTH, GSH, KTU, DMO, HYP
Partner(s) responsible for the data storage	CERTH
Partner(s) responsible for the data analysis	CERTH
WPs and tasks	T3.3, T4.4
Metadata, Pre-processing, Sharing and Expected Size	
Metadata info (Production and storage dates, places) and documentation	User data (user id) to correctly assign personalized notifications, custom user-input data regarding visualization preferences
External data used	User input regarding type and frequency of the displayed notifications, in order to build the user profile
Data pre-processing steps	Data from the tool's calculations will be properly formatted in order to be presented to the user in an intuitive way
Sharing	Confidential
Licence type (e.g. Public Domain, Attribution, Non-commercial, No Derivatives, or other)	Will be evaluated and agreed within consortium
Expected volume of data	Few kilobytes – depending on user set preferences
Format of data	Notifications displayed in text format in the user interface
Storage location (URI)	Will be stored in the D^2EPC repository.

Exploitation	
Data exploitation (purpose/ use of the data analysis)	To deliver the Performance Alerts and Notifications tool, as part of the Added Value Services Suite (MS7)
Data Storage Duration	Until deletion of corresponding user profile or up to the duration of project

4.1.9 Building Energy Performance Benchmarking

DS_09_Building_Energy_Performance_Benchmarking	
Data Identification	
Dataset Reference/ name	DS_09_BEPB
Dataset description	This dataset includes all the data collected as well generated in T4.1 (Building Performance Module). Exploiting the calculations of the relevant tools, a comparative visualization of the studied buildings' performance (asset-based/operational-based ratings and set of indicators) is provided. Related datasets: DS_05_BPM
Source of the data (e.g. device, evaluation surveys)	Collected and generated from the T4.1 tools
Related D^2EPC architectural component(s)	Building Performance Module Added Value Services Suite
Related D^2EPC objectives	Objectives 3,5,6
Partners services and responsibilities	
Partner(s) responsible for the data collection	CERTH, HYP, SEC
Partner(s) responsible for the data storage	CERTH
Partner(s) responsible for the data analysis	CERTH,SEC
WPs and tasks	The data will be gathered as part of the activities of WP4 and Subtask 4.3.1
Metadata, Pre-processing, Sharing and Expected Size	
Metadata info (Production and storage dates, places) and documentation	Building ids, space ids, location etc. to provide the benchmarking
External data used	None
Data pre-processing steps	Structuring, pre-processing to establish a minimum amount of information to properly benchmark the buildings' performance
Sharing	Confidential/only among project partners
Licence type (e.g. Public Domain, Attribution, Non-commercial, No Derivatives, or other)	Will be evaluated and agreed within consortium

Expected volume of data	Depending on DS_05_BPM dataset size
Format of data	Structured data in tabular form
Storage location (URI)	Will be stored in the D^2EPC repository.
Exploitation	
Data exploitation (purpose/ use of the data analysis)	To deliver the Energy Performance Benchmarking Tool as part of the Extended dEPCs applications toolkit (MS7)
Data Storage Duration	Duration of project

4.1.10 Energy Performance Verification and Credibility

DS_10_Energy_Performance_Verification_and_Credibility	
Data Identification	
Dataset Reference/ name	DS_10_EPVC
Dataset description	- Receives operational status data of all IoT devices installed in the pilots and generates **alerts** regarding connection losses and equipment malfunctions - Receives ambient conditions (Temperature, Relative Humidity, Illuminance), indoor air quality (CO_2, VOC, $PM_{2,5/10}$, Radon, Benzene, Formaldehyde), energy metering and occupancy data from the D^2EPC repository and generates **verification signals** if the datasets are reliable qualitative and quantitative-wise Related datasets: DS_01_IM, DS_02_IML
Source of the data (e.g. device, evaluation surveys)	Sensors and smart meters installed locally at the pilot sites.
Related D^2EPC architectural component(s)	D^2EPC Information Management Layer, D^2EPC Repository, D^2EPC Web-Platform
Related D^2EPC objectives	Objective 6
Partners services and responsibilities	
Partner(s) responsible for the data collection	HYP, CERTH
Partner(s) responsible for the data storage	CERTH
Partner(s) responsible for the data analysis	HYP
WPs and tasks	The data will be gathered as part of the activities of WP4 and specifically T4.3.2
Metadata, Pre-processing, Sharing and Expected Size	
Metadata info (Production and storage dates, places) and documentation	TBD

External data used	TBD
Data pre-processing steps	Ambient sensing, air quality, energy metering and occupancy data sets are cleansed in the D^2EPC IML
Sharing	Confidential
Licence type (e.g. Public Domain, Attribution, Non-commercial, No Derivatives, or other)	TBD
Expected volume of data	40-50 GB
Format of data	JSON
Storage location (URI)	TBD
Exploitation	
Data exploitation (purpose/ use of the data analysis)	− Validate the proper operation of the installed IoT devices in the pilots − Verify the qualitative and quantitative reliability of the collected data
Data Storage Duration	Duration of the project

4.2 Pilot Measurement Datasets

4.2.1 Case Study 1 Thessaloniki, Greece

DS_12_Case_Study_1_Thessaloniki_Greece	
Data Identification	
Dataset Reference/ name	DS_12_CS1
Dataset description	Data retrieved from the CERTH/ITI Smart House, which corresponds to D^2EPC Case Study 1 Related datasets: DS_01_IM, DS_02_IML, DS_03_DT
Source of the data (e.g. device, evaluation surveys)	Metering devices and sensors on-site from the pilot building
Related D^2EPC architectural component(s)	D^2EPC Information Management Layer
Related D^2EPC objectives	All (1-6 from DOA)
Partners services and responsibilities	
Partner(s) responsible for the data collection	CERTH
Partner(s) responsible for the data storage	CERTH
Partner(s) responsible for the data analysis	CERTH, HYP
WPs and tasks	The data will be gathered as part of the activities of WP5 and T5.2.
Metadata, Pre-processing, Sharing and Expected Size	

Metadata info (Production and storage dates, places) and documentation	Timestamps, sensor and device IDs, space ids, and more metadata for properly identifying the origin of the data
External data used	Weather API for getting local weather forecast
Data pre-processing steps	Cleaning of outliers and missing data, realized in the IML
Sharing	Consortium
Licence type (e.g. Public Domain, Attribution, Non-commercial, No Derivatives, or other)	Will be evaluated and agreed within consortium
Expected volume of data	50-100 MB
Format of data	Csv if provided as files, JSON if retrieved from the API
Storage location (URI)	Currently in a local server, will also be and stored to the D^2EPC Repository
Exploitation	
Data exploitation (purpose/ use of the data analysis)	To assess the D^2EPC tools, and validate their performance under real-life conditions
Data Storage Duration	The current local database will continue without restrictions since it is used for other applications. Data stored in the project's Repository will remain for the duration of the project.

4.2.2 Case Study 2 Velten, Germany

DS_13_Case_Study_2_Velten_Germany	
Data Identification	
Dataset Reference/ name	DS_13_CS2
Dataset description	At the Velten demonstration site, case study 2, the concepts and solutions developed by the D^2EPc will be tested, validated and evaluated. Data on CO2, temperature and humidity as well as electricity consumption is being collected by devices using Sigfox and NB-IoT technologies. Sigfox: CO_2 emissions in ppt Temperature in °C Humidity in % NB-IoT: Electricity consumption in kWh, Active power

	Current
	Reactive power
	Voltage
	Power factor
	In the case of Sigfox, raw data arrives to Sigfox backend and from there it is transferred to our platform (ThingsBoard) where data is decodified. For the electricity meters, currently data is retrieved by a third party and from there can be transferred to our platform.
	Related datasets: DS_01_IM, DS_02_IML, DS_03_DT
Source of the data (e.g. device, evaluation surveys)	Sensors installed inside the apartments are collecting data on CO2, temperature and humidity.
	Sensors installed in the stairways are collecting data on temperature and humidity.
	These sensors transmit data using Sigfox technology.
	Smart meters installed inside the meters panel in the basement of the building are collecting data on:
	Electricity consumption in kWh,
	Active power
	Current
	Reactive power
	Voltage
	Power factor
	The meters collect data using NB-IoT technology.
Related D^2EPC architectural component(s)	D^2EPC Information Management Layer
Related D^2EPC objectives	All (1-6 from DOA)
Partners services and responsibilities	
Partner(s) responsible for the data collection	CLEO
Partner(s) responsible for the data storage	CERTH, CLEO
Partner(s) responsible for the data analysis	CLEO, KTU
WPs and tasks	WP5
Metadata, Pre-processing, Sharing and Expected Size	
Metadata info (Production and storage dates, places) and documentation	For Sigfox devices: Id number, timestamp. Data is reported every 30 minutes and is directly sent from Sigfox Backend to the ThingsBoard platform (Cleopa local server).
	For meters:

	Device serial number (S/N), timestamp. Data is reported every 5 minutes. Data sent directly from the device to the ThinsBoard platform (Meazon local server).
External data used	Meazon database
Data pre-processing steps	For Sigfox devices: Raw data arrives to Sigfox backend and from there it is transferred to the ThingsBoard platform where data is decodified and available to push it further to an external server, i.e. D^2EPC solution. Callback configuration and payload parsing is required.

For Meazon meters: No data pre-processing takes place. Data are sent from the device in 5min intervals. The data recovery if needed is performed manually every 10-15 days. |
| Sharing | Consortium |
| Licence type (e.g. Public Domain, Attribution, Non-commercial, No Derivatives, or other) | For Sigfox devices connectivity needs to be purchased by means of yearly contracts. Each contract has a token which is consumed by the devices once it is activated.

For the smart meters: EULA |
| Expected volume of data | For Sigfox: N/A

For the meters: 0.24MB usage per month |
Format of data	JSON from API and CSV
Storage location (URI)	The dataset will be stored in D^2EPC DB. Currently in local DB
Exploitation	
Data exploitation (purpose/ use of the data analysis)	The dataset is expected to be used in the demonstration and validation activities for the evaluation of D^2EPC solution.
Data Storage Duration	Duration of the project

4.2.3 Case Study 3 Berlin, Germany

DS_15_Case_Study_3_Berlin_Germany	
Data Identification	
Dataset Reference/ name	DS_14_CS3
Dataset description	This pilot is a demonstration site where the implementation of the concepts and solutions

	developed by the D^2EPc will be tested, validated and evaluated.
	Data on CO2, temperature and humidity is being collected using Sigfox technology.
	Sigfox:
	CO2 emissions in ppt
	Temperature in °C
	Humidity in %
	Raw data arrives to Sigfox backend and from there it is transferred to the ThingsBoard platform where data is decodified and available to push it further to an external server, i.e. D^2EPC solution.
	Related datasets: DS_01_IM, DS_02_IML, DS_03_DT
Source of the data (e.g. device, evaluation surveys)	Sensors are installed at different points in the production halls of the building - data collection on CO2, temperature and humidity.
	The sensors installed in this pilot transmit data using Sigfox technology.
Related D^2EPC architectural component(s)	D^2EPC Information Management Layer
Related D^2EPC objectives	All (1-6 from DOA)
Partners services and responsibilities	
Partner(s) responsible for the data collection	CLEO
Partner(s) responsible for the data storage	CERTH, CLEO
Partner(s) responsible for the data analysis	CLEO, KTU
WPs and tasks	The data are gathered as part of the tasks activities of WP5
Metadata, Pre-processing, Sharing and Expected Size	
Metadata info (Production and storage dates, places) and documentation	Id number, timestamp. Data is reported every 30 minutes and is directly sent from Sigfox Backend to the ThingsBoard platform (Cleopa local server).
External data used	None
Data pre-processing steps	Raw data arrives to Sigfox backend and from there it is transferred to the ThingsBoard platform where data is decodified and available to push it further to an external server, i.e. D^2EPC solution. Callback configuration and payload parsing is required.
Sharing	Consortium
Licence type (e.g. Public Domain, Attribution, Non-commercial, No Derivatives, or other)	For Sigfox devices connectivity needs to be purchased by means of yearly contracts. Each

	contract has a token which is consumed by the devices once it is activated.
Expected volume of data	N/A
Format of data	JSON from API, CSV and Excel
Storage location (URI)	The dataset will be stored in D^2EPC DB. Currently in local DB
Exploitation	
Data exploitation (purpose/ use of the data analysis)	The dataset is expected to be used in the demonstration and validation activities for the evaluation of D^2EPC solution.
Data Storage Duration	Duration of the project

4.2.4 Case Study 4 Nicosia, Cyprus

DS_15_Case_Study_4_Nicosia_Cyprus	
Data Identification	
Dataset Reference/ name	DS_15_CS4
Dataset description	The data will be acquired by the installed equipment, which will be connected to a system to allow monitoring, control, and remote sensing of the actual energy performance of the building, as well as to enable the realization of the dynamic EPC scheme. Related datasets: DS_01_IM, DS_02_IML, DS_03_DT
Source of the data (e.g. device, evaluation surveys)	MX Gateways, MX Devices In the First floor there is one smart meter EG4115 – 15 inputs dataloggers that measure: (in total 14) - 3 x 100 A. - 11 x 50 A 9mm T-EG-0390-0050. In the Second floor there is one smart meter EG4130 Pro – 30 Inputs, that measures: 22 x 50 A 9mm T-EG-0390-0050. In Roof there is one smart meter (EG4115 – 15 input data logger) that measures 5 x 3 three-phase air condition Units. MX1102A 3-Zone monitoring and remote sensing
Related D^2EPC architectural component(s)	D^2EPC Information Management Layer Building Performance Module
Related D^2EPC objectives	All (1-6 from DOA)
Partners services and responsibilities	

Partner(s) responsible for the data collection	FRC
Partner(s) responsible for the data storage	FRC
Partner(s) responsible for the data analysis	FRC
WPs and tasks	The data will be gathered as part of the activities of WP5 and T5.2.
Metadata, Pre-processing, Sharing and Expected Size	
Metadata info (Production and storage dates, places) and documentation	The gather data first are edited and then stored.
External data used	
Data pre-processing steps	
Sharing	Consortium / Private
Licence type (e.g. Public Domain, Attribution, Non-commercial, No Derivatives, or other)	Will be evaluated and agreed within consortium
Expected volume of data	
Format of data	CSV
Storage location (URI)	Cloud-based
Exploitation	
Data exploitation (purpose/ use of the data analysis)	The dataset is expected to be used in the demonstration and validation activities for the evaluation of D^2EPC solution.
Data Storage Duration	Duration of the project

4.2.5 Case Study 5 Berlin, Germany

DS_16_Case_Study_5_Berlin_Germany	
Data Identification	
Dataset Reference/ name	DS_16_CS5
Dataset description	The dataset includes the in-room measurements as well as the meter readings for D^2EPC Case Study 5. Related datasets: DS_01_IM, DS_02_IML, DS_03_DT
Source of the data (e.g. device, evaluation surveys)	Netatmo home coach, which will be positioned on shelf in a living room and APIs from metering data providers
Related D^2EPC architectural component(s)	D^2EPC Information Management Layer
Related D^2EPC objectives	All
Partners services and responsibilities	
Partner(s) responsible for the data collection	SEC

Partner(s) responsible for the data storage	CERTH
Partner(s) responsible for the data analysis	HYP, CERTH, SEC
WPs and tasks	The data will be gathered as part of the activities of WP5 and T5.2
Metadata, Pre-processing, Sharing and Expected Size	
Metadata info (Production and storage dates, places) and documentation	Timestamps, sensor and device IDs, space ids, and more metadata for properly identifying the origin of the data
External data used	Weather data (degree days)
Data pre-processing steps	Cleaning of outliers and missing data, realized in the IML
Sharing	Confidential, only between members of the Consortium
Licence type (e.g. Public Domain, Attribution, Non-commercial, No Derivatives, or other)	Will be evaluated and agreed within consortium
Expected volume of data	4kB per day
Format of data	JSON
Storage location (URI)	Data will be stored locally in server managed by SEC and also to the D^2EPC Repository
Exploitation	
Data exploitation (purpose/ use of the data analysis)	To assess the D^2EPC tools, and validate their performance under real-life conditions
Data Storage Duration	Duration of the project

4.2.6 Case Study 6 Berlin, Germany

DS_17_Case_Study_6_Berlin_Germany	
Data Identification	
Dataset Reference/ name	DS_17_CS6
Dataset description	The dataset includes the in-room measurements as well as the meter readings for D^2EPC Case Study 6. Related datasets: DS_01_IM, DS_02_IML, DS_03_DT
Source of the data (e.g. device, evaluation surveys)	Netatmo home coach, which will be positioned on shelf in a living room and APIs from metering data providers
Related D^2EPC architectural component(s)	D^2EPC Information Management Layer
Related D^2EPC objectives	All
Partners services and responsibilities	

Partner(s) responsible for the data collection	SEC
Partner(s) responsible for the data storage	CERTH
Partner(s) responsible for the data analysis	HYP, CERTH, SEC
WPs and tasks	The data will be gathered as part of the activities of WP5 and T5.2.
Metadata, Pre-processing, Sharing and Expected Size	
Metadata info (Production and storage dates, places) and documentation	Timestamps, sensor and device IDs, space ids, and more metadata for properly identifying the origin of the data
External data used	Weather data (degree days)
Data pre-processing steps	Cleaning of outliers and missing data, realized in the IML
Sharing	Confidential, only between members of the Consortium
Licence type (e.g. Public Domain, Attribution, Non-commercial, No Derivatives, or other)	Will be evaluated and agreed within consortium
Expected volume of data	4kB per day
Format of data	JSON
Storage location (URI)	Data will be stored locally in server managed by SEC and also to the D^2EPC Repository
Exploitation	
Data exploitation (purpose/ use of the data analysis)	To assess the D^2EPC tools, and validate their performance under real-life conditions
Data Storage Duration	Duration of the project

4.3 D^2EPC Datasets for Third Party Stakeholders

As the DMP is considered an ongoing activity with quite a few iterations expected during the project's lifecycle (with one more report version), it is provisioned that more information regarding the datasets for Third Party Stakeholders will be included in the updated version of this report, which is due M36. Relevant findings from WP6 will be studied towards defining the aforementioned datasets, especially the results from Task 6.2 Linking NG EPC with integrated national/regional certification schemes & choices, where information exchange with stakeholders is planned to be brought into discussion.

5 Legislation

The D^2EPC consortium is fully aware of the ethical implications of the proposed research and respects the ethical rules and standards of HORIZON 2020, and those reflected in the Charter of Fundamental Rights of the European Union. In general, ethical, social, and data protection concerns are highly important for D^2EPC and special focus will be given to those aspects. The D^2EPC partners have knowledge of the fact that privacy and data protection concerns could be anticipated as part of the activities (in WP1 and WP5) to be executed in the context of the project's vision. D^2EPC includes data gathering as part of its pilot trials in order to evaluate how effective the envisaged solution is and specific individuals are expected to participate in the pilot execution activities. Data collection will be performed in full compliance with any European and national (i.e. Greece, Germany, and Cyprus) regulatory framework relevant to the country where the data gathering is taking place (INTERNATIONAL/EUROPEAN).

5.1 EU Legislation

Regarding the EU legislation, the D^2EPC partnership considers the following:

- The Universal Declaration of Human Rights and the Convention 108 for the Protection of Individuals with Regard to Automatic Processing of Personal Data and
- The General Data Protection Regulation[11] (Regulation (EU) 2016/679 of the European Parliament and of the Council, hereinafter: GDPR) that has been issued on 27th April 2016).
- Core ethical issues and with the European Charter of Fundamental Human Rights and as well as with any relevant EU standard in the fields of privacy and data protection.

The General Data Protection Regulation - Regulation (EU) 2016/679 of the European Parliament and of the Council, hereinafter: GDPR - applied across the EU from 25 May 2018, replacing the previous Directive 95/46/EC[12]. Articles 40 and 41 of the GDPR are the primary sources of authority for establishing approved codes of conduct to serve as compliance tools for data controllers and processors. Regarding GDPR, 80% of the new legislation is primarily the same as before, just a bit stricter, mainly related to the national Data Protection Acts. The last 20% comes down to better planning, giving informed consent in a more transparent and detailed way, and provides some technical solutions. 10% of the GDPR will be covered by the standard working practises in the EU member states and this opens up own interpretation. This concerns the supervisory authority rules for areas of employment, sensitive personal data such as health data, age threshold for children and in relation to the role of data protection officer.

In D^2EPC, the ethics aspects will be considered by all consortium partners and monitored by the Ethics Advisory Board and the Project Coordinator. Any significant issues or deviations pertaining to the ethics aspects will be reported to the Technical Management Team. The innovation of GDPR in comparison with the previous European actions is that it combines the regulatory aspects with organizational and technological perspectives.

The GDPR regulation addresses individuals, but not anonymized data (data which do not allow the identification of a data subject). According to article 4, par. 1 of GDPR, the personal data are defined as "any information relating to an identified or identifiable natural person (data subject)".

The following sections refer in particular to the information that will be gathered as part of the pilot trials, the respective procedures and the GDPR aspects that will be addressed.

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[11] https://www.eugdpr.org/

[12] http://eurlex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:31995L0046:en:HTML.

On top of the above and in order to safeguard the fundamental human rights and security needs of individuals participating in pilot trials, a particular section will be outlined in the Evaluation Plans including ethical and privacy steps to be followed. These best practice principles include:

- For all data collection it is obligatory to have the explicit informed consent of the persons under observation. This means that the participants are fully aware of and understand in what they are being involved as well as that they fully agree to the research being performed as part of the pilot trials, by giving their explicit consent.
- The collected data will be solely used for the purposes of the D^2EPC project and will not be sold or utilized for any other reason.
- The project will adopt a data minimisation policy that each pilot representative will be responsible for adhering to. This will ensure that no data which are not required for the realization of the proposed research will be gathered.
- In case of acquiring any shadow (ancillary) personal data during the pilot trials, this will be immediately destroyed. Efforts will be done to keep to a minimum this kind of ancillary information. Particular attention will also be given to adhering to the Council of Europe's Recommendation R(87)15 on the processing of personal data for police purposes, Art.2:
    o The collection of data on individuals solely on the basis that they have a particular racial origin, particular religious convictions, sexual behaviour or political opinions or belong to particular movements or organisations which are not proscribed by law should be prohibited. The collection of data concerning these factors may only be carried out if absolutely necessary for the purposes of a particular inquiry.
- In case of compensation, this will be provided as reimbursement for working hours lost as a result of taking part in the research. Particular attention will be given to refrain from unfair inducement.
- In case of recruiting personnel of partner organizations, special precautions will be taken in order to protect them from a breach of privacy/confidentiality and any potential discrimination. In particular, their names will not be made public and their involvement will not be provided to their managers.

5.2 National Legislation

D^2EPC core components will be demonstrated and deployed in Greece, Germany and Cyprus, where each pilot site representative will be responsible for the proper implementation. The legislation for the countries taking part in the demonstration activities is highlighted in the following sections:

5.2.1 Greek Pre-Pilot Trials

- The relevant legislation in Greece corresponds to the GDPR as described above.
- The national supervisory data protection authority in Greece is the Hellenic Data Protection Authority (HDPA) (http://www.dpa.gr/portal).

5.2.2 German Pilot Trials

The relevant legislation in the Germany includes:

- **"Datenschutzgrundverordnung"**, The German equivalent for the GDPR. The legal basis for the processing of personal data is Article 6(1) DSGVO. The DSGVO harmonies the rules for the processing of personal data by private companies and public bodies. This is intended to guarantee the protection of personal data and to ensure the free movement of data.
- ***"General Data Protection Regulation"***, https://eugdpr.org/ The General Data Protection Regulation (EU) 2016/679 ("GDPR") is a regulation in EU law on data protection and privacy

for all individuals within the European Union (EU) and the European Economic Area (EEA). It also addresses the export of personal data outside the EU and EEA areas. The GDPR aims primarily to give control to individuals over their personal data and to simplify the regulatory environment for international business by unifying the regulation within the EU.

5.2.2.1 *Difference between the DSGVO and the GDPR*

The GDPR has direct effect across all EU member states and has already been confirmed. Thus, organisations will still have to be compliant with this regulation as well as examine the GDPR for more legal commitments. Nevertheless, the GDPR provides to member states limited opportunities for making foresights about its application in their country. Hence, it is of high importance to comply with the GDPR along with the DSGVO considering all the highlighted points. The DSGVO is the GDPR of Germany and has partially adapted guidelines.

The national supervisory data protection authority in Germany is the Federal Commissioner for Data Protection and Freedom of Information based on the DSGVO (https://dsgvo-gesetz.de/).

The main topics of the DSGVO (Art 6(1)) are:

- Scope of the processing of personal data
- Legal basis for the processing of personal data
- Data erasure and storage duration
- Provision of the website and creation of log files, cookies, registration, contact form and e-mail contact
    - Passing on personal data to third parties
    - Description and scope of data processing
    - Legal basis for data processing
    - Purpose of data processing
    - Duration of storage
    - Possibility of opposition and removal
- Rights of the data subject
    - Right to information
    - Right to rectification
    - Right to limitation of processing
    - Right to deletion
    - Right to disclosure
    - Right to data transferability
    - Right of objection
    - Right to revoke the declaration of consent under data protection law
    - Automated decision in individual cases including profiling
    - Right of appeal to a supervisory authority

5.2.3 Cypriot Pilot Trials

The relevant legislation in Cyprus includes:

- "Laws 138 (I) of 2001 and 37(I)/2003"

Relevant national authorities include:

- Office of the Commissioner for Personal Data Protection.

6 Conclusions

The Data Management Plan is based upon the datasets for procedures and infrastructure that are anticipated at this point in the project. The second version of this deliverable aims at providing the overall guidelines as well as updates on the datasets listed in the first version.

As previously noted, a key conclusion is that each partner is responsible for particular type of dataset. At this stage of the project, some issues in precisely specifying all essential datasets related to the projects' activities still remain. The studies and the tests that will be carried out in the pilots sites are expected to support this process.

The D^2EPC Data Management Plan will continue to provide the infrastructure required for the proper collection, dissemination and storage of metadata. Each data producer will be in charge of this metadata, which will be made available based on their classification (i.e. Open, Consortium, and Private).

In more detail, D^2EPC will collect data from six pilot sites, which will be conducted in Greece, Germany, and Cyprus. As described, both EU and national legislations and guidelines will be followed closely according to the D^2EPC Ethical Management procedures as defined in D8.4 Data Management Plan v1 & Ethics. D^2EPC will address any ethical and other privacy issues during the lifetime of the project, through activities foreseen in T8.4, reviewing the design, development and deployment of the D^2EPC solutions for data management, privacy and security.

As an ongoing investigation and monitoring, the finalized concrete details on the DMP (in terms of the actual data explored), are expected to be provided in third and final version of this deliverable in M36.

ANNEX A: Non Disclosure Agreements (NDAs)

Non Disclosure Agreement

CONFIDENTIAL DISCLOSURE AGREEMENT

THIS AGREEMENT dated DD/MM/YYYY, by and between [Name of the Data Owner] ("Discloser") and [Name of the D^2EPC partner] ("Recipient").

WHEREAS, [Discloser] and [Recipient] anticipate that [Discloser] may disclose or provide to [Recipient] building-related data and information, energy consumption information, building occupancy information, sketches, specifications, and other materials, confidential or proprietary nature, both written and oral, with the intention to create a collaborative partnership as part of the D^2EPC project's research, including, but not limited to, any and all marketing, financial, future projections and research information drafted or submitted by or on [Discloser]'s behalf, in any jurisdiction, as well as any revisions or supplements thereto (collectively, "Proprietary Information"); and

WHEREAS, [Discloser] intends to ensure that any Proprietary Information is kept confidential;

NOW, THEREFORE, [Discloser] and [Recipient] thus agree, in account of the aforementioned premises and the mutual covenants included herein, as follows:

1. Under the terms of this Agreement [Recipient] agrees to: **(i)** keep any Proprietary Information, in any form, disclosed to [Recipient] by [Discloser], in strict confidence and not disclose it to any third party (including a Recipient's Affiliates) or others or use it for [Recipient]'s own benefit or the benefit of third party or others, at any time, without the express prior written approval of [Discloser] and **(ii)** to perform all necessary and proper actions to ensure protection of the Proprietary Information against third-parties or other unauthorized access. [Recipient] shall only provide Proprietary Information obtained under this Agreement to individuals within its organization only if **(i)** it is necessary for them to know and **(ii)** they are committed in writing to maintain the Proprietary Information as confidential under the same terms as this Agreement. This paragraph 1 shall survive and continue to bind the [Recipient] its employees, agents, representatives, successors, heirs and assigns beyond the expiration or termination of this Agreement.

If [Recipient] is obliged to disclose any Proprietary Information by mandatory law or regulation or by order of a court, government department or agency, or recognized stock exchange, the [Recipient] shall promptly notify the [Discloser] of such obligation, to the extent permitted by law or regulation, allowing [Discloser] to pursue a protective order or other proper remedy or waive compliance with this Agreement's requirements.

A [Recipient] shall only disclose that part of the Proprietary Information that is legally mandated to be disclosed, based on [Recipient]'s advice, regardless of whether a protective order or other remedy is issued, or whether the [Discloser] waives compliance with this Agreement's requirements.

2. The Recipient]'s pledges and obligations] under this Agreement shall not be applicable to any Proprietary Information which: **(a)** is disclosed in a publicly available printed publication or is otherwise in accessible in the public domain due to no fault or related activity on the part of [Recipient]; **(b)** is commonly disclosed without restriction to third parties by [Discloser], or is authorized for release by the [Discloser] in writing; or **(c)** is proven to [Discloser] by accompanying documentation to have been known by [Recipient] before receipt from [Discloser] and/or to have been developed by [Recipient] totally independent of any disclosure by [Discloser] within ten (10) days of disclosure.

3. All property provided to [Recipient] from [Discloser], enclosing all Proprietary Information, shall remain the sole property of [Discloser] at all times, and in no way this Agreement shall be interpreted as grant to [Recipient] of any patents, licenses or related rights to such property and Proprietary Information disclosed to [Recipient] hereafter.

4. On [Discloser]'s demand, [Recipient] shall hand back all documents, drawing and other materials, including all Proprietary Information and all manifestation thereof, that have been provided to [Recipient], along with all copies and reproductions thereof. The [Recipient] must destroy all copies of any Proprietary Information unless required otherwise by mandatory law. The [Recipient] shall acknowledge in writing the compliance with the obligations under this paragraph 4.

5. The Proprietary Information is disclosed "as is", without express or implied representation or warranty, concerning its accuracy or completeness. Each Party hereby acknowledges and accepts that the [Recipient] is solely responsible for all conclusions drawn from the Proprietary Information by the [Recipient]. In any manner and on any legal ground, the [Discloser] shall have no liability in regard to the Proprietary Information, inaccuracies therein, or omissions therefrom.

6. The Parties also agree to the terms and conditions listed below:
   a. For any acts or failures to act that result in a violation of this Agreement's terms, the [Recipient] agrees to be completely responsible and liable to the [Discloser]. Any violation by [Recipient] concerning any of [Recipient]'s obligations under this Agreement will entail the irreversible inquiry to [Discloser] for any damages and other legal remedies that will be insufficient. In order to enforce any of these obligations, [Discloser] will be entitled to provisional and permanent injunction or other equitable relief to prevent, cease and/or restrain this Agreement's breach.
   b. If any term of this Agreement is deemed as invalid or ineffective, then such term shall be construed and restricted to the extent necessary, or disjoined if required, to rule out such invalidity or ineffectiveness, without impacting the other Agreement's terms.
   c. In the event of any disagreement over whether information or matter is considered Proprietary Information under this Agreement, [Recipient] shall have the obligation to prove both that the aforementioned information or matter is not Proprietary Information and that it does not comprise a trade secret.
   d. No failure or delay by either party in exercising any rights under this Agreement will be construed as a waiver of that or any other right. A waiver or permission provided by either party on any one occasion is valid for that occasion only and will not be regarded as a bar to or waiver of any right on any other occasion.
   e. The parties hereto, as well as their respective successors and assigns will be bounded by this Agreement which will inure to their benefit.
   f. This Agreement is governed by and will be interpreted in conformity with the laws of {COUNTRY}, and the courts of {TOWN}, {COUNTRY} shall serve as the sole forum. (TOWN and COUNTRY are considered as the town and the country of the Discloser respectively).
   g. This Agreement supersedes any prior written agreement between [Discloser] and [Recipient] concerning the subject matter of this agreement; in the case of any discrepancy or dispute between the terms of such agreements, the terms protecting Proprietary Information to a greater extent shall take precedence.

This Agreement may not be amended, in whole or in part, without a written agreement signed by [Discloser] and [Recipient].

IN WITNESS WHEREOF, the parties have executed this Agreement as of the date first above written.

[Discloser]   [RECIPIENT]

By: _____   By: _____

Signature   Signature

_____   _____

Printed Name   Printed Name

_____   _____

Title   Title

ANNEX B: Informed Consent Form Guidelines

Consent Form

Project Purpose

- A commonly comprehensible written description of the project and its aims, also targeted to people who are unfamiliar with the project scope (2-3 paragraphs)

Project Progress Schedule

- The progress plan of the project and the corresponding testing and assessment procedures (1-2 paragraphs)

Disclaimer Rights

- Advice on unfettered disclaimer rights on their agreement.

Voluntary Participation Form

1. General Information
   - Participant basic information
   - ID (reference code) of the participant, which will be used throughout the pilot trial execution)
2. Study Information
   - Details about the pilot Use Case
3. Participant's Questionnaire
   - has been fully informed on the purpose, duration, activities of the study;
   - has been informed on the rights to oppose to participation or to resign from the study and about the corresponding consequences.
   - has been informed on the contact person in case of questions and queries about the study.
   - had adequate time to reach a decision regarding the participation in the study.
   - understands that he/she can resign from the study at any time without having to provide any justification regarding his/her decision.
   - has been warned about potential effects, difficulties and dangers.
   - has been informed about the sensors equipment that will be utilized to collect field-level data.
   - has been informed about the security of the study data and results.
   - has been ensured about the confidentiality of his/her personal information. Publications of the study results do not allow the personal data disclosure, due to the principle of anonymity. Always under the confidentiality principles.
4. Signed Consent to Participate
   - A signed consent of the participant allowing the study responsible to examine and evaluate the data gathered during the study.

ANNEX C: Informed Consent Form template

Next-generation Dynamic Digital EPCs for Enhanced Quality and User Awareness

Grant Agreement No 892984

This project has received funding from the European Union's Horizon 2020

Research and innovation programme

Start date	01 September 2020	**Duration in Months**	36
Project Coordinator	Dr. Dimosthenis Ioannidis		
	Center for Research and Technology Hellas (CERTH) (GR)		
Project partners	https://www.d2epc.eu/en/partners		
Project website	https://www.d2epc.eu/en		

Purpose of the study

This document was created in the frame of the D^2EPC project (Grant Agreement N°: 892984), funded by the European Union under Horizon 2020.

D^2EPC aspires to deliver the next-generation of dynamic EPCs for the operational and regular assessment of buildings energy performance through a set of cutting-edge design and monitoring tools and services.

D^EPC relies upon and adjusts accordingly to the smart-readiness level of the buildings and corresponding data collection infrastructure and management systems. It subsequently builds upon actual data and the "digital" twin concept to calculate the energy, environmental, financial and human comfort indicators and through them the EPC classification of the building in question. In this context, D^2EPC will be based on Level 3 6D-BIM literacy, integrating smart meters, actual performance-related data and activities profiling into the buildings' digital twins.

The proposed scheme will provide sufficient background for the redefinition of EPC related policies, through regular benchmarking and upgrade of the reference buildings, as well as with the integration of geolocation and "polluter pay" practices into the EPC rationale. The implementation of the proposed project is also anticipated to foster the energy saving consciousness of buildings' users, through their regular information on the actual energy performance of their buildings and suitable incentivisation. The proposed D^2EPC scheme is expected to transform EPCs into a user-friendly, reliable and cost-effective informative tool for both the wide public (building users, occupants, owners, etc.) and professionals (building managers, engineers, designers, etc.), as well as to establish the grounds for turning EPCs registries into consistent policy feeding mechanisms.

The following page of the document contains the consent form for collecting the above data through measurements and records in your place.

Voluntary Participation Consent Form for the D^2EPC project

1. Volunteer's Information

Full name	
Reference code	

2. Study Elements

Country	
Infrastructure type	
Infrastructure address	
Representative of the pilot	

3. Volunteer Questionnaire

I have read the D^2EPC information sheet, providing more insights about the project (goals, expected duration and procedures of the study).	Yes	No
I was orally informed about the goals, expected duration and procedures of the study by the responsible person.	Yes	No
I was informed of my right to object to participate or to quit the study.	Yes	No
I was informed and I am aware of the contact person, in the case I have questions and queries about the study or about my personal data being gathered.	Yes	No
I was provided with a copy of my filled in consent form.	Yes	No
I was provided enough time to reach a decision regarding my participation in the study.	Yes	No
I comprehend that I can quit the study at any time, without having to provide any justifications and to demand discarding my personal data.	Yes	No
I have been informed of the recording equipment that will be installed in my environment for the purposes of data collection.	Yes	No
I was informed about the storage procedures of the study data.	Yes	No
I was informed about the personal data that will be gathered, the processors and the procedures that will take place, as well as my rights according to the General Data Protection Regulation. Publication of study results does not disclose personal data. Always according to the principles of confidentiality, I approve the utilization of the information by researchers involved in the study and signing respective NDAs, for the purpose of the study and only for this.	Yes	No
I agree to the use of the collected data also after the completion of the D^2EPC project.	Yes	No

I agree to participate in the study	Yes	No

Date: _____   Signature: _____

ANNEX D Informed Consent forms used at the pilot sites

• Greek Pilot (CERTH)

This project has received funding from the European Union's Horizon 2020

Research and innovation programme

Next-generation Dynamic Digital EPCs for Enhanced Quality and User Awareness

Grant Agreement No 892984

Start date	01 September 2020	Duration in Months	36
Project Coordinator	Dr. Dimosthenis Ioannidis Center for Research and Technology Hellas (CERTH) (GR)		
Project partners	https://www.d2epc.eu/en/partners		
Project website	https://www.d2epc.eu/en		

Purpose of the study

This document was created in the frame of the D^2EPC project (Grant Agreement N°: 892984), funded by the European Union under Horizon 2020.

D^2EPC aspires to deliver the next-generation of dynamic EPCs for the operational and regular assessment of buildings energy performance through a set of cutting-edge design and monitoring tools and services.

D^EPC relies upon and adjusts accordingly to the smart-readiness level of the buildings and corresponding data collection infrastructure and management systems. It subsequently builds upon actual data and the "digital" twin concept to calculate the energy, environmental, financial and human comfort indicators and through them the EPC classification of the building in question. In this context, D^2EPC will be based on Level 3 6D-BIM literacy, integrating smart meters, actual performance-related data and activities profiling into the buildings' digital twins.

The proposed scheme will provide sufficient background for the redefinition of EPC related policies, through regular benchmarking and upgrade of the reference buildings, as well as with the integration of geolocation and "polluter pay" practices into the EPC rationale. The implementation of the proposed project is also anticipated to foster the energy saving consciousness of buildings' users, through their regular information on the actual energy performance of their buildings and suitable incentivisation. The proposed D^2EPC scheme is expected to transform EPCs into a user-friendly, reliable and cost-effective informative tool for both the wide public (building users, occupants, owners, etc.) and professionals (building managers, engineers, designers, etc.), as well

as to establish the grounds for turning EPCs registries into consistent policy feeding mechanisms. For more information see the D^2EPC Website: https://www.d2epc.eu/en

Data Categories: In this context, it is necessary to collect data concerning the energy consumption, environmental conditions (temperature, humidity, CO_2), operational set points of specific devices (status, mode, set point) and, finally, visual and thermal comfort feedback information. The installation will be placed at one indicated point inside the building. The dataset will be collected by smart meters for energy monitoring, temperature, humidity and CO_2 sensors for comfort, well-being, life safety, and security for indoor and outdoor usage to allow monitoring, control, and remote sensing of the actual energy performance of the building, as well as to enable the realization of the dynamic EPC scheme. In addition to the aforementioned data that will be collected from your premises, your contact data (name, address, phone number), your premise details (number of rooms, floor, orientation, number of inhabitants), your electrical asset details and the IP address for each of the sensors shall be processed. The research to be conducted aims to be in full compliance with EU REGULATION 2016/679 on the protection of natural persons with regard to the processing of personal data and on the free movement of such data (GDPR regulation).

To this end, you are asked to participate as a pilot user in D^2EPC project and give your consent to the data collection and monitoring of various parameters, such as energy consumption of the building etc. as described above.

The data controller is the Centre for Research and Technology Hellas based in Thessaloniki, Greece. The data controller determines the purposes for which and the means by which personal data is processed and is also the principal party for responsibilities such as collecting consent, managing consent-revoking and enabling right to access.

Data processors, transfer of data: Some of your anonymized data and only those strictly necessary may be processed by data processing project partners on behalf of the data controller and only during the duration of the project. No data collection and processing will be performed by the electrician that shall install the necessary equipment in your premises. No personal data shall be transferred outside the European Union.

All necessary measures shall be taken in order to ensure the security of your data and prevent any unauthorized access such as encryption, access controls, pseudonymization and anonymization.

Duration of the Research Activities: The Research Activities last from September 2020 to August 2023.

Technical and operational measures, Privacy and Confidentiality: As a voluntary participant in the D^2EPC pilot site experiments and analyses, responses you give in the questionnaires and interviews will be recorded. Your recorded data will not include any personal identification; hence it will not be possible to identify you afterwards. Information will be held and used on an anonymous basis only for the purpose of the project D^2EPC on research servers for processing.

Benefits: The results of the survey will provide a feedback to the project partners on the actual energy performance of the building and on the opinion of the users. This will consent to implement corrections and improvements to the system, with potential benefits on the overall project results, but also on the Energy Performance Certificate (EPC) innovations.

Data retention and destruction: Data that are deemed as Open Data will be published to online open repositories (i.e. Zenodo), whereas all other data will be deleted after the project's completion. Any data that will be made openly available will undergo anonymization and/or aggregation where

required and appropriate in order to protect the identities of project participants. Before publishing data sets, even after anonymization, clearance must be issued by the data controllers.

Subject rights and complaint lodging: Participants may exercise their right to access, correct, delete, block the processing, object to the processing, object to the automated energy performance assessment at any moment by contacting Dr. Dimosthenis Ioannidis at the Centre for Research and Technology Hellas. If you wish to lodge a complaint with the competent authority, the competent authority for these matters is the Office of the Commissioner for Personal Data Protection.

Contact persons: Your participation is voluntary, consent can be refused, and withdrawal is possible at any time per email to the local data manager and project Coordinator, Dr. Dimosthenis Ioannidis at djoannid@iti.gr. You can also obtain information and ask for rectifying it. If you decide to exercise your rights, including the withdrawal from the project, please contact the D^2EPC pilot partners in charge, and they will explain the best way for you to exercise them or stop taking part.

Please note that withdrawing your consent at some point of time does not make the so far processing unlawful.

Voluntary Participation Consent Form for the D^2EPC project

Same as template

• German Pilots (Cleopa)

Next-generation Dynamic Digital EPCs for Enhanced Quality and User Awareness

Start date	01 September 2020	Duration in Months	36
Project Coordinator	Dr. Dimosthenis Ioannidis Center for Research and Technology Hellas (CERTH) (GR) Ansprechpartner in Deutschland Detlef Olschewski dolschewski@cleopa.de Cleopa GmbH Tel 03302 2069295		
Project partners	https://www.d2epc.eu/en/partners		
Project website	https://www.d2epc.eu/en		

Purpose of the study

This document was created in the frame of the D^2EPC project (Grant Agreement N°: 892984), funded by the European Union under Horizon 2020.

D^2EPC aspires to deliver the next-generation of dynamic EPCs for the operational and regular assessment of buildings energy performance through a set of cutting-edge design and monitoring tools and services.

D^EPC relies upon and adjusts accordingly to the smart-readiness level of the buildings and corresponding data collection infrastructure and management systems. It subsequently builds upon actual data and the "digital" twin concept to calculate the energy, environmental, financial and human comfort indicators and through them the EPC classification of the building in question. In this context, D^2EPC will be based on Level 3 6D-BIM literacy, integrating smart meters, actual performance-related data and activities profiling into the buildings' digital twins.

The proposed scheme will provide sufficient background for the redefinition of EPC related policies, through regular benchmarking and upgrade of the reference buildings, as well as with the integration of geolocation and "polluter pay" practices into the EPC rationale. The implementation of the proposed project is also anticipated to foster the energy saving consciousness of buildings' users, through their regular information on the actual energy performance of their buildings and suitable incentivisation. The proposed D^2EPC scheme is expected to transform EPCs into a user-friendly, reliable and cost-effective informative tool for both the wide public (building users, occupants, owners, etc.) and professionals (building managers, engineers, designers, etc.), as well as to establish the grounds for turning EPCs registries into consistent policy feeding mechanisms.

For more information see the D^2EPC Website: https://www.d2epc.eu/en

Data Categories: In this context, it is necessary to collect data concerning the energy consumption, environmental conditions (temperature, humidity, CO_2), operational set points of specific devices (status, mode, set point) and, finally, visual and thermal comfort feedback information. The installation will be placed at one indicated point inside the building. The dataset will be collected by smart meters for energy monitoring, temperature, humidity and CO_2 sensors for comfort, well-being, life safety, and security for indoor and outdoor usage to allow monitoring, control, and remote sensing of the actual energy performance of the building, as well as to enable the realization of the dynamic EPC scheme. In addition to the aforementioned data that will be collected from your premises, your contact data (name, address, phone number), your premise details (number of rooms, floor, orientation, number of inhabitants), your electrical asset details and the IP address for each of the sensors shall be processed. The research to be conducted aims to be in full compliance with EU REGULATION 2016/679 on the protection of natural persons with regard to the processing of personal data and on the free movement of such data (GDPR regulation).

To this end, you are asked to participate as a pilot user in D^2EPC project and give your consent to the data collection and monitoring of various parameters, such as energy consumption of the building etc. as described above.

The data controller is Cleopa GmbH, 16761 Hennigsdorf. The data controller determines the purposes for which and the means by which personal data is processed and is also the principal party for responsibilities such as collecting consent, managing consent-revoking and enabling right to access.

Data processors, transfer of data: Some of your anonymized data and only those strictly necessary may be processed by data processing project partners on behalf of the data controller and only during the duration of the project. No data collection and processing will be performed by the electrician that shall install the necessary equipment in your premises. No personal data shall be transferred outside the European Union.

All necessary measures shall be taken in order to ensure the security of your data and prevent any unauthorized access such as encryption, access controls, pseudonymization and anonymization.

Duration of the Research Activities: The Research Activities last from March 2022 to December 2023.

Technical and operational measures, Privacy and Confidentiality: As a voluntary participant in the D^2EPC pilot site experiments and analyses, responses you give in the questionnaires and interviews will be recorded. Your recorded data will not include any personal identification; hence it will not be possible to identify you afterwards. Information will be held and used on an anonymous basis only for the purpose of the project D^2EPC on research servers for processing.

Benefits: The results of the survey will provide a feedback to the project partners on the actual energy performance of the building and on the opinion of the users. This will consent to implement corrections and improvements to the system, with potential benefits on the overall project results, but also on the Energy Performance Certificate (EPC) innovations.

Data retention and destruction: Data that are deemed as Open Data will be published to online open repositories (i.e. Zenodo), whereas all other data will be deleted after the project's completion. Any data that will be made openly available will undergo anonymization and/or aggregation where required and appropriate in order to protect the identities of project participants. Before publishing data sets, even after anonymization, clearance must be issued by the data controllers.

Subject rights and complaint lodging: Participants may exercise their right to access, correct, delete, block the processing, object to the processing, object to the automated energy performance assessment at any moment by contacting Detlef Olschewski dolschewski@cleopa.de Cleopa GmbH Tel 03302 2069295. If you wish to lodge a complaint with the competent authority, the competent authority for these matters is the Office of the Commissioner for Personal Data Protection.

Contact persons: Your participation is voluntary, consent can be refused, and withdrawal is possible at any time per email to the local data manager, Detlef Olschewski dolschewski@cleopa.de Cleopa GmbH Tel 03302 2069295. You can also obtain information and ask for rectifying it. If you decide to exercise your rights, including the withdrawal from the project, please contact the D^2EPC pilot partners in charge, and they will explain the best way for you to exercise them or stop taking part.

Please note that withdrawing your consent at some point of time does not make the so far processing unlawful.

Voluntary Participation Consent Form for the D^2EPC project

Same as template

• Cypriot Pilot (FRC)

Next-generation Dynamic Digital EPCs for Enhanced Quality and User Awareness

Start date	01 September 2020	Duration in Months	36
Project Coordinator	Dr. Dimosthenis Ioannidis Center for Research and Technology Hellas (CERTH) (GR)		
Partner website	https://www.d2epc.eu/en/partners		
Project website	https://www.d2epc.eu/en		

Purpose of the study

This document was created in the frame of the D^2EPC project (Grant Agreement N°: 892984), funded by the European Union under Horizon 2020.

D^2EPC aspires to deliver the next generation of dynamic EPCs for the operational and regular assessment of buildings' energy performance through a set of cutting-edge design and monitoring tools and services.

D^2EPC relies upon and adjusts accordingly to the smart-readiness level of the buildings and corresponding data collection infrastructure and management systems. It subsequently builds upon actual data and the "digital" twin concept to calculate the energy, environmental, financial, and human comfort indicators and through them the EPC classification of the building in question. In this context, D^2EPC will be based on Level 3 6D-BIM literacy, integrating smart meters, actual performance-related data, and activities profiling into the buildings' digital twins.

The proposed scheme will provide sufficient background for the redefinition of EPC-related policies, through regular benchmarking and upgrade of the reference buildings, as well as with the integration of geolocation and "polluter pay" practices into the EPC rationale. The implementation of the proposed project is also anticipated to foster the energy-saving consciousness of buildings' users through their regular information on the actual energy performance of their buildings and suitable incentivization. The proposed D^2EPC scheme is expected to transform EPCs into a user-friendly, reliable, and cost-effective, informative tool for both the wide public (building users, occupants, owners, etc.) and professionals (building managers, engineers, designers, etc.), as well as to establish the grounds for turning EPCs registries into consistent policy feeding mechanisms. For more information, see the D^2EPC Website: https://www.d2epc.eu/en

Data Categories: The Frederick Research Center collects data on energy usage, ambient factors (temperature, humidity, CO2), device operational setpoints (status, mode, setpoint), and, lastly,

visual and thermal comfort feedback. The installation was situated at a predetermined location within the building. Smart meters for energy monitoring, temperature, humidity, and CO_2 sensors for comfort, well-being, life safety, and security for indoor and outdoor use will collect the data, allowing monitoring, control, and remote sensing of the building's actual energy performance, as well as the realization of the dynamic EPC scheme. Personal information will not be gathered in addition to the aforementioned data that will be collected from the Frederick University premises. Each sensor's premise information (number of rooms, floor, orientation, and number of people), as well as the electrical asset information and IP address, must be analyzed. The research will be carried out in strict accordance with EU REGULATION 2016/679 on the protection of natural persons concerning the processing of personal data and the free movement of such information (GDPR regulation).

As a pilot user in the D^2EPC project, Frederick Research Center collects and monitors data on numerous aspects, such as the building's energy use, as detailed previously.

The data controller is the Frederick Research Center based in Nicosia, Cyprus. The data controller is the party in charge of determining the reasons for which and how personal data is processed, as well as collecting consent, managing consent revocation, and providing the ability to information.

Data processors, transfer of data: No personal data shall be collected, processed, and/or transferred on behalf of the data controller and only during the duration of the project or outside the European Union.

Duration of the Research Activities: The Research Activities last from September 2020 to August 2023.

Technical and operational measures, Privacy and Confidentiality: Measurement information will be held and used on an anonymous basis only for the purpose of the project D^2EPC on research servers for processing.

Benefits: The survey's findings will give project partners information on the building's actual energy performance as well as user input. This will give permission to make system modifications and enhancements, which could positively impact the overall project results and the Energy Performance Certificate (EPC) advancements.

Contact persons: Your participation is completely voluntary, and you can deny consent or withdraw at any moment by sending an email to project partner Dr. Paris A. Fokaides at eng.fp@frederick.ac.cy. You can also acquire information and request that it be corrected. If you wish to exercise any of your rights, including the right to withdraw from the project, please contact the D^2EPC pilot partners in charge, who will explain how to do so in the most efficient manner.

Voluntary Participation Consent Form for the D^2EPC project

Same as template

• German Pilots (SEC)

Projekttitel: D2EPC Dynamische digitale EPCs der nächsten Generation für mehr Qualität und Benutzerfreundlichkeit

Datum des Beginns	01. September 2020	**Voraussichtliches Ende**	Sept. 2023
Projektkoordinator	Dr. Dimosthenis Ioannidis		
	Zentrum für Forschung und Technologie Hellas (CERTH) (GR)		
Projektpartner	https://www.d2epc.eu/en/partners		
Projekt-Website	https://www.d2epc.eu/en		

Einleitung

Dieses Dokument wurde im Rahmen des D^2EPC-Projekts (Grant Agreement N°: 892984) erstellt, das von der Europäischen Union im Rahmen von Horizon 2020 finanziert wird.

D^2EPC erforscht Ansätze, welche bei der nächsten Generation von dynamischen Energieausweisen für die regelmäßige Bewertung der Energieeffizienz von Gebäuden Verwendung finden könnten.

Zweck der Datenerhebung

Das vorgeschlagene Verfahren für einen dynamischen Energieausweis bereitet den Hintergrund auf, damit die Europäische Politik einen zukünftigen Energieausweis definieren kann. Dies umfasst regelmäßiges Benchmarking mit ähnlichen Gebäuden, die Ermittlung des Komforts, von Einsparvorschlägen, sowie die Darstellung in Karten. Durch die Umsetzung soll auch das Energiespar-bewusstsein der Gebäudenutzer gefördert werden, indem sie regelmäßig über die tatsächliche Energieeffizienz ihrer Gebäude informiert werden und geeignete Anreize erhalten. Es wird erwartet, dass das vorgeschlagene D^2EPC-System die Energieausweise in ein benutzerfreundliches, zuverlässiges und kosteneffizientes Informationsinstrument für die breite Öffentlichkeit (Gebäudenutzer, -nutzer, -eigentümer usw.) und für Fachleute (Gebäudemanager, Ingenieure, Planer usw.) umwandelt. Energieausweise bzw. die damit generierten Daten sollen die Basis für konsistente Energiepolitische Maßnahmen schaffen.

Art der Datenverarbeitung

D^EPC nutzt bei den Piloten vorhandene Intelligente Infrastruktur der Gebäude zur Datenerfassung (Vernetzte zentrale Wärmemengenzähler oder das vorhandene Energiemanagementsystem der Heizanlage) und ergänzende Datenerfassungsinfrastruktur und Datenmanagementsysteme (konkret Netatmo Homecoach und deren Cloud-Lösung). Anschließend werden auf der Grundlage der aktuellen Daten und des Konzepts des "digitalen" Zwillings die Energie-, Umwelt-, und Komfortindikatoren und damit die Energieausweis-Klassifizierung des betreffenden Gebäudes berechnet.

Die Daten werden dabei vom Projekt:

- maximal mit Stundenmittelwerten ausgewertet (netatmo speichert allerdings selbsttätig in kürzeren Intervallen, SEnerCon nutzt aber nur stündliche Werte)

- anonymisiert mit dem Referenzcode für die Wohnungen gespeichert

- nicht an Dritte außerhalb des Konsortiums weitergegeben

- nur im Rahmen der Verpflichtung zur Erfüllung der Projektauflagen genutzt.

Die folgende Seite des Dokuments enthält die Einverständniserklärung für die Erhebung der oben genannten Daten durch Messungen und Aufzeichnungen in Ihrem Ort.

Zustimmungsformular für die freiwillige Teilnahme am D^2EPC-Projekt

1. Name

Vollständiger Name	
wohnhaft	Sonnenallee 159 10259 Berlin
Referenzcode zur Anonymisierung	

2. Objekt

Land	Deutschland
Art der Infrastruktur	Wohnung
Adresse der Infrastruktur	Sonnenallee 159
Datenakquisition durch	SEnerCon GmbH

3. Zustimmung Datenüberlassung

Ich bestätige hiermit die Teilnahme mit Datenüberlassung zu Forschungszwecken im Projekt D^2EPC. Ich bin über die Umstände (Datenhaltung, Anonymisierung, Datennutzung) informiert worden und dass ich jederzeit ohne Angabe von Gründen die Teilnahme beenden und die Löschung der Daten verlangen kann.

Datum:_____   Unterschrift:_____