IANOS

SUSTAINABLE SOLUTIONS
for islands' decarbonisation

Data Management Plan

Authors: Denisa Ziu, Vincenzo Croce (ENG)

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0.2	03/03/2021	ENG	Integrated partners' answers to the questionnaire
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Executive Summary

This document presents IANOS' Deliverable D1.13 – Data Management Plan, developed under task T1.4 – Data, Ethics and Cyber Security Management of Work Package 1 – Project Management. The purpose of this deliverable is to describe the datasets collected and generated by the project and to define the IANOS consortium's data management policy that has been issued regarding these datasets. The approach followed for this document refers to the Guidelines on FAIR Data Management in Horizon 2020 (V3.0- 26 July 2016) along with ANNEX 1- Horizon 2020 FAIR DMP template. The datasets identified in the deliverable were collected through a questionnaire sent to all project partners.

This is a living document and other three further versions in D1.14, D1.15 andD1.16 are planned to be issued at M18,30 and 42 respectively, as information is made available the document will be updated in order to reflect a finer level of granularity.

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Notations, abbreviations, and acronyms

Table 1 Acronym's list

AES	Advanced Encryption Standard
AMI	Advanced Metering Infrastructure
API	Application Programming interface
BMS	Building Management System
dEF-Pi	distributed Energy Flexibility Platform and interface
EMS	Energy Management System
ESB	Enterprise Service Bus
ESDL	Energy System Description Language
ESSIM	Energy System SIMulator
EV	Electric Vehicle
EVSE	Electric Vehicle Supply Equipment
FI	Fellow Island
HEMS	Home Energy Management System
IaaS	Infra-structure as a Service
IoT	Internet of Things
iVPP	intelligent Virtual Power Plant
LCA	Life Cycle Assessment
LCC	Life Cycle Cost
LH	LightHouse island
RES	Renewable Energy Source
SIEM	Security Information Event Management
SOC	Security Operations Center
SoC	State of Charge
VDC	Virtual Data Centre
V2G	Vehicle to Grid

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1 Introduction

1.1 Objectives and Scope

This deliverable presents the first version of the Data Management Plan for the IANOS project. The Data Management Plan explains how the different datasets of the IANOS project are stored and shared with third parties. The datasets are assembled and constructed in order to fulfil the project goals. The main datasets identified are:

- Lighthouse Island (LH) and Fellow Island (FI) telemetry, forecast and optimization data;
- intelligent Virtual Power Plant (iVPP) flexibility data;
- Smart Energy Router monitoring data;
- Data used by Energy System SIMulator (ESSIM) platform;
- Data used by Life Cycle Assessment and Life Cycle Cost (LCA/LCC) - VERIFY platform;
- Hybrid distribution transformer data;
- Data used by IANOS Secured Enterprise Service Bus;
- Data used by Flywheel device;
- Data used by distributed Energy Flexibility Platform and interface (dEF-Pi) system;
- Data used by TidalKite system;
- Stakeholder list and newsletter subscriber list.

This document was created following the guidelines specified by the EC in “H2020 Programme Guidelines on FAIR Data Management in Horizon 2020 (V3.0- 26 July 2016)” along with “ANNEX 1- Horizon 2020 FAIR DMP template”. A questionnaire has been sent to all project partners to answer the questions in the Horizon 2020 FAIR DMP template.
The Data Management Plan is a living document, which means that updated versions will be created as part of the progress being made in the project, additional official versions of this document are already planned for M18, M36, and M42. This version reflects the status based on the information currently available in the project.

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1.2 Relation to other activities

T1.4 and its deliverables provide guidelines to aggregate, maintain, and further distribute collected data for external usage. This document is linked to overall activities within IANOS as it describes how the data will be managed and stored throughout the project.

1.3 Structure of the deliverable

Deliverable D1.13 is structured as follows. Chapter 1 – Introduction aims at presenting the objective of the document and its structure. Chapter 2 – Description of Collected Data, reports the list of identified datasets collected/generated within IANOS project. For each dataset information on purpose of data, types and formats, security and privacy considerations, origin, expected size and access policy is provided. Chapter 3 – Findable, Accessible, Interoperable, and Reusable (FAIR) data management, describes how the FAIR principles are applied to the project. Chapter 4 – Allocation of resources, explains what the costs are for making data FAIR. Chapter 5 – Data security, describes what provisions are in place for data security. Chapter 7 – Ethical aspects, covers the ethical principles that IANOS partners are to comply with. Finally, Chapter 8 – Conclusions and next steps, provides the conclusions and the next steps towards updated versions of the document.

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2 Description of Collected Data

This chapter describes the data collected/generated within IANOS project. The datasets are assembled and constructed in order to fulfil the project goals. The main datasets identified in this phase of the project are:

- Lighthouse Island (LH) and Fellow Island (FI) telemetry, forecast and optimization data;
- iVPP flexibility data;
- Smart Energy Router monitoring data;
- Data used by ESSIM simulation platform;
- Data used by LCA/LCC (VERIFY) platform;
- Hybrid distribution transformer data;
- Data used by IANOS Secured Enterprise Service Bus;
- Data used by Flywheel device;
- Data used by dEF-Pi system;
- Data used by TidalKite system;
- Stakeholder list and newsletter subscriber list.

In the following section, the collected data are described in more detail. Specifically, each dataset is represented by a table containing information on purpose of data collection/generation and its relation to the objectives of the project, what types and formats of data will be generated/collected, security and privacy considerations, what is the origin of the data, what is the expected size of the data, and what will be the access policies for the data.

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2.1 List of identified datasets

2.1.1 Lighthouse Island (LH) and Fellow Island (FI) telemetry forecast and optimization data

Table 2 Telemetry, forecast and optimization data

Dataset Name	Lighthouse Island (LH) and Fellow Island (FI) telemetry, forecast and optimization data
Description	Data acquired and stored locally or remotely from IoT devices, energy and other data assets (i.e.: weather stations), regarding energy production and consumption, asset status (i.e.: on/off), forecasting and optimization calculations.
Security & Privacy considerations	The data collected will be stored on a cloud-based platform deployed on a Virtual Data Centre (VDC) of an IaaS (Infra-structure as a Service) provider. The IaaS provider is Altice Portugal Data Center SA, formerly known as Portugal Telecom. They have advanced security protocols for data protection to mitigate any malicious actions. Their Data Centre has several certifications including the: - ISO/IEC 20000, acknowledging the use of best practices in IT Services Management Systems, according to the Cloud Computing services provision, IT Management Services, Security Management Services and Data Center Infrastructure Services, within the “Data Center as a Service”. - ISO/IEC 27001, acknowledging the use of best practices in Information Security Management Systems, according to the Cloud Computing services provision, IT Management Services, Security Management Services and Data Center Infrastructure Services, within the “Data Center as a Service”. - ISO 9001, Quality Management System. The Data Center has a SOC (Security Operations Center) team

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	in place 24 x 7 with training in security and that uses state of the art SIEM (Security Information Event Management) technology to assure high availability. The cloud virtual Data Center is also protected by several security systems: • Firewall, DMZ & VPN to further secure remote access; • Biometric controls (palm vein system for reading the veins of the hands of each person registered in the system), Alarms, CCTV surveillance, Automatic detection / fire extinguishing system and local support team – protect physical access to servers. Regarding the data storage, the database is encrypted, assuring Client data privacy. Also, weekly backups of the databases are executed to an off-site that are also stored on an encrypted data drive. The software platform uses HTTPS to assure that the information travelling on the web is properly secured.
Datatype Name	Energy generation and consumption data
Description	Metering and status data acquired and stored locally or remotely from smart meters, other IoT devices, and operational platforms regarding energy generation, consumption, and storage.
Purpose	Data to be processed, using computational algorithms, for forecasting and optimization purposes according to the different use cases. Data visualization and analysis through the iVPP platform UI.
Format	Relational SQL database also accessible via API.
Expected size	Several dozen GBs.
Origin	IoT devices, RES assets, EV chargers, operational platforms.
Access	Authorized iVPP users.
Recipients	Confidential, within consortium members and iVPP managers and users of the Ameland and Terceira LH.
Datatype Name	Forecast and optimization data LH

Description	RES generation forecasts, energy assets consumption forecasts, energy storage forecast, usage profiles, EV charging profiles, optimization calculations and results
Purpose	Forecast of energy production and consumption for optimization purposes according to the use cases to be explored with the project
Format	Relational SQL database also accessible via API.
Expected size	Several dozen MBs.
Origin	Calculations performed by computer algorithms on the iVPP optimization module.
Access	Authorized iVPP users.
Recipients	Confidential, within consortium members and iVPP managers and users of the Ameland and Terceira LH
Datatype Name	Forecast RES generation data FI
Description	RES generation forecasts, energy assets consumption forecasts, energy storage forecast, usage profiles.
Purpose	Forecast of energy production and consumption according to the use cases to be explored with the project replicability Actions in the fellow Islands
Format	.csv
Expected size	>100 MB
Origin	User's device
Access	CNR IIA Users (Lampedusa)
Recipients	Confidential within users themselves and IANOS consortium members
Datatype Name	Control actions and DR scheduling
Description	List of timestamped commands for Demand Response control of energy assets.
Purpose	Store scheduled and past control actions of energy assets.
Format	Relational SQL database also accessible via API.
Expected size	Several dozen MBs.

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Origin	Output of the Demand response module of iVPP
Access	Authorized iVPP users.
Recipients	Confidential, within consortium members and iVPP managers and users of the Ameland and Terceira LH.

2.1.2 iVPP flexibility data

Table 3 iVPP flexibility data

Dataset Name	iVPP flexibility data
Description	The iVPP requires flexibility information of all assets it has in its portfolio. This flexibility information is used to create an optimal plan for the VPP. This is real-time information, based on IoT devices data and state information of the asset that is managed.
Security & Privacy considerations	Flexibility information is privacy sensitive and needs to be appropriately secured for both communication and storage of this information. Data that has entered the platform will only be used by the platform itself and does not need to be shared with other parties.
Datatype Name	prEN 50491-12-2 standard
Description	Until now TNO has used the S2 interface defined in EN 50491-12-1 and preliminary standard prEN 50491-12-2 to connect to devices using the dEF-pi platform provided by NEROA. TNO has created an implementation of this preliminary standard. Outputs: Market bids towards the markets and control instructions towards the managed Assets (by using the S2 interface)
Purpose	Optimize the flexibility of the available portfolio for multiple energy markets/ services simultaneously.
Format	XML schema definitions
Expected size	Not known

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Origin	Meters' data
Access	iVPP users
Recipients	Project partners

2.1.3 Smart Energy Router monitoring data

Table 4 Smart Energy Router monitoring data

Dataset Name	Smart Energy Router monitoring data
Description	This dataset comprises i) information about the PV system connected to the Smart Energy Router, including the respective 15-min resolution generation profile; and ii) information about the battery storage system of the Smart Energy Router, including the respective 15-min resolution State of Charge (SoC) profile.
Security & Privacy considerations	Smart Energy Router complies with IEC 61850 standard, as well as existing European (e.g., GDPR) and national regulations.
Datatype Name	Smart Energy Router – PV generation
Description	Information about the PV system connected to the Smart Energy Router, including the respective 15-min resolution generation profile.
Purpose	Provide iVPP real time information about the generation of the PV system connected to the Smart Energy Router.
Format	TBD
Expected size	TBD
Origin	Smart Energy Router
Access	IANOS consortium members
Recipients	iVPP platform
Datatype Name	Smart Energy Router – Battery SoC
Description	Information about the battery storage system of the Smart Energy Router, including the respective 15-min resolution State of Charge (SoC) profile.

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Purpose	Provide iVPP real time information about the battery storage system of the Smart Energy Router.
Format	TBD
Expected size	TBD
Origin	Smart Energy Router
Access	IANOS consortium members
Recipients	iVPP platform

2.1.4 Data used by ESSIM simulation platform

Table 5 ESSIM simulation data

Dataset Name	Data used by ESSIM simulation platform
Description	ESSIM is an ESDL (Energy System Description Language) based energy system simulator used to quantify specific KPI's of energy systems of any size, including marginal pricing based optimized energy flows.
Security & Privacy considerations	Some technical data could be restricted on the energy grid (ie. Transport and Transformers); usage of hourly data if collected from real measurements should be anonymised and be made non traceable.
Datatype Name	Simulation for energy system
Description	Energy system related data for the physical energy system: asset data describing its dimensioning and characteristics (i.e. production, storage, conversion, consumption and transport assets), hourly profiles, weather data (solar, wind, temperatures).
Purpose	Provide a simulation of grid balancing and its effects in an interconnected hybrid energy system over a period of time. It takes as inputs the energy system defined in ESDL and calculates optimal schedule of flexible producers and the effect of this schedule in terms of emissions, costs, load on the network,

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	etc.
Format	Energy system description in ESDL
Expected size	TBD
Origin	Asset data
Access	Consortium Partners
Recipients	Project partners

2.1.5 Data used by LCA/LCC (VERIFY) platform

Table 6 CERTH LCA/LCC (VERIFY) platform data

Dataset Name	CERTH LCA/LCC (VERIFY) platform
Description	Output data related to Environmental and Economic KPIs using as Input i) Prosumers' smart meter, ii) IoT devices produced data in relation with mainly the following categories: • **IANOS Electrical Systems** • **IANOS Thermal Systems** • **IANOS Storage (electricity, heating/cooling) Systems**
Security & Privacy considerations	Consideration of privacy for injected (input) and calculated (output) data related to the energy production/consumption of specific systems on a building / district level, since they may reveal the activity and the users' behaviour. Consideration of the systems location, as they may provide important information for the owner and his economic status. Hence, the IANOS LCA/LCC platform entitled as "VERIFY" will assure that owed to afore-mentioned considerations, encoded data transactions and firewall utilization for the data base protection, will be applied. Access to the data will be monitored and controlled. The data will be stored in encrypted form, under Advanced Encryption Standard (AES) on the CERTH's related Data Lake. Firewall will

	prevent unauthorized malicious access, by separating the public and internal network. Furthermore, only certain people from IANOS consortium will be authorized to have access in the platform. Finally, in relation with the statement of key results in the public Deliverables produced, during IANOS, necessary data anonymisation and/or aggregation will apply, before being reported.
Datatype Name	IANOS Electrical Systems
Description	Generated data that report back the associated Environmental and associated Economic KPIs from the energy production/consumption of the various electrical components (e.g. PV, Wind Turbines, Flywheel, EVs (V2G), geothermal plant, waste incineration plant, Fuel Cells, Tidal Kite, Digester …) of the power system along with their location.
Purpose	Data will be used for calculating the environmental impact (e.g., CO2 emissions) and the economic performance.
Format	*.json, *.xml, *.csv
Expected size	multiple Mb/s (worst case scenario)
Origin	i) Prosumers' smart meter, ii) IoT devices provided by the operators/vendors of both a) the IANOS innovative Electrical systems and b) own funded ones.
Access	Data will be openly available upon request, given that there are no restrictions/limitations (GDPR, IP) from the data sources side. Moreover, any necessary data related provision access rights will be respected, according to the GDPR and CA. Data will be made accessible through the CERTH' s Data Lake. Data streams will be formulated according to a standard ontology (i.e., SAREF, Bricks Schema) with custom extensions. After access has been granted to external users, "download by dataset" option from the API would allow specific data version to be retrieved.
Recipients	Project partners

Datatype Name	IANOS Thermal Systems
Description	Generated data that report back the associated Environmental and associated Economic KPIs from the various thermal components (e.g. PCM, Heat Pumps, electric water heaters, FCs for the part of any waste heat produced …) of the power system along with their location.
Purpose	Data will be used for calculating the environmental impact (e.g. CO2 emissions) and the economic performance.
Format	*.json, *.xml, *.csv
Expected size	multiple Mb/s (worst case scenario)
Origin	i) Prosumers' smart meter, ii) IoT devices provided by the operators/vendors of both a) the IANOS innovative Electrical systems and b) own funded ones.
Access	Data will be openly available upon request, given that there are no restrictions/limitations (GDPR, IP) from the data sources side. Moreover, any necessary data related provision access rights will be respected, according to the GDPR and CA. Data will be made accessible through the CERTH' s Data Lake. Data streams will be formulated according to a standard ontology (i.e., SAREF, Bricks Schema) with custom extensions. After access has been granted to external users, "download by dataset" option from the API would allow specific data version to be retrieved.
Recipients	Project partners
Datatype Name	IANOS Storage Systems
Description	Generated data that report back the associated Environmental and associated Economic KPIs from the various thermal components (e.g., electrochemical BESS (centralized or distributed), Flywheel, biobased battery, Electrolyzer …) of the power system along with their location.
Purpose	Data will be used for calculating the environmental impact (e.g., CO2 emissions) and the economic performance.

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Format	*.json, *.xml, *.csv
Expected size	multiple Mb/s (worst case scenario)
Origin	i) Prosumers' smart meter, ii) IoT devices provided by the operators/vendors of both a) the IANOS innovative Electrical systems and b) own funded ones.
Access	Data will be openly available upon request, given that there are no restrictions/limitations (GDPR, IP) from the data sources side. Moreover, any necessary data related provision access rights will be respected, according to the GDPR and CA. Data will be made accessible through the CERTH' s Data Lake. Data streams will be formulated according to a standard ontology (i.e., SAREF, Bricks Schema) with custom extensions. After access has been granted to external users, "download by dataset" option from the API would allow specific data version to be retrieved.
Recipients	Project partners

2.1.6 Hybrid distribution transformer data

Table 7 Hybrid transformer data

Dataset Name	Hybrid distribution transformer data
Description	Data from the monitoring system installed in the hybrid transformer.
Security & Privacy considerations	Data is owned by the customer, then used by Efacec to assess the condition of the asset.
Datatype Name	Temperatures RTD PT100
Description	Ambient, top, and bottom oil temperatures.
Purpose	Measure temperatures indicating transformer failure modes.
Format	Real
Expected size	TBD

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Origin	PT100
Access	Transformer Monitor
Recipients	Asset Management Platform
Datatype Name	Low Voltage side currents
Description	Low Voltage side currents.
Purpose	Measure transformer currents for load indicator currents.
Format	Real
Expected size	TBD
Origin	Rogowski coil sensor
Access	Transformer Monitor
Recipients	Asset Management Platform
Datatype Name	Moisture in oil
Description	Moisture in oil
Purpose	Measure the moisture dissolved in the transformer oil.
Format	Real
Expected size	TBD
Origin	Moisture in oil sensor
Access	Transformer Monitor
Recipients	Asset Management Platform
Datatype Name	Accelerometer
Description	Vibration in transformer
Purpose	Measure transformer vibration to detect patterns associated with known failure modes.
Format	Real
Expected size	TBD
Origin	Vibration sensor
Access	Transformer Monitor
Recipients	Asset Management Platform
Datatype Name	Noise
Description	Noise in transformer
Purpose	Measure the noise in the transformer surroundings to detect

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	patterns associated with known failure modes.
Format	Real
Expected size	TBD
Origin	Vibration sensor
Access	Transformer Monitor
Recipients	Asset Management Platform
Datatype Name	Ambient Humidity
Description	Ambient humidity
Purpose	Measure ambient humidity
Format	Real
Expected size	TBD
Origin	Humidity
Access	Transformer Monitor
Recipients	Asset Management Platform

2.1.7 Data used by IANOS Secured Enterprise Service Bus

Table 8 IANOS Secured Enterprise Service Bus (ESB)

Dataset Name	IANOS Secured Enterprise Service Bus (ESB)
Description	IANOS Secured Enterprise Service Bus (ESB) would communicate with several scattered units across the pilot units. For this purpose, it is established a communication from dispersed field-level infrastructure such as AMI/EMS and BMS. Next, it will be identified some of the datasets identified that go through the ESB component. These datasets have been identified in a primary analysing stage, and we reserve the right to further update this flow in future deliverables when the ESB is further developed.
Security & Privacy considerations	The Enterprise Service Bus is an architectural software that solves the communication issues between different fields and

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	external devices eliminating the differences between the protocols considered. Additionally, ESB establishes routes between messages protecting the location or identity between the partners in the communication process. The Secured Enterprise Service Bus in IANOS will securely monitor energy-related and exchange contextual data from field components. IANOS ESB during its developing phase, will take care of security concerns, stablishing the appropriate network configuration so that data traffic through the ESB could be separated if necessary, to add extra security measures.
Datatype Name	Smart Load Agent
Description	Energy data coming from the demand side regarding the Smart Loads, Hybrid Heat Pumps in the system.
Purpose	Serve to further engines in the iVPP Operative Orchestration Toolkit and the IEPT Toolkit.
Format	To be determined.
Expected size	To be determined.
Origin	Smart Loads
Access	EBS
Recipients	iVPP platform/IEPT Toolkit
Datatype Name	HEMS/BMS Agent
Description	Energy data coming from the demand side regarding Home Energy Management Systems and Building Management Systems within the Buildings in the Islands.
Purpose	Serve to Virtual Integration Layer: IEPT Toolkit and iVPP platform.
Format	To be agreed.
Expected size	Not determined yet
Origin	Advanced Metering Infrastructure (AMI)
Access	ESB
Recipients	iVVP Platform /IEPT Toolkit

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Datatype Name	EV Agent
Description	Energy data coming from the demand side regarding EV access points.
Purpose	Serve to Virtual Integration Layer: IEPT Toolkit and iVPP platform.
Format	To be agreed.
Expected size	Not determined yet
Origin	Electric Vehicle Supply Equipment (EVSE), Electric Vehicle Charging Infrastructure (V2G)
Access	ESB
Recipients	iVPP Platform /IEPT Toolkit
Datatype Name	SCADA / EMS Agent
Description	Energy data coming from SCADA and Energy Management System.
Purpose	Serve to Virtual Integration Layer: IEPT Toolkit and iVPP platform.
Format	To be agreed.
Expected size	Not determined yet
Origin	SCADA System
Access	ESB
Recipients	iVPP Platform /IEPT Toolkit
Datatype Name	BESS Agent
Description	Energy Data coming from Battery Energy Storage Systems.
Purpose	Serve to Virtual Integration Layer: IEPT Toolkit and iVVP platform.
Format	To be agreed.
Expected size	Not determined yet
Origin	Flywheel in its relevant pilot, Biobased Battery
Access	ESB
Recipients	iVPP Platform /IEPT Toolkit
Datatype Name	Storage Vectors Agent

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Description	Energy Data coming from Storage Vectors in the system.
Purpose	Serve to Virtual Integration Layer: IEPT Toolkit and iVPP platform.
Format	To be agreed.
Expected size	Not determined yet
Origin	Thermal Storage Units, Hydrogen Storage.
Access	ESB
Recipients	iVPP Platform /IEPT Toolkit

2.1.8 Data used by Flywheel device

Table 9 Flywheel utilization data

Dataset Name	Flywheel utilization data
Description	Teraloop's flywheel power management load profile
Security & Privacy considerations	To be kept confidential, disclosure to be discussed with Teraloop and end user.
Datatype Name	Load Profile in kW
Description	Profile of electricity consumption of end user, profile of grid electricity power fluctuation and activation of Teraloop device.
Purpose	Load profile forecast for the integration of a Teraloop device in the Terceira electricity grid at the end user location, to provide power management and fault ride through services.
Format	Excel
Expected size	MB's
Origin	Teraloop's flywheel
Access	Terceira LH
Recipients	iVPP platform

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2.1.9 Data used by dEF-Pi system

Table 10 dEF-Pi system data

Dataset Name	dEF-Pi system data
Description	The dEF-Pi system targets the technical aggregator role. It is a platform that unlocks and controls energy flexibility from smart devices (e.g. heat pumps, EV, PV, batteries, etc.) and describes that energy flexibility in a generic way using appropriate interfaces.
Security & Privacy considerations	All data will flow through this system, so it has to be secure. It can lift on the privacy statement etc. from other parts of the projects, as this system is usually the backend of someone else's interface.
Datatype Name	Generic dEF-Pi telemetry data
Description	The data that the system needs to run itself.
Purpose	Check whether connections made with pilot-sites are made correctly.
Format	TBD
Expected size	Relatively small (couple of GB)
Origin	The system itself
Access	Stays within the system
Recipients	Neroa
Datatype Name	Generic user data
Description	Smart meter data and other IoT data.
Purpose	To facilitate the measurements of the IANOS KPI's.
Format	TBD
Expected size	Large (hundreds of GB)
Origin	User's device
Access	Project partners
Recipients	Users themselves, and IANOS project partners

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2.1.10 Data used by TidalKite system

Table 11 TidalKite system data

Dataset Name	TidalKite system data
Description	TidalKite use case electricity production.
Security & Privacy considerations	To be kept confidential, disclosure (of totals) to be discussed with SeaQurrent (developer of the technology).
Datatype Name	Production profile forecast in kW
Description	Profile of electricity production from a TidalKite unit.
Purpose	Production profile forecast for the integration in the Ameland electricity grid, to service electricity demand and determine reduction of / contribution to electricity storage capacity required.
Format	To be discussed and to be adapted so that it can be integrated in the Ameland electricity grid balancing optimisation.
Expected size	In the range of MB
Origin	SeaQurrent
Access	Ameland LH
Recipients	Ameland LH project manager

2.1.11 Stakeholder list and newsletter subscriber list

Table 12 Stakeholder list and newsletter subscriber list

Dataset Name	Stakeholder list and newsletter subscriber list
Description	A database of stakeholder and subscribers to the newsletter will be created to keep track of the contacted/interested subjects.
Security & Privacy considerations	Minimum amount of data will be retained (name, email address, affiliation) and no profiling will be performed. Sendinblue will be used (EU servers, GDPR compliant), which takes all necessary precautions to preserve the security of personal data and, in

	particular, to prevent it from being accessed by unauthorized third parties, distorted, or damaged. These measures include the following: • Multi-level firewall. • Proven solutions for anti-virus protection and detection of intrusion attempts. • Encrypted data transmission using SSL/https/VPN technology. • Tier 3 and PCI DSS certified data centres.
Datatype Name	Stakeholder contact
Description	Name, email, (affiliation) of the person subscribed.
Purpose	Disseminate the project.
Format	Excel
Expected size	<100MB
Origin	Stakeholders who subscribe to the newsletter and/or people who express their interest in the project (privacy statement to be accepted).
Access	Project partners
Recipients	Stakeholders

3 Findable, Accessible, Interoperable, and Reusable (FAIR) data management

3.1 Making data findable, including provisions for metadata

To make data generated/collected by the project findable, it is necessary to have a naming and versioning convention. IANOS will use a naming convention with the following information:

- Project name/acronym (IANOS)
- Name or abbreviation of Dataset
- Source provider
- Date file created/generated (in YYYY-MM-DD format)
- Version number

For example: IANOS_VERIFY_CERTH_2021-04-01_v1.0

The data will adopt the Semantic Versioning 2.0 scheme to assign a unique version to each release of the data.

In addition to naming convention, the “Guidelines on FAIR Data Management in Horizon 2020” also propose to have Digital Object Identifiers (DOI) for the data generated during the project. For this reason, the project will use the Zenodo platform (http://www.zenodo.org) to fulfil the DOI requirement. Zenodo is an open-access repository developed under the European OpenAIRE program and operated by CERN. The platform can handle single datasets with up to 50GB size. To help research projects to share data all over the world, the platform also helps by defining and storing some additional metadata provided by the uploader. It is possible to grant access to the data only to a specific group of users or the public. The platform also gives the user the possibility to restrict or open access to data for a fixed period of time.

Concerning the metadata provision, IANOS will not use any formal standard for their creation. Instead, security and privacy guidelines will be followed to ensure that only the necessary details are stored, especially when dealing with sensitive personal information.

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Possible metadata may include: location, grid node identification, energy contract details, descriptors of the pilot setup, energy component descriptors, sensor descriptors, measurement values descriptors etc.

3.2 Making data openly accessible

An important part of the FAIR concept is to make data accessible to project partners and when possible to other researchers and the public. The IANOS project will use the Zenodo platform for the data that the consortium decides to make public.

Given the nature of the data acquired during the pilot implementations, not all data collected will be made openly available. Some of the acquired information is private data subject to GDPR and national regulations and therefore cannot be open without reservations. The data is acquired in real-time and comprises of (but not limited to): individual users' personal data, equipment list including characteristics and usage patterns, energy consumption and energy production profiles.

All sensitive data gathered during the project lifetime will be kept confidential by the consortium partners, namely research participants data from pilot sites. Particular attention will be paid to personal data, which will be codified and destroyed after the project ends. All other collected data, such as real-time energy consumption and renewable energy production, will be anonymized or aggregated and will not be used with any identifying information within the project or in external publications.

The software adopted to access data will use HTTPS (encrypted communications over the web) to assure that the information travelling on the web is properly secured. Data can be accessed using the iVPP or the implemented RESTful API for which an open documentation will be made available.

3.3 Making data interoperable

Making data interoperable mainly relies on using suitable standards for data and metadata creation along with appropriate vocabularies (e.g., for providing search keywords).

To facilitate interoperability a partial list of standards used by IANOS platform components includes:

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- Secure TCP/IP and MQTT protocols to communicate with the IoT devices and energy assets
- Standard ontology like SAREF or Bricks Schema to define data and metadata vocabularies
- RESTful API services to communicate among the different platform components
- S2 standard interface used by dEF-Pi system
- IEC 61850 communication standard used by the Smart Energy Router to provide real time information about the battery storage system and PV system to the iVPP
- Energy System Description Language (ESDL, see https://energytransition.gitbook.io/esdl/) used by ESSIM simulation platform
- EN 50491-12-1 and prEN 50491-12-2 standards used by TNO for connection of devices

Other standards may be added in future updated versions of the document.

3.4 Increase data re-use (through clarifying licences)

Data will be stored in servers, either on site of the pilots or on locations indicated by the technology provider.

Public data will be published after the release of the respective deliverable or after the end of the project. The availability of data that contain key information on the end customer's commercial operations should be discussed with pilot sites partners following the terms of the consortium agreement and with the consent of the end user. However, sensitive data will be anonymized and processed/analysed as a part of a larger body of data. No information, from which an individual participant can be identified, will be published. Only anonymized results will be summarized as a part of a research publication.

The availability of data after the end of the project depends highly on the type and content of the data. Therefore, storing data on a public platform needs to be discussed with the contributor of the data.

The licensing of data and deliverables is not yet specified but data that can compromise commercialization prospects or have inadequate protection of (e.g. personal information), shall not be published. The rest of the data will be openly accessible. If there is an open-

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source license applicable, some partners are in favour of the Apache License, Version 2.0.

4 Allocation of resources

The costs of making data FAIR depend on the amount of data, due to the cost of long-term storage solution and additional effort for publication. An estimation cannot be delivered to date, as too many influencing factors are unknown at the moment.
The management of the dataset is shared amongst the project partners who take part in contributing details about the datasets in the DMP deliverables, those that take care of the deposition of research data in open research data repositories, and overall, through the Quality Manager.

5 Data security

Raw data used by the platform components during the project will be stored in secure and reliable databases. A backup plan defining local and remote backup policies will be defined.
Data collection procedures within the project will comply with the European legislation (such as GDPR) as well as national regulations. The project partners involved in the pilots will provide detailed information on the procedures that will be implemented for data collection, storage, protection, retention, and destruction, including confirmation that they comply with national and EU legislation.
In all cases the data protection and privacy of personal information will be governed by the following principles, which consist of part of an overall information security policy:

- Protective measures against infiltration will be provided
- Physical protection of core parts of the systems and access control measures will be provided
- Logging of IANOS system and appropriate auditing of the peripheral components will be available.

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6 Ethical aspects

The IANOS partners are to comply with the ethical principles as set out in Section 5.1 “Ethics” of the Grant Agreement, page 194.

7 Conclusions and next steps

In this deliverable we reported the first version of the Data Management Plan. The main goal of the first version is to identify the datasets collected/generated for the IANOS project. The main datasets defined in this phase of the project are:

- Lighthouse Island (LH) and Fellow Island (FI) telemetry, forecast and optimization data;
- iVPP flexibility data;
- Smart Energy Router monitoring data;
- Data used by ESSIM simulation platform;
- Data used by LCA/LCC (VERIFY) platform;
- Hybrid distribution transformer data;
- Data used by IANOS Secured Enterprise Service Bus;
- Data used by Flywheel device;
- Data used by dEF-Pi system;
- Data used by TidalKite system;
- Stakeholder list and newsletter subscriber list.

Additional datasets might be identified during the project and will be handled in the planned future versions of the deliverable.

FAIR Data Principles: Findable, Accessible, Interoperable, and Re-Usable have been applied, these are essential for good data management.

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The Data Management Plan will be updated during the course of the project whenever significant changes arise, e.g., when new data are introduced, changes in consortium policies, changes in consortium composition and external factors. Three additional official versions of this document are already planned for M18, M36, and M42.

Furthermore, as the Data Management Plan is a living document, information will be made available at a finer level of granularity through updates, including in the context of periodic project evaluation. A second version of this document will reflect the updates.

8 References

- Grant Agreement number 957810 – IANOS – H2020-LC-SC3-2018-2019-2020 / H2020-LC-SC3-2020-EC-ES-SCC
- IANOS Consortium Agreement, 2020-06-30
- H2020 Programme - Guidelines on FAIR Data Management in Horizon 2020, version 3.0, European Commission, 2016

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