IANOS
SUSTAINABLE SOLUTIONS
for islands' decarbonisation

D10.9 - IANOS Exploitation Plan (PUDF and identification of project KERs) (T10.4) _v2

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PROJECT CONTRACTUAL DETAILS

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Project acronym	IANOS
Grant agreement no.	957810
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Project end date	01-10-2024
Duration	48 months
Supplementary notes	-

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V1	July	RINA	Second draft
V2	September	RINA	1st Review from WP10 leader
V3	September	All	Partner's review and comments
V5	September	RINA	Comments and feedback implemented and final version submission.
V6	September	NEC, SUNAMP, CERTH, CW, NEROA, SUWOTEC, UBITECH, SQH	Check and Review

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Executive Summary

The present deliverable D10.9 has been developed in the framework of WP10 activities related to the "Dissemination, Exploitation, Promotion & Knowledge Transfer" of IANOS project results and it is the second release of the main outcome of T10.4 "Exploitation Strategy & IPR Management".

Indeed, this deliverable represents the second draft version of the Plan for Use and Dissemination of Foreground (PUDF) for the IANOS project consortium, thus aimed at updating the first release of the exploitation strategy supported by a lean approach to market outreach and reliable routes to market to make sure that IANOS outcomes are tangible and sustainable once the project and the funding are over.

In this framework, this second version provides an overview of the main Key Exploitable Results (KERs) under a market perspective as well as an analysis of the IANOS partners responsible for their development, focusing on the related IPR management. In this way, the document clarifies the main roles and responsibilities of the project partners towards personal and/or joint exploitation of project results.

D10.9 will be then updated along the project duration; the next intermediate version (D10.10) is foreseen at the end of M36. The final version is foreseen at the end of M48.

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Abbreviations & Acronyms

Abbreviation	Definition
KER	Key exploitable result
PR	Project Result
SGAM	Smart Grid Architecture Model
BEMS/HEMS/CEMS	Building/Home/City Energy Management System
BFMULO	Background (B), Foreground (F), Making (M), Using (U), Licensing (L), Other (O)
CA	Consortium Agreement
CHP	Combined Heat and Power
DSM	Demand Side Management
DSO	Distribution System Operator
ETT	Energy Transition Track
EV	Electric Vehicle
FI	Follower Island
GA	Grant Agreement
HHP	Hybrid Heat Pump
IE	Innovative Element
INEA	Innovation and Networks Executive Agency
IVPP	Intelligent Virtual Power Plant
LEC	Local Energy Community
LH	Lighthouse
LV/MV	Low Voltage/Medium Voltage
P2P	Peer-to-Peer
PC	Project Coordinator
PCM	Phase Change Materials
PEB	Positive Energy Building
PV	Photovoltaic
PUDF	Plan for Use and Dissemination of Foreground
RES	Renewable energy sources
SGAM	Smart Grid Architecture Model
TRL	Technology Readiness Level
UC	Use Case
V2G	Vehicle to Grid
VPP	Virtual Power Plant
WP	Work Package

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1 Introduction

IANOS brings together two Lighthouse (LH) islands (Terceira-PT, Ameland-NL), and three Fellow islands (FI) (Lampedusa-IT, Bora-Bora-FR, Nisyros-GR), all sharing a common vision of decarbonizing their energy systems and be energy independent until 2050. Thirty-four (34) strongly experienced partners from nine (9) European countries, join forces to deliver smart technological, economic, and social innovations, providing systemic optimization starting from an Energy Community-centric approach. IANOS adopts an Island Energy Transition Strategy built around three (3) Island Energy Transition Tracks that focus on: a) Energy efficiency and grid support for extremely high-RES penetration, b) Decarbonization through electrification and support from non-emitting fuels, c) Empowering Local Energy Communities (LEC).

Within this context this deliverable was prepared within the framework of Work Package 10 "Exploitation of the project Results and Impact assessment" and refers to activities carried out by RINA-C within Task 10.4 "Plan for Exploitation of Key Exploitable Results and IPR Management".

The purpose of this document is thus to start preparing the ground for a proper Exploitation Strategy developed at Consortium as well as at individual partner level, based on the initial version of the same document submitted in M12. Furthermore, together with the dissemination activities managed in WP10, it is forthcoming to guarantee the maximum visibility to the Key Exploitable Results, ensuring their exploitation by the partners and to reach the maximum share of knowledge out of the project foreground. In this context, it is of utmost importance to support the partners in the development of the most appropriate strategy for exploiting the IANOS results.

To this aim, the commercially exploitable outcomes within the project shall be screened and the possible exploitation routes and actions to be undertaken shall be recommended, ensuring at the same time the compliance with the IPR rules laid down in detail within the Consortium Agreement.

In this framework, activities have been initially focused on the definition of the IANOS Key Exploitable Results. The list of Key Exploitable Results proposed at the proposal stage and reported in the initial version of the document (M12) was thus updated accordingly and to each result a partner/more partners identified as main leader and responsible for the results' development and in coherence with the WP1 adopted SGAM methodology from T1.2 that was adapted for the specific purpose of this task. Once defined the main KERs and related responsible partner/s, the characterization of each result, in terms of description of competitive advantages, market perspective and IPR management, has been preliminary assessed by responsible partners. In addition, exploitation strategies

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at partner and consortium level have been preliminarily investigated. Regarding IPR, background and foreground information together with exploitation claims have been provided according to the partners' intentions and to the project development. Finally, IPR protection measures have been preliminarily investigated for each project result with the aim to understand the protection intentions for each of them.

The IANOS project represents a unique opportunity for the project partners to reinforce their market positions or enter new markets, properly exploiting the results developed within the project. For this reason, a proper exploitation plan is crucial to maximize the potential benefits for each project partner.

This document represents a "living document" that will be updated along the project as long as the results are developed and validated, and partners define the related exploitation perspective according to the developments they have been involved in.

The project is currently at Month 24 (out of 48) and thus it is not yet sufficiently mature for outlining a complete exploitation plan. IANOS project has 20 key exploitable results and for each of them we need to receive a characterization table to finalize the exploitation strategy. In this document we collected 17 characterization table, the other 3 will be included in the next version of this document.
Nevertheless, this preliminary document aims to provide common guideline as well as a common plan for the participants to undertake exploitation actions with a structured and well-organized approach for the following months, as only in this way the widest communication and dissemination of the foreground generated by the project can be reached and the foreground can be adequately protected and exploited.

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2 IANOS Exploitation model

As a first step towards exploitation, a definition of Key Exploitable Results has been provided to help the consortium in their clear identification. Based on the initial version of the present document, these Key Exploitable Results have been identified and preliminarily characterized, according to their actual development status, with the aim to evaluate their readiness towards the market. Then, the analysis of the main expectations of project partners with respect to their main developments has been updated with the aim of evaluating roles and single or joint market intentions.

The final goal of this analysis is the identification of the exploitation framework, towards the definition of proper strategies for market penetration including all aspects related to the IPR management.

2.1 Definition and identification of IANOS Key Exploitable Results

Firstly, a definition of Project Result (PR) as defined by the European Commission is provided:

"A Project Result is defined as any tangible or intangible output of the action, such as data, knowledge and information whatever their form or nature, whether or not they can be protected."

Thus, PR is the outputs generated during the project which can be used and create impact, either by the project partners or by other stakeholders. Project results can be reusable and exploitable (e.g., inventions, prototypes, services) as such, or elements (knowledge, technology, processes, networks) that have potential to contribute to further work on research or innovation.

Figure 2-2-1: Project Results[1]

Dealing with the exploitation of results means evaluating the utilization of results in developing, creating and marketing a product or process, or in creating and providing a service, or in standardization activities.

[1] https://ec.europa.eu/research/participants/data/ref/h2020/other/events/2018-09-21/9_dissemination-exploitation-activities_en.pdf

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As explained by mean of an extract from the European Commission slides on Dissemination and Exploitation activities in figure below, it is important to:

- Make use of the results for scientific, societal and economic purposes, or for improving public knowledge and action (e.g., recommendations for policy making); recognizing exploitable results and their stakeholders, as group of entities that are making concrete use of results.
- Concretize the value and impact of the Research & Innovation activity for societal challenges; with this respect, partners shall make best efforts to exploit the results it owns, or to have them exploited by another legal entity (e.g., through making results available under open licenses).

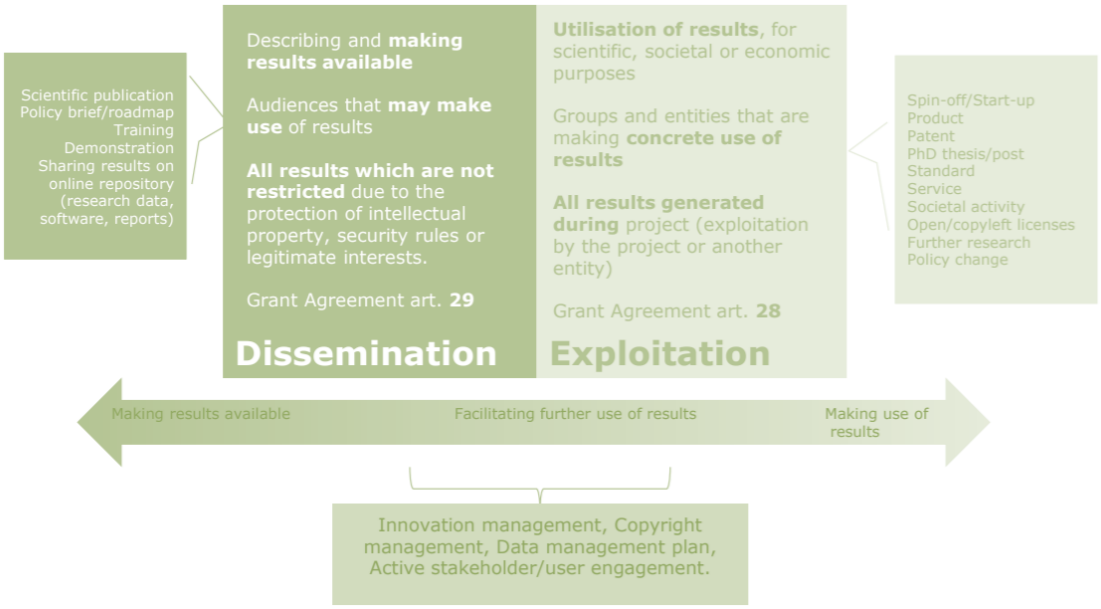

Figure 2-2: Dissemination and Exploitation of Project Results[2]

Given the list of Key Exploitable Results (KERs) presented in D10.8 and the input provided by partners, an updated list of Key Exploitable Results is reported below.

[2] https://ec.europa.eu/research/participants/data/ref/h2020/other/events/2018-09-21/9_dissemination-exploitation-activities_en.pdf

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Table 2-1: IANOS Key Exploitable Results overview

#	Key Exploitable Results	Responsible Partner(s)
1	iVPP platform: Centralized Dispatcher [Terceira]	CERTH & CW
2	iVPP platform: Centralized Dispatcher [Ameland]	TNO & Neroa
3	iVPP platform: Forecasting Engine	CERTH
4	iVPP platform: - Intelligent Segmentation & Clustering Engine	CERTH
5	iVPP platform: IEPT toolkits (specifically VERIFY and INTEMA.grid)	CERTH
6	iVPP platform: - P2P Transactive Energy Trading Framework	ENG
7	iVPP platform: - Virtual Energy Console	CW
8	iVPP platform: Enterprise Service Bus	ETRA
9	FEID PLUS	CERTH
10	PCM Thermal Storage Heat Batteries	SUNAMP
11	V2G Charging & Services on Terceira	EFACEC
12	DefPi Platform	NEROA
13	Smart Energy Router	UNINOVA
14	Flywheel	TERALOOP
15	Tidal Kite	SQH
16	Auto generative High-Pressure Digester (AHPD)	BAREAU
17	Hybrid Transformer	EFACEC
18	PVs with microinverter	BEON
19	Biobased saline batteries	SWT
20	IANOS Energy Planning and Transition suite (IEPT)	UBE

In the following paragraphs, each KER has been preliminary characterized according to the information available, with particular focus on the innovation, potential customers and exploitation perspectives (including IPR management).

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2.2 Preliminary characterization of Key Exploitable Results

An exploitation model shall contain adequate exploitation strategy, which will ensure successful implementation and the market entry of the identified project results. It is, however, crucial to know the characteristics of each of the results.

Error! Reference source not found.Error! Reference source not found. summarizes the list of KERs together with a short description and the related ownership including the involved partners and a first assumption about the expected TRL improvement within the project.

Table 2-2: IANOS Key Exploitable Results overview

#	Key Exploitable Results	Description	Responsible Partner(s)
1	iVPP platform: Centralized Dispatcher [Terceira]	The Centralized Dispatcher is part of the IANOS iVPP Operative Orchestration Toolkit (iVPP) that contains functionalities to provide energy flexibility services and foster island self-consumption according to each use case specification. CERTH optiMEMS component is utilized to evaluate the optimal dispatch scheduling on the island of Terceira, in the cases i) of the large-scale BESS, ii) of several residential controllable devices such as SUNAMP heat batteries and electrochemical batteries, iii) of EV charging stations charge/discharge setpoints	CERTH & CW
2	iVPP platform: Centralized	Ameland's iVPP platform integrates flexible energy assets at the island and	TNO & Neroa

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#	Key Exploitable Results	Description	Responsible Partner(s)
	Dispatcher [Ameland]	implements an optimal dispatch plan that deals with grid congestion while integrating as much renewable energy sources as possible. Ameland's iVPP utilizes ReFlex technology to create the optimal dispatch plan.	
3	iVPP platform: Forecasting Engine	By creating forecasting algorithms for both energy consumption and generation, this component generates the essential inputs for the decision support system (Centralized Dispatcher), assisting in the optimal programming and managing of the grid assets. Furthermore, forecasts will be provided for the energy market prices, and more specifically for the day-ahead price, intraday price, imbalance price, and frequency containment reserves (FCR).	CERTH
4	iVPP platform: - Intelligent Segmentation & Clustering Engine	This tool will be able to provide a detailed overview of the energy portfolio creating clusters of residential users based on various objectives and thus delivering insightful information for the end user. Also, it will be integrated with the	CERTH

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#	Key Exploitable Results	Description	Responsible Partner(s)
		Forecasting Engine of the iVPP to assist with the (aggregated) forecasting of residential loads. The Aggregation and Intelligent Segmentation component consists of three different submodules that: examine typical consumption patterns, detect the most appropriate set of customers for demand response schemes and examine the daily variation of the consumption time series. Towards this end, three different clustering algorithms (k-means, Spectral and Hierarchical) are utilized and the best performing one according to certain metrics and domain knowledge will be kept.	
5	iVPP platform: IEPT toolkits (specifically VERIFY and INTEMA.grid)	VERIFY conducts LCA/LCC analysis, using either synthetic data and/or real-time data, to support islands in their replication activities and foreseen investoments, in terms of environmental aspects. This tool will be able to provide a detailed overview of the environmental profile of the energy portfolio of	CERTH

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#	Key Exploitable Results	Description	Responsible Partner(s)
		islands, supporting their SECAP development in the future. INTEMA.grid serves as a fully interoperable with VERIFY, Energy Simulation platform, able to quantify in a dynamic fashion (if deemed as necessary, but for the main scope of IANOS in a quasi-steady fashion) the energy profiling of islands, accounting both for fossil based PPs and RES, integrated with multiple storage options, taking into account the consumption (or demand) profiles. This set of tools, can facilitate the optimisation process and overall long-term cost benefit of a wide repository of solutions in energy grids, able to address the energy balance in the system on short timescales (hours usually) over all infrastructure	
6	iVPP platform: - P2P Transactive Energy Trading Framework	To be provided in the next version of the document.	ENG
7	iVPP platform: - Virtual Energy Console	The Virtual Energy Console is an iVPP module that consists of the User Interface (UI) dashboards	CWD

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#	Key Exploitable Results	Description	Responsible Partner(s)
		for monitoring the whole VPP operation	
8	iVPP platform: Enterprise Service Bus	Allows the communication of the different components in the iVPP and other elements in the IANOS architecture.	ETRA
9	FEID PLUS	FEID-PLUS (Fog Enabled Intelligent Devices) is equipped with embedded communication interfaces, either directly on the main unit or in the form of add-ons; it can communicate unobtrusively with most commonly used wired or wireless communication protocols. FEID-PLUS will be utilized as a local energy management system, which will collect and monitor real-time data through deployed smart sensors, plugs and field-level interfaces. In addition, FEID-PLUS will perform optimization procedures for the management and consequently the local control of the building loads.	CERTH
10	PCM Thermal Storage Heat Batteries	Heat Batteries are modern-day, energy saving thermal stores made with a high-	SUNAMP

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#	Key Exploitable Results	Description	Responsible Partner(s)
		performance phase change material (PCM technology) to deliver fast flowing hot water, reliably, safely and efficiently. Sunamp heat batteries are beneficial for multiple reasons, we are four times smaller than the equivalent hot water cylinder, easier to install, kinder to the environment and there is no mandatory annual maintenance. We charge our Heat Batteries in multiple ways, grid electricity, solar PV and/or from heat pumps (HVAC). We enable hot water storage systems to be installed where otherwise they would not fit, so particularly benefiting retrofitting projects.	
11	V2G Charging & Services on Terceira	The EV Charger is constituted by several high efficiency power electronic conversion stages, using the latest technology in terms of semiconductors and conversion topologies for the inclusion of the bidirectional power capability. The charger will incorporate a dedicated interface and control module with the iVPP. Additionally, grid support features will be developed	EFACEC

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#	Key Exploitable Results	Description	Responsible Partner(s)
		and validated in the Terceira pilot.	
12	DefPi Platform	The platoform will be able to gather data and to send steering signals to the involved assets. The platform will gather all data and structure it after it can be sent to [1] Energy Bus and [2] the flex algoritm (Repowered / TNO) and receive the steering signals	NEROA
13	Smart Energy Router	The Smart Energy Router is a power electronics device that manages the energy transfer from/to different sources (distribution grid, RES-based distributed generators), loads and electricity storage system.	UNINOVA
14	Flywheel	The Teraloop solution of a flywheel differs from conventional flywheel solutions by using a patented and prototyped hubless outer-rotor design. The flywheel will be integrated to the energy system for power management and fault ride through at a local industrial site.	TERALOOP
15	Tidal Kite electricity integration	TidalKite technology is a renewable energy solution that harnesses energy from tidal streams. The TidalKite technology is	SQH

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#	Key Exploitable Results	Description	Responsible Partner(s)
		based on an underwater kite operated perpendicular to a water stream that creates a traction force that is converted into electricity. The TidalKite technology is unique in its capability to exploit energy from low velocity tidal streams in shallow waters.	
16	Auto generative High-Pressure Digester (AHPD)	A large-scale Autogenerative High Pressure Digester (AHPD) to convert sewage and swill plus hydrogen and carbon dioxide into green NG (90-98% CH4), which can be injected in the existing NG network.	BAREAU
17	Hybrid Transformer	The Hybrid Transformer is an innovative distribution transformer that incorporates new materials, power electronics technology and an advanced monitoring system.	EFACEC
18	PVs with microinverter	BeON's microinverters allow for individual power generating PVs to directly connect to any electric socket (Pluginverter), just like a common electric appliance, in a safe, reliable, and simple way. This bypasses the need to connect to a switchboard or to an exclusive power line for the PV, cutting	BEON

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#	Key Exploitable Results	Description	Responsible Partner(s)
		down on infrastructure needs, space, and costs. To integrate these highly distributed systems in Smart Grids a communication interface and API protocol will be developed in order to provide demand/response capability thus supporting local grid infrastructure capability and stability.	
19	Biobased saline batteries C1	The Bio Based Battery technology is a unique and Safe, renewable energy solution that stores energy to have better use of local energy harvested from local resources like the sun, hydropower, wind or other means you have to store it locally for local use.	SWT
20	IANOS Energy Planning and Transition suite (IEPT)	A suite that supports the investments of the different stakeholders providing a holistic approach that quantifies both the costs and benefits of the IANOS interventions in the demonstration sites, i.e., Lighthouse and fellow islands of IANOS, as well as providing a tool that facilitates the fundraising campaigns.	UBE

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With the aim to better know and understand the characteristics of each of the above-mentioned results, lead partners were asked to answer questions regarding their developments and these outputs were then served as a basis for the formulation of results characteristics. The questions revolved mainly around four key areas:

- General description of Project Result focusing on its innovativeness and competitive advantages
- Market context in which the product will be introduced
- IPR management detailing the role of partners involved
- Exploitation Strategy

Thus, a description of the above identified results of IANOS project has been provided following the template below.

Table 2-3: Characterization table template

<table>
<tr><td rowspan="6">Project Result general description</td><td>Project Result # / Title</td><td colspan="2"></td></tr>
<tr><td>Project Result Short description/Service Description</td><td colspan="2">Short description of the component and of the related service provided</td></tr>
<tr><td>Innovation content/ Competitive advantage/Benefits</td><td colspan="2">Added value of the project result/service provided from the end-user point of view</td></tr>
<tr><td>Legal, normative, or ethical requirements connected to the development</td><td colspan="2">Any legal, normative, or ethical requirements that shall be kept into account during the development and, potentially after the end of the project (e.g., any legal constraints for the exploitation?)</td></tr>
<tr><td rowspan="2">TRL</td><td>Before IANOS</td><td>After IANOS</td></tr>
<tr><td></td><td></td></tr>
<tr><td rowspan="2">Market</td><td>Targeted Market</td><td colspan="2">Example of application or scenario for the project result/service</td></tr>
<tr><td>Customer segments and whom to address (inside the client's organization)</td><td colspan="2">Target clients</td></tr>
</table>

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	Potential competitors				
IPR	Owner(s) of Result				
	Other Partners involved	If there are other partners involved, we will involve them in the exploitation call			
	Joint ownership (Need of agreement before the end of the project?)	Yes/No			
Exploitation Strategy	Exploitation claim	Consultancy service	Academic exploitation	Commercial exploitation (e.g., selling licenses)	Other
		Yes/No	Yes/No	Yes/No	Yes/No
	Revenue streams associated to the above exploitation claim	€	€	€	€
	Estimated effort to bring the Project Result to the market (yearly)	Activities	Cost	Time	

The outcome of the PRs characterization activity will produce a series of characterization table for each KER, preliminarily completed according to their on-going status and to the project timeline thanks to the partners inputs that will serve as basis for the development of exploitation strategy both at partner level and at consortium level.

The updated version of the characterization tables for each exploitable result will be provided in the deliverable D10.10 “IANOS Exploitation plan (PUDF and identification of project KERs) (T10.4)_v3” due at M36.

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2.2.1 iVPP platform: Centralized Dispatcher - optiMEMS [Terceira]

Table 2-4 Characterization table KER 1: iVPP platform - Centralized Dispatcher [Terceira]

Project Result general description	Project Result # / Title	iVPP platform: Centralized Dispatcher - optiMEMS [Terceira]			
	Project Result Short description/Service Description	The Centralized Dispatcher is part of the IANOS iVPP Operative Orchestration Toolkit (iVPP) that contains functionalities to provide energy flexibility services and foster island self-consumption according to each use case specification. CERTH optiMEMS component is utilized to evaluate the optimal dispatch scheduling on the island of Terceira, in the cases i) of the large scale BESS, ii) of several residential controllable devices such as SUNAMP heat batteries and electrochemical batteries, iii) of EV charging stations charge/discharge setpoints			
	Innovation content/ Competitive advantage/Benefits	Integration of multiple energy assets and evaluation of optimal schedule according to system technical constraints and cost saving objectives			
	Legal, normative, or ethical requirements connected to the development	Adoption of best practices to protect privacy and personal data, in accordance with EU/national regulations.			
	TRL	Before IANOS	After IANOS		
		6	8		
Market	Targeted Market	The Centralized Dispatcher and optiMEMS in particular can find application in any kind of energy portfolio management application, when there is a need of applying the optimal schedule for dispatchable units, based on profit/self-consumption or environmental indices			
	Customer segments and whom to address (inside the client's organization)	Retailers Aggregators, VPP Operators Microgrid operators Building Energy Management Systems Providers			
	Potential competitors	Building Energy Management Systems Providers (partially) VPP solutions providers			
IPR	Owner(s) of Result	CERTH			
	Other Partners involved	CWD			
	Joint ownership (Need of agreement before the end of the project?)	Yes/No			
Exploitation	Exploitation claim	Consultancy service	Academic exploitation	Commercial exploitation	Other

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				(e.g., selling licenses)	
		No	No	Yes	No
	Revenue streams associated to the above exploitation claim	-	-	200 000€	-
	Estimated effort to bring the Project Result to the market (yearly)	Activities	Cost	Time	
			65k	1yr	

2.2.2 iVPP platform - Centralized Dispatcher [Ameland]

Table 2-5 Characterization table KER 2: iVPP platform: Centralized Dispatcher [Ameland]

Project Result general description	Project Result # / Title	iVPP platform: Centralized Dispatcher [Ameland]	
	Project Result Short description/Service Description	Ameland's iVPP platform integrates flexible energy assets at the island and implements an optimal dispatch plan that deals with grid congestion while integrating as much renewable energy sources as possible. Ameland's iVPP utilizes ReFlex technology to create the optimal dispatch plan.	
	Innovation content/ Competitive advantage/Benefits	The system reduces grid congestion and allows the island to incorporate at much renewable energy sources as possible, e.g. by shifting load and use intermediate storage for surplus of energy. *Added value of the project result/service provided from the end-user point of view*	
	Legal, normative, or ethical requirements connected to the development	*Any legal, normative, or ethical requirements that shall be kept into account during the development and, potentially after the end of the project (e.g., any legal constraints for the exploitation?)* The system requires energy measurements (e.g., from households when part of the use case) which might contain privacy sensitive information in some situations.	
	TRL	Before IANOS	After IANOS
		6	8
Market	Targeted Market	Any region that has to deal with grid congestion or imbalance. *Example of application or scenario for the project result/service*	
	Customer segments and whom to address (inside the client's organization)	Municipalities, industry park owners, national governments	
	Potential competitors	Companies with similar technology	

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IPR	Owner(s) of Result	TNO			
	Other Partners involved	NEROA			
	Joint ownership (Need of agreement before the end of the project?)	No			
Exploitation Strategy	Exploitation claim	Consultancy service	Academic exploitation	Commercial exploitation (e.g., selling licenses)	Other
		Yes	Yes	Yes	No
	Revenue streams associated to the above exploitation claim	Knowledge acquired is used in consultancy (e.g., to governments)	Use of the technology to improve company knowledge position	Currently not feasible to sell this technology as a product in the market.	-
	Estimated effort to bring the Project Result to the market (yearly)	Activities	Cost	Time	
		tbd	tbd	tbd	
		It is difficult to estimate at the current stage of the project the effort in terms of timing and costs to bring the project result to the market. More details will be provided by the end of the project.			

2.2.3 iVPP platform - Forecasting Engine

Table 2-6 Characterization table KER 3: iVPP platform: Forecasting Engine

Project Result general description	Project Result # / Title	iVPP platform: Forecasting Engine
	Project Result Short description/Service Description	By creating forecasting algorithms for both energy consumption and generation, this component generates the essential inputs for the decision support system (Centralized Dispatcher), assisting in the optimal programming and managing of the grid assets. Furthermore, forecasts will be provided for the energy market prices, and more specifically for the day-ahead price, intraday price, imbalance price, and frequency containment reserves (FCR).
	Innovation content/ Competitive advantage/Benefits	The Forecasting Engine is a vital part of the decision-making process as it delivers the necessary forecasts for the consumption, generation and market prices to the Centralized Dispatcher in order to provide the setpoints for the optimal dispatch of the assets. For the development of the forecasting engine a plethora of machine learning models (tree-based models and SVM), deep learning models (RNN, LSTM), physical models and ensembles

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<table>
<tr><td rowspan="4"></td><td></td><td colspan="4">were utilized for the forecasting of the energy-based time series. The approach that is followed is heavily based on the feature engineering aspect of the machine learning methodology, utilizing historical values, time features and weather features.

The lightweight, feature-depended methodology that is proposed is proved to achieve highly accurate results without the need of a large dataset or high training time.</td></tr>
<tr><td>Legal, normative, or ethical requirements connected to the development</td><td colspan="4">Adoption of best practices to protect privacy and personal data, in accordance with EU/national regulations.</td></tr>
<tr><td rowspan="2">TRL</td><td colspan="2">Before IANOS</td><td colspan="2">After IANOS</td></tr>
<tr><td colspan="2">6</td><td colspan="2">8</td></tr>
<tr><td rowspan="3">Market</td><td>Targeted Market</td><td colspan="4">The Forecasting Engine can find application in the following sectors, whenever there is a need for forecasting load/generation & price profiles: Renewable Energy Resources, Microgrids, Smart Grids, Architecture, Engineering and Construction (Smart Buildings), and Building Energy Management Systems</td></tr>
<tr><td>Customer segments and whom to address (inside the client's organization)</td><td colspan="4">Retailers
Aggregators, VPP Operators
Microgrid operators
Building Energy Management Systems Providers</td></tr>
<tr><td>Potential competitors</td><td colspan="4">Forecasting Services Providers
DR services providers
Building Energy Management Systems Providers</td></tr>
<tr><td rowspan="3">IPR</td><td>Owner(s) of Result</td><td colspan="4">CERTH</td></tr>
<tr><td>Other Partners involved</td><td colspan="4"></td></tr>
<tr><td>Joint ownership (Need of agreement before the end of the project?)</td><td colspan="4">No</td></tr>
<tr><td rowspan="4">Exploitation Strategy</td><td rowspan="2">Exploitation claim</td><td>Consultancy service</td><td>Academic exploitation</td><td>Commercial exploitation
(e.g., selling licenses)</td><td>Other</td></tr>
<tr><td>No</td><td>No</td><td>Yes</td><td>No</td></tr>
<tr><td>Revenue streams associated to the above exploitation claim</td><td>-</td><td>-</td><td>130 000€</td><td>-</td></tr>
<tr><td rowspan="2">Estimated effort to bring the Project</td><td colspan="2">Activities</td><td>Cost</td><td>Time</td></tr>
<tr><td colspan="2"></td><td>40k</td><td>1yr</td></tr>
</table>

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	Result to the market (yearly)			

2.2.4 iVPP platform - Intelligent Segmentation & Clustering Engine

Table 2-7 Characterization table KER 4: iVPP platform: - Intelligent Segmentation & Clustering Engine

Project Result general description	Project Result # / Title	iVPP platform: - Aggregation and Intelligent Segmentation	
	Project Result Short description/Service Description	The Aggregation and Intelligent Segmentation component of IANOS iVPP will be used to assist with the decision-making process of the energy portfolio/VPP manager.	
	Innovation content/ Competitive advantage/Benefits	This tool will be able to provide a detailed overview of the energy portfolio creating clusters of residential users based on various objectives and thus delivering insightful information for the end user. Also, it will be integrated with the Forecasting Engine of the iVPP to assist with the (aggregated) forecasting of residential loads. The Aggregation and Intelligent Segmentation component consists of three different submodules that: examine typical consumption patterns, detect the most appropriate set of customers for demand response schemes and examine the daily variation of the consumption time series. Towards this end, three different clustering algorithms (k-means, Spectral and Hierarchical) are utilized and the best performing one according to certain metrics and domain knowledge will be kept.	
	Legal, normative, or ethical requirements connected to the development	Adoption of best practices to protect privacy and personal data, in accordance with EU/national regulations.	
	TRL	Before IANOS	After IANOS
		6	8
Market	Targeted Market	This tool is best suited for managers of energy portfolios of residential clients with smart meters installation. Its main aim is to assist the user with the creation of appropriate Demand Response schemes and different tariffs for different sets of residential customers.	
	Customer segments and whom to address (inside the client's organization)	Aggregators, VPP Operators, Energy Communities Managers, Energy Retailers	
	Potential competitors	DR Services Providers, ESCOs	
IPR	Owner(s) of Result	CERTH	
	Other Partners involved	-	

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	Joint ownership (Need of agreement before the end of the project?)	No			
Exploitation Strategy	Exploitation claim	Consultancy service	Academic exploitation	Commercial exploitation (e.g., selling licenses)	Other
		No	No	Yes	No
	Revenue streams associated to the above exploitation claim	-	-	70 000€	-
	Estimated effort to bring the Project Result to the market (yearly)	Activities	Cost	Time	
			50k	1yr	

2.2.5 iVPP platform - IEPT toolkits (specifically VERIFY and INTEMA.grid)

Table 2-8 Characterization table KER 5: iVPP platform: - IEPT toolkits (specifically VERIFY and INTEMA.grid)

Project Result general description	Project Result # / Title	iVPP platform: - IEPT toolkits (specifically VERIFY-D and INTEMA.grid)
	Project Result Short description/Service Description	The IEPT component of IANOS iVPP will be used to assist with the decision-making process, the IANOS LHs and FIs on their replication activities, integrating selected innovative systems, while also the assessment of the environmental impact of the IANOS solutions in the LHs.
	Innovation content/ Competitive advantage/Benefits	VERIFY-D offers a holistic life cycle tool applicable in energy networks considering both existing energy grid infrastructure and comparisons with planned energy grid interventions. Multiple energy grid sectors, such as power plants production units, energy storage, and public infrastructures (e.g. lighting) can be incorporated to the life cycle analysis, specifically for the case of district level interventions. INTEMA.grid offers an Energy Planning & Transition Decision Support Tool able to simulate multi-vector energy systems, integrated, accounting also the grid topologies and interconnections among variable systems. Both tools are designed to be interoperable with multiple commercial platforms, if deemed as necessary, since are based on open-source algorithms, house developed by CERTH, through appropriately selected APIs offering the ability for instant communication and data exchange. Particularly, the analysis results of the VERIFY-D platform offer an accurate energy intervention planning mechanism through the quantify of

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<table>
<tr><td rowspan="4"></td><td></td><td colspan="4">environmental and economic impacts and further evaluation through the operation assessment specialized on IANOS demo sites.</td></tr>
<tr><td>Legal, normative, or ethical requirements connected to the development</td><td colspan="4">Adoption of best practices to protect privacy and personal data, in accordance with EU/national regulations.</td></tr>
<tr><td rowspan="2">TRL</td><td colspan="2">Before IANOS</td><td colspan="2">After IANOS</td></tr>
<tr><td colspan="2">6</td><td colspan="2">8</td></tr>
<tr><td rowspan="3">Market</td><td>Targeted Market</td><td colspan="4">This tool is best suited for managers of energy portfolios on a district and even island level. It can also support ESCOs and power plant operators, for selecting best available technologies, aiming at increasing their renewable share. Moreover, it can facilitate activities of local Municipalities, by assisting them in the definition of most promising interventions in their energy mixture.</td></tr>
<tr><td>Customer segments and whom to address (inside the client's organization)</td><td colspan="4">Aggregators, VPP Operators, Energy Communities Managers, Energy Retailers, Municipalities, ESCOs, Engineers, SECAP Planners</td></tr>
<tr><td>Potential competitors</td><td colspan="4">Other Services Providers, ESCOs</td></tr>
<tr><td rowspan="3">IPR</td><td>Owner(s) of Result</td><td colspan="4">CERTH</td></tr>
<tr><td>Other Partners involved</td><td colspan="4">-</td></tr>
<tr><td>Joint ownership (Need of agreement before the end of the project?)</td><td colspan="4">No</td></tr>
<tr><td rowspan="4">Exploitation Strategy</td><td rowspan="2">Exploitation claim</td><td>Consultancy service</td><td>Academic exploitation</td><td>Commercial exploitation
(e.g., selling licenses)</td><td>Other</td></tr>
<tr><td>Yes</td><td>No</td><td>Yes</td><td>No</td></tr>
<tr><td>Revenue streams associated to the above exploitation claim</td><td>5000 €/simulation case</td><td>-</td><td>12000€</td><td>-</td></tr>
<tr><td>Estimated effort to bring the Project Result to the market (yearly)</td><td>Activities
Direct Labour to launch the product commercially. Initial efforts and contacts have been already undertaken</td><td colspan="2">Cost</td><td>Time
6 months</td></tr>
</table>

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		Maintenance and customer support	3000 €	
		Software updates	1 000 €	

2.2.6 iVPP platform - P2P Transactive Energy Trading Framework

The characterization table of this result will be included in the next version of the document.

2.2.7 iVPP platform - Virtual Energy Console

Table 2-9 Characterization table KER 7: iVPP platform: - Virtual Energy Console

Project Result general description	Project Result # / Title	iVPP platform: Virtual Energy Console	
	Project Result Short description/Service Description	Consists of the User Interface (UI) dashboards for monitoring the whole VPP operation. It will offer unique linked data exploration, perception and knowledge extraction for effective energy flows' assessment.	
	Innovation content/ Competitive advantage/Benefits	Advances on visual analytics will be used to enable the dynamic connection of different datasets with several types of visualization.	
	Legal, normative, or ethical requirements connected to the development	-	
	TRL	Before IANOS	After IANOS
		6	8
Market	Targeted Market	Any kind of VPP portfolio management application, when there is a need to visualize and manage operations of disperse energy assets.	
	Customer segments and whom to address (inside the client's organization)	Energy Community Managers, Aggregators, Retailers, System Operators	
	Potential competitors	VPP solutions providers	
IPR	Owner(s) of Result	CWD	
	Other Partners involved	None	
	Joint ownership (Need of agreement before the end of the project?)	No	

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Exploitation Strategy	Exploitation claim	Consultancy service	Academic exploitation	Commercial exploitation (e.g., selling licenses)	Other
		No	No	Yes	No
	Revenue streams associated to the above exploitation claim	-	-	200 000€	-
	Estimated effort to bring the Project Result to the market (yearly)	Activities	Cost	Time	
			65k	1yr	

2.2.8 iVPP platform - Enterprise Service Bus

Table 2-10 Characterization table KER 8: iVPP platform: Enterprise Service Bus

Project Result general description	Project Result # / Title	iVPP platform: Enterprise Service Bus	
	Project Result Short description/Service Description	Allows the communication of the different components in the iVPP and other elements in the IANOS architecture.	
	Innovation content/ Competitive advantage/Benefits	Added value of the project result/service provided from the end-user point of view	
	Legal, normative, or ethical requirements connected to the development	-	
	TRL	Before IANOS	After IANOS
		6	8
Market	Targeted Market	Multi-protocol and multi-format scenarios which require a common language to perform the communication. These scenarios are typically composed by multiple applications which need an effective communication. Industries in the field of financial services, insurance, manufacturing, retail, telecom, energy utility, food distribution network require the use of ESB in their software architecture.	
	Customer segments and whom to address (inside the client's organization)	Loosely coupled business units and business partners automating supply chains.	
	Potential competitors	Oracle, Microsoft, IBM, Jboss, Phoenix, Apache, WSO2 ESB	

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IPR	Owner(s) of Result	ETRA			
	Other Partners involved	It will depend on how the iVPP platform is commercialized. If it was presented as a joint of the several tools that compose the iVPP platform, it would need to be treated as joint ownership.			
	Joint ownership (Need of agreement before the end of the project?)	Yes. It will depend on how the iVPP platform is commercialized. If it was presented as a joint of the several tools that compose the iVPP platform, it would need to be treated as joint ownership.			
Exploitation Strategy	Exploitation claim	Consultancy service	Academic exploitation	Commercial exploitation (e.g., selling licenses)	Other
		Yes	No	Yes	No
	Revenue streams associated to the above exploitation claim	2 000€	-	9 000€	-
	Estimated effort to bring the Project Result to the market (yearly)	Activities	Cost	Time	
		Personal cost- Direct Labour to launch the product commercially	5 000 €	5 months	
		Maintenance and customer support	500 €	-	
		Software updates	2 000 €	-	
		Marketing and Commercial activities	1 500 €	-	
		General expenses	1 000 €	-	

2.2.9 *FEID Plus - Fog Enabled Intelligent Devices*

Table 2-11 Characterization table KER 9: FEID PLUS

Project Result general description	Project Result # / Title	FEID PLUS
	Project Result Short description/Service Description	FEID-PLUS (Fog Enabled Intelligent Devices) is equipped with embedded communication interfaces, either directly on the main unit or in the form of add-ons; it can communicate unobtrusively with most commonly used wired or wireless communication protocols. FEID-PLUS will be utilized as a local energy management system, which will collect and monitor real-time data through deployed smart sensors, plugs and field-level interfaces. In addition, FEID-

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<table>
<tr><td rowspan="5"></td><td></td><td colspan="4">PLUS will perform optimization procedures for the management and consequently the local control of the building loads.</td></tr>
<tr><td>Innovation content/ Competitive advantage/Benefits</td><td colspan="4">For the real time monitoring and controlling of the local loads, the FEID-PLUS supports the most common wired and wireless communication protocols such as:
• WiFi
• Bluetooth
• Enocean
• Ethernet
• RS-485/Modbus RTU
• RS-232/UART
• Zigbee
For on-the fly decision-making, the FEID-PLUS is also enhanced with cutting-edge intelligence, including prediction and optimization algorithms.</td></tr>
<tr><td>Legal, normative, or ethical requirements connected to the development</td><td colspan="4">None</td></tr>
<tr><td rowspan="2">TRL</td><td colspan="2">Before IANOS</td><td colspan="2">After IANOS</td></tr>
<tr><td colspan="2">6</td><td colspan="2">8</td></tr>
<tr><td rowspan="3">Market</td><td>Targeted Market</td><td colspan="4">Building Energy Management / wired and wireless monitoring and control applications</td></tr>
<tr><td>Customer segments and whom to address (inside the client's organization)</td><td colspan="4">Building Managers, Building Users, Retailers, Aggregators, ESCOs, Energy Community Managers, Microgrid Operators</td></tr>
<tr><td>Potential competitors</td><td colspan="4">IoT & Smart Meter Vendors, BMS/ Building Automation providers</td></tr>
<tr><td rowspan="3">IPR</td><td>Owner(s) of Result</td><td colspan="4">CERTH</td></tr>
<tr><td>Other Partners involved</td><td colspan="4">-</td></tr>
<tr><td>Joint ownership (Need of agreement before the end of the project?)</td><td colspan="4">No</td></tr>
<tr><td rowspan="3">Exploitation Strategy</td><td rowspan="2">Exploitation claim</td><td>Consultancy service</td><td>Academic exploitation</td><td>Commercial exploitation
(e.g., selling licenses)</td><td>Other</td></tr>
<tr><td>No</td><td>No</td><td>Yes</td><td>No</td></tr>
<tr><td>Revenue streams associated to the</td><td>-</td><td>-</td><td>60k€</td><td>-</td></tr>
</table>

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	above exploitation claim				
	Estimated effort to bring the Project Result to the market (yearly)	Activities	Cost	Time	
			40 000	1yr	

2.2.10 PCM Thermal Storage Heat Batteries

The characterization table of this result will be included in the next version of the document.

2.2.11 V2G Charging & Services on Terceira

Table 2-12 Characterization table KER 11: V2G Charging & Services on Terceira

Project Result general description	Project Result # / Title	V2G Charging & Services on Terceira	
	Project Result Short description/Service Description	The EV Charger is constituted by several high efficiency power electronic conversion stages, using the latest technology in terms of semiconductors and conversion topologies for the inclusion of the bidirectional power capability. The charger will incorporate a dedicated interface and control module with the iVPP. Additionally, grid support features will be developed and validated in the Terceira pilot.	
	Innovation content/ Competitive advantage/Benefits	The bidirectional power capability allied with grid support features allow the development of new business models that will benefit and enhance the role of the EV user	
	Legal, normative, or ethical requirements connected to the development	The regulation for the bidirectional charging is still on progress in terms of electrical safety of installations and the interface to the grid. Also, the creation of a market regulation for the valorization of the bidirectional capability and the contribution for the grid support is still under discussion. On the EV side, presently, the offer of EV models with bidirectional capability is limited.	
	TRL	Before IANOS	After IANOS
		5	7
Market	Targeted Market	North and Central Europe/Portugal/Spain	
	Customer segments and whom to address (inside the client's organization)	EV charging for commercial fleets	
	Potential competitors	ABB/Tritrium/Hypercharger	
IPR	Owner(s) of Result	EFACEC	

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	Other Partners involved	-			
	Joint ownership (Need of agreement before the end of the project?)	No			
Exploitation Strategy	Exploitation claim	Consultancy service	Academic exploitation	Commercial exploitation (e.g., selling licenses)	Other
		No	No	Yes	No
	Revenue streams associated to the above exploitation claim	-	-	Product sales in (2024-27) 6,1 M€	-
	Estimated effort to bring the Project Result to the market (yearly)	Activities	Cost	Time	
		Industrialization	75 000€	4 months (in the first year)	
		Third party Certification program covering different markets	80 000€	8 months (in the first year)	
		Product launch commercial and dissemination activities	21 000€	-	

2.2.12 DefPi Platform

The characterization table of this result will be included in the next version of the document.

2.2.13 Smart Energy Router

Table 2-13 Characterization table KER 13: Smart Energy Router

Project Result general description	Project Result # / Title	Smart Energy Router
	Project Result Short description/Service Description	The Smart Energy Router is a power electronics device that manages the energy transfer from/to different sources (distribution grid, RES-based distributed generators), loads and electricity storage system.
	Innovation content/ Competitive advantage/Benefits	The Smart Energy Router (SER) allows a holistic integration of local renewable energy production along with the integration of local energy storage, with proven effectiveness in managing the

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		building's energy flux and improving the self-consumption ratios, while reducing electricity costs to end-users.			
	Legal, normative, or ethical requirements connected to the development	If the DSO demands certification of the Smart Energy Router it may impact its installation. The prototype is planned to achieve TRL7 and is not expected to become a certified product during the lifetime of the project.			
	TRL	Before IANOS	After IANOS		
		5	7		
Market	Targeted Market	Research and development at university level			
	Customer segments and whom to address (inside the client's organization)	PhD students to support/develop their research work based on the Smart Energy Router technology; training/demonstration actions in energy efficiency field for university students and researchers.			
	Potential competitors	NA			
IPR	Owner(s) of Result	UNINOVA			
	Other Partners involved	No			
	Joint ownership (Need of agreement before the end of the project?)	No			
Exploitation Strategy	Exploitation claim	Consultancy service	Academic exploitation	Commercial exploitation (e.g., selling licenses)	Other
		No	Yes	No	No
	Revenue streams associated to the above exploitation claim	-	NA	-	-
	Estimated effort to bring the Project Result to the market (yearly)	Activities	Cost	Time	
		--	--	--	
		--	--	--	

2.2.14 Flywheel

Table 2-14 Characterization table KER 14: Flywheel

Project	Project Result # / Title	Flywheel

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<table>
<tr><td rowspan="5"></td><td>Project Result Short description/Service Description</td><td colspan="4">The Teraloop solution of a flywheel differs from conventional flywheel solutions by using a patented and prototyped hubless outer-rotor design. The flywheel will be integrated to the energy system for power management and fault ride through at a local industrial site.</td></tr>
<tr><td>Innovation content/ Competitive advantage/Benefits</td><td colspan="4">The end user suffers voltage sags events, which are mainly caused by more than 200 kW of power difference at the load side. Those escalate sometimes to a domino effect making more machines shutting down despite their voltage drop tolerance for more than 25%. Teraloop 100 kW flywheel will be ready to supply or absorb 100 kW of the power difference, the power tolerance range is increased by 100 kW added to the 200 kW. Based on this added tolerance, and the data provided by the end user, the end user will be able to mitigate about 74% of the voltage sags.</td></tr>
<tr><td>Legal, normative, or ethical requirements connected to the development</td><td colspan="4">The flywheel solution must be safely installed. This requires Teraloop to perform numerous safety tests ahead of the deployment, and active monitoring upon deployment.</td></tr>
<tr><td rowspan="2">TRL</td><td colspan="2">Before IANOS</td><td colspan="2">After IANOS</td></tr>
<tr><td colspan="2">6</td><td colspan="2">8</td></tr>
<tr><td rowspan="3">Market</td><td>Targeted Market</td><td colspan="4">Example of application or scenario for the project result/service</td></tr>
<tr><td>Customer segments and whom to address (inside the client’s organization)</td><td colspan="4">Teraloop can be deployed as a ‘power on demand’ solution to reduce reliance on Li-Ion batteries for energy storage; for end-users it provides protection against fluctuation and revenue from extending the utility of distributed energy assets. It integrates with a client's electrical power infrastructure, either on AC or DC supply, and provides power or protection as needed.</td></tr>
<tr><td>Potential competitors</td><td colspan="4">Beacon Power, Active Power, Zooz, Adaptive Balancing Power</td></tr>
<tr><td rowspan="3">IPR</td><td>Owner(s) of Result</td><td colspan="4">TERALOOP</td></tr>
<tr><td>Other Partners involved</td><td colspan="4">None</td></tr>
<tr><td>Joint ownership (Need of agreement before the end of the project?)</td><td colspan="4">No</td></tr>
<tr><td rowspan="3">Exploitation Strategy</td><td rowspan="2">Exploitation claim</td><td>Consultancy service</td><td>Academic exploitation</td><td>Commercial exploitation
O&M</td><td>Other</td></tr>
<tr><td>No</td><td>No</td><td>Yes</td><td>No</td></tr>
<tr><td>Revenue streams associated to the above exploitation claim</td><td>-</td><td>-</td><td>5 000 €</td><td>-</td></tr>
</table>

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	Estimated effort to bring the Project Result to the market (yearly)	Activities	Cost	Time
		O&M	5 000 €	2 weeks / year

2.2.15 Tidal Kite

Table 2-15 Characterization table KER 15: Tidal Kite

Project Result general description	Project Result # / Title	TidalKite electricity integration	
	Project Result Short description/Service Description	TidalKite technology is a renewable energy solution that harnesses energy from tidal streams. The TidalKite technology is based on an underwater kite operated perpendicular to a water stream that creates a traction force that is converted into electricity. The TidalKite technology is unique in its capability to exploit energy from low velocity tidal streams in shallow waters[3].	
	Innovation content/ Competitive advantage/Benefits	The IANOS project scope related to the TidalKite focuses on the integration of the TidalKite produced electricity in the Ameland island electricity grid. A huge benefit of tidal energy is its continuous availability. This makes it a major component in a 100% renewable, reliable and affordable energy system. Studies show that adding tidal energy to the islands energy mix enables substantial cost reductions towards a 100% renewable energy system.	
	Legal, normative, or ethical requirements connected to the development	Key requirements requiring consideration relate to the environmental impact. Given the predictable and near-continuous availability of tidal energy, the TidalKite will likely be used to balance energy supply and demand for islands. The related quick stopping and (re)starting of TidalKite operation needs to be done in such a way not to harm nature's (protected) species. Developing the knowledge to do this in a safe and environmentally fitting way is part of the TidalKite activities in the IANOS project.	
	TRL[4]	Before IANOS	After IANOS
		6	8
Market	Targeted Market	Island energy cooperatives and islands energy systems	
	Customer segments and whom to address (inside the client's organization)	Various stakeholders are key to realising future TidalKite energy projects, including: - Island energy system policy makers and marine spatial planning specialists - Island energy system cooperatives and/or island energy companies	

[3] The ocean energy strategic research and innovation agenda recognizes (on page 32) that: "Tidal kite devices are being developed for medium to low velocity currents". See: https://www.oceanenergy-europe.eu/wp-content/uploads/2020/05/ETIP-Ocean-SRIA.pdf

[4] The TRL refers to the integration of electricity produced in the islands energy system. The TRL enhancement of the total TidalKite system is realised in other projects.

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	Potential competitors	Given the unique characteristics of the TidalKite, in cases there are no competing tidal energy solutions available, certainly in lower velocity shallow waters areas. The main alternative to tidal energy is the combination of other renewables, complemented with energy storage, to provide for a constant supply of renewabe energy to meet demand. Depending on the local tidal resources available, a TidalKite project will not be able to provide for all the energy needed to fully decarbonise an island's energy system. Alternative solutions are: - Alternative tidal energy technologies. - Renewable energy technologies complemented with storage for continuous electricity supply.			
IPR	Owner(s) of Result	SQH			
	Other Partners involved	-			
	Joint ownership (Need of agreement before the end of the project?)	No			
Exploitation Strategy	Exploitation claim	Consultancy service	Academic exploitation	Commercial exploitation (e.g., selling licenses)	Other
		No	No	Yes	No
	Revenue streams associated to the above exploitation claim	-	-	It will depend on the number of TidalKite units [5] that can be placed in a project. This in turn depends on the local energy demand and Tidal resource available.	-

[5] The TidalKite unit needed, depends on the water velocity locally available (higher velocities enable more energy capture per unit and lower total costs). Higher velocities will typically enable more power generation, from higher capacity units. Also local conditions are key in determining costs of mooring systems and grid connections (a.o. determined by cable length) as well as cost to obtain permits and consents (e.g. seabed lease).
Also installation costs depend on locally available facilities (vessels, harbour cranes, workshops, etc).

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				Cost indication of units is 3500 €/kW.	
	Estimated effort to bring the Project Result to the market (yearly)	Activities	Cost	Time	
		tbd	tbd	tbd	

2.2.16 Auto generative High-Pressure Digester including hydrogen application

Table 2-16 Characterization table KER 16: Auto generative High-Pressure Digester including hydrogen application

Project Result general description	Project Result # / Title	Autogenerative High Pressure Digester (AHPD) including hydrogen application (AH2PD)	
	Project Result Short description/Service Description	A large-scale Autogenerative High Pressure Digester (AHPD) to convert sewage and swill ***plus hydrogen and carbon dioxide*** into green NG (90-98% CH4), which can be injected in the existing NG network.	
	Innovation content/ Competitive advantage/Benefits	First Demo of large-scale green gas production based on biotechnology (AH2PD). No upgrade of biogas required, AHPD will produce high quality biomethane in one single step. AHPD uses biotic pressure generation, leading to very low operational cost.	
	Legal, normative, or ethical requirements connected to the development	No particular requirements: the required permits are already available.	
	TRL	Before IANOS	After IANOS
		8 (AHPD) 6 (AH2PD)	9 (AHPD) 9 (AH2PD)
Market	Targeted Market	Example of application or scenario for the project result/service AH2PD is at this moment the only technology to fulfill the green gas blending obligation for natural gas.	
	Customer segments and whom to address (inside the client's organization)	NV Nederlandse Gasunie (Ulco Vermeulen) Unie van Waterschappen (Rogier van der Sande)	
	Potential competitors	No. All other parties invested in biogas upgrading. We do not need that. SCW (supercritical water gasification) will not be ready for production earlier than 2030, according to the Dutch Ministry of Economic Affairs (letter dd July 4, 2022).	

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IPR	Owner(s) of Result	BAREAU			
	Other Partners involved	-			
	Joint ownership (Need of agreement before the end of the project?)	No, all IP is owned by Bareau.			
Exploitation Strategy	Exploitation claim	Consultancy service	Academic exploitation	Commercial exploitation (e.g., selling licenses)	Other
		Yes	No	Yes	Yes
	Revenue streams associated to the above exploitation claim	tbd	-	0 as this will be a demonstration project without profit.	Operations and control
	Estimated effort to bring the Project Result to the market (yearly)	Activities	Cost	Time	
		Cost of AHPD licenses with several parties	25 000	2022	

2.2.17 Hybrid Transformer

Table 2-17 Characterization table KER 17: Hybrid Transformer

Project Result general description	Project Result # / Title	Hybrid Transformer	
	Project Result Short description/Service Description	The Hybrid Transformer is an innovative distribution transformer that incorporates new materials, power electronics technology and an advanced monitoring system.	
	Innovation content/ Competitive advantage/Benefits	Low losses and more sustainable design, with the capacity to continuously adjust the voltage during operation, in each phase, with unlimited number of operations and with other innovative features such as the contribution to reactive power compensation, voltage unbalance correction and improvement in the voltage profile quality. The transformer control unit will integrate advanced sensoring and diagnostic function blocks for processing the status and the condition of the transformer and the grid that is fed by this asset.	
	Legal, normative, or ethical requirements connected to the development	During the development stage, international standards (IEC 60076) and DSOs (EDA) specification must be respected.	
	TRL	Before IANOS	After IANOS

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		TRL 5		TRL 7	
Market	Targeted Market	DSOs with distributed renewable generation and high level of voltage quality profile.			
	Customer segments and whom to address (inside the client's organization)	DSOs (Distribution system operators of energy distribution grids) Procurement.			
	Potential competitors	ABB, Siemens, Schneider, General Electric Company, …			
IPR	Owner(s) of Result	EFACEC Energia			
	Other Partners involved	No other partners involved			
	Joint ownership (Need of agreement before the end of the project?)	No			
Exploitation Strategy	Exploitation claim	Consultancy service	Academic exploitation	Commercial exploitation (e.g., selling licenses)	Other
		No	No	Yes	No
	Revenue streams associated to the above exploitation claim	-	-	5 M€ (2024-2027)	-
	Estimated effort to bring the Project Result to the market (yearly)	Activities	Cost	Time	
		Promotion and dissemination of results	~50 000€	2024	
		Product industrialization	~500 000€	2024	

2.2.18 PVs with microinverter

Table 2-18 Characterization table KER 18: PVs with microinverter

Project Result general description	Project Result # / Title	Smart Grid interactive PV systems, with plug inverters
	Project Result Short description/Service Description	BeON's microinverters allow for individual power generating PVs to directly connect to any electric socket (Pluginverter), just like a common electric appliance, in a safe, reliable, and simple way. This bypasses the need to connect to a switchboard or to an exclusive power line for the PV, cutting down on infrastructure needs, space, and costs. To integrate these highly distributed systems in Smart Grids a communication interface and API protocol will be

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		developed in order to provide demand/response capability thus supporting local grid infrastructure capability and stability.	
	Innovation content/ Competitive advantage/Benefits	The current mainstream technology with voluminous and size inflexible units of energy conversion (string inverters) do not offer adequate solutions, in any of the aspects. even the need for batteries removes the only advantage, cost. Therefore, there is right now, a definite need for microinverters integrated in a self-contained, self-consumption system. There is also the need to democratize power production and green thinking. this can be done by avoiding lengthy procedures to large installations and a purchase of a DIY kit (panel plus inverter with socket plug) will be ideal, and suitable for several situations. For the end users' point of view. An empowering feeling of contribution, of modernity or independence, leading to an exemplary and contagious feeling to friends and close ones. The difference in the offer proposed is a microinverter that is simpler, smaller, more reliable, and more affordable. Filling in all the gaps that exist for the introduction of microinverters into affordable DIY kits, formed in combination between the panel and the conversion unit - the microinverter. These kits can be directly connected to a wall socket for total convenience (BeON plug inverter). In order for these systems to interact with a smart-grid, and since these mini and highly distributed systems can be spread in many locations and a large area, a robust communications system will need to be implemented in order to connect millions of such systems, creating energy communities and enabling that a central grid controller, can increase the power output dynamically in very localized points of the grid, with very high granularity, precisely targeting any grid point which maybe be under electrical stress. Besides the communication between the BeON PV systems creating a community network, APIs will be created in order for the controlling central to be able to interact with each PV system, assisting demand/response algorithms, target precisely which areas are necessary to be intervened.	
	Legal, normative, or ethical requirements connected to the development	No legal constraints for the exploitation.	
	TRL	Before IANOS	After IANOS

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		TRL 2 A complete second-generation prototype is ready at M24. Several test batches have been completed.	TRL 8 The outcomes expected are the production of the best solution for the installation of a self-consumption photovoltaic system, consisting of a panel, a micro-inverter and a fixing structure, which means that a house or company will only install the adequate power to the satisfaction of its average consumption, with the objective of not buying (or reducing the purchase) of energy to the network saving money. The development of a smart microinverter integrated in module and prepared for an integrated system perfectly adapted to the self-consumption is the result of a long research work of 3 years. The outcome post IANOS will be the most grid responsive and dynamic renewable power source in the world, being able to create energy communities on its own and allowing for panel by panel, house by house, the precise energy increase and reduction helping to keep grid stability without high impact on a large area.
Market	Targeted Market	The potential customers are, energy retailers and energy solutions providers, distributors of solar products as well as Large solar installers and also end customers (homeowners and business owners will purchase from these clients for energy production). In case of making combination DIY Kits the clients can also be hardware/furniture stores like IKEA or B&Q. European panel makers may also be interested in partnering to make a Euro made PV kit with BeOn microinverters. The cost of producing photovoltaic energy at home is less than the cost of purchasing from the distributor.	
	Customer segments and whom to address (inside the client's organization)	'Do It Yourself' (DIY) Kits can be sold in home appliances or local appliance stores, either for electricians who are not PV specialists or even for homeowners with no specific training, since the facility can be as installation of any equipment. On the other hand, the idea of a self-consumption kit induces a change in thinking about energy production and consumption. The owner of the photovoltaic plant not only produces energy from a renewable and potentially inexhaustible source - the sun - but also induces	

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		the reduction of energy consumption, motivating the consumer not to waste it.
	Potential competitors	While inverter manufactures may have a basic way to control the inverter, they lack grid operator integrability, Currently the landscape of grid integrated distributed PV systems is practically inexistent. To address this we intend to have a product during this project which can immediately be used and set the standard for distributed PV smart-grid interaction algorithms and technologies. Besides the highly complex state of the art technologic implementations during the project, this highly integrated system, transcends even technology and goes in to the area of collaborative co-development and value co-creating, making it difficult for companies developing either inverters or microinverters to follow, without going through the same process as we are doing with IANOS and all the partners.
IPR	Owner(s) of Result	Bemicro LDA
	Other Partners involved	-
	Joint ownership (Need of agreement before the end of the project?)	No

Exploitation Strategy	Exploitation claim	Consultancy service	Academic exploitation	Commercial exploitation (e.g., selling licenses)	Other
		No	No	Yes	No
	Revenue streams associated to the above exploitation claim	-	-	TBD	-
	Estimated effort to bring the Project Result to the market (yearly)	Activities	Cost	Time	
		Dissemination results	25 000€	5 years	
		Communication to the potential market. Marketing campaign	75 000€	5 years	

2.2.19 Biobased saline batteries C1

Table 2-19 Characterization table KER 19: Biobased saline batteries

Project	Project Result # / Title	Bio Based Battery C1

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	Project Result Short description/Service Description	Bio Based Battery technology is a unique and safe renewable energy solution that stores energy to have better use of local energy harvested from local resources like the sun, hydropower, wind or other means you have to store it locally for local use.	
	Innovation content/ Competitive advantage/Benefits	The IANOS project scope related to the Bio Based Battery C1 focuses on the island integration. This unique concept battery is developed for electricity storage in a simple, safe and affordable way. Not using valuable resources like lithium and Kobalt. This recyclable battery has many advantages above lithium solutions for stationary applications. It is safe in use no risk of fires and thermal runaways. Has a unique Natural Self Cooling system. No energy loss for process cooling. It is very flexible and mobile . Can be transported and assembled on remote sites. flexible for input and output AC and DC. Fully recyclable. Currently in 120 KWh capacity per battery and scalable to multiple MWh.	
	Legal, normative, or ethical requirements connected to the development	The BBB C1 solution must be safely installed. This requires SuWoTec to perform numerous safety tests ahead of the deployment, and active monitoring upon deployment.	
	TRL[6]	Before IANOS	After IANOS
		6	8
Market	Targeted Market	Island energy cooperatives and islands energy systems	
	Customer segments and whom to address (inside the client's organization)	SuWoTec can be deployed as a safe 'power on demand' solution to reduce reliance on Lithium and Kobalt batteries and other systems for energy storage; for end-users it provides protection against fluctuation and revenue from extending the utility of distributed energy assets. It integrates with a client's electrical power infrastructure, either on AC or DC supply, and provides power or protection as needed.	
	Potential competitors	Given the unique characteristics of the Bio Based Battery, there are no real competitors for the several applications. Like the Natural Self Cooling System. And the safe recyclable 120 kWh setup.	
IPR	Owner(s) of Result	SuWoTec	
	Other Partners involved	None	
	Joint ownership (Need of agreement before the end of the project?)	No	

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Exploitation Strategy	Exploitation claim	Consultancy service	Academic exploitation	Commercial exploitation (e.g., selling licenses)	Other
		No	No	Yes	No
	Revenue streams associated to the above exploitation claim	-	-	It will depend on the number of SuWoTec units that can be placed in a project. This in turn depends on the local energy demand and resource available. Cost indication of units is 450-600 €/kW.	-
	Estimated effort to bring the Project Result to the market (yearly)	Activities	Cost	Time	
		tbd	Tbd	tbd	

2.2.20 IANOS Energy Planning and Transition suite (IEPT)

Table 2-20 Characterization table KER 20: IANOS Energy Planning and Transition suite (IEPT)

Project Result general description	Project Result # / Title	IANOS Energy Planning and Transition suite (IEPT)
	Project Result Short description/Service Description	A suite that supports the investments of the different stakeholders providing a holistic approach that quantifies both the costs and benefits of the IANOS interventions in the demonstration sites, i.e., Lighthouse and fellow islands of IANOS, as well as providing a tool that facilitates the fundraising campaigns.
	Innovation content/ Competitive advantage/Benefits	This tool satisfies the need of the decision-makers across the energy value chain by offering a tool that can provide quantifiable insights supporting their potential investments decisions in clean and smart energy interventions

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<table>
<tr><td rowspan="3"></td><td>Legal, normative, or ethical requirements connected to the development</td><td colspan="4">Sensitive data from the end-users shall be kept confidential without relieving them to unauthorized third parties.</td></tr>
<tr><td rowspan="2">TRL</td><td colspan="2">Before IANOS</td><td colspan="2">After IANOS</td></tr>
<tr><td colspan="2">4</td><td colspan="2">7</td></tr>
<tr><td rowspan="3">Market</td><td>Targeted Market</td><td colspan="4">Example of application or scenario for the project result/service</td></tr>
<tr><td>Customer segments and whom to address (inside the client's organization)</td><td colspan="4">Renewable owners
DSOs
TSOs</td></tr>
<tr><td>Potential competitors</td><td colspan="4"></td></tr>
<tr><td rowspan="3">IPR</td><td>Owner(s) of Result</td><td colspan="4">UBE, CERTH, TNO</td></tr>
<tr><td>Other Partners involved</td><td colspan="4"></td></tr>
<tr><td>Joint ownership (Need of agreement before the end of the project?)</td><td colspan="4">No</td></tr>
<tr><td rowspan="4">Exploitation Strategy</td><td rowspan="2">Exploitation claim</td><td>Consultancy service</td><td>Academic exploitation</td><td>Commercial exploitation</td><td>Other</td></tr>
<tr><td>Yes</td><td>Yes</td><td>Yes</td><td>Yes/No</td></tr>
<tr><td>Revenue streams associated to the above exploitation claim</td><td>€</td><td>€</td><td>Selling licensing</td><td>€</td></tr>
<tr><td></td><td>Activities</td><td>Cost</td><td colspan="2">Time</td></tr>
</table>

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	Estimated effort to bring the Project Result to the market (yearly)	More actions needed for the platform generalization to make it automatic to the different technologies. Demonstration to different environments	100.000€	2yr.

2.3 IANOS Draft Exploitation Strategy

2.3.1 Assessment of Exploitable Results Technology Readiness Level (TRL)

The TRL, Technology Readiness Level, scale is a metric for describing the maturity of a technology[7] which consists of 9 levels. Each level characterizes the progress in the development of a technology, from the idea (level 1) to the full deployment of the product in the marketplace (level 9), as described in Table below.

Table 2-21: Technology Readiness Levels (TRLs)[8]

Level 1	Basic Research: basic principles are observed and reported	Lowest level of technology readiness. Scientific research begins to be translated into applied research and development. Examples might include fundamental investigations and paper studies
Level 2	Applied Research: technology concept and/or application formulated	Once basic principles are observed, practical applications can be formulated. Examples are limited to analytic studies and experimentation.
Level 3	Critical function, proof of concept established	Active research and development are initiated. Laboratory studies aim to validate analytical predictions of separate components of the technology. Examples include components that are not yet integrated or representative.
Level 4	Laboratory testing of prototype	Design, development, and lab testing of technological components are performed. Here,

[7] https://ec.europa.eu/research/participants/data/ref/h2020/other/wp/2018-2020/annexes/h2020-wp1820-annex-g-trl_en.pdf

[8] https://acqnotes.com/acqnote/tasks/technology-readiness-level

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	component or process	basic technological components are integrated to establish that they will work together. This is a relatively "low fidelity" prototype in comparison with the eventual system.
Level 5	Laboratory testing of integrated system	The basic technological components are integrated together with realistic supporting elements to be tested in a simulated environment. This is a "high fidelity" prototype compared to the eventual system.
Level 6	Prototype system verified	The prototype, which is well beyond that of level 5, is tested in a relevant environment. The system or process demonstration is carried out in an operational environment.
Level 7	Integrated pilot system demonstrated	Prototype is near, or at, planned operational system level. The final design is virtually complete. The goal of this stage is to remove engineering and manufacturing risk.
Level 8	System incorporated in commercial design	Technology has been proven to work in its final form under the expected conditions. In most of the cases, this level represents the end of true system development.
Level 9	System ready for full scale deployment	Here, the technology in its final form is ready for commercial deployment.
Beyond 9	Market introduction	The product, process or service is launched commercially, marketed to, and adopted by a group of customers (including public authorities).

In order to access IANOS technology readiness levels, an estimation has to been given by the leaders of each of the exploitable results. It is important to note that following technology readiness levels are estimated and might change in line with the project development.

With respect to the first version of the Plan for Use and Dissemination of Foreground, the TRL of most of the KER was assessed comparing the level before the IANOS project and that expected after the project end, as reported in the figures below. The final and completed TRLs of each KER will be provided in the next version of the document.

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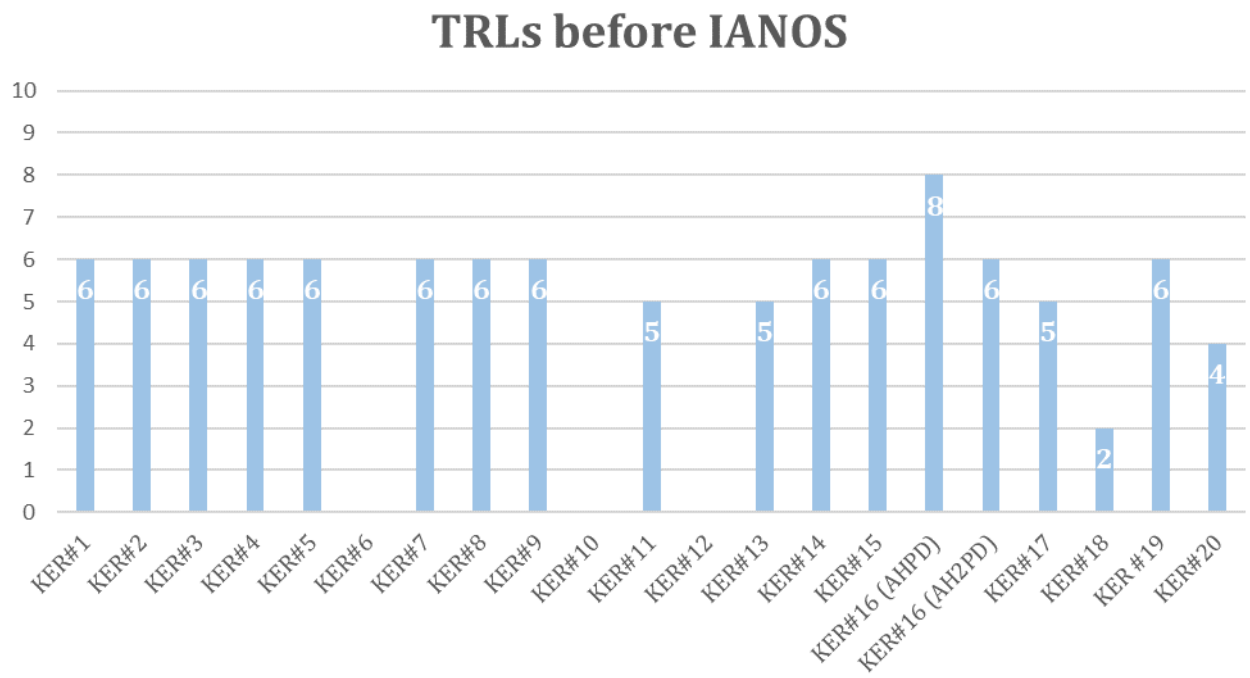

Figure 2-3: Technology KERs before the project

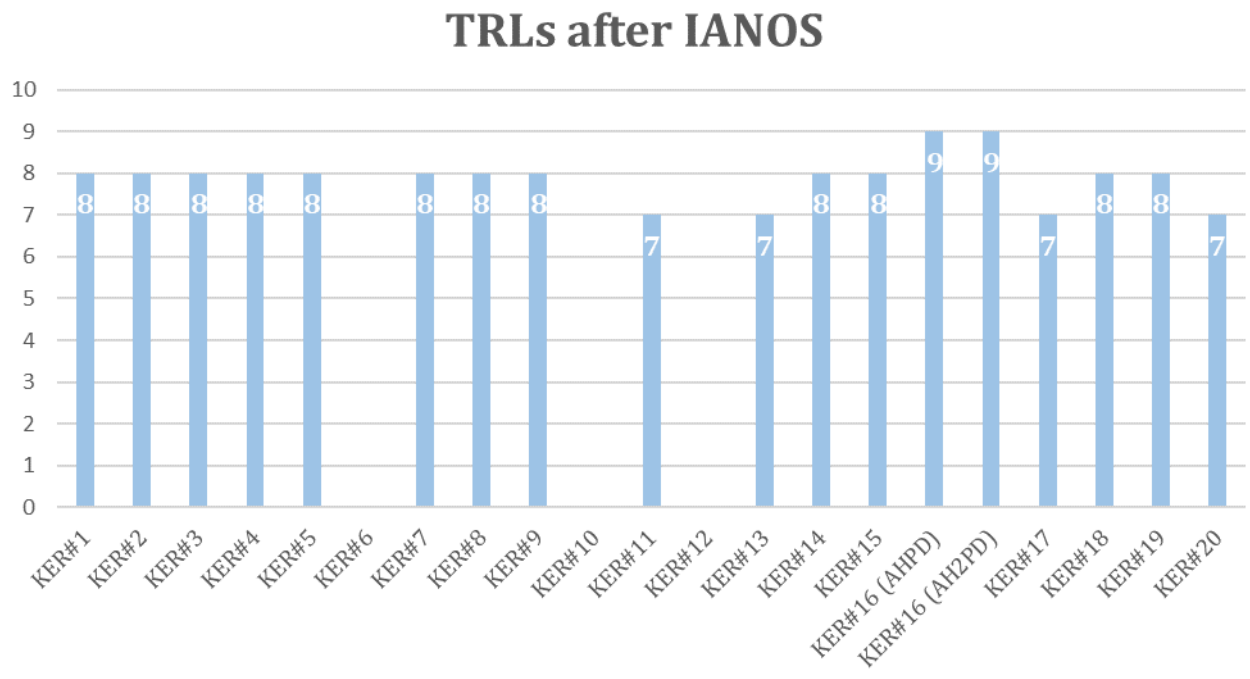

Figure 2-4: Technology KERs after the project

2.3.2 Methodology for exploitation routes

As detailed in previous section 2.1 exploitation means that project results can be used in further research activities, other than those covered by the project, or in developing, creating, and marketing a product or process, or providing a service.

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Therefore, the possible exploitation routes options adoptable for each PR identified can be divided into several categories, such as:

- Use for further research (e.g., use of the newly gained knowledge in further research activities, projects or even in enhancing products for the market uptake to find new exploitation perspectives).
- Consultancy services (e.g., professional service providing expert advice for a fee).
- Academic exploitation (e.g., development of specific research topics, participation and/or organization of seminars and, in the case of universities, new bachelor, master and PhD thesis development).
- Commercial exploitation (e.g., direct sale of products/services, selling licenses).
- Spin-off activities
- Cooperation agreement/Joint Ventures
- Standardization activities (e.g., contribution to new standards or their revision).

Each of the above specified possible route will define the exploitation route for each specific PR. These routes will be developed with the cooperation of the Key Exploitable Results lead partner during the next months of project.

2.3.3 Exploitation Strategy at partner level

The IANOS project is coordinated by EDP, a leading Energy Utility, with vast experience in European projects. The consortium consists of 34 partners from 8 European countries, with 60% involvement of industrial or SMEs partners. 5 research centres and universities contribute with scientific expertise in analysis, methodologies, dissemination support, technology development, work covering several different aspects on the integrated IANOS framework.
10 SMEs demonstrate novel technical solutions (such as RES and storage) on both lighthouse islands showcasing their relevant expertise. 10 heavily experienced large industries and utilities support the efficient integration and performance monitoring of all (i.e., ICT, Energy, Mobility etc.) solutions on the LHs as well. Additionally, citizens are involved in the project so it is ensured that IANOS will have a strong user-driven approach. Dissemination and exploitation potential is strong, including leading EU partners in the field (such as RINA, EREF). IANOS's Horizontal Partners will focus on global solutions (including the development of IEPT and iVPP) for the chosen lighthouse and fellow islands. Fellow islands participate also through their municipalities and are accompanied by supporting partners for drafting their replication plans. A core responsibilities' split for the local LH ecosystems partners is made in the following table.

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Table 2-22: Partners responsibilities

Island	Energy	ICT	Citizen engagement	General
Terceira	EDP, UNINOVA, EFACEC, EDA, EFAEM, TERA,	EDP, UNINOVA, EFACEC, EDA, EFAEM, TERA,	EDP, UNINOVA, EFACEC, EDA, EFAEM, TERA,	EDP, UNINOVA, EFACEC, EDA, EFAEM, TERA,
Ameland	Sunamp, Beon	Sunamp, Beon	Sunamp, Beon	Sunamp, Beon

Deliverable 10.9 focusses on the methodology and the first preliminary results gathered during the project and is updated with respect to the first version. These are not yet analyzed from a Key Exploitable Results characterization perspective, will be further developed in the subsequent deliverables through ad-hoc workshops with the project results lead partner to build consolidated strategy.

2.3.4 Exploitation Strategy at Consortium Level

The IANOS commercial solutions will be evaluated to create synergistic commercial packages (IANOS Use Cases) enabling faster replication and market uptake. These packages will be commercialised under joint sales agreements among project's commercial partners and SMEs. Issues regarding equity distribution, roles/responsibilities and upfront contributions will be discussed and resolved during the commercialisation planning activities of the project.

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3 IPR Management

3.1 General Overview and IPR Background

Effective exploitation of the project results depends, among others, on the proper management of intellectual property. There are several intellectual property-related activities, namely the evaluation of the existing knowledge of project partners, their potential contribution to the prospective project's intellectual property rights, and the potential overlap of intellectual property rights in order to formulate and prepare the shaping of the IP strategy of the consortium. Main results patent mapping studies will be specified and delivered in order to raise the IPR protection scheme. The overall IPR strategy of the project is to ensure that partners are free to benefit from their complementarities and are able to fully exploit their market position.

This chapter, relevant to the IPR management, provides an overview of the main provisions related to intellectual property rights as well as use and dissemination of the results (also named foreground) generated by the IANOS project. It is however recommended to always refer to prescriptions included in the Consortium Agreement and Grant Agreement and to consult the Project Coordinator and the Exploitation Manager for any issues concerning IPR protection in order to elaborate exploitation agreements.

Background Information (B), in the context of Horizon 2020 programme, means "any data, know-how or information whatever its form or nature, tangible or intangible, including any rights such as intellectual property rights, which is:

- held by participants prior to their accession to the action.
- needed for carrying out the action or for exploiting the results of the action.
- identified by the participants."[9]

To summarise, Background includes pre-existing IP, know how, knowledge and any additional data that is needed for carrying out the project as well as that each partner is going to bring to the project itself.

Before the beginning of the project, it is necessary to ensure that every information needed for the smooth running of the project is accessible to all project partners, therefore matters related to access rights, have already been addressed in the IANOS Consortium Agreement.

[9] Definition from DESCA Template: https://www.desca-agreement.eu/what-is-desca/

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3.2 Results (Foreground) and BFMULO Analysis

Results, formerly called "Foreground" in FP7 projects, mean "any data, knowledge and information, whatever their form or nature, whether or not they can be protected, which are generated in the action as well as any attached rights, including intellectual property rights".[10]
Concerning the protection of results and dissemination, the following aspects should be considered:

- Owners must ensure adequate protection for the Results capable of industrial or commercial application in conformity with Grant Agreement and Consortium Agreement.
- In the absence of protection and transfer of Results, owner(s) shall inform EC, which may take the responsibility of protection and granting of access rights. Beneficiary concerned may only refuse if its interests are impaired.
- Any disclosure (publication, announcements etc.) shall not affect the protection of Results.

The Consortium Agreement may specify details concerning protection and publication but not in conflict with EC Contract.
In the specific case of the IANOS project, the Background (B) and Foreground (F) associated to the partners involved in each related exploitable result will be analysed. The methods of exploitation will be resumed in the following four cases identified by a single letter, describing the intention of the partner to exploit the results by:

- M = Making the products, manufacturing, and selling or directly implementing through own facilities and skills
- U = Using the result, implemented with own knowledge to develop new ranges of products or newer processing. Furthermore, the direct or indirect use of foreground in further research activities other than those covered by the project, or for developing, creating, and marketing a product or process, or for creating and providing a service
- L = Licensing the result, therefore earning from a negotiation towards third parties outside the Consortium
- O = Other, any other exploitation means (e.g.: consultancy, services, etc.)

The analysis of the IANOS exploitation claims will be reported in Table 3-2 on how each partner could exploit the foreseen results for instance by producing and selling them (M); by using them internally (U) (new research project, lectures in case of universities, etc.); by licensing them (L); or by providing services (O) (consultancy, etc.). Below, we reported Table 3-1 with the preliminary list of KER

[10] Definition from DESCA Template: https://www.desca-agreement.eu/what-is-desca/

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again, in order to make the relationship between the responsible partners of each result and the exploitation claims evident.

Table 3-1: List of KER

#	Key Exploitable Results	Responsible Partner(s)
1	iVPP platform: Centralized Dispatcher [Terceira]	CERTH & CW
2	iVPP platform: Centralized Dispatcher [Ameland]	TNO & Neroa
3	iVPP platform: Forecasting Engine	CERTH
4	iVPP platform: - Intelligent Segmentation & Clustering Engine	CERTH
5	iVPP platform: IEPT toolkits (specifically VERIFY and INTEMA.grid)	CERTH
6	iVPP platform: - P2P Transactive Energy Trading Framework	ENG
7	iVPP platform: - Virtual Energy Console	CW
8	iVPP platform: Enterprise Service Bus	ETRA
9	FEID PLUS	CERTH
10	PCM Thermal Storage Heat Batteries	SUNAMP
11	V2G Charging & Services on Terceira	EFACEC
12	DefPi Platform	NEROA
13	Smart Energy Router	UNINOVA
14	Flywheel	TERALOOP
15	Tidal Kite	SQH
16	Auto generative High-Pressure Digester (AHPD)	BAREAU
17	Hybrid Transformer	EFACEC
18	PVs with microinverter	BEON
19	Biobased saline batteries	SWT
20	IANOS Energy Planning and Transition suite (IEPT)	UBE

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Table 3-2: BFMULO analysis – TEMPLATE to be completed

KER / Partners	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
EDP																				
UNI																				
EFACEC																				
EDA																				
EFAEM																				
RGA																				
VPS																				
TERA																				
SunAmp																				
BEON																				
AME																				
NEC																				
TNO																				
ALI																				
AEC																				
SWT																				
HANZE																				
NEROA																				
REO																				
SQH																				
BAREAU																				
GASTERRA																				
LAMP																				
CNR-IIA																				
BORA																				
AKUO																				
NIS																				
CERTH																				
ETRA																				
ENG																				
RINA																				
EREF																				
HAEE																				
UBE																				

3.3 Access Rights

Access Right, in Horizon 2020, simply stands for the right to use Key Exploitable Results or Background.

During the implementation stage of the project, partners need to give access rights to their background and results being created in order to allow to other partners to carry out their work on the project and/or exploit their results. The requests should be done in written form, which could take for instance the format of an email with acknowledgement of receipt, if participants so decide in their

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Consortium Agreement. Participants granting access rights may request to put in place an agreement, particularly when they wish to make the access rights limited to some conditions (e.g., stronger confidentiality commitments).
The following table gives an overview of the general conditions concerning the granting of access rights as established in the GA (articles 25.2 and 25.3):

Table 3-3: Overview of the general conditions concerning the granting access rights

Purpose	Access to background	Access to results
Implementation of project	Royalty – free, unless otherwise agreed by participants before their accession to the Grant Agreement.	Royalty - free
Exploitation of owned project results	Subject to agreement, access rights shall be granted under fair and reasonable conditions (which can be royalty – free)	

The above-mentioned rules are normally valid unless stated otherwise. One new feature of Horizon 2020 concerns the granting of access rights to a project's results, not only to the European Union, but also, in specific cases, to Member States. Access rights for the European Union's institutions and bodies will be granted on a royalty-free basis, limited however to non-commercial and non-competitive use since their purpose relates merely to the development, implementation and monitoring of EU policies and programmes.

3.3.1 Access Rights on the Background of the Project

In attachment 1 of the Consortium Agreement, the Parties have identified and agreed on the Background of the project and have also, where relevant, informed each other that access is subjected to legal restrictions or limits. Anything not identified in the Consortium Agreement shall not be objected to Access Right obligations regarding Background.

Table 3-4: Claims for Background in Attachment 1 of the CA

Background provision / Partners	Yes	No
EDP	X	
UNI		X
EFACEC	X	
EDA	X	
EFAEM	X	
RGA	X	
VPS	X	
TERA	X	
SunAmp	X	
BEON	X	

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Background provision / Partners	Yes	No
AME		X
NEC		X
TNO	X	
ALI	X	
AEC		X
SWT	X	
HANZE		X
NEROA	X	
REO	X	
SQH	X	
BAREAU	X	
GASTERRA		X
LAMP	X	
CNR-IIA	X	
BORA	X	
AKUO	X	
NIS		X
CERTH	X	
ETRA		X
ENG		X
RINA	X	
EREF	X	
HAEE		X
UBE		X

3.3.2 Results ownership

According to the Horizon 2020 Rules for Participation and Models Grant Agreement, project results belong to the participant generating them. Given the collaborative nature of European projects, some results can be jointly developed by several participants; therefore, situations of joint ownership might arise.

3.3.3 Joint ownership

Results are jointly owned when:

- they have been jointly generated by two or more participants
- it is not possible to:
  - establishe the respective contribution of each beneficiary, or
  - separate them for the purpose of applying for, obtaining, or maintaining their protection.

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Usually, joint ownership occurs in very specific situations, mainly for technological results.
It is best practice to regulate, in the Consortium Agreement, the rules on joint ownership of results. However, since this agreement is entered into force before the launch of the project and the development of the results, participants shall, if needed, establish a separate joint ownership agreement during the project implementation, defining the allocation and terms of exercising their ownership.
Unless otherwise agreed in the Consortium Agreement or in the joint ownership agreement, according to the default Grant Agreement rules, each joint owner may grant non-exclusive licences to third parties to exploit the jointly owned results (without any right to sub-license), if the other joint owners are given:

- at least 45 days advance notice and
- fair and reasonable compensation.

Since managing jointly owned results is a complicated issue, participants have the possibility to implement a different ownership regime from the one established in the Consortium Agreement, if the new agreement is done in a written form.
In fact, they may decide for instance to transfer ownership to one of the joint owners, in accordance with the rules on transfer of results under the grant agreement.

3.3.4 IANOS Project Results Ownership

Based on the BFMULO Analysis and the individual interviews that will be carried out during the IANOS project execution, the type of ownership of each result (single or joint ownership) will be discussed. In particular, the need of Joint Agreement among partners will be investigated to agree on potential agreement that will be formalized and finalized before the end of the project.

3.3.5 Transfer of results

Transferring the ownership of their results to other partners is a possibility for those participating in Horizon 2020. However, it is fundamental that, whenever transferring the ownership of their results, participants follow the requirements established in their Grant Agreement:

- The transfer should be done through an agreement (preferably in written form), since beneficiaries must ensure that the obligations of the participant(s) under the grant agreement are passed on to the new owner and that this owner has the obligation to pass them on in any subsequent transfer.
- Prior notice is given, at least 45 days before the intended transfer, to the other consortium partners that may still have (or may still request) access rights to the results, with sufficient information about the new owner. The right to prior notice can be waived in the case of transfers to a specifically identified third party, which is usually done through the consortium agreement.

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- Participants are bound to formally request authorization from the European Commission in advance, in cases of foreseen transfers to third parties established in a non-EU country not associated with Horizon 2020, including information on:
  - the identification of the results at stake;
  - the new owner and the planned or potential exploitation of the results;
  - the likely impact of the transfer or licence on EU competitiveness and its consistency with ethical principles and security considerations. This notification must be done up to four years after the end of project.

3.4 Knowledge Management and Protection

Throughout the project, the Consortium continuously contributes to generating new knowledge that is instrumental for shaping the expected project outcomes, several of which may be qualified for Intellectual Property (IP) protection. On the other side, it is an obligation and is also the interest of the Consortium to disseminate the proposed new methods and tools, including qualified scientific publications, with open access which will have to be provided.
A strategy aimed at proper management of the generated knowledge shall ensure that communication and dissemination activities is duly carried out.
This strategy will be taken into account on the one hand the obligation to disseminate results as well as open access rules and obligations and from the other hand the need of safeguarding the rights of the Consortium partners to protect their IP, thus enhancing the chances of effective commercial exploitation of the project's results. Accordingly, a dedicated procedure for knowledge management and protection (see paragraph below) was already defined at proposal stage and adopted along the project duration.

3.4.1 Procedure for Knowledge Management and Protection

While being instrumental for IP management within the project, the procedure for knowledge management and protection represents at the same time relevant input for the Exploitation Action Plan. In particular, knowledge management refers to a series of practices that enable knowledge to create value in an organization. Intellectual property management is the management of intellectual assets, which meet the protection conditions of the intellectual property law.[11]
This procedure has been developed while taking into account the basic principles set in the Grant Agreement as well as the Consortium Agreement, with particular

[11] A detailed contribution to the differentiation between knowledge management and intellecutual property management concept is available at the following document: AD-minister N°. 31 julio-diciembre 2017 pp. 137 - 160 · ISSN 1692-0279 · eISSN 2256-4322 - Monica Henao-Calad · Paula Rivera Montoya · Beatriz Uribe Ochoa - Knowledge Management Processes and Intellectual Property Management Processes: an Integrated Conceptual Framework

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focus on the assessment of the background of the Consortium partners and monitoring of the partners' potential contribution to new IP generation. Indeed, whenever certain results are identified to be attractive for the future business opportunities of one or more of the partners, the necessary steps to protect the associated IP shall be taken. IP protection measures (such as, but not limited to, patents, copyrights, trademarks, registered designs, design rights, databases, trade-secrets, confidentiality, and other forms of protection) may follow the procedures already in use by the concerned partner(s).
However, according to the procedures defined by the consortium, the Exploitation Manager (ETRA), will be informed at the earliest possible instance, about the intention by the concerned partner(s) to protect that IP. Hence, the Exploitation Manager brings the IP protection intention at the attention of the Project Coordinator, who directly informs the Project Steering Committee. In order to secure research and business interests of all partners involved, any issue that might arise from the IP protection initiative will be dealt with by the General Assembly. In case of jointly owned IP, procedures for IP protection, use and licensing will comply with the rules set in the Grant Agreement and described in the Consortium Agreement.
In addition to the above, issues related to IP protection will be handled within the Project Steering Committee on a regular basis, as well as within the General Assembly upon necessity. Below, Figure 3-1 represents the scheme of the management structure that clarifies specific roles.

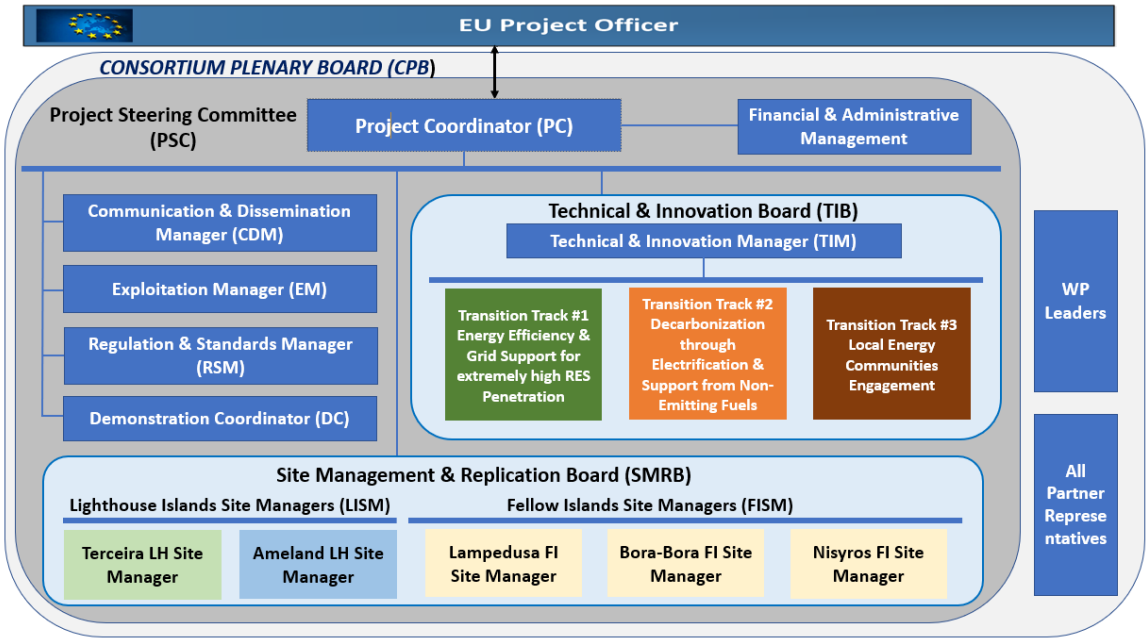

Figure 3-1: Management Organization Structure of IANOS Project

Each time certain results are identified that are worth IP protection; legal aspects are handled along with activities aimed at analysing and providing support for filing the IP protection application. If necessary, commercial agreements are also

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drafted and agreed upon among the relevant actors. Hence, for any protectable IP the following steps are carried out:

- The concerned partner notifies the Exploitation Manager about the technical contents it would aim to protect and the related ownership rights (including in case of joint ownership).
- Preliminary copyright, trademark, or patent searches are conducted by the concerned partner as well as the Exploitation Manager, in order to check 'freedom-to-operate' with the scope of avoiding eventual infringements.
- Filing of the related IP protection application is then followed directly by the relevant partner(s), in accordance with the perimeter agreed with the other partners, as well as the perimeter of innovation and in order to maximize the potential for protection of the result.

Any filed application for protection of results will duly include information on the EU funding.

3.4.2 Knowledge transfer to industrial partners

According to the Model Grant Agreement, and in line with the rules laid down in the Code of Practice annexed to the Commission Recommendation on the management of intellectual property in knowledge transfer activities, the beneficiaries belonging to the category of universities or other public research organisations will consider knowledge transfer towards relevant stakeholders as a strategic mission to maximize the impact from this project.

Accordingly, the universities and other public research organizations belonging to the consortium will ensure that knowledge is appropriately transferred, via licensing to the private industrial and commercial organisations existing in the consortium or to potential spin-off companies, should these appear to be the best option for exploitation according to the final exploitation action plan.

3.4.3 Dissemination and Exploitation of Results

In the context of Horizon 2020, dissemination refers to the public disclosure of results by any appropriate means, except those resulting from protecting or exploiting results. Scientific publications, providing general information on web sites, participation in conferences or trade fairs are some examples of dissemination activities.

According to the general model grant agreement, dissemination activities have to be undertaken starting from the beginning of the project. Under the leadership of RINA-C and the supervision of the Coordinator, all partners have to proactively contribute to disseminate activities. To this end, roles and responsibilities of each partner will be clearly agreed upon at the beginning of the project through a dissemination plan and coordinated actions.

Prior to any dissemination activity, other partners must/have to be consulted in order for them to exercise their right to object in the case where such dissemination could cause significant harm to their background or results. In

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particular, at least 45 days prior notice of any dissemination activity shall be given to the other beneficiaries concerned that within 30 days may object about the dissemination activity.
A novelty of Horizon 2020 is the requirement for participants to ensure open access to project results that is free of charge for any user, to all peer-reviewed scientific publications relating to its Horizon 2020 project's results. This does not mean that participants have the obligation to publish their results, nor does this affect their plans for exploitation. In fact, first, participants must decide on the protection of their results and, once the decision is taken, they have to consider if and when dissemination should be done through scientific publication.
Participants receiving European Union funding must use their best efforts to take measures aiming at ensuring the exploitation of their results up to four years after the project. This means that participants must take steps to make sure the results they own are used:

- in further research activities other than those covered by the project concerned;
- in developing, creating, and marketing a products or processes;
- in creating and providing a service;
- in standardisation activities.

The exploitation does not necessarily need to be done directly by the participants. Indirect exploitation can be performed by licensing the results or assigning them to third parties, in accordance with the requirements established in the Grant Agreement.

3.5 IPR Protection Strategy

Outcomes generated within the project must be properly protected, in order to guarantee their effective commercial exploitation.
Protection of results has to be ensured in a reasonable and justified way for an appropriate period of time and in a suitable territory.
In particular, IP protection measures can be distinguished in:

- Industrial property that can be protected through Patents, Designs and Trademarks
- Non-technical intellectual creations, e.g., literature or artistic ones including software, that can be protected through Copyrights

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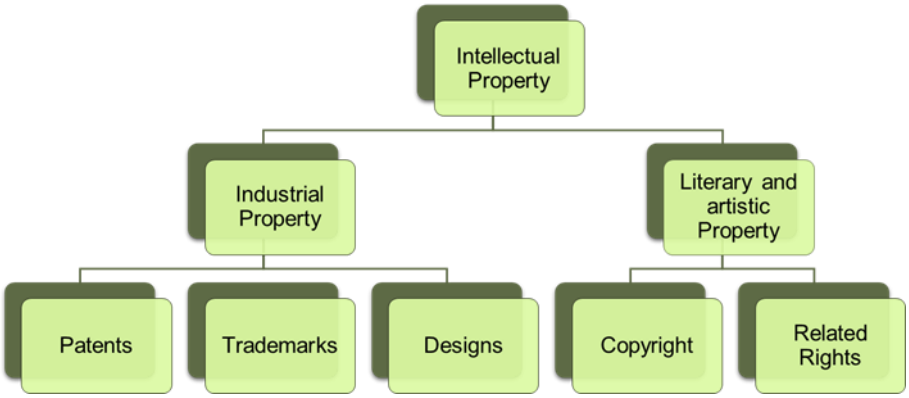

Figure 3-2: Different Intellectual Property Rights

The choice of the most suitable form of IP protection, as well as the duration and geographical coverage depends on the results at stake, but also on the business plans for their exploitation and on the legitimate interests of consortium partners. Patents, trademarks, designs, and copyrights are described further in the following section, while related rights are not covered in this manual, since they deal with rights that benefit to performers (e.g., actors, musicians), producers of phonograms (CDs) and broadcasting organisations (TV, radio).

3.5.1 Formal and informal IP protection – Intellectual Property Rights

Formal IP is designed to provide incentives for innovation through a reward system that makes it easier for innovators to gain profits if their innovation is successful by allowing them to exclude imitators for a finite period.
A number of common formal IPRs measures are listed in the Table 3-5 below.

Table 3-5: Formal IP protection measures

Patents	A **patent** is an industrial property right that protects a technical invention for a limited period of time (generally 20 years), giving the holder an exclusive right to prevent others from selling, making, and using the patented invention. An invention to be patentable must fulfil three criteria: being new, innovative and be susceptible of industrial application[12].
Utility Models	A **Utility Model** is an exclusive right granted for an invention, which allows the right holder to prevent others from commercially using the protected invention, without his authorization and for a limited period of time (usually between 7 and 10 years, without the possibility of extension or renewal). It may be any useful machine, implement, tools, product, composition, process, improvement, or part of the same, that is of practical utility, novelty, and industrial applicability. In practice, protection for utility models is often sought for innovations of a rather incremental character that may not meet the patentability criteria. Although a utility model is similar to a patent, it is generally cheaper to

[12] https://www.wipo.int/patents/en/

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	obtain and maintain, it has shorter grant lag, and less stringent patentability requirements. This kind of solution can be evaluated among the project partners to improve the IP protection[13].
Industrial Design	Industrial Design is a type of protection dedicated to the intellectual creation used by designers; it is provided for a shape, configuration, surface pattern, colour, or line (or a combination of these), which, when applied to a functional product, produces, or increases aesthetics, and improves the visual appearance of the design, be it a two-dimensional or a three-dimensional product. The subject of the design protection is the outwardly visible appearance of the product or its part, packaging, or the ornamentation itself [14] [15].
Copyrights	Copyrights protect non-technical intellectual creations; in practice, it refers to all of the rights owned by creators over their literary or artistic work. In order to be protected by copyright, a work must first have sufficient originality and, second, have taken form. Protection arises automatically giving the holder the exclusive right to control reproduction or adaptation[16]. This type of protection could be envisaged in the context of the IANOS project, particularly if specific software or programming codes would be developed as support for the exploitation of other IANOS results.
Trademarks	Trademarks are distinctive signs identifying brands of products or services. Any sign that can be represented graphically may be registered as a trademark for a period of 10 years, with the option for indefinite renewal[17]. If not already registered, the IANOS acronym and logo should most probably be registered as a trademark in view of reinforcing other IPR types.

Protection of the Intellectual Property generated within the IANOS project can be ensured also through 'informal' methods, such as[18] :

- Secrecy of information;
- Restricted access to information;
- Database and network protection;
- Confidentiality agreement;
- Technical protection (imitation difficult);

[13] https://www.wipo.int/patents/en/topics/utility_models.html
[14] https://www.wipo.int/designs/en/
[15] https://yourstory.com/2015/07/what-is-industrial-design-protectiontheir-designs/
[16] https://www.wipo.int/copyright/en/
[17] https://www.wipo.int/trademarks/en/
[18] Nber Working Paper Series - The choice between formal and informal intellectual property: a literature review - National Bureau Of Economic Research – April 2012 https://www.nber.org/system/files/working_papers/w17983/w17983.pdf

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- Components and system design protection.

The list above consists of conventional procedures, which will be adopted by each Partner in the IANOS project and will be strictly followed also post-project to ensure that no information may leak outside of the Consortium.
Below, some examples of project outcomes that may be subjected to IPR protection are reported, and possible IPR protection measures for each of them are identified (Table 3-6).

Table 3-6: Examples of project outcomes that may be subjected to IPR protection

Subject Matter	Patent	Utility Model	Industrial Design	Copyright	Trademark	Confidential Information
Invention	X	X				X
Algorithm Software	X			X		X
Scientific article				X		
Design of a product			X	X	X	
Name of a product, service /project					X	
Know - How						X
Website			X	X	X	

3.5.2 IPR Protection procedure

In line with the Model Grant Agreement, the project has a policy of protection of the project's results whenever results are expected to be commercially or industrially exploitable and whenever protecting them is possible, reasonable, and justified.
In order to ensure an adequate share in the protection of joint efforts it is recommended to notify whenever an innovation or any foreground is generated, as well as to ensure that the foreground sharing is ascertained and agreed among the partners creating it. This should occur on a case-by-case basis and under the supervision of the Project Steering Committee, in the person of the project coordinator, supported by the Exploitation Manager.
Thus, according to the procedure for knowledge and management protection that has been anticipated, each partner has to inform, at the earliest possible instance, the Exploitation Manager (ETRA) about the technical contents it would aim to protect and the related ownership rights (including in case of joint

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ownership). In this case, it is considered a good practice to consult with other partners involved, before deciding whether and how to protect a specific result.
Any Partner intending to apply for any of the protection measures, listed in the previous section, acknowledges the Exploitation Manager of its intention. The Exploitation Manager then has to inform the project Steering Committee (SC). The acknowledgement of the intention to protect the generated foreground has to be accompanied by a synthetic description of the foreground subject to the intention for IPR protection by filling a specific template.
The template requires the following fields to be filled in:

- Subject;
- Description;
- Type of Protection (Patent, Trademark, Industrial Design, Copyright, Other);
- Protection Rationale;
- Potential Market;
- Scientific Responsible;
- Keywords;
- Work-package(s);
- Partners involved.

The Subject field enables a unique identification of the innovation (possible patentable idea): the subject should be well suited to enable a quick retrieval of the different claimed innovations. Partners are encouraged to describe in the field description the main terms of the innovation, according to simple and clear terms precisely referring to the activities performed in the project.
The Keyword field is optional; however, it is strongly recommended to provide at least one keyword for a unique identification of the innovation. This enables the Coordinator and the Exploitation Manager to perform the work of review and evaluation of the effective potentiality of the innovation better.
The different possible protection mechanisms (more than one choice is possible) can be indicated in the field “Type of Protection”. This is only a suggestion and a preference of the evaluator, but it will not constitute a restriction for the evaluation activity.
Other fields are related to the protection rationale and the potential market. The latter enables the partner to identify the possible potential market of the innovation. This can be useful both for the definition of the foreseen economic impact and for achieving a rough estimate of the potential geographical market penetration. Such information could be relevant for the definition of places where it can be crucial to protect the claimed innovation.
Specific fields to be filled in have been foreseen in order to identify the Work Package in which the innovation has been developed and the Partners involved in the new innovation.
The description shall be sufficiently detailed to allow the Steering Committee to evaluate whether the application for protection of the IPR may endanger other Partners of the Consortium, though it shall be sufficiently general not to disclose

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too much information related to the subject. In any case, the Steering Committee shall deem that the application for IPR protection may have an impact on other Partners' activities or businesses, the control body shall be entitled to ask for more details on the matter of the application and eventually involve all the interested Parties in a discussion to analyse the situation.
The coordinator shall track all acknowledgements of partners expressing the intention for IPR protection as well as the date of the acknowledgement. The intention for IPR application shall be archived. This will be useful to uniquely identify the partner's ownership and attribute a clearly defined date to the claimed invention. This, besides the short description of the invention, will provide the Steering Committee with archive information to be referred to in the case of IPR related disputes between partners.
Table 3-7 provides the template to be used to define the list of applications for patents, trademarks, registered designs, etc. However, according to partners' feedback, no application, so far, was registered during the duration of the project.

Table 3-7: Template for applications for IP protection measures

IANOS: List of applications for patents, trademarks, registered designs, etc.			
Type of IP Rights	Application reference(s) (e.g., EP123456)	Subject or title of application	Applicant(s) (as in the application)
Patent	-	-	-

3.5.3 Patent application

There are different routes to patent protection and the best route will depend on the invention and the markets where the IANOS results would be exploited.
National patents
If the intention is to apply for a patent in just a few European countries, it may be better to choose the national route and file the specific application at the IP offices in the countries for which protection is sought.
Patent law in the European Patent Organisation (EPO) member states has been extensively harmonised with the European Patent Convention (EPC) in terms of patentability requirements. However, the national route generally leads to national rights that confer protection of differing extent.
The European Patent Convention (EPC) is a multilateral treaty instituting the European Patent Organisation (EPO) and providing an autonomous legal system according to which European patents are granted.
The fees for applying for a patent at the EPO are, however, higher than those that are charged by the national patent offices. The fees at the EPO do not cover the actual grant of patents by individual countries, so one has to allow for additional

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official fees following the grant of the patent when it is validated in those countries in which the patent is wished to be in force.
Based on the fees related to the European grant procedure, costs for representation by a single agent and cost of conducting the proceedings in a single language, a European patent costs is as much as about three or four national patents.
In other words, if a partner wishes to gain protection in more than two or three of the countries that are members of the European Patent Convention, it will probably be cheaper to go for the European Patent route. If a partner just wants two countries, then separate national applications will probably be cheaper. If a partner would like patent protection in three countries, then a very careful analysis would need to be performed.

European or International Filing

The Patent Cooperation Treaty (PCT) is an international patent law Treaty that provides unified procedures for filing patent applications to protect inventions in each of its 148 Contracting States. A patent application filed under the PCT is called an international application, or PCT application.
A PCT application, which establishes a filing date in all contracting states, must be followed up with the step of entering into national or regional phases to proceed towards the grant of one or more patents. The PCT procedure essentially leads to a standard national or regional patent application, which may be granted or rejected according to applicable law, in each jurisdiction in which a patent is desired.
If a partner decides to apply for a European patent, the choice would be to follow the direct European route or the international PCT procedure.
Due to the European scope of the IANOS project, European patent applications are the most likely to happen.
A European patent application consists in:

- A request for grant (obligatory), preferably on EPO form 1001;
- A description of the invention (obligatory);
- Claims;
- Drawings (if any);
- An abstract.

According to the Horizon 2020 Rules for Participation and Models Grant Agreement, the project results belong to the participant generating them.

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4 Conclusions and next activities

The present deliverable D10.9 has been developed in the framework of WP10 activities related to the "Dissemination, Exploitation, Promotion & Knowledge Transfer" of IANOS Key Exploitable Results and it is the second main outcome of T10.4 "Exploitation Strategy & IPR Management".

It represents the second release of the Plan for Use and Dissemination of Foreground (PUDF) for the IANOS project consortium, thus aimed at defining a proper exploitation strategy, based on the following actions:

- identification of Key Exploitable Results: in total 20 results have been identified with the related Responsible Partners,
- Sharing the characterization tables with the partners,
- Collection and analysis of the characterization tables complete with the inputs of the partners.

D10.9 will then be updated along the project duration (D10.10 and D10.11); the next intermediate version is foreseen at the end of M36. In the next months the following activities will be carried on (and main results included in the third PUDF release):

- The characterization tables will be updated including more details in the next version of the document. The KER tables missing in this document will be completed and provided by the responsible partners during the next months and reported in the next version of the deliverable.
- The BFMULO analysis will be conducted taking into account the Background, the Foreground and the methods of exploitation associated to the partners involved in each related exploitable result.
- Concerning the overall IANOS exploitation strategy, an overview will be provided, highlighting the consortium mix of knowledge and proper balance in terms of competences and competitiveness towards the creation of the market conditions for the deployment of the first commercial system.
- The intellectual properties mapping activities will be carried out with a focus on each Key Exploitable Result, the activities will be finalized to understand:
    - the international technological scenario;
    - patents publication trend;
    - the most relevant patent assignees and players of the analysed sector;
    - the most relevant patents of the sector;
    - The exploitation strategy at partner and consortium level will be updated.

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