

Data management plan v1 & ethics



Project Acronym: D²EPC

Project Full Title: Next-generation Dynamic Digital EPCs for Enhanced Quality and User Awareness

Grant Agreement: 892984

Project Duration: 36 months (01/09/2020 – 31/08/2023)

DELIVERABLE D8.4

Data management plan v1 and ethics

Work Package: WP8 – Project Management & Coordination (M1-M36)

Task: T8.4 Ethics and Data Management

Document Status: Final

File Name: D²EPC_D8.4_Data management plan v1 and ethics_CERTH

Due Date: 28/02/2021

Submission Date: 05/03/2021

Lead Beneficiary: CERTH

Dissemination Level

Public ☒

Confidential, only for members of the Consortium (including the Commission Services) ☐



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Version History

v	Author	Date	Brief Description
0.1	Apostolos Tsolakis	21.12.2020	Initial draft (ToC)
0.2	Apostolos Tsolakis, Panagiota Chatzipanagiotidou	15.01.2021	First version with key aspects in terms of Data Management Plan
0.3	Apostolos Tsolakis, Panagiota	05.02.2021	First Complete Draft

	Chatzipanagiotidou		with both DMP and Ethics sent for feedback collection
0.4	All Authors	22.02.2021	Updated context and corrections provided
0.6	Apostolos Tsolakis	24.02.2021	Ready for Peer Review
0.8	Panagiota Chatzipanagiotidou	03.03.2021	Updated basd on peer review comments
1	Apostolos Tsolakis	05.03.2021	Available for submission to the EC

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Executive Summary

The present report is the deliverable D8.4 corresponding to the first version of the project's Data Management Plan (DMP). Throughout the document, the initial versions of the produced datasets are presented along with the following information:

- Type and short description of the datasets to be produced, collected and processed;
- Management processes of research data during and after the realization of the project;
- Standards and formats concerning the metadata; and
- Information about data sharing, exploitation and preservation.

In the light of the required information and considering the guidelines for reports related to “Pilot on Open Research Data in Horizon 2020”, an appropriate dataset template was created and sent to partners who are responsible for specific components and their corresponding produced datasets.

In the second part of this report, the procedures that all consortium members will adhere to concerning the ethics requirements are presented.

The D²EPC 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. Such critical issues that may emerge, are considered quite typical in the cases of ICT and IoT projects and initiatives. The D²EPC consortium has paid full attention in such issues and structured for this purpose an ethical management plan (Section 6) and a pilot ethical methodology (Section 6) following both the European Union (EU) and national legislations (Section 5). Furthermore, this approach enables secure data exchange among the project members. Further information on these sections is provided within the report.

As the corresponding tasks and pilot activities progress, the datasets will be elaborated and the information on the templates will be updated. The next version of the deliverable is due to be delivered on M18 including the updated information.



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List of Acronyms and Abbreviations

Term	Description
EPC	Energy Performance Certificate
GDPR	General Data Protection Regulation
HVAC	Heating Ventilation and Air Conditioning
IPR	Intellectual Property Rights
LED	Light Emitting Diode
SCP	Secure Copy Protocol
SFTP	Secure File Transfer Protocol



1 Introduction

1.1 Scope and objectives of the deliverable

The current report has a dual scope. First of all, it aims to introduce the general principles and the necessary information for outlining the Data Management Plan (DMP) within D^2EPC project. The mentioned principles and standards should be considered by D^2EPC partners and participants during the collection, organization, storage and sharing of the generated datasets. These datasets will be produced within different project's activities.

The document generally presents two types of datasets. The one is the datasets from the pilot sites' meters (raw data) and the second one is the (processed) datasets from the system's developed components. After proper evaluation and post-processing of the datasets (i.e. anonymization if needed), such data may be utilised for further research by third parties. In this context, the concept of Open Access is described briefly, as it is a quite important concept in research projects.

Secondly, this report is focused on the elaboration of the ethical aspects that surround the D^2epc activities, analyzing also legislative and regulatory frameworks. The overall D^2EPC ethical management policy, and in particular the pilot related requirements and processes.

This document is considered an ongoing process, and following the D^2EPC progress it will be updated throughout the project's duration presenting 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 a preliminary indicative 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. As this report is quite early in the project's duration, most datasets are not yet complexly described.
- **Chapter 5** covers EU and National Legislation that affects directly or indirectly the Data and Ethics Management
- **Chapter 6** introduces the D^2EPC Ethics Management Design, covering the overall policy, a brief outline of the Ethics Advisory Board, and a more extensive list of the Ethical Risks.
- **Chapter 7** goes deeper to the D^2EPC demonstrators, introducing specific requirements, processes, and guidelines for preserving Research Ethics throughout the duration of the D^2EPC project.
- **Chapter 8** sums up the main conclusions and findings of this deliverable, and the next steps for the subsequent deliverables.

1.3 Relation to Other Tasks and Deliverables

The deliverable is an outcome of Task 8.4 Ethics and data management. The provided information can be used as input for the respective tasks concerning the exploitation activities and the work packages related to components' development activities. The templates present various exploitable



data that should be handled properly. In addition, the dataset type, along with the format, standards and data models can be used as input for the activities and deliverables related to development of specific components during WP2, WP3, WP4, and WP5.

In addition, since this report covers also the ethical aspects of the D²EPC project, in particular with relevance to the identified stakeholders (mainly end-users) participating in the project's lifecycle, this document will define the roadmap for the activities of WP1 and WP5, where involvement of end-users is envisaged.



2 General Principles for Data Management

2.1 Participation in the Pilot on Open Research Data

D²EPC participates in the Pilot on Open Research Data Pilot launched by the European Commission along with the Horizon2020 program. The participants of the D²EPC consortium embrace the concepts and the principles of open science and acknowledge the benefits of reusing and evaluating already produced data for promoting and supporting research and innovation projects at European level. The data generated during the project activities may be available in open access for further analysis and exploitation. Towards ensuring the proper usage of data, all the relevant principles for data handling should be described. At the same time, the perspective of the D²EPC 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

The term of open access (OA) concerns the free, online provision of re-useable scientific information to other users. The scope of publically funded research and innovation projects and incentives is to contribute to the improvement of different sectors within society serving environmental, economic and social needs and objectives. The benefits of open access to scientific outcomes are outlined in the “Guidelines on Open Access to Scientific Publications and Research Data in Horizon 2020”¹ and are outlined below:

- Accessible existing scientific publications and results form the basis for efficient peer-to-peer knowledge exchange and improvement of the quality of research reducing the effort and eliminating the duplicated results;
- Connection between market and innovation actions becomes faster and seamless thanks to information flow and
- Transparency during research is ensured, while facilitating the progress and the dissemination of ideas.

The processes for the identification and management of the exploitable results concerning IPR and patent issues and the individual exploitation plans of each partner will be presented and analyzed in the first version of the deliverables Exploitation Report and IPR Protection Plan v1 and v2 in M24 and M36, respectively.

Data availability can be divided in three categories, as mentioned below:

- **Open Data:** Data that are publicly shared for re-use and exploitation
- **Consortium:** Confidential data that are available only to the D²EPC consortium members and the EU Commission services and subject to the project Non-Disclosure Agreement (NDA)
- **Private:** Data that are retained by individual partners for their own processes and tests

Within the D²EPC 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)

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



Shared datasets will be allowed between the consortium members in order to fulfill the project's objectives. For this reason, and under specified conditions, NDAs would be introduced and signed among involved data processors and controllers before distributing these data to the consortium. Secondly, open access to the public may be granted on a fully anonymized dataset, under specified conditions by the consortium members.

D²EPC introduces two main roles concerning data handling activities: the data controllers and the data processors. The data controllers are the ones imposing the purposes and rules of data processing, while the processors are the ones processing the personal data for the sake of the controller. In D²EPC, the data controllers will be the Pilot Responsibles and the Data Protection Officers (DPOs), whereas the data processors will be all the technical partners who will need to analyse data from the pilots.

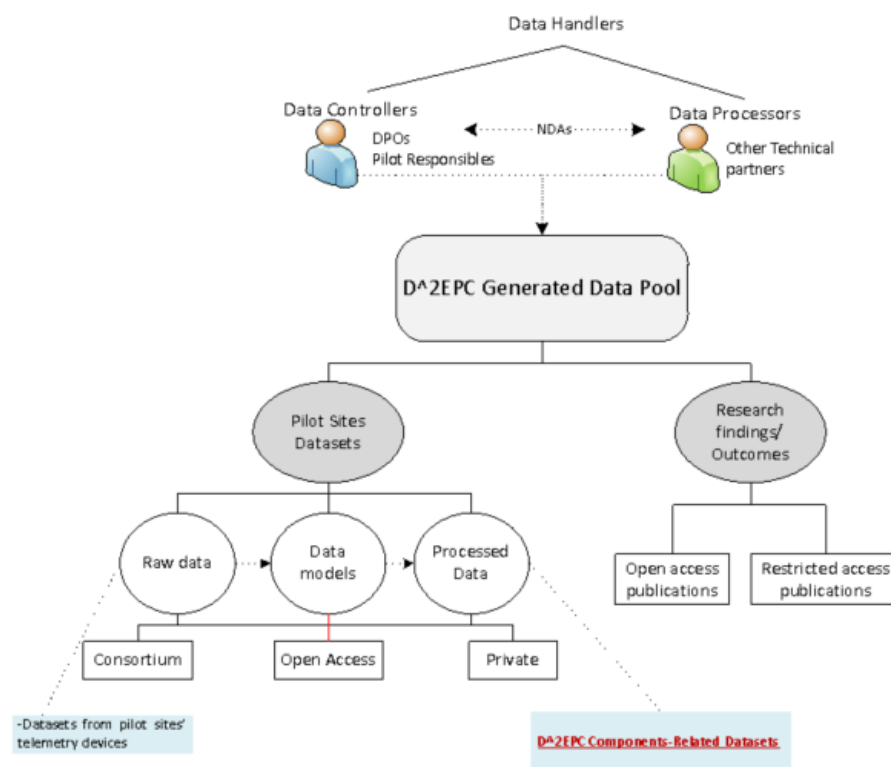


Figure 1. D²EPC Data Handling

2.1.2 Open Access to Scientific Publications

Open access is defined so that each beneficiary must ensure free of charge online access, for any user, to all peer-reviewed scientific publications related to the results extracted from its scientific research.

Partners may define the background needed in any manner, and may exclude specific background (not necessarily prior to signature of EC grant agreement). It is possible to grant exclusive licenses to background and foreground if the other partners waive their access rights and depending on previous agreements. The EC may object to exclusive licenses being granted to third parties established in non-associated third countries for ethical, competitiveness or security reasons (where appropriate, a requirement to notify the EC will apply). Partners may agree to additional or more favourable access rights than those provided for in the consortium agreement. At a preliminary



stage, partners agreed on open access publishing. However, in the future, partners may opt for gold or green access² to peer-reviewed scientific publications, which might result from the project, depending on the information type to be published.

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 (e.g. Zenodo³).

2.1.3 Open Access to Research Data

There are four main aspects of open data summarized in the acronym FAIR⁴:

- **Findable:** Data has a unique, persistent ID, located in a searchable resource, and documented with meaningful metadata.
- **Accessible:** Data are readily and freely retrievable using common methods and protocols, metadata are accessible even if the data are not.
- **Interoperable:** Data are presented in broadly recognized standard formats, vocabularies, and languages.
- **Re-useable:** Data has clear licenses, and accurate meaningful metadata conform to relevant community standards and identifying its content and provenance.

As the project's pilots also concern residential buildings, the datasets from users should be checked if they require aggregation or anonymization for security or commercial reasons prior to release.

2.1.4 IPR Management and Security

Upon the completion of D^2EPC project, along with the integrated platform, a number of software and hardware technological components will be extracted. During the development of these components, Intellectual Property will be generated that has to be protected through patents or copyright⁵, yet made available for other partners for their own work in the project, and exploited outside of the project by appropriate licensing. The handling of the project knowledge and IPRs are specified in the Consortium Agreement (CA) that is signed by partners. Its content reflects in some cases the terms and conditions defined in the Commission Contractual Rules. More specifically, the CA covers topics such as: 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, etc.

D^2EPC, as an innovation action project, addresses mid to high TRL technologies targeting to provide market oriented solutions by the end of the project's duration. The project consortium includes many partners from the academic and institutional sector (CERTH, KTU, UNE, FRC, ASI, AEA), as well as private companies (GSH, CLEO, SEC, DMO, SGS, HYP). These partners will obviously have Intellectual Property Rights on their technologies and data. Therefore, the D^2EPC consortium

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

³ <https://zenodo.org/>

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>



should crosscheck with the concerned partners before every publication of data. More information on the IPR management is disclosed in Deliverables D7.5 and D7.13.

D²EPC 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 may include secure protocols (HTTPS and SSL), login procedures, as well as protection about bots and other malicious attacks, as for example CAPTCHA technologies. Moreover, the demonstration pilot sites apply monitored and controlled procedures related to the data collection, their integrity and protection. Personal information security (data protection and privacy) will entail protective measures against penetration as well as physical protection of core parts of the systems and access control measures. More detailed information on data protection, ethics and security are presented in Sections 6 and 7 of this report.



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	<p><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.></p> <p>Related datasets:</p>
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 ² EPC architectural component(s)	<Mention the name of the architectural component which is linked with the metering device >
Related D ² EPC objectives	<Mention the related D ² EPC 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 ² EPC 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 D²EPC partners can use a variety of methods for exploitation and dissemination of the data including:

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

The main sharing enabler of the datasets to be produced within the pilot activities will be the Zenodo Online Repository³. Zenodo was developed by researchers for researchers and not only, as part of the OpenAIRE project⁶, to ensure that everyone can join in Open Science.

Besides open sharing and for the needs of the D²EPC tools, a dedicated secure repository will be deployed for the project, Secure application programming interfaces (APIs) will be implemented for delivering a robust information flow among the various D²EPC components, through common industry protocols such as CoAP, MQTT and HTTP(S). In case of public/open datasets, these APIs may also be provided to third parties (besides Zenodo).

Towards data interoperability, the D²EPC information exchange and specifically EPC related information will be built on well-known protocols and standards such as ETSI SAREF⁷. These are expected to be identified and extended if needed in the activities foreseen in *T2.5 D²EPC Information Model*. As this Task has not been initiated yet, more information will be provided in the next versions of this report.

⁶ <https://www.openaire.eu/>

⁷ <https://saref.etsi.org/>



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

Data storage will be performed in a secured form (e.g. data encrypted with a strong cryptographic protocol) in servers indicated by the pilots or the technology providers, and agreed within the consortium. Descriptive metadata will be also stored/provided by such repository. To ensure data reliability, RAID and other common backup technologies may be employed. Local backups of the data, if needed, could be also established by the pilot responsables (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 will be applied for the quality assurance of the collected data:

- When transefring data from field devices to other project repositories for further processing and analysis, specific technical measures should be followed.
- Pilot sites should be equipped with suitable devices and mechanisms so as 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 trasfered 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 identified as confidential will be discarded after the realization of the project, whereas only the public models and respective datasets that will be described in details in the Data Management Plan will be kept open.

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 linked with 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 D²EPC 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 D²EPC 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 from malevolent/criminal/terrorist abuse by following strictly procedures, as they will be defined 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 D²EPC 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 D²EPC 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. Inline 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:
 - Name, address, phone/fax. number(s), e-mail address, full postcode
 - Any identifying reference numbers, photographs, data about relatives.
- **Right to get more information about the pilots:** The pilot participants will be in completeliberty 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.

3.7 Datasets List

The produced datasets are defined, presuming certain interactions between the various modules of the D^2EPC architecture. These interactions are bound to change in a later stage of the project, when the tools will be developed and a clear description of the D^2EPC components interrelations will be available. More specifically, the datasets described in this section are subdivided, in accordance with Figure 1, into:

- i) datasets belonging to the architecture components of D^2EPC (DS_01 - DS_12),
- ii) raw datasets from the pilot sensors/meters (DS_13 – DS_18),
- iii) open data / datasets to be made available for third party stakeholders (DS_19+).

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_Building_Energy_Performance_Simulation_Engine	T3.3, WP4, WP5	CERTH
DS_05_GIS_Tool	T3.2, T3.3, T4.4, WP5	GSH
DS_06_Building_Performance_Module	T4.1, T4.2, T4.4, WP5	SEC



DS_07_Roadmapping_Tool_For_Performance_Upgrade	T4.2, T4.4, WP5	CERTH
DS_08_AI_Driven_Performance_Forecasts	T4.2, T4.4, WP5	CERTH
DS_09_Performance_Alerts_and_notifications	T4.2, T4.4, WP5	CERTH
DS_10_Building_Energy_Performance_Benchmarking	T4.3, T4.4, WP5	HYP
DS_11_Energy_Performance_Verification_and_Credibility	T4.3, T4.4, T3.1	HYP
DS_12_D ² EPC_Web_Platform	T4.4, WP5	SEC
Measurement Datasets		
DS_13_Case_Study_1_Thessaloniki_Greece	T3.1, T3.3, T4.4, WP5	CERTH
DS_14_Case_Study_2_Velten_Germany	T3.1, T3.3, T4.4, WP5	CLEO
DS_15_Case_Study_3_Berlin_Germany	T3.1, T3.3, T4.4, WP5	CLEO
DS_16_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_17_Case_Study_5_Berlin_Germany	T3.1, T3.3, T4.4, WP5	SEC
DS_18_Case_Study_6_Berlin_Germany	T3.1, T3.3, T4.4, WP5	SEC



4 Description of Datasets

In this Section, a preliminary assessment of few available D²EPC datasets are elaborated in more detail. Since at this point in the project's progress, the complete functionalities and data requirements from the components, and therefore the pilots are not clear, limited information is provided for each dataset. Both the number of the dataset and context may change in the following months, and will be updated in the next version of the DMP which is due M18.

4.1 Architecture Components

4.1.1 D²EPC_Information_Model

DS_01_IM	
Data Identification	
Dataset Reference/ name	DS_01_IM
Dataset description	<p>The data in tasks T2.1, T2.2, T2.3, T2.4 is collected in order to analyse and define a set of indicators to be included in the next generation EPCs, including SRI, LCA and Economic indicators and considering user driven models (thermal/vision comfort, occupancy).</p> <p>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.</p> <p>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.</p> <p>LCA indicators included in the dataset links it to the relevant guidelines.</p> <p>Economic indicators dataset enables the interpretation of the individual elements of buildings energy performance into monetary normalized values.</p>
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.). Other will be determined.
Related D ² EPC architectural component(s)	Technical requirements, specifications and Architecture will be determined when task T1.4 will be executed and deliverable D1.4 presented (M7).
Related D ² EPC objectives	Objective 1, Objective 3, Objective 4, Objective 5, Objective 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 will be gathered from the deliverables D1.3 and D1.4 of WP1, T1.3, T1.4.
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 be act as the foundation of the data molel
Sharing	<p>The dataset generated will be shared among project partners throught 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.</p> <p>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.</p>
Licence type (e.g. Public Domain, Attribution, Non-commercial, No Derivatives, or other)	Will be evaluated and agreed within consortium
Storage location (URI)	<p>Public - https://www.d2epc.eu/en; (Other Online repositories will be explored)</p> <p>Consortium / Private information will be stored in D^2EPC share point - https://www.d2epc.org/.</p>
Exploitation	
Data exploitation (purpose/ use of the data analysis)	To deliver D^2EPC Information Model (milestone no 4).

4.1.2 D^2EPC_Information_Management

DS_02_IML	
Data Identification	
Dataset Reference/ name	DS_02_IML



Dataset description	Indoor ambient conditions, occupancy, energy metering and operational status are the typical datasets collected from the sensing 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 ² EPC architectural component(s)	Information Management Layer
Partners services and responsibilities	
Partner(s) responsible for the data collection	HYP
WPs and tasks	The hardware to be deployed at the pilot sites 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	
External data used	N/A
Data pre-processing steps	Data cleansing techniques (e.g. outlier detection/removal/replacement)
Sharing	Consortium / Private

4.1.3 Performance_Alerts_and_notifications

DS_09_PAN	
Data Identification	
Dataset Reference/ name	DS_09_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 to the most efficient to the targeted user.
Source of the data (e.g. device, evaluation surveys)	Surveys, literature, and other components
Related D ² EPC architectural component(s)	Performance Alerts and notifications
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
WPs and tasks	The data will be gathered as part of the of WP4 and T4.2



4.2 Pilot Measurement Datasets

4.2.1 Case_Study_1_Thessaloniki_Greece

DS_13_Case_Study_1_Thessaloniki_Greece	
Data Identification	
Dataset Reference/ name	DS_13_Case_Study_1_Thessaloniki_Greece
Dataset description	Data retrieved from the CERTH/ITI Smart House Related datasets: -
Source of the data (e.g. device, evaluation surveys)	Metering devices on site from the pilot buildings
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	CERTH
Partner(s) responsible for the data storage	CERTH
Partner(s) responsible for the data analysis	CERTH
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 weather forecast
Data pre-processing steps	Cleaning of outliers and missing data
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	50-100MB
Format of data	Csv if provided as files, json if retrieved from the API
Storage location (URI)	Currently in a local server
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. If a dedicated DB within the D ² EPC is created, it will be determined later in the project how it should be handled.
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4.2.2 Case_Study_4_Nicosia_Cyprus

DS_16_Case_Study_4_Nicosia_Cyprus	
Data Identification	
Dataset Reference/ name	DS_16_Case_Study_4_Nicosia_Cyprus
Dataset description	<p>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</p> <p>Related datasets: DS_01_IM, DS_02_IML</p>
Source of the data (e.g. device, evaluation surveys)	There will be 3 zones in total; the university's cafeteria on the ground floor, three seminar halls on the first floor, and offices on the second floor. 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. Additionally, the supply and installation of a weather station will be at the building's rooftop based on automated measurements and real-time data.
Related D ² EPC architectural component(s)	Building Performance Module
Related D ² EPC objectives	<ul style="list-style-type: none"> - Analysis and preparation of the D²EPC pilot sites; - Deployment of the D²EPC solutions at the pilot sites and validation of the integrated framework; - Evaluate the impact achieved by the D²EPC framework implementation at pilot buildings; - Consolidate lessons learned from real-life demonstrations
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	
Sharing	Consortium / Private

4.2.3 Case_Study_5_Berlin_Germany

DS_17_Case_Study_5_Berlin_Germany	
Data Identification	
Dataset Reference/ name	Meter data readings
Dataset description	<p>Meter data is acquired directly addressing the meter or from network operators. For smaller units meter data is acquired and stored every month, not to exhaust meter batteries.</p> <p>Related dataset: weather data for the location or more precisely degree days</p>
Source of the data (e.g. device, evaluation surveys)	Meter data is acquired from the district heating heat transfer module located mostly in the cellar
Related D ² EPC architectural component(s)	Data is stored in SECs meter data database
Related D ² EPC objectives	to be able to update the performance based EPC every month
Partners services and responsibilities	
Partner(s) responsible for the data collection	SEC or the service provider
Partner(s) responsible for the data storage	SEC or the service provider
Partner(s) responsible for the data analysis	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	Building and Client ID
External data used	Degree Days Data
Data pre-processing steps	Data attribution to time periods might be necessary if readings are lacking. Since performance-based EPC is only allowed for multi family homes, no anonymisation is needed,
Sharing	Confidential to the flat owners
Licence type (e.g. Public Domain, Attribution, Non-commercial, No Derivatives, or other)	n.a.
Expected volume of data	one reading per month relates to less than 50 bytes
Format of data	Database
Storage location (URI)	Database is not accessible from the internet by



	design
Exploitation	
Data exploitation (purpose/ use of the data analysis)	Data is weather corrected and used to calculate the energy intensity of the residential building per m ² inhabited area. Those results might be presented to entities owning several buildings in a dashboard. Savings calculations and machine learning may make use of the data (outside the project).

4.2.4 Case_Study_6_Berlin_Germany

DS_18_Case_Study_6_Berlin_Germany	
Data Identification	
Dataset Reference/ name	Meter data readings
Dataset description	Meter data is acquired directly addressing the meter or from network operators. For smaller units meter data is acquired and stored every month, not to exhaust meter batteries. Related dataset: weather data for the location or more precisely degree days
Source of the data (e.g. device, evaluation surveys)	Meter data is acquired from the district heating heat transfer module located mostly in the cellar
Related D ² EPC architectural component(s)	Data is stored in SECs meter data database
Related D ² EPC objectives	to be able to update the performance based EPC every month
Partners services and responsibilities	
Partner(s) responsible for the data collection	SEC
Partner(s) responsible for the data storage	SEC
Partner(s) responsible for the data analysis	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	Building and Client ID
External data used	Degree Days Data
Data pre-processing steps	Data attribution to time periods might be necessary if readings are lacking. Since performance-based EPC is only allowed for multi family homes, no anonymisation is needed,
Sharing	Confidential to the flat owners



Licence type (e.g. Public Domain, Attribution, Non-commercial, No Derivatives, or other)	N/A
Expected volume of data	one reading per month relates to less than 50 bytes
Format of data	Database
Storage location (URI)	Database is not accessible from the internet by design
Exploitation	
Data exploitation (purpose/ use of the data analysis)	Data is weather corrected and used to calculate the energy intensity of the residential building per m ² inhabited area. Those results might be presented to entities owning several buildings in a dashboard. Savings calculations and machine learning may make use of the data (outside the project).

4.3 D²EPC Datasets for Third Party Stakeholders

As the project is still in its first steps, there is additional work required as part of the technical activities within WP2, WP3 and WP4, as well as pilot preparation in WP5, towards presenting more concrete information on the all datasets, and in particular the pilot ones. As the DMP is considered an ongoing activity with quite a few iterations expected during the project's lifecycle (with two more report versions), it is expected that more information to be included in the updated version of this report, which is due M18.



5 Legislation

The D²EPC 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. Generally speaking, ethical, social and data protection considerations are significant for D²EPC and special focus will be given to those aspects. The D²EPC 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. D²EPC 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 D²EPC 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 Regulation⁸ (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/EC⁹. 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 D²EPC, 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)”.

• ⁸ <https://www.eugdpr.org/>

⁹ <http://eurlex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:31995L0046:en:HTML>.



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.

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 is not needed 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:
 - 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 employees of partner organizations, special actions will be followed in order to shield them from a breach of privacy/confidentiality and any potential discrimination. In particular, their names will not be made public and their participation will not be communicated 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 (HDP) (<http://www.dpa.gr/portal>).

5.2.2 German Pilot Trials

The relevant legislation in 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 harmonises 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 D^2EPC Ethical Management

With the aim to be compliant with the EU and national legislations outlined in Section 5, the D^2EPC partnership:

- Allocates special efforts to ensure the confidentiality and security of the collected, stored, and transferred data;
- Secures access to personal data, which can be re-identified only by the ethics boards; and
- Has delivered an information consent form and Non-Disclosure Agreement (NDA) templates that will be distributed and signed by the pilot trials participant (the former) or between consortium members (the latter).

The following section presents the actions that D^2EPC partners will pursue towards this direction.

6.1 Ethics Advisory Board

An Ethics Advisory Board (EAB) has been established to support and safeguard any legal and ethical issues within the project's results and the technologies developed. The Ethics Advisory Board (EAB) will address privacy issues related to data collection, management and processing, supporting the consortium members that participate in the development and realisation of the pilot studies, as well as actual end-user participants.

The members of the EAB are provided in Table 3, as agreed and delivered in D8.1 Project Management Plan. The EAB includes at least one person per pilot, who will be in charge of pointing out potential ethical issues, implementing the D^2EPC ethical policy, as well as resolving ethical concerns raised during the trials, and the Ethics Manager, who will act as the coordinator of the ethics board. The ethics board will be assisted by further external experts (or the commission), if needed.

The EAB will be responsible for the implementation and management of the ethical and legal issues of all procedures in the project, ensuring that each of the partners provides the necessary participation in D^2EPC and its code of conduct towards the participants. In addition, the EAB members will be the only ones who will have the key to re-identify the data gathered during the pilot trials. In order to make sure that each pilot site will comply with its national legislation, during the execution phase, an ethics committee will be formed for each pilot site and one person will be nominated per site as responsible for taking into consideration the project's guidelines as well as the National and European legislations (as already provided in the following table).

Table 3. D^2EPC Ethics Advisory Board

Partner	Person	e-mail
CERTH (Greece)	Dr. Dimosthenis Ioannidis (Ethics Manager)	djoannid@iti.gr
CLEO (Germany)	Mr. Detlef Olschewski	dolschewski@mail-do.de
SEC (Germany)	Mr. Immanuel Hengstenberg	Immanuel.Hengstenberg@senercon.de
FRC (Cyprus)	Dr. Paris Fokaides	eng.fp@frederick.ac.cy

Additionally, the EAB will provide a clear mandate and will support and train the consortium members in terms of ethical and privacy issues. Considering the European legislation and the



National legislation of the countries, the EAB will outline best practises and recommendations for the demonstration sites, in which the pilot use cases will take place.

6.2 Ethical Policy

D^2EPC will align with the opinions of multiple experts (e.g. the European group on ethics – EGE) in regards to science and novel technologies to the EC. In addition, all national legal and ethical requirements and guidelines of the countries where the research is performed will be followed and fulfilled. Any human-related data collection will be strictly held confidential at any time of the research to be conducted, which will also be in full compliance with the principles and guidelines of “Ethics for Researchers” to facilitate research excellence (prepared by the EC Governance and Ethics Unit in 2007). This means in detail that:

- detailed information will be provided to all end-users upon requesting their consent to any monitoring and data acquisition process. All participants will be strictly volunteers and will receive detailed oral (and where necessary written) information.
- there will not be any kind of centralized storage of personal or sensitive data. Moreover, where possible, data will be processed (e.g. data scrambling and abstraction) in a way that will not affect the final project outcome.

Furthermore, to further facilitate understanding and communication the following will be distributed in their native language:

- an easy to understand written description of the project in general and its goals;
- the project’s timeplan, including progress aspects and related testing and evaluation procedures; and
- advice on unrestricted disclaimer rights on their agreement.

In parallel, the EAB will carefully evaluate all research activities towards guaranteeing that no unjustified risk for the end-users will be possible, neither technical nor related to the breach of privacy. The D^2EPC Consortium will perform all activities in full respect of all ethical and legal requirements and code of practice. In any case, in which authorisations are required from national bodies, those shall be considered as project related documents. Copies of such authorisations shall be submitted to the EC prior to commencement of the relevant project activities.

6.3 Ethical Risks

In general, there are not any critical ethical issues or problems to be introduced by the D^2EPC project; nevertheless several typical considerations to ICT applications and real-world pilot demonstrators shall be considered. The D^2EPC consortium has the necessary experience and expertise to address any challenges that may arise in regards to ethical risks and mitigate them seamlessly.

Following best management practices, a risk registry has been formed and documented in D8.2 “Quality & Risk Assessment Plan”. As the project progresses, In parallel with other activities, ethics and security issues will be thoroughly investigated in an iterative process and always in a way that will allow risk avoidance and, if needed, early mitigation.



7 D^2EPC Pilot Ethical Methodology

As the ethical requirements identification is closely related to the pilots demonstration activities, where the most engaging participation of end-users is expected, a specific methodology is drafted and presented towards describing in detail the steps and guidelines for all involved processes, from data collection to results exploitation. The aim of this specific procedure is to ensure that any pilot-related activity is in accordance with ethical principles concerning user privacy and data protection.

7.1 Ethical Requirements

In accordance with EU and national legislations along with the national implementations in relevant EU Member States, D^2EPC has identified initial steps to be followed by the consortium as follows:

1. Identify and analyse National and EU Regulations
2. Provide detailed specifications regarding data collection towards D^2EPC objectives
3. Provide detailed consent forms and procedures for end-users' participation (include information about data collection, storage, protection, retention, handling and destruction). Ensure compliance with national and EU legislation for all of the above.
4. Provide Non-Disclosure Agreements (NDAs) to be signed if needed (beyond what is stated in the GA) to justify and ensure proper information exchange within D^2EPC activities.
5. Define detailed policy regarding incidental findings
6. Confirm opinion or confirmation by the competent Institutional Data Protection Officer and/or obtain authorization or notification by the National Data Protection Authority, and keep on file (whichever applies according to GDPR and national laws).
7. Provide reasonable justification for any case of personal sensitive data collection and/or processing.
8. Before complete implementation, integration and Pilot deployment all necessary NDAs will have been signed by the involved parties.
9. Before initiating pilot deployment, all involved end-users will be thoroughly informed, both orally and written, through informed consents. The later, after signage, will be collected from all involved stakeholders.

7.2 Process Approach and Guidelines

The framework delivered will be evaluated and validated under real-life conditions in Greece, Germany, and Cyprus buildings with the aim to evaluation the real-life potential of the dEPC technologies offered by the D^2EPC framework. The demonstration case studies to be tested are described briefly below:

- One demonstration building will be CETH/ITI nZEB Smart House at CETH premises in **Thessaloniki, Greece**, a 316 m² rapid prototyping demonstration infrastructure shaped as a real residential household. The house is representative of a single family, detached residential building and is already equipped with many IoT, smart home solutions that provide a lot of information about its operational characteristics. The existing infrastructure of the building will be extended to incorporate the proposed software tools. The intention is the experimentation with the energy assessment and renovation-support tools, to assess the applicability in real-life situations and their usability along with any margins for further developments. It is equipped with a 9.57kWp PV system and a 5kWh Li-on battery, and a custom BMS for monitoring and control.
- In **Velten, Germany**, the pilot building consists of six apartments (three-store) and a cellar where all the mechanical equipment is located. The building is occupied by 10 tenants. The heating system consists of one Viessmann Vitodens 300-W condensing boiler and one DHW



cylinder Viessmann Vitocell with capacity of 150 liters. Oil is the main source of fuel. The whole equipment was installed in 2009, and it is in a good condition. It is set to maintain a water temperature of 60°C and provide hot water to the apartments through radiators. No renewable energy systems are currently installed. The electrical systems (cables) were recently upgraded.

- In **Berlin, Germany**, three different case studies.
 - The first one is a building of 2235 m² with four different heating installations, two gas powered HVAC systems, one gas powered base building heating system and one gas powered "black heater" in the production area. The building is used by a metalworking company and can be divided into the following areas: Stainless steel production hall 2 of the plasma cutting machine, production hall 1, staff room, work equipment warehouse, lathe and milling shop, polish, paint shop and a warehouse. Above the work equipment warehouse, turning shop and milling shop are the offices on the 1st floor. The other areas are designed as an industrial hall. Production hall 1 already has a new, well-insulated roof made of sandwich panels and is heated by a gas heater (200 kWth). The original lights are retrofitted into LED. The paint shop still has the old, uninsulated roof construction. The air heater is powered by oil (203 kWth) and is located in the front area on the wall and heats it through an opening in the wall. In the production hall 2, a middle/interior wall was removed. This separated the ceiling radiator (approx. 20 kWth) heated area with the plasma cutting machine from the remaining, non-suspended hall area. The rest of the area is now covered by heated fresh air, which is supplied externally via a ventilation duct. The fresh air heater has a heating capacity of approx. 45 kW. This is a temporary solution, which was installed in the course of the restructuring of the production and is now to be optimally designed. The lighting consists of T5 luminaires in the suspended area and LED Retrofit T8 in the non-suspended area. The regular door openings allow the cooling of the hall.
 - The second pilot building is located in Donaustraße. It has been erected in 1996. It consists of 18 flats. The tenants are participating in an energy monitoring scheme. The building is heated via methane, has a green roof and there is a solar thermal installation on the roof at the southwest oriented and facing the yard. In front of the building and in the backyard trees are located.
 - Finally, the last pilot building will be located as well in the centre of Berlin and it is a classical multifamily building, with exterior walls made from brickwork and wooden windows. The building is already equipped with smart devices and its performance is being monitored by SEC. The building was initially constructed in 1911 and constitutes a historical building as well. It consists of 4 floors, and overall, there are 12 apartments, with 36 occupants of mixed age.
- In **Nicosia, Cyprus**, the pilot comprises of FRC's new wing building, which is a two-store 2000 m² building, built in 2007. University's cafeteria is in the ground floor. In the first floor, there are three seminar halls of 220 students' capacity and offices are found in the second floor. The building can host up to 390 people. The services that are provided within the building include heating, cooling, ventilation, lighting and electrical appliances. A 3 kW Solar Water Heating System is currently installed on the building. The building has already a BMS system installed for the monitoring and control of the building's HVAC systems, lighting and appliances.

For all demonstrator cases, in order to ensure that all proper procedures will be followed for collecting and handling data, the below process (Figure 2) will be followed:



- Detailed Informed consent forms including all required project information must be prepared for the pilot participants. Where required their native language should be selected (a sketch of the consent form can be found at Annex B).
- Permission from the national data protection authorities should be taken for each of the pilots prior to their deployment.
- NDAs will be signed between D²EPC pilot responsible partners and building owners (public and residential) for the data collection and use, in cases where the buildings are not owned by Consortium members (see Annex A).
- Pilot responsible partners should identify and introduce Data Protection Officers (DPOs), Pilot responsible and Data controllers for the proper execution of the Data Management Plan according to ethical requirements.

This methodology guarantees that:

- All the participating end-users are fully aware of the D²EPC objectives, and the data that will be collected to achieve them.
- It will not be possible to distribute sensitive data outside the D²EPC project, and
- Access to all D²EPC partners to the data necessary for the completion of the research, will be provided, as needed.

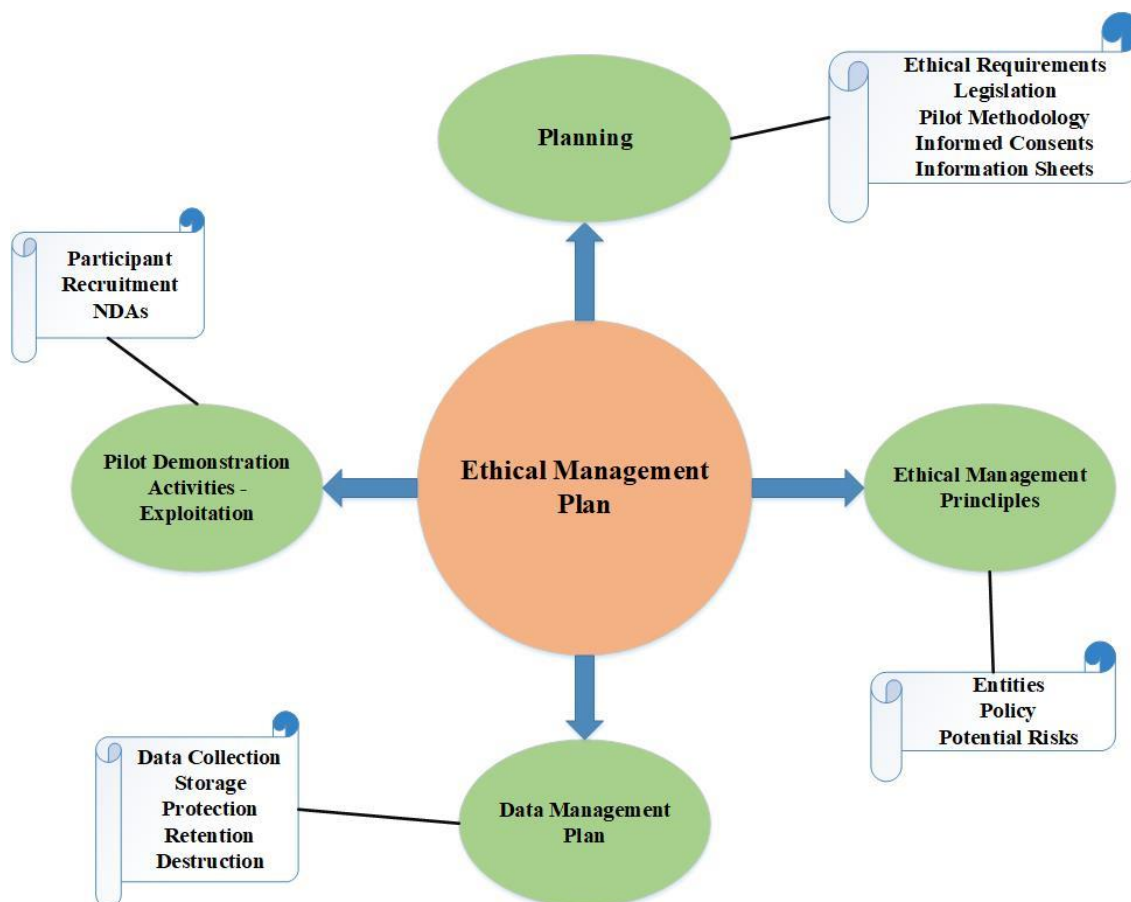


Figure 2. Ethical Management Methodology

7.3 Methodology & Guidelines for the delivery of Informed Consent

Consent procedures are to be carefully defined and managed by Pilot-Specific Work Packages (WP4 and WP5) that will manage the Use Cases per pilot demonstrator. Throughg foreseen activities in these WPs, it is expected that various end-users (building owners, tenants, etc.) will voluntarily enrol (by signing the consent form prepared) to the D²EPC pilot trials. All of these procedures, starting with the design of the observational study will be prepared in strict collaboration with the D²EPC EAB, in order to respect privacy and ethical issues implied by the data to be collected and analysed. In particular, the consortium, with the guidance of the Ethics Manager and the EAB, will take the appropriate action for exluding that:

1. data can be collected without the explicit informed consent of people participating in the pilot trials; no person unable to express a free and informed consent for age-related reasons, ongoing medical and / or psychological conditions, mental incapacity, will be enrolled in the study;
2. data collected may be sold or used for any different purposes (beside the project's objectives) from the D²EPC project;
3. data will be collected that are not strictly necessary to accomplish the current study; data minimization policy will be adopted at any level of the project and will be supervised by the ethical/privacy component of the project;
4. any shadow (ancillary) personal data obtained in the course of the observation will be immediately cancelled. However, it is planned to minimize as far as possible this kind ancillary data.

Special attention will be also paid to comply with Council of Europe's Recommendation R(87)15 on the processing of personal data for police purposes, Art.2: *"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"*. Some sessions between technical and ethical components of the project will be devoted to this.

The end-user enrolment, followed by the consent procedure for the pilot demonstrator realisation at each pilot site will be obtained through a two-stage procedure:

- Initially the each pilot responsible partner will arrange for an oral presentation to the pilot end-users that will be involved, towards carefully describing the level of privacy infringement that the execution of each of the pilot realisation involves. In case someone wants to exercise his/her right not to know, he/she will be excluded from the pilot.
- Secondly, either in the end of the presentation or after a few days, subjects will be required to read and sign an informed consent form that will explain in both plain English and in local language what has already been orally explained. The informed consent forms in English and in local language to be used will be included in the experimental protocol, and if requested, they will be sent to the European Commission.

A template of such a consent form, to be adopted as required per pilot use case, is provided in the Annex B.

8 Conclusions

The Data Management Plan is based upon the datasets for procedures and infrastructure that are anticipated at this point in the project. The first version of this deliverable aims at providing the overall guidelines and a first preliminary list of identified datasets.

An important conclusion is that all the partners are responsible for different kind of datasets. At this phase of the project, there are many difficulties to specify exactly all the relevant datasets for the projects' activities. This process will be supported by the studies and the tests on the pilot sites.

The D^2EPC Data Management Plan will focus on providing the necessary infrastructure for the appropriate collection, publication and storage of metadata. This metadata will be managed by each data producer and will be made available based on their classification (i.e. Open, Consortium, Private).

The second part of this document summarized the ethical challenges that surround all user-related activities, especially pilot ones, during which data collection, storage, and process is expected. It also presented ethical policies, as well as the countermeasures that will be used in order to guarantee the privacy of sensitive personal data. 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, with the D^2EPC Ethics Manager and the EAB closely monitoring and assisting all related activities. In more detail, the EAB will be responsible for ensuring that all project measures are in compliance with both the EU and national legislations. The ethics board will also monitor the implementation of the D^2EPC ethical policy, which has been elaborated within the present document. Finally, the pilot ethical methodology has been described, which guarantees that all the D^2EPC partners will have access to the data necessary for the completion of the research, while at the same time no sensitive data will be distributed outside the D^2EPC project, among other restrictions and requirements.

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 privacy and security. As an ongoing investigation and monitoring, more concrete details on the DMP (in terms of the actual data explored), will be provided in the future versions of this report in M18 and 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], for the purpose of establishing a cooperative relationship and pursuant to the research related to D^2EPC project, anticipate that [Discloser] may disclose or deliver to [Recipient] building data and information, energy consumption information, building occupancy information, drawings, data, sketches, specifications, and other materials, both written and oral, of a secret, confidential or proprietary nature, including without limitation any and all information relating to marketing, finance, forecasts, research, prepared or filed by or behalf of by [Discloser], in any jurisdiction, and any amendments or supplements thereto (collectively, “Proprietary Information”); and

WHEREAS, [Discloser] desires to assure that the confidentiality of any Proprietary Information is maintained;

NOW, THEREFORE, in consideration of the foregoing premises, and the mutual covenants contained herein, [Discloser] and [Recipient] hereby agree as follows:

1. Under this Agreement the [Recipient] undertakes: **(i)** to hold in trust and confidence and not disclose, without the express prior written consent of the [Discloser], to any third party (including a Recipient’s Affiliates) or others or use for [Recipient]’s own benefit or for the benefit of any third party or others, any Proprietary Information, in any form, which is disclosed to [Recipient] by [Discloser] at any time and **(ii)** to carry out all necessary and appropriate measures to ensure that the Proprietary Information is protected against any access by third parties or others. [Recipient] shall disclose Proprietary Information received under this Agreement to person within its organization only if such persons **(i)** have a need to know and **(ii)** are bound in writing to protect the confidentiality of such Proprietary Information under the same terms as this Agreement. This paragraph 1 shall survive and continue after any expiration or termination of this Agreement and shall bind [Recipient], its employees, agents, representatives, successors, heirs and assigns.

In the event that the [Recipient] is required by mandatory law or regulation or by order of a court, government department or agency or recognized stock exchange to disclose any Proprietary Information, the [Recipient] shall provide the [Discloser] with prompt notice of such requirement – to the extent that such notice is permitted by law or regulation – so that the [Discloser] may seek a protective order or other appropriate remedy or waive compliance with the provisions of this Agreement. Whether or not such protective order or other remedy is obtained, or whether the [Discloser] waives compliance with the provisions of this Agreement, a [Recipient] shall disclose only that portion of the Proprietary Information which is legally required to be disclosed based on the advice of the [Recipient].

2. The undertakings and obligations of [Recipient] under this Agreement shall not apply to any Proprietary Information which: **(a)** is disclosed in a printed publication available to the public, or is otherwise in the public domain through no action or fault of [Recipient]; **(b)** is generally disclosed to third parties by [Discloser] without restriction on such third parties, or is approved for release by written authorization of [Discloser]; or **(c)** is shown to [Discloser] by [Recipient], within ten (10) days from disclosure, by underlying documentation to have been known by [Recipient] before receipt from [Discloser] and/or to have been developed by [Recipient] completely independent of any disclosure by [Discloser].



3. Title to all property received by [Recipient] from [Discloser], including all Proprietary Information, shall remain at all times the sole property of [Discloser], and this Agreement shall not be construed to grant to [Recipient] any patents, licenses or similar rights to such property and Proprietary Information disclosed to [Recipient] hereunder.
4. [Recipient] shall, upon request of [Discloser], return to [Discloser] all documents, drawings and other materials, including all Proprietary Information and all manifestation thereof, delivered to [Recipient], and all copies and reproductions thereof. Unless required otherwise by mandatory law, the [Recipient] shall destroy all copies of any Proprietary Information. Upon the [Discloser's] request the [Recipient] shall confirm compliance by the [Recipient] with the obligations under this paragraph 4 in writing.
5. The Proprietary Information is provided without any representation or warranty, express or implied, as to its accuracy or completeness. Each Party hereby agrees that the [Recipient] will assume full responsibility for all conclusions that the [Recipient] derives from the Proprietary Information. The [Discloser] shall have no liability with respect to the Proprietary Information, errors therein or omissions therefrom in any manner and on any legal ground.
6. The parties further agree to the following terms and conditions:
 - a. The [Recipient] agrees to be fully responsible and liable to the [Discloser] for any actions or failures to act which result in a breach of this Agreement. Any breach by [Recipient] of any of [Recipient]'s obligations under this Agreement will result in irreparable injury to [Discloser] for which damages and other legal remedies will be inadequate. In seeking enforcement of any of these obligations, [Discloser] will be entitled (in addition to other remedies) to preliminary and permanent injunctive and other equitable relief to prevent, discontinue and/or restrain the breach of this Agreement.
 - b. If any provision of this Agreement is invalid or unenforceable, then such provision shall be construed and limited to the extent necessary, or severed if necessary, in order to eliminate such invalidity or unenforceability, and the other provisions of this Agreement shall not be affected thereby.
 - c. In any dispute over whether information or matter is Proprietary Information hereunder, it shall be the burden of [Recipient] to show both that such contested information or matter is not Proprietary Information within the meaning of this Agreement, and that it does not constitute a trade secret.
 - d. No delay or omission by either party in exercising any rights under this Agreement will operate as a waiver of that or any other right. A waiver or consent given by either party on any one occasion is effective only in that instance and will not be construed as a bar to or waiver of any right on any other occasion.
 - e. This Agreement shall be binding upon and will inure to the benefit of the parties hereto and their respective successors and assigns.
 - f. This Agreement is governed by and will be construed in accordance with the law of {COUNTRY}, and the courts of {TOWN}, {COUNTRY} shall be the exclusive forum. (TOWN and COUNTRY is the town and the country of the Discloser respectively).
 - g. This Agreement is in addition to any prior written agreement between [Discloser] and [Recipient] relating to the subject matter of this agreement; in the event of any disparity or conflict between the provision of such agreements, the provision which is more protective of Proprietary Information shall prevail.

This Agreement may not be modified, in whole or in part, except by an agreement in writing signed by [Discloser] and [Recipient].

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

[Discloser]

[RECIPIENT]



By: _____

Signature

Printed Name

Title

By: _____

Signature

Printed Name

Title



ANNEX B: Consent Form

Consent Form - template

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 N°: 892984

Purpose of the study

This document was created in the frame of the D²EPC project (Grant Agreement N°: 892984), funded by the European Union under Horizon 2020.

D²EPC 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 digital design and monitoring tools and services.

D²EPC relies upon and adjusts accordingly to the smart-readiness level of the buildings and the corresponding data collection infrastructure and management systems. It subsequently builds upon actual data and the 'digital twin' concept to calculate energy, environmental, financial and human comfort indicators and through them the EPC classification of the building in question. In this context, D²EPC 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 D²EPC 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 Form in the D²EPC 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 ² EPC information sheet, which provides more details about the project (purpose, expected duration and procedures of the study).	Yes	No
I was orally informed about the purpose, expected duration and procedures of the study by the responsible person.	Yes	No
I was informed of my right to refuse to participate or to leave the study.	Yes	No
I was notified of the contact person, in the case I have questions and queries about the study or about my personal data being collected.	Yes	No
I was given a copy of my filled in consent form.	Yes	No
I had enough time to decide on my participation in the study.	Yes	No
I understand that I can leave the study at any time, without having to justify it and to require deleting 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 collected, 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 allow researchers involved in the study and signing respective NDAs can utilize the information for the purpose of the study and only for this.	Yes	No
I agree to the use of the collected data also after the termination of the D ² EPC project.	Yes	No

I agree to participate in the study	Yes	No
-------------------------------------	-----	----

Date: _____

Signature: _____

ANNEX C: Information Sheet



Consent Form

Project Purpose

- A commonly understandable written description of the project and its goals even for people that are not familiar to the project scope (2-3 paragraphs)

Project Progress Schedule

- The progress schedule of the project and the related testing and evaluation procedures (1-2 paragraphs)

Disclaimer Rights

- Advice on unrestricted 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, procedures of the study;
 - has been informed on the rights to deny participating or to quit from the study and about the corresponding consequences.
 - has been informed on the contact person in case that I have questions and queries about the study.
 - had adequate time to make my decision concerning my participation in the study.
 - comprehend that he/she can quit from the study at any time without having to justify his/her decision.
 - has been informed about potential effects, difficulties and dangers.
 - has been informed about the sensors equipment that will be used to collect 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 recognition, 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 inspect the data collected during the study.

