Virtual Power Plant for Interoperable and Smart isLANDS

VPP4Islands

LC-SC3-ES-4-2020

GA 957852

Deliverable Report

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REVISION AND HISTORY CHART

Version	Date	Main Author(s)	Summary of changes
V1	30/11/'20	Micaela Viola (AMU/PVM), Meysam Qadrdan (CU)	N.A.

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List of Abbreviations and Acronyms

Abbreviation/Acronym	Meaning
ALWA	AlgoWatt
AMU	Aix-Marseille Université
BC2050	Blockchain2050
BornholmsVarme	Bornholms Varme A/S
BoZI	Bozcaada Belediye Baskanligi
BUL	Brunuel University
CA	Consortium Agreement
CIVI	CIVIESCO srl
CSIC	Consejo Superior de Investigaciones Científicas
CU	Cardiff University
DAFNI	Network of Sustainable Greek Islands
DER	Distributed energy resources
DLT	Digital Ledger Technologies
DoA	Description of Action
DSO	Distribution System Operator
DT	Digital Twins
ESS	Energy Storage System
FORM	Consell Insular de Formentera
FTK	FTK Forschungsinstitut für Telekommunikation und Kooperation EV
GA	Grant Agreement
GeA	General Assembly
GRADO	Comune di Grado
IDEA	Ingenieria Y Diseno Estructural Avanzado
INAVITAS	INAVITAS Enerji AS
IoT	Internet of Things
LIS	Laboratoire Informatique des Systèmes
JV	Joint Venture
MST	Management Support Team
OpB	Operational Board
PMP	Project Management Plan
PVM	Protisvalor Méditerranée
RES	Renewable Energy Sources
RDIUP	RDI'UP
REGENERA	REGENERA LEVANTE
SB	Strategic Board
SCHN	Schneider Electric
TROYA	TROYA CEVRE DERNEGI
UEDAS	Uludag electric dagitim
VESS	Virtual Energy Storage Systems
VPP	Virtual Power Plant

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EXECUTIVE SUMMARY

The following “Project Management Plan (PMP) and Quality Assurance” represents a text of reference for management and monitoring activities to be realized during the lifetime of the project VPP4Islands. The PMP complements other documents also relevant to this matter, like the Grant Agreement (GA), the Commission Rules and the Consortium Agreement (CA); should ambiguity of interpretation among these documents arise, the PMP will take a subordinate role. Therefore, priority is given to the documents in the following order: GA, Commission Rules, CA, PMP. After the PMP, the “Dissemination and Communication Plan” follows in the prioritisation of documents.
The overall objective of the PMP and Quality Assurance is to facilitate the successful implementation of VPP4Islands, the smooth realisation of project tasks, proper coordination between partners, meeting project deliverables dates, monitor and control the technical and scientific quality of the project, and establish effective communication with the European Commission (EC). Also, it will help early identification of conflicts and propose solutions to avoid risks in project implementation.
The last part of this document is the project risk assessment. At proposal stage, the consortium discussed potential risks and obstacles that may arise during the implementation of the project. Therefore, the following risk assessment is an update of the precedent version.

The plan is the third deliverable submitted since the beginning of the project and is related to the Work Package 1 “Coordination and Project Management”.

This deliverable will be updated whenever necessary by AMU and any update will be notified to the project beneficiaries.

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1. PROJECT MANAGEMENT PLAN OF VPP4ISLANDS

VPP4Islands is a collaborative project, granted in the framework of Horizon 2020 topic LC-SC3-ES-4-2020 “Decarbonising energy systems of geographical Islands”.
The main objectives of the VPP4Islands project are to maximise the use of RES, to reduce fossil energy consumption and to ensure stable and flexibile energy supply in islands. These goals will be reached by creating an open network of VPPs and VESS promoting the synergy and the flexibility of distributed renewable energy sources, demand and storage, integrating them into a portfolio. This will facilitate the integration of clean energy into the existing grid system, for the benefit of consumers and climate.

The project is carried out by a large consortium of 19 beneficiaries: 3 universities (AMU, BUL, CU), 2 large companies (ALWA, SCHN), 1 DSO (UEDAS), 6 SMEs (BC2050, REGENERA, CIVIESCO, INAVITAS, IDEA, RDIUP), 2 Research and Technology Organisation (FTK, CSIC), 3 islands municipalities (FORMENTERA, BOZI, GRADO) and 2 non-profits organisations (TROYA, BornholmsVarme).
The multinational and multisectoral characteristic of the consortium is one of its strengths as it nurtures new ideas and promotes replicability of results. Nevertheless, it implies a constant attention to the objectives and strong commitment to the project plan and meeting deadlines, in order to avoid undesirable trends that could become difficult to control. For this reason, the parts of the PMP of VPP4Islands that required a deeper analysis and that are therefore more interesting to show, are the following:

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- The roles and responsibilities in directing and managing project execution;
- The work plan with the project time management;
- The internal communication.

1.1. GOVERNANCE, MANAGEMENT STRUCTURE AND DECISION-MAKING PROCESS

VPP4Islands management structure has been designed to ensure effective governance and clear definition of responsibilities for each project partner.
The aim of the management structure is also to support all work packages and task leaders in the planning and implementation of individual work packages and tasks, and to facilitate interactions between the management bodies and the beneficiaries, in order to ensure the smooth and efficient implementation of the project.

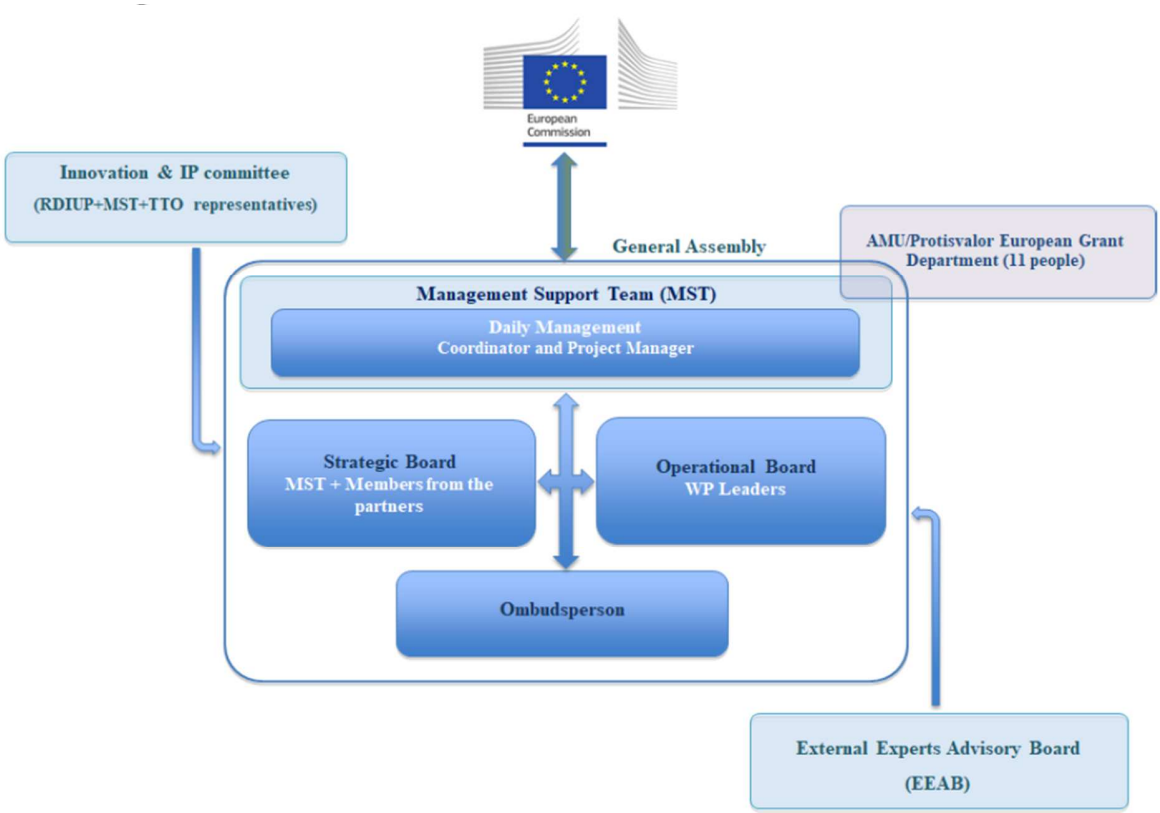

Figure 1 – Management structure (ref. GA957852)

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MANAGEMENT BODIES

With reference to the Management Structure in the chart above, the roles and responsibilities of the Management Bodies (alternative referred to as "Consortium Bodies" in the CA) are describe in further details.

1. Coordination: Management Support Team (MST)

Composition: the Coordinator, Dr. Seifeddine BenElghali (AMU-LIS) and the Project Manager, Ing. Micaela Viola (AMU-PVM).

The Management Support Team (MST) is in charge of the day-to-day project management and provides support and assistance to the different project bodies. In accordance with the EC requirements, it plays a hands-on role in administrative actions as defined in the GA (Art. 7 and 41). Additionally, the MST prepares the needed logistical, legal and administrative documents and supervises the overall running of the project. It is responsible for ensuring that all the administrative steps required for effective progress of the project are fulfilled in good time.

The Coordinator is responsible for taking all actions to enable proper decision making by the project bodies, thus ensuring smooth project operations: work plan maintenance, monitoring project progress, identification of potential problems and possible consequences for future research (GA Art. 19), submitting all required progress reports, deliverables and financial statements to the EC (GA Art. 20), communicating all information to the Commission and for transferring payments to the partners (GA Art. 21).

The European Project Manager (EPM), hired by Protisvalor, handles administrative, financial and contractual aspects of the project. She is integrated in the EU Grant Department of Protisvalor and benefits from the support of its 10 people team if needed. She is responsible for the dissemination of information inside the consortium, as well as for the communication with the EC officer. She is in charge of the implementation of appropriate management tools and their updating, including the present document, as well as of the organisation of the general meetings.

The MST is in constant communication with the Operational Board (Work package Leaders) on the status of the project (deliverables, new results, new risks, modifications, etc.), with all the partners, and will be the contact point between the Consortium and the European Commission. It is ultimately in charge of safeguarding the interests of the project, ensuring its smooth implementation, representing it towards external stakeholders and networks (GA Art. 7). It is in regular contact with the Strategic Board and participates to the strategic decisions.

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2. The Strategic Board (SB)

Composition: MST, Stefano Bianchi (ALWA), Jianzhong Wu (CU), Dominic Heutelbeck (FTK), Mehmet Koç (UEDAS), Habib Nasser (RDIUP)

The Strategic Board is a supervisory body that proposes strategic orientations of the project to the General Assembly and implements it. Its tasks are:

- Preparing any scientific, political and strategic orientations of the project
- Preparing the agenda and objectives of technical and consortium meetings, as well as EC reviews
- Identifying needed contractual changes, including technical work plan changes and consortium agreement changes
- Supervising the production of all reports and deliverables required in the frame of the Grant Agreement
- Arbitrating on deadlock situations occurring within the WPs and Tasks.

The Strategic board will meet at least three times a year, by conference call or by physical meetings if required. Additional conference call meetings or Internet-based conferences will be organized at any time upon request of a member or of a partner of the Consortium. The Coordinator shall chair all meetings of the Strategic Board, unless decided otherwise by a majority of two-thirds (2/3) of the Strategic Board Members.

3. The Operational board (OpB)

Composition: WP leaders (AMU, ALWA, IDEA, BC2050, SCHN, UEDAS, RDIUP)

The Operational board is composed of the Work Package leaders only. They are autonomous in the management of their own WP, for which they are responsible. The WP leaders are in charge of coordinating all activities relating to the objectives of their WPs. They take operational decisions regarding their WP day-to-day management, in collaboration with the Task leaders of their WP, on the basis of a detailed definition of milestones, scope and expected results of the WP. They prepare an annual progress report on the scientific results (protocols, scientific results, finance…) to be transmitted to the Coordinator and are responsible to transmit in due time their WP deliverables to the Strategic board for the EC review. The WP Leaders are also in charge of addressing and documenting internal risks that may impair progress towards the objectives of the WP and suggesting strategies to anticipate and minimize such internal risks. The chairperson for the meetings of OpB rotates among the WP leaders.

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4. The General Assembly (GeA)

Composition: Partners' representatives. One voice per partner.

The General Assembly (GeA) is the ultimate decision-making body of the consortium, endorsing decisions concerning the project implementation, as prepared and presented by the Strategic Board. The GeA meetings will take place once a year and will bring together the entire project participants and their working teams. The Coordinator shall chair all meetings of the GeA, unless decided otherwise in a meeting of the GeA.

During these meetings, special sessions will be organised, following any Partner's or OpB's request, to discuss legal, financial, organisational, or any other important issues relating to the project. Decisions will be made using the principle of consensus voting or, in exceptional circumstances, qualified votes (2/3 e.g.: 4 out of 6 votes). This requires the presence of more than 50% of the partner representatives.

Consultative Bodies

To ensure the coherence and consistency of the work to be carried out under the various work packages, the decisional bodies will benefit from the support of the Project Officer of the European Commission and the following consultative bodies of the project:

- the External Advisory Board, composed of both stakeholders from the private and the public sector, providing key advice on the way the project is running;
- the Innovation and IPR Committee, that is focused on exploitation and commercialisation plans. Lead by RDIUP, each partner will be represented by one person from its legal service or technology transfer office;
- the Ombudsperson, so that students and young researchers (over 10 PhD and Postdocs will be hired during the project) can exchange information with somebody in charge of anticipating or solving problems in case of conflicts with supervisors.

Convening of Meetings

Frequency of ordinary meetings as indicated in the table below are compulsory for the management bodies. The chairperson convenes the meetings for the body. Participating to the meetings by each member or a proxy is required.

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	Ordinary meeting	Extraordinary meeting
GeA	At least once a year	At any time upon written request of the Strategic Board or 1/3 of the Members of the General Assembly
SB	At least every 4 months	At any time upon written request of any Member of the Strategic Board
OpB	At least every 4 months	At any time upon written request of any Member of the Operational Board

The chairperson of a consortium body gives written notice of a meeting to each Member of that consortium body as soon as possible and no later than the minimum number of days preceding the meeting indicated in the table below, and prepares and sends each Member of that Consortium Body the agenda no later than the minimum number of days preceding the meeting, as indicated in the table below.

	Sending of the invitation to a meeting		Sending of the agenda	
	Ordinary meeting	Extraordinary meeting	Ordinary meeting	Extraordinary meeting
GeA	45 calendar days	15 calendar days	21 calendar days	10 calendar days
SB	14 calendar days	7 calendar days	7 calendar days	7 calendar days
OpB	14 calendar days	7 calendar days	7 calendar days	7 calendar days

After the minutes of meeting have been accepted, decisions are considered taken and binding. Any decision may also be taken without a meeting if the Coordinator circulates to all members of a specific management body a written document, with a reasonable deadline for responses; the decision is taken if agreed by the defined majority.

1.2. Project Structure and Work Plan

The work plan is composed of 8 work packages of which the technical ones are strongly interconnected, and the other two (WP1 and WP8) are transversal work packages.

The WP1 is devoted to ensure the proper coordination and management of the project. The WP2 is devoted to identify islands needs in terms of energy production and the exploitable RES, and clearly the VPP value chain. The work packages WP3 to WP6 are dedicated to develop Digital Twin, IoT integration and smart functionalities including the DLT in order to develop the VPP4IPlatform needed in order to achieve VPP4Island objectives. The results of WPs 2-6 will be integrated into the demonstration and validation environment in WP7 to provide real-life results of different use cases. Finally, WP8 is dedicated to dissemination and communication activities, and to the exploitation of the project results.

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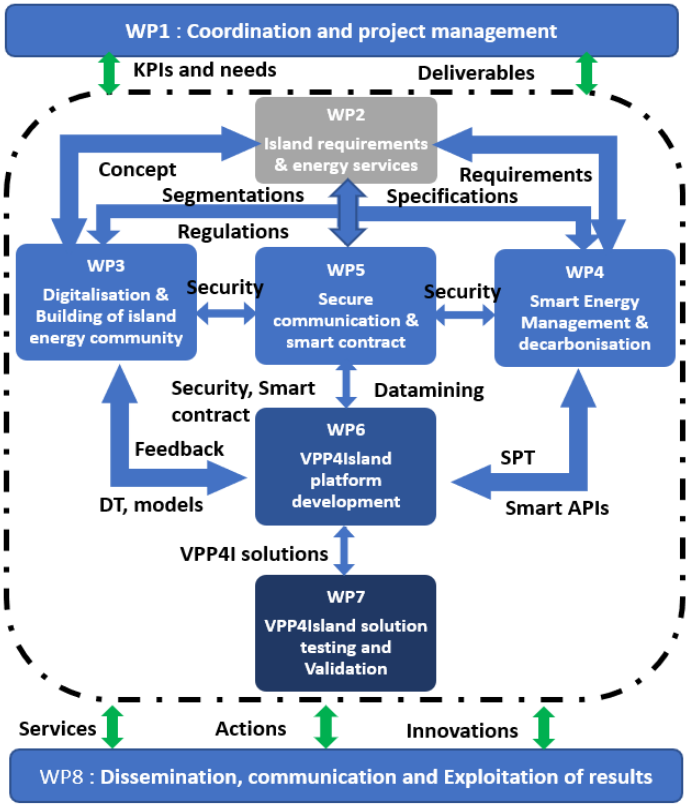

Figure 2 – Work Plan structure (ref. GA957852)

Each Work Package is structured in Tasks and Sub-Tasks with its own responsible beneficiary and period of implementation, as showed in the GANTT Chart.

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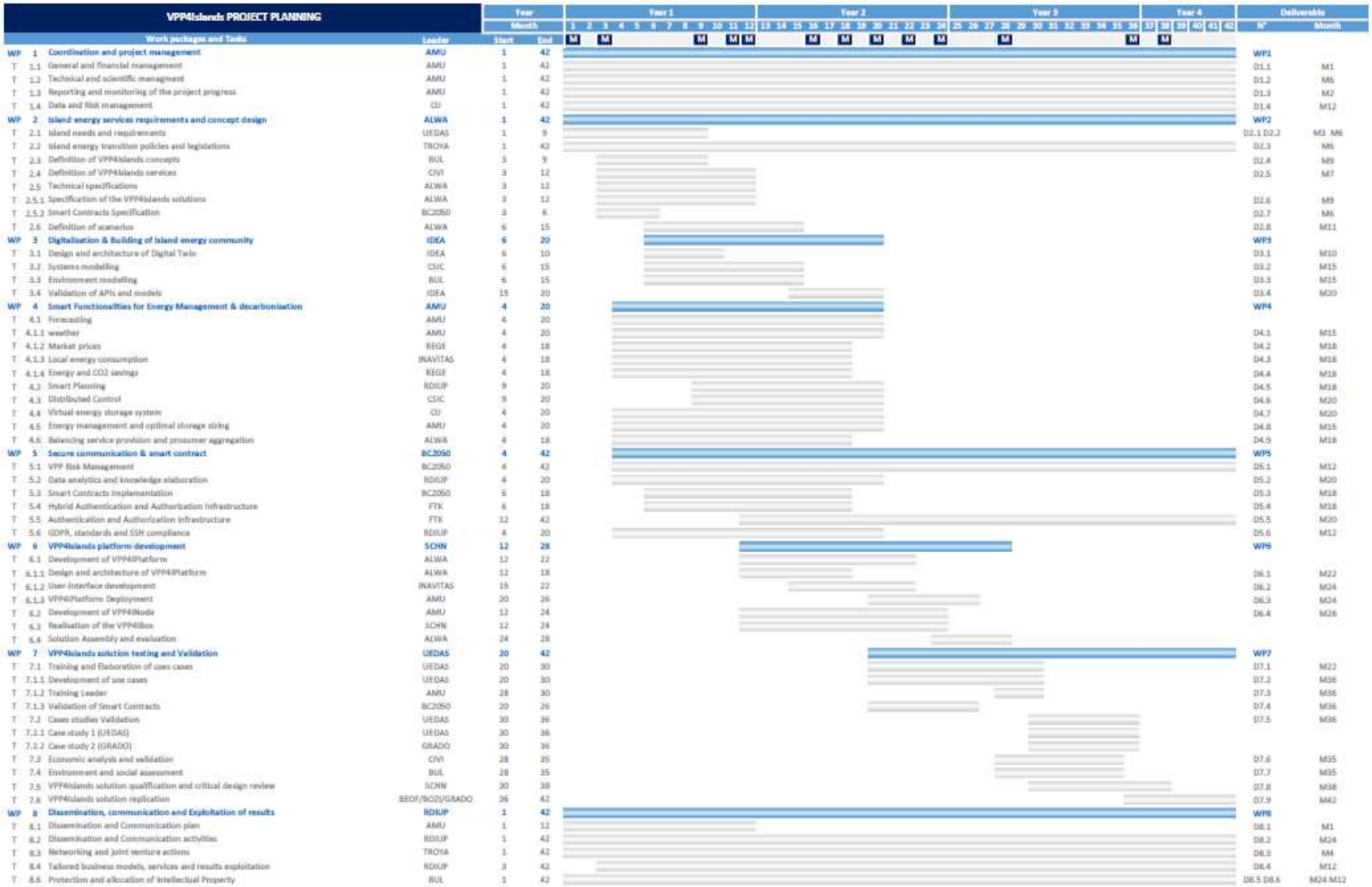

VPP4Islands PROJECT PLANNING				Year	Year 1												Year 2												Year 3												Year 4						Deliverable	
				Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	N°	Month
Work packages and Tasks			Leader	Start	End	M		M					M		M	M				M		M		M		M				M						M					M	M					
WP	1	Coordination and project management	AMU	1	42																																									WP1	
T	1.1	General and financial management	AMU	1	42																																								D1.1	M1
T	1.2	Technical and scientific management	AMU	1	42																																								D1.2	M6
T	1.3	Reporting and monitoring of the project progress	AMU	1	42																																								D1.3	M2
T	1.4	Data and Risk management	CU	1	42																																								D1.4	M12
WP	2	Island energy services requirements and concept design	ALWA	1	42																																								WP2	
T	2.1	Island needs and requirements	UEDAS	1	9																																								D2.1 D2.2	M3 M6
T	2.2	Island energy transition policies and legislations	TROYA	1	42																																								D2.3	M6
T	2.3	Definition of VPP4Islands concepts	BUL	3	9																																								D2.4	M9
T	2.4	Definition of VPP4Islands services	CIVI	3	12																																								D2.5	M7
T	2.5	Technical specifications	ALWA	3	12																																									
T	2.5.1	Specification of the VPP4Islands solutions	ALWA	3	12																																								D2.6	M9
T	2.5.2	Smart Contracts Specification	BC2050	3	6																																								D2.7	M6
T	2.6	Definition of scenarios	ALWA	6	15																																								D2.8	M11
WP	3	Digitalisation & Building of island energy community	IDEA	6	20																																								WP3	
T	3.1	Design and architecture of Digital Twin	IDEA	6	10																																								D3.1	M10
T	3.2	Systems modelling	CSIC	6	15																																								D3.2	M15
T	3.3	Environment modelling	BUL	6	15																																								D3.3	M15
T	3.4	Validation of APIs and models	IDEA	15	20																																								D3.4	M20
WP	4	Smart Functionalities for Energy Management & decarbonisation	AMU	4	20																																								WP4	
T	4.1	Forecasting	AMU	4	20																																									
T	4.1.1	weather	AMU	4	20																																								D4.1	M15
T	4.1.2	Market prices	REGE	4	18																																							D4.2	M18
T	4.1.3	Local energy consumption	INAVITAS	4	18																																							D4.3	M18
T	4.1.4	Energy and CO2 savings	REGE	4	18																																							D4.4	M18
T	4.2	Smart Planning	RDIUP	9	20																																							D4.5	M18
T	4.3	Distributed Control	CSIC	9	20																																							D4.6	M20
T	4.4	Virtual energy storage system	CU	4	20																																							D4.7	M20
T	4.5	Energy management and optimal storage sizing	AMU	4	20																																							D4.8	M15
T	4.6	Balancing service provision and prosumer aggregation	ALWA	4	18																																							D4.9	M18
WP	5	Secure communication & smart contract	BC2050	4	42																																								WP5	
T	5.1	VPP Risk Management	BC2050	4	42																																							D5.1	M12
T	5.2	Data analytics and knowledge elaboration	RDIUP	4	20																																							D5.2	M20
T	5.3	Smart Contracts Implementation	BC2050	6	18																																							D5.3	M18
T	5.4	Hybrid Authentication and Authorization Infrastructure	FTK	6	18																																							D5.4	M18
T	5.5	Authentication and Authorization Infrastructure	FTK	12	42																																							D5.5	M20
T	5.6	GDPR, standards and SSH compliance	RDIUP	4	20																																							D5.6	M12
WP	6	VPP4Islands platform development	SCHN	12	28																																							WP6	
T	6.1	Development of VPP4IPlatform	ALWA	12	22																																								
T	6.1.1	Design and architecture of VPP4IPlatform	ALWA	12	18																																							D6.1	M22
T	6.1.2	User interface development	INAVITAS	15	22																																							D6.2	M24
T	6.1.3	VPP6Platform Deployment	AMU	20	26																																							D6.3	M24
T	6.2	Development of VPP4INode	AMU	12	24																																							D6.4	M26
T	6.3	Realisation of the VPP4IBox	SCHN	12	24																																								
T	6.4	Solution Assembly and evaluation	ALWA	24	28																																								
WP	7	VPP4Islands solution testing and Validation	UEDAS	20	42																																							WP7	
T	7.1	Training and Elaboration of uses cases	UEDAS	20	30																																							D7.1	M22
T	7.1.1	Development of use cases	UEDAS	20	30																																							D7.2	M36
T	7.1.2	Training Leader	AMU	28	30																																							D7.3	M36
T	7.1.3	Validation of Smart Contracts	BC2050	20	26																																							D7.4	M36
T	7.2	Cases studies Validation	UEDAS	30	36																																							D7.5	M36
T	7.2.1	Case study 1 (UEDAS)	UEDAS	30	36																																								
T	7.2.2	Case study 2 (GRADO)	GRADO	30	36																																								
T	7.3	Economic analysis and validation	CIVI	28	35																																							D7.6	M35
T	7.4	Environment and social assessment	BUL	28	35																																							D7.7	M35
T	7.5	VPP4Islands solution qualification and critical design review	SCHN	30	38																																							D7.8	M38
T	7.6	VPP4Islands solution replication	BEOF/BOZI/GRADO	36	42																																							D7.9	M42
WP	8	Dissemination, communication and Exploitation of results	RDIUP	1	42																																							WP8	
T	8.1	Dissemination and Communication plan	AMU	1	12																																							D8.1	M1
T	8.2	Dissemination and Communication activities	RDIUP	1	42																																							D8.2	M24
T	8.3	Networking and joint venture actions	TROYA	1	42																																							D8.3	M4
T	8.4	Tailored business models, services and results exploitation	RDIUP	3	42																																							D8.4	M12
T	8.6	Protection and allocation of Intellectual Property	BUL	1	42																																							D8.5 D8.6	M24 M12

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As links and feedback loops are in place between WPs, so that the results from one feeds the others, the timely delivery of tasks and outputs (in particular, the contractual deliverables) is fundamental to avoid bottlenecks in the project implementation. Particular attention is taken on the interrelations shown in the following table, where the input and output deliverables are mentioned.

	WP	Inputs	Outputs
2	**Island requirements & energy services**	Technical and scientific Background of partners, State of the art, existing regulation	Requirements (D2.1), policies and legislation (D2.3), VPP concept (D2.4), services (D2.5), technical specification(D2.6), Smart Contracts Specifications (D2.7)
3	**Digitalisation & Building of island energy community**	Requirements (D2.1), VPP concept (D2.4), technical specification (D2.6)	Digital Twin (D3.1), System modelling (D3.2), Environment modelling (D3.3)
4	**Smart Functionalities for Energy Management & decarbonisation**	(D2.1), (D2.6), (D3.2), (D3.3)	Forecasting tools (D4.1), Smart planning tool (D4.2), VESS (D4.4), Energy management (D4.5)
5	**Secure communication & smart contract**	(D2.1), (D2.7)	Data analytics (D5.2), Smart contracts (D5.3), AAI infrastructure software (D5.4), GDPR (D5.6)
6	**VPP4Island platform development**	(D2.1), (D2.6), (D3.1), (D4.1), (D4.2), (D4.4), (D4.5), (D5.2), (D5.3), (D5.4)	VPP4IPlatform (D6.1), VPP4INode (D6.2), VPP4IBox (D6.3)
7	**VPP4Island solution testing and Validation**	(D6.1), (D6.2), (D6.3)	Economics analysis (D7.4), Environment assessment (D7.5), Qualification (D7.6), Replication (D7.7)
8	**Dissemination, communication and Exploitation of results**	(D2.3), (D2.4), (D2.5), (D6.1), (D6.2), (D6.3), (D7.4), (D7.5), (D7.6), (D7.7)	Networking (D8.4), Business model, exploitation strategy plan (D8.5), IPR (D8.6)

Management of Changes in the Work Plan

During the lifetime of the project it can happen that new opportunities arise or, on the contrary, that obstacles have to be faced and new solutions are proposed. In such cases, a change in the work plan would occur. It is the responsibility of the task leader to notify a deviation from the work plan, at first to the WP leader and to the Coordinator. In both cases of a positive or negative deviation, a change may occur, and the MST will make a first evaluation of the types of changes, with the collaboration of the involved partners. If it is a minor change that can be managed internally to the consortium, the information will be communicated to the GeA, and no action will need to be taken with the EC. If instead the change is substantial, or in case of doubt, the MSP will communicate to the EC about the change, in order to verify if it is necessary to start an amendment procedure. Of course, in case of changes that modify the nature of the project, the amendment would be rejected and an alternative to the proposed change would have to be found. If an amendment is needed, the PM will be in charge of the procedure and will follow the EC guidelines.

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As the Milestones represent crucial points for the project, they are as well monitored and discussed during the SB, together with the verification means that has been chosen. In fact, depending on the results achieved at the time where Milestones are indicated, corrective actions or process improvement activities will be proposed to make the processes more efficient and effective, if necessary.

N.	Milestone title	WP	Due date	Means of verification
M1	Risk analysis	WP1	M1	Risk Analysis is directly relevant to D1.3 which defines the quality assurance plan, risk analysis and related mitigation actions through the project management and coordination (WP1)
M2	Requirements and needs	WP2	M3	Verified against D2.1
M3	Technical specifications of VPP4Islands solutions	WP2	M9	Two reports on technical specification of VPP4Islands and will be reviewed internally and by EAB. (D2.5.1 and D2.5.2)
M4	Scenarios for studying VPP4Islands concept	WP2	M11	A report will be published, in which a number of representative scenarios for studying the identified KPIs of VPP4Islands are described. (D2.6)
M5	Proof-of-concept hybrid AAI	WP5	M12	An autonomous demonstrator showing the integration of smart contracts and AAI has been developed, and is running in a containerized environment. (D5.3)
M6	Hybrid AAI Initial Release	WP5	M16	The policy decision point and the smart contract policy information points are released with full documentation.
M7	Final AAI Release	WP5	M18	The improved AAI is released and documented. (Subject of D5.5)
M8	Completion of VPP4Islands model	WP3	M20	Verification by means of simulation and documentation (D3.4)
M9	Accuracy of forecasting tools	WP4	M20	Verification by using historical data (Subject of D4.1.1, D4.1.2, D4.1.2 and D4.1.4)
M10	Optimized energy management	WP4	M20	Verification through real scenario simulation (D4.5)
M11	VPP4I-Platform release	WP6	M22	Software released and documented (Subject of D6.1)
M12	VPP4I-Node release	WP6	M24	Software released and documented (Subject of D6.2)
M13	VPP4I-Box prototype	WP6	M24	VPP4I-Box tested and running (Subject of D6.3)
M14	VPP4Islands ecosystem	WP6	M28	VPP4Islands factory tested and running (Subject of D6.4)
M15	VPP4Islands ecosystem validation with use cases	WP7	M36	VPP4Islands solution tested for lead islands use cases (Subject of D7.3)
M16	VPP4Islands solution qualification	WP7	M38	VPP4Islands solution assessment and qualification to TRL8 (subject of D7.6)

Besides Deliverables and Milestones, a set of Key Performance Indicators has been chosen to quantify the level of attainment of strategic objectives.

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Strategic objectives	KPI
***SO1*: Implement Living labs to promote renewable energy communities in islands:** VPP4Islands will engage citizens, potential stakeholders and influencers to ensure the tailored co-design of innovative market flexibility tools and services.	-Number of engaged stakeholders (at least 20) - high consumer trust - At least 50 feedbacks from potential actors
***SO2*: Increase the exploitation and the penetration of renewable energy-based system on the Island:** VPP4Islands will provide a tool to assess in depth the island capacity in terms of RES. The tool will allow to quantify the energy that can be produced from the available RES along with its implementation costs and ROI. The tool will give also an output result including the environmental performance and monetary saving (€/kWh).	-CO2 reduction index (at least 2 Ton CO_2 reduction[1] during the experimentation) -Reduction around 40 % on Fossil fuel consumption in leading islands[1]
***SO3*: Embracing new technologies to promote a large penetration of renewable energy sources:** Mitigating the fluctuations caused by the RES and proposing advanced forecasting approaches to reduce uncertainties that will save the cost of energy and power balance, increase the quality of the supplied electricity and foster stakeholders relying on this green energy. Therefore, VPP4Islands will facilitate the integration of renewable sources by becoming more profitable and an indispensable player in the energy market.	-Forecasting accuracy (>80%) -Market price of provided energy and services
SO4: Smart combination of multiple storage strategies: VPP4Islands will promote the integration and combination of diverse storage sources (e.g. flywheel, batteries, micro CHP, hydrogen fuel cell, small hydro, etc ...) instead of a single conventional ESS to act as storage with a high capacity and performance.	-Energy Return on Investment (EROI)[2] -Virtual ESS Efficiency (> 90%)[1]
SO5: Digitalization ensuring the multi-dimensional flexibility and increasing the performance of the portfolio of RES: VPP4Islands will define a flexibility potential for the VPP context, which takes into account a set of technical flexibility characteristics, such as generation level, operating range, magnitudes of changes of its power exchanges with the grid and ramp rates to estimate the technical ability of the system to provide flexibility. A flexibility index will be calculated in a similar way as in the MAGNITUDE EU-funded project (See 1.3.4) by CU and REGE; short-term and long-term. A specific module (API) will be integrated to digitize this calculation. A holistic approach to evaluate accurately the level of flexibility will be defined in four layers: load demand, energy offer, forecasting and ancillary services. The extent of flexibility will be evaluated inside the VPP, as well as multifunctional capacity.	-Short-term flexibility index (below 15 minutes) -Long-term flexibility index (intra-day)
SO6: Enhancing the transparency and the cybersecurity of data related to the green energy: This objective aims to secure the data exchange and share information between producers, consumers, DSO/TSO and other stakeholders in an effective and transparent way. A hybrid cybersecurity approach (AAI + DLT) will be deployed to increase data sharing and transparency. It is essential to detect, mitigate and recover from cyberattacks.	-Availability of service (99%)[1] -Transparency
SO7: Development of an open VPP4Islands ecosystem: This project aims to facilitate the creation of flexible VPPs, unlock access to highly-valuable information related to energy trading, empower the active participation of consumers and facilitate the market uptake of small prosumers by reducing intermediaries and share know-how between created VPP4I-Nodes to optimize their energy management and revenues. It will be considered as VPP4Islands factory.	-Computational complexity -Number of reduced intermediaries (>2)

[1] According to predefined scenarios and case-studies

[2] The ratio between the amount of usable energy and the energy used to obtain that energy resource.

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SO8: Development of tailored business models to support the sustainability and commercialisation of VPP4Islands outputs: Market segments, target prosumers, tailored business model and exploitation strategy will be defined by automating the entire energy value chain. Market development and exploitation of VPP4Islands services will be addressed by deploying agile approaches. The project will combine proven strategies and novel methods to deliver optimized ancillary services while supporting the durability of the VPP. A replication study will be carried out through concrete business cases to maximise the values of the proven technologies and services.	-Number of engaged professional end-users (>8) - Number of engaged prosumers\consumers (>100) -Number of created startups (>2)

2. QUALITY ASSURANCE

This section aims to describe the guidelines that shall be applied during the lifetime of the project to assure the high quality of all outputs, both in terms of their technical contents, clarity of writing and appropriateness for the target audience. Each beneficiary shall perform the work in accordance to these quality regulations concerning mainly deliverable control and approval, but also rules for document naming and referencing. Quality Assurance procedures internal to a partner organisation will complement this quality assurance policy and will not be in contrast with it. Planning and executing quality assurance and control activities can be a significant investment of time and effort and are to be considered part of WP1.

In particular, task 1.2 “Technology and scientific management” (leader: CU) aims to monitor and control the technical and scientific quality of the project through periodically reviewing of the project objectives, progress, and quantifying impacts. A review procedure will be setup to guarantee the quality of the project methodologies and outputs. This will cover technical and scientific methodologies used, project progress, outputs, deliverables and compliance against objectives, as well as the monitoring and updating of the possible identified risks and mitigation measures. *An International Technical and Scientific Committee will be set up to provide external expert advice and steering to the technical and scientific development and output of the project.* The technical and scientific impact of project outputs will be collected, quantified, and analysed in this task in order to deliver a sustained impact on decarbonising energy systems of geographical islands. *The outputs will be communicated to the project Coordinator and to the General Assembly by means of yearly technical and scientific management reports* (D1.4 at M12, M24, M36 – CU).

The activities carried out in task 1.2 will help the successful Task 1.3 “Reporting and monitoring of the project progress” (leader: AMU). In this task, specific KPIs are defined to allow the Coordinator to monitor and follow the progress of the project. Also, all partners will participate in providing contributions to the interim and final reports and other administrative issues as required by the EC and the Coordinator.

Furthermore, Task 1.4 “Data and Risk management” (leader: AMU) aims to identify early risk management, ensure the mediation of any potential conflict, propose corrective actions to avoid

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conflicts, and define rules to ensure quality of reporting and progress. To ensure the high quality of the project for capacity building results and compliance with the contract commitments, all project deliverables and key events will be monitored and reviewed internally.

Moreover, experiments, digital tools, and surveys will generate data related to market, environment, and load demand that are needed to manage the portfolio. Also, this project will generate data about the properties of different units. These data are the basis of the project since they will be considered to perform the flexibility of the VPP. Also, VPP4Islands proposes to share data and experiences. For these reasons, the following processes and procedures for data management will be established: data governance, architecture including data modelling, General Data Protection Regulation (GDPR), the instructions for data erasure, and database management. A detailed Data Management Plan (DMP) is under development and will be submitted as a public deliverable at M6; it will be updated in M36 and M42 (D1.2). The description of Data Management Plan and all of related procedures will be included in D1.2.

Concerning document management, in order to prevent unauthorised changes and traceability of modifications, some internal communication guidelines have been set. A specific section will be dedicated to this aspect, that is fundamental also to facilitate good working relationships between project partners, encouraging and stimulating open communication and full sharing of information.

This chapter will end with an important section describing the communication and reporting to the relevant Commission services.

2.1. QUALITY OF THE OUTPUTS, DOCUMENT REVIEWING AND APPROVAL PROCESS

To monitor the progress related to the Key Performance Indicators, and to monitor and control the technical and scientific quality of the project, internal reporting procedures have been set.

INTERNAL REPORTING PROCEDURES

In order to ensure a proper reporting to the EC in duly time and manner, a specific procedure has been designed for monitoring project evolution from a technological and scientific side (results, impact, etc.) as well as a procedure to monitor costs and consumed resources. With this purpose, apart from formal reporting periods, additional interim follow-up procedures have been established in order to better monitor the project implementation along the whole project duration.

Technical reporting

The Work Package leaders have autonomy in organising the monitoring of activities related to their respective WPs. Technical information regarding the project implementation should be prepared by WP Leaders and submitted to the Project Coordinator by means of minutes of meeting, following the

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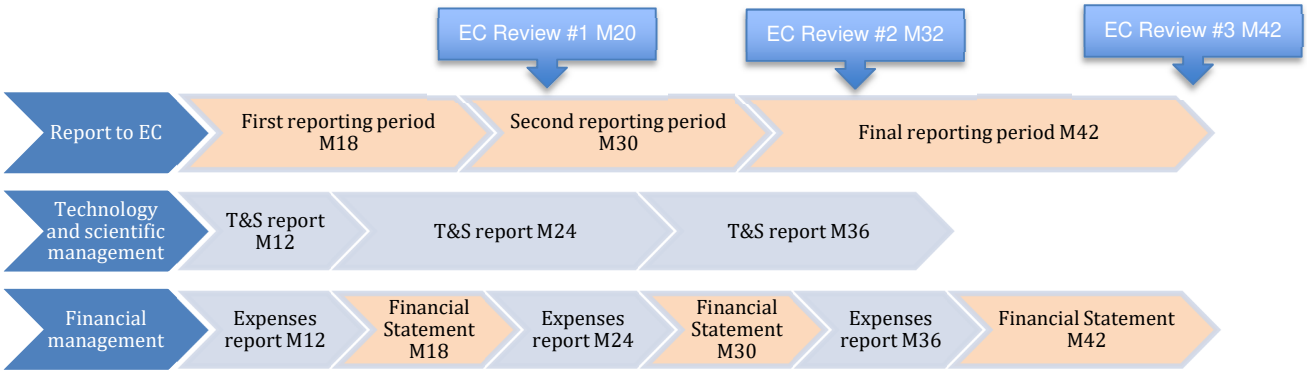
template “VPP4ISLANDS_Template_Minutes”, shared for this purpose. Task leaders’ participation will be required directly by the corresponding WP Leader.
The WP leaders are responsible to transmit in due time their WP deliverables to the SB for the EC review. The results of the WPs will be discussed within the Strategic Board and corrective measures will be proposed if needed.

Furthermore, the Operational Board, composed by all the Work Package leaders, prepares an annual progress report on the scientific results (protocols, scientific results, finance…) to be transmitted to the Coordinator.

Financial reporting

All information concerning expenses and resources utilisation will be reported directly by each partner to the MST on the basis of the template prepared for this purpose (VPP4ISLANDS_WP1_BudgetGlobalMonitoring.xls). The PM will revise the information provided and prepare a summary to be submitted for approval to the SB; corrective actions will be proposed when necessary. In formal reporting periods (M18, M30 and M42), in addition to the above described template, the finance offices of partners will be also required to complete Periodic Financial Report (for the Financial Statement) using the electronic tool provided by the EC.



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INTERIM AND FINAL REPORTING TO EC

The European Commission monitors progresses and controls correctness in project implementation through the interim reporting (M18, M30, M42) and the project reviews (M20, M32, M42), in addition to the evaluation of project deliverables submitted in the continuous reporting.

These forms of assessment present the evidence that the project is progressing, it should continue, that the Consortium has completed its duty as set out in the Grant Agreement, and that it is eligible for the EC payment.

The MST collects all the technical, scientific and financial documents and information in support of the reporting and of project reviews. Starting from the Internal reporting (technical and financial), the Strategic Board will verify if additional information is needed and, if so, request partners to integrate missing data at least one month before the due date of the reporting or the review. The draft version of the reports to be submitted to the EC will be circulated for comments to the members of GeA at least two weeks before the delivery date.

2.2. INTERNAL COMMUNICATION

The project is carried out by a large transnational consortium with partners coming from and outside Europe. In order to assure the smooth communication among partners, some tools and channels have been chosen in respect of the expected output.
First, all the persons participating in the project are included in a contact list "VPP4ISLANDS_contacts.xls" with their respective email address, that is shared among all the partners. It is responsibility of each partner to update the list directly in the shared file and/or ask to the PM for inclusion in the list.
For day-to-day communication, the professional emails are the more immediate channel. Considering the large participation from personnel with different expertise, the definition of the relevant target of the communication is recommended and some thematic mailing lists have been created at this effect, for example for relevant people in Work Packages.
In order to facilitate the record archiving of emails to each participants, it is recommended to start the object of the email messages with the following text: VPP4ISLANDS-WPx-[object of the message]

The individuals who wish to be part of a specific mailing list have to send the request to the PM and to update the excel file in the shared directory.
Other instruments are used in order to avoid the multiplication of emails, in particular open source collaboration platforms.
For the sharing of files relevant to the project, there is a dedicated cloud directory in the Aix-Marseille University server. The documents are uploaded in their final version by the PM. The modification of a

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document will imply a new version and the substitution of the previous one (that will be moved to the "old version" folder).
The architecture of the shared directory follows the project structure, with one folder for each WP. The deliverables of the work packages, the validated minutes of meetings and other relevant documents are uploaded as soon as the final version in available. It is recommended to notify the feed of a new element, avoiding if possible to send by email large size files.

Some guidelines are recommended for the identification of files:

> Minutes of meeting: VPP4ISLANDS-WPx-MoM-ddmmyy(of the meeting)-vfinal (or vdraft)
> Deliverables: Dx.y [name of the deliverable]-v[number]

2.3. DELIVERABLES APPROVAL AND SUBMISSION TO EC

The different actors involved in the deliverable production are:

- Lead Beneficiary: it is the organisation responsible for the deliverable, as indicated in the deliverable list in the DoA
- Contributor(s): person(s) responsible of activities related to the deliverable,
- Reviewer(s) : person(s) or the organisation(s) involved in the activities related to the deliverable, different from the organisation of the lead benficiary ;
- Document approval: Work Package leader

The main contributor is the person in charge of the production of a document. When the document is ready in its first draft status, he/she may share it among other project partners that are concerned, in order to gather the different parts/inputs and make a version for the final review. Before submitting formal deliverables of each WP to the EC, the deliverables will be reviewed internally by a member of SB and another partner that is not directly involved in the WP. This process requires the deliverable reports to be ready for internal review before the official deadlines to allow a sufficient time window for reviewing them and addressing any comments from reviewers. Feedback from reviewers and responses from lead beneficiary and contributors will be recorded through proper version control of the documents. After the integration and document update, the document has to be delivered to the Work Package leader for approval and quality check. After the approval, the deliverable is sent to the MST for submission to the EC.

GUIDELINES FOR DOCUMENTS

The deliverables are realised in general in form of reports; even if the deliverable itself is another kind of artefact, such for example a physical equipment, a piece of software, a database or a demo, a report

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to be uploaded to the EC Tender & Funding Portal will be produced, which demonstrates the work carried out.
The list of deliverables, the level of dissemination (e.g. public, confidential), and the due date of all deliverable are listed in GA.
The deliverable will be structured with a cover page (as the one in the present deliverable), and a list of parts or chapters including at least: the acknowledgement and the disclaimer, the revision and history table, the summary, the list of acronyms, the executive summary.
A template for deliverables is uploaded in the shared directory to allow for uniform and recognisable style, whenever possible. Deliverables will be tracked by the SMT, identifying deliverables due in the near future, the deadlines for each deliverable, follow-up actions. The names of the persons producing and reviewing is in the file « VPP4ISLANDS-WP1-list of deliverable-vfinal » in the shared directory.
The MST will report about the progress to the SB and to the GeA.

3. Risk Assessment and Management

The Risk Assessment has been a crucial moment of the proposal preparation, with all the partners contributing to identify and evaluate the project implementation risks; for each critical risk, a contingency plan with mitigation measures have been set.
The identification of new risks is responsibility of each partner, who will notify the WP leader and the MST about the occurrence of a new risk, with an estimation of its Likelihood and Impact according to a qualitative scale (Low, Medium, High). The monitoring of the identified risks is a responsibility of the Coordinator, who will notify the SB if it is deemed necessary to put in place any mitigation measure.
At proposal stage the Risk Assessment brought to the identification of 14 risks to which 2 others were added at GA preparation stage (R4 and R13).

VPP4ISLANDS Risks for implementation			
Risk	**Description of risk**	**WP**	**Proposed risk-mitigation measures**
R1	Withdrawal of partners. For several unexpected reasons, even unrelated to the project, a partner could decide to discontinue the collaboration and formally leave the consortium. (**L: Low,** I: **Medium**)	WP1	This risk is averted by the definition of adequate contractual provisions to regulate possible conflicts or default cases through the signature of a Consortium Agreement. As risk mitigation measures, the SB will prepare a proposal for replacement/swap of activities, including possible partial or total reallocation to existing partners.
R2	As part of WP2 it is foreseen to publish all deliverables publicly to maximise the impacts of the project. However, there might be some issues related to confidentiality of data. (**L: Medium, I: Low**)	WP2	To address the concerns related to confidential data and at the same time be able to publish the deliverables publicly, we will synthesize representative data as proxy or alternative for confidential data.

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R3	The difficulty to combine models together. This could cause neglecting many assumptions and parameters, and consequently could result in producing biased outputs from the models. (**L: Low, I: High**)	WP3	During the WP3, appropriate strategies for coupling the modelling tools (e.g. soft-linking and clear structure for exchanging data) will be studied to avoid this risk.
R4	Insufficient computational resources and capacities for digital twin functionalities (**L: Low, I: Medium**)	WP3	This risk is mitigated through the authentication of the adequate NVIDIA equipment. IDEA and AMU have already qualified technical staff to ensure the deployment of the developed solutions.
R5	The difficulty to collect enough data from the demos and the generation of poor information, which would affect the robustness of the MLs and the decision making. (**L: High, I: Medium**)	WP3 -4-5	It is possible to look for open datasets, gather data from existing projects, and complete with simulated data from the digital twin.
R6	Costs in selected public blockchain explode and make approach uneconomical. (**L: Medium, I: Low**)	WP5	The proposed approaches are to be designed in a generic way, so that migration to private or alternative platforms is possible without putting the core research questions and results in question.
R7	Transaction rates in selected blockchain are not able to keep up with runtime requirements. (**L: Low, I: Medium**)	WP5	The hybrid approach of using local systems in conjunction with smart contracts allows for a fine-grained mapping of functionality to sub-systems of VPP4Islands. This minimizes the risk. In case this should occur, alternative higher throughput blockchains can be selected.
R8	Cyber-attacks to the platform (**L: Low, I: Medium**)	WP6 -7	All necessary precautions will be taken to improve the security of the website and to maintain a high level of resistance. Regular backups will be made of database and website functionality.
R9	DERs are likely to use heterogeneous technology (such as proprietary software from different energy providers that own the DERs, or legacy platforms with limited functionality) which can prove difficult to integrate with the VPP4Islands infrastructure. (**L: Medium, I: Low**)	WP6	The VPP4I-Box will provide a unified hardware module which facilitates communication to the VPP4Islands infrastructure, essentially acting as a 'bridge' for heterogeneous technology components which seamlessly integrates them into the larger infrastructure.
R10	INTEGRATION COMPLEXITY: the components fail in data exchange and interface compliancy and/or it is difficult to integrate the	WP6	An integration plan will be defined in WP6. The platform will integrate several complementary tools/functionalities and will be deployed in several significant pilot studies: a first version will give a real

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	solution in the pilot test cases (**L: Medium, I: Medium**)		starting point in terms of new features to develop, or of existing components to tune or to enhance. An integration methodology will be proposed, including guidelines for the partners to integrate in a Continuous Integration methodology all the main components/building blocks.
R11	The degree of central control in the system could present challenges when it comes to the required latency and security, potentially reducing the stability of the system. (**L: Low, I: Medium**)	WP6	Depending on results from initial simulations and tests, we will investigate other solutions that rely on more decentralized modes of control, for instance at the level of the (aggregated) VPP4I-Nodes or individual VPP4I-Boxes.
R12	The difficulty to experiment the flexibility services due to legal fences (e.g. control) (**L: Medium, I: Medium**)	WP7	The consortium can provide conventional services, monitor the installation and carry out in parallel the flexibility services in the digital twin to assess the benefits.
R13	High electric consumption variability and uncertain forecasting (weather, DR balance). (**L: Medium, I: High**)	WP7	This risk is mitigated installing a Sky camera solution for very short-term forecasting, increasing the VESS integration, and providing high flexibility index.
R14	Provoke an electric blackout (**L: Low, I: High**)	WP7	Before demonstration, VPP4Islands will define a risk management and prepare corrective actions to avoid this risk. Also, digital twin can be deployed to predict this issue.
R15	Lack of interest among SMEs, aggregators and prosumers (**L: Low, I: High**)	WP8	The participation of target groups will be facilitated to visit the workshops and virtual infodays. The involvement of end-users will be promoted through basic open services
R16	The difficulty to define a sustainable business model (**L: Low, I: High**)	WP8	To mitigate this, RDIUP will include the non-monetized profits in the business model to guarantee the durability of the VPP4I factory.

After project start, the risks related to the project management have been reassessed, according to Milestone M1. For example, the limitation of travels and the lock-down for some countries, together with the uncertainty about the date when all these limitation measures will be removed, brought to evaluate this as a real risk for the project (R17) and to propose specific risk-mitigation measures. Risks related to the management of the project and mitigation measures are described in the second table here below.

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VPP4ISLANDS: focus on risks in project management			
Risk	**Description of risk**	**WP**	**Proposed risk-mitigation measures**
R1	Withdrawal of partners. For several unexpected reasons, even unrelated to the project, a partner could decide to discontinue the collaboration and formally leave the consortium. (**L**: **Low,** I: **Medium**)	WP1	This risk is averted by the definition of adequate contractual provisions to regulate possible conflicts or default cases through the signature of the Consortium Agreement. As risk mitigation measures, the SB will prepare a proposal for replacement/swap of activities, including possible partial or total reallocation to existing partners.
R17	Delay in carrying out activities due to the pandemic outbreak, or other "force majeure" reasons. **(L:Medium; I:High)**	WP1	Discuss with the Project Officer of the EC about the opportunity of a « no cost extension » of the project
R18	Conflicts in the Consortium (**L: Medium; I: Medium**)	WP1	Potential conflicts will be solved at the lowest level possible, and preferably amicably. In case of conflicting views, the decisions will be taken by voting in the appropriate management boards.
R19	Delays in deliverables and milestones (**L:Low; I:High**)	All WPs	Continuous monitoring of the activities in each task/sub-task will be carried out by PM to ensure their relevance and timeliness to the planed objectives and milestone. Early intervention from task leaders and WP leaders ensure potential delays will be identified and addressed to avoid cascading effect on other tasks and WPs.
R20	Lack of communication or collaboration among different work packages (**L:Low; I:High**)	WP1	Key links and data exchanges between WPs have been identified and specified/elaborated in the project Gantt Chart. WP leaders are responsible for ensuring effective collaborations between WPs will be established. This will be monitored by the project coordinator.
R21	WP cost/time overrun (**L:Low; I:High**)	All WPs	Regular progress and expenditure reviews will allow project management to track and re-schedule as necessary.

Each partner has the responsibility to report immediately to their respective WP Leader and to the Project Coordinator any risky situation that may arise and may affect the project objectives or their successful completion. Any change in time schedule of deliverables or in the allocated budget must be reported to the corresponding WP Leader and the Project Coordinator. In case of problems or delays, the Operational Board and Strategic Board will be consulted as appropriate, and it may install task forces to take the necessary actions and will establish mitigation plans to reduce the impact of risk occurring. Responses may include: 1) strengthened supervision, 2) adjustments to project strategy, 3) changes to implementation arrangements; and 4) changes in budget allocations.

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