HORIZON-CL5-2022-D3-01-11
Demonstration of innovative forms of storage and their successful operation and integration into innovative energy system and grid architectures

AGISTIN
Advanced Grid Interfaces for innovative STorage INtegration

D1.1: Project method and activity plan

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EXECUTIVE SUMMARY

This document provides a preliminary version of the detailed management plan of the AGISTIN project. It defines in detail the tasks to be performed in each Work Package and identifies the input and output connections for each activity. It also shows the mapping of the tasks into the deliverables and describes the plan for the deliverables' preparation.

PROJECT CONTRACTUAL DETAILS

Project Title	Advanced Grid Interfaces for innovative Storage INtegration
Project Acronym	AGISTIN
Grant Agreement No.	101096197
Project Start Date	01-01-2023
Project End Date	31-12-2026
Duration	48 months

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I. INTRODUCTION

AGISTIN will enable industrial grid users to rapidly deploy renewables through advanced integration of innovative energy storage technologies at the interface with the grid. Rapid decarbonisation of industry through electrification, the growth of renewables, and the need for grid stability present a unique opportunity for new forms storage of storage and integration schemes to emerge. The main objectives in the project are to develop new forms of energy storage that meet grid needs for short-duration flexibility and stability, reduce the impact of new, large demand on the grid, and reduce costs for large grid users through innovative storage integration. This project will exceed the state of the art for aqueous batteries, use of irrigation systems as energy storage, grid interface designs and provision of advanced grid services from large load users.

Two demonstrations and three test activities centred around renewable hydrogen electrolysis, irrigation pumping, and fast EV charging are used to demonstrate advanced concepts for energy storage, grid integration and grid users. AGISTIN results in reduced grid connection for industrial grid users, reducing H2 production cost by 10% and improved grid stability through advanced grid services, that enable grids to run with 100% renewables. The innovative storage technologies directly addressed in the project include aqueous electrochemical recuperators, with properties between super capacitors and batteries, use of irrigation systems as energy storage and aluminum ion batteries. These technologies will be developed to test and demonstrate in the target use cases, resulting in TRL level increases for each. The consortium consists of members from 9 countries and across the value chain best able to exploit project results, including storage and power electronics providers, industrial grid users, a grid operator, an engineering consultancy, research institutes, universities and an energy storage association.

This document presents the detailed definition of the tasks, together with the required inputs and the associated outputs, which will serve as a reference for the coordination of the above-mentioned activities. The identification of the tasks inter-dependencies allows both highlighting the input requirements for the initial development phase and determining which activities are generating the feedback necessary for continuation of the work.

The plan of the activities is presented in detail for each WP, providing the corresponding scheduling and the Input/Output (I/O) dependencies. In addition to this, the mapping of the tasks to the Deliverables is shown and a plan for the Deliverables preparation is also defined.

Figure 1 gives as a reference the overall Gantt chart of the project, with the indication of the Deliverable and Milestones due dates for each Work Package.

Table I includes the full list of AGISTIN consortium partners, with their legal names, the acronyms used through the rest of the document, their country of origin and their role in the consortium: COO for coordinator; BEN for Beneficiary and AP for Associated Partner.

Table II and Table III provide the overview of Deliverables and Milestones for the whole project. The following Chapters will present a more detailed view of the activities for each Work Package.

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Figure 1- AGISTIN project complete Gannt chart

Table I - List of AGISTIN consortium partners

Legal name	Acronym	Country	Role
EPRI EUROPE DAC	EPRI	IE	COO
UNIVERSITAET KASSEL	UniK	DE	BEN
RTE RESEAU DE TRANSPORT D'ELECTRICITE	RTE	FR	BEN
FRAUNHOFER GESELLSCHAFT ZUR FORDERUNG DER ANGEWANDTEN FORSCHUNG EV	FHG	DE	BEN
FUNDACION CARTIF	CTF	ES	BEN
CENTRO DE INVESTIGACIONES ENERGETICAS, MEDIOAMBIENTALES Y TECNOLOGICAS-CIEMAT	CDR	ES	BEN
SHELL GLOBAL SOLUTIONS INTERNATIONAL BV	SHL	NL	BEN
UNIVERSITAT POLITECNICA DE CATALUNYA	UPC	ES	BEN
GEYSER BATTERIES OY	GSR	FI	BEN
INFRAESTRUCTURES DE LA GENERALITAT DE CATALUNYA SA	ICAT	ES	BEN
EUROPEAN ASSOCIATION FOR STORAGE OF ENERGY	EASE	BE	BEN
RINA CONSULTING SPA	RINA	IT	BEN
EIDGENOESSISCHE TECHNISCHE HOCHSCHULE ZUERICH	ETH	CH	AP

Table II - List of AGISTIN deliverables

Deliverable	Title	Work Package	Lead Partner	Due Month	Type	Diss. Level
D1.1	Project method and activity plan	WP1	EPRI	2	R	PU
D1.2	Data management plan prepared and maintained	WP1	EPRI	6	DMP	PU
D1.3	First year risk management plan	WP1	EPRI	12	R	PU
D1.4	Final risk management report	WP1	EPRI	48	R	PU
D1.5	Ethics assessment report	WP1	EPRI	48	ETHICS	PU

D2.1	Energy storage integration requirements, incentives and constraints: EU-wide analyses	WP2	EPRI	12	R	PU
D2.2	LCA methodology for storage integrated in AGI	WP2	CTF	24	R	PU
D2.3	Guidelines for CNC to facilitate the integration of energy storage with significant grid users, including emerging business models	WP2	RINA	48	R	PU
D3.1	Topologies for common AGI of the identified combinations	WP3	UniK	15	R	PU
D3.2	Open-source simulation models of the pertinent grid coupling systems open for parametrisation to individual load, generation and storage technologies.	WP3	UniK	30	R	PU
D3.3	Methods and provision of open-source code for AGI operation	WP3	ETH	36	R	PU
D3.4	AGI design adequacy for the respective system & customer services along with min. dimensioning	WP3	UniK	46	R	PU
D4.1	Use case identification and test infrastructure set-up	WP4	FHG	12	R	PU
D4.2	Validation process, results and lessons learned	WP4	FHG	40	R	PU
D4.3	Summary of validation process and result discussion	WP4	FHG	45	R	PU
D5.1	PLECS model of SHL's site for PQ4Wind	WP5	FHG	20	R	SEN
D5.2	Validation of simulation results in real environment	WP5	FHG	25	R	SEN
D5.3	Technical performance of the AGISTIN concept	WP5	FHG	32	R	SEN
D5.4	Technical, economic and sustainability assessment of the AGISTIN storage concept for green H2	WP5	CTF	42	R	SEN
D6.1	Technical-economical sizing, operation and control tools for irrigation system modernisation into energy storage systems	WP6	ICAT	36	R	PU

D6.2	AGISTIN concept analysis on the field tests at CDR and Segrià-Sud canal installations	WP6	RINA	42	R	PU
D6.3	Technical, economic and sustainability assessment of the AGISTIN storage concept for irrigation canal-based storage system	WP6	UPC	30	R	PU
D7.1	First DEC Plan	WP7	EPRI	6	R	PU
D7.2	Mid-term DEC Plan	WP7	EPRI	24	R	PU
D7.3	Final Exploitation Roadmap including Business Plan and IPR report	WP7	EASE	42	R	SEN
D7.4	Final DEC Report	WP7	EPRI	48	R	PU
D7.5	Collection of newsletters and dissemination actions	WP7	EPRI	48	R	PU
D7.6	AGISTIN EU Positioning paper	WP7	EASE	48	R	PU

Table III - List of AGISTIN milestones

Milestone	Title	Work Package	Lead Partner	Due Month	Means of verification
MS1	SoA of Connection Network Codes	WP2	RINA	2	Overview available on AGISTIN website
MS2	Innovative energy storage integration requirements, incentives and constraints	WP2	RTE	6	Overview available on AGISTIN website (M06) and published in D2.1 (M12)
MS3	LCA methodology for storage integrated in AGI	WP2	RINA	24	Published in D2.2
MS4	Business model opportunities	WP2	CTF	44	Overview available on AGISTIN website (M44) and published in D2.3 (M48)
MS5	AGI topology design tool completed	WP3	UniK	15	Published in D3.1
MS6	General generic model template available for benchmark simulations	WP3	UniK	24	Template available on AGISTIN website

MS7	Control optimisation code ready to provide to other work packages	WP3	UniK	36	Code and optimisation architecture available on an open-source platform
MS8	Test scenarios & use cases defined & Test centre setup adjusted to the scenarios	WP4	FHG	18	Pictures of setup are available on the AGISTIN website (M20) and reported in the 2nd progress report (M24)
MS9	Test Setup completed and GFI/GFL implemented on inverters	WP4	FHG	20	Pictures of setup are available on the AGISTIN website (M20) and reported in the 2nd progress report (M24)
MS10	High performance batteries characterised in modelling results	WP4	FHG	18	Consortium memorandum on battery characterisation results (M18) and reported in the 2nd progress report (M24)
MS11	Simulations and test scenarios are validated in the laboratory	WP4	GSR	45	Published in D4.3
MS12	Improved plant dynamics & new ancillary services with AGISTIN concept at PQ4Wind	WP5	FHG	25	Results summary on AGISTIN website (M44) and presented in D5.2 (M25)
MS13	Successful operation of the tested inverter and at SHL's site demonstrating improved plant dynamics	WP5	FHG	32	Results of measurement campaign published in D5.3
MS14	AGISTIN sizing, operation and control tools completed for irrigation systems	WP6	UPC	30	Published in D6.1
MS15	Hydraulic, electrical & storage assets designed and constructed for field installation	WP6	UPC	36	Design and pictures available on website (M36) and presented in D6.2 (M36)
MS16	AGISTIN field tests completed and validated in both test locations	WP6	CDR	42	Published in D6.3

1 WP 1 – Project Coordination and Management

The goal of this WP is to coordinate and manage all project activities among the partners, to monitor quality and timing of project results and to carry out the overall administrative and financial management of the project. The aim is to ensure the project is conducted on time according to the budget and directed towards the overall project objectives. The main focus will be on:

- Coordination of the technical activities of the project and linking together all project components;
- The overall legal, contractual, ethical, financial and administrative management;
- Maintaining communication with the European Commission and each partner;
- Establishing and maintaining conflict resolution and management of strategic orientation of the project;
- Facilitate and maintaining strong and effective involvement of relevant various stakeholders at local, national and European level, and between the different sectors of research, policy and practice.

Figure 2 depicts the overarching structure of the AGISTIN project and the relationship between the different work packages.

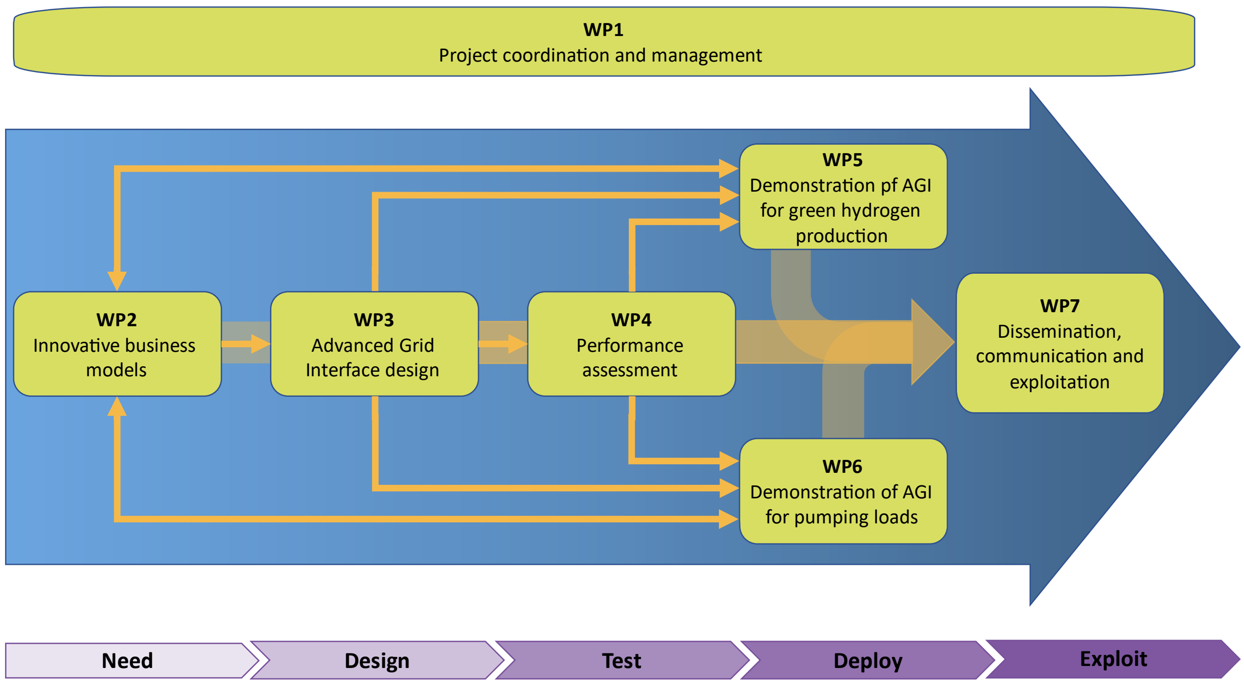

Figure 2 - Overarching AGISTIN project structure

1.1 List of tasks and sub-tasks

Work Package 1 is composed of four tasks. Each of the relevant management aspects of the project has its own dedicated task, which will run for the whole duration of the project. Since the management activities will be run continuously during the life the project the time plan of this work package foresees a constant effort distribution.
The relationship between them as well as with other Work Packages is depicted Figure 3.

Table IV - List of activities in WP1

Activity	Description	Lead partner
T1.1	Internal communication and contractual, administrative and financial project management	EPRI
T1.2	Technical coordination and quality assurance	EPRI
T1.3	Research knowledge and data management mechanism	EPRI
T1.4	Ethics assessment and management	EPRI

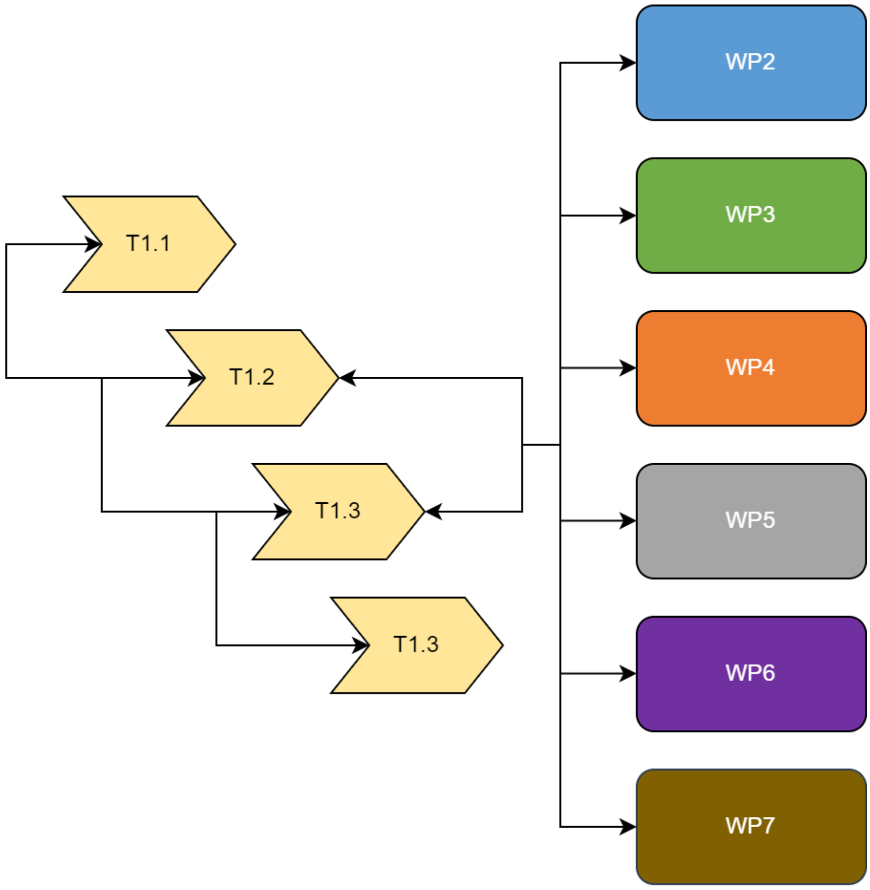

Figure 3 - PERT chart for WP1

1.2 Quality assurance process

For ensuring the proper level of quality for the deliverables of the project, the AGISTIN consortium has defined in its project management structure a dedicated quality management strategy and the related quality assurance process.
The quality assurance process foresees the following steps for the creation, writing and revision of project's deliverables:

1. Deliverable planning
2. Document preparation
3. Document review
4. Quality check

During the deliverable planning phase, which is part of the actual task effort and thus internal to the specific task or Work Package, the responsible partner, in coordination with the other task participants, will produce a Table of Content (ToC) for the deliverable and agree on responsibilities for providing input or managing specific sections of the document.
With the document preparation, all the relevant input from involved partners will be collected and added to the deliverable structure, iterating the process until a first draft version of the document is ready for review.
Two partners from the AGISTIN consortium will be assigned with reviewing the deliverable and add their feedback and comments. The deliverable responsible will then address reviewers' comments and further improve the document based on the reviewers' feedback. If needed multiple rounds of review can be performed until the desired level of quality for the deliverable is reached.
The final step is the quality check, which includes a final round of internal revision, mainly focusing on style check and document coherency. The finalized document will be then ready for submission.
A reference timeline for the quality assurance process depicted in Figure 4.

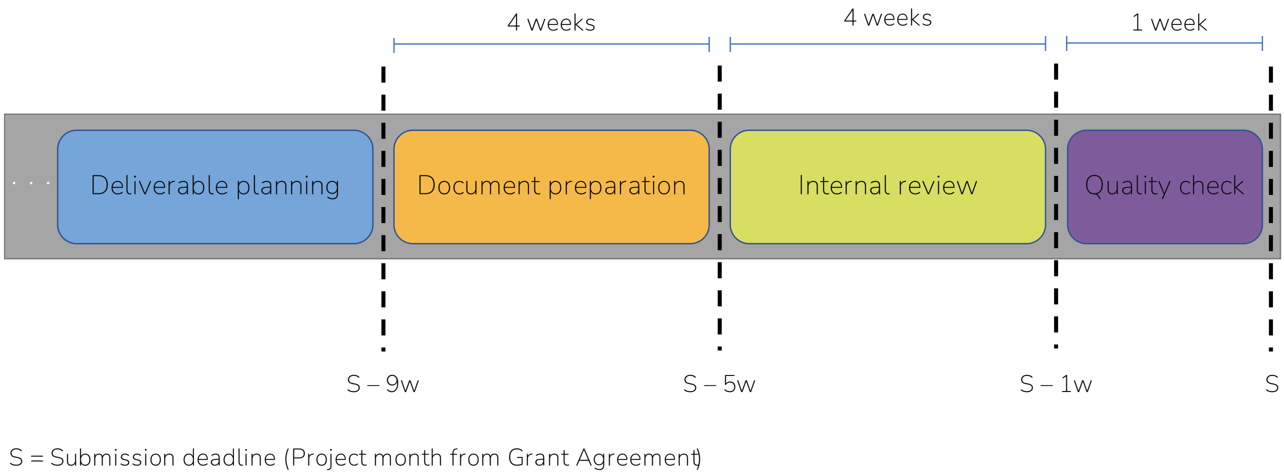

Figure 4 - Deliverable quality assurance process timeline

2 WP 2 – Identification and enabling innovative business models for energy storage integration with grid users

This work package will aim at assessing the economic benefits of innovative storage solutions connected through adapted AGI topologies. For reaching this goal the partners will conduct an analysis of the non-technical barriers to the integration of energy storage for the grid users and afterwards devise guidance and supports to mitigate these issues.

Additionally, WP2 will identify business models and current market barriers for AGISTIN, based on the DC-(interconnection) market as well as trajectories of market growth and economies of scale for DC components.

Finally, the work executed in WP2 will prepare dedicated recommendations for adapting regulatory frameworks, such as Connection Network Codes (CNC), to enable AGISTIN developments to be put on the market and propose an LCA methodology that is adapted to AGI concept as well as connected storage solutions.

In the beginning, we are going to conduct an analysis of the CNC and the improvements they have made for the storage integrations according to AGISTIN. At the moment, energy storages by themselves are not included in Connection Network Codes (CNC), which make it clear what the restrictions are for each sort of unit. As a result of the fact that AGI may collect various types of storage, generation, and load on the same point of common coupling, it may be subject to a diverse set of connection rules.

In task T2.2 we will investigate the necessary technological requirements for novel energy storage and AGIs in order for them to interact with grids, onsite renewable energy sources, and demand, as well as deliver grid services.

The third workstream will document how current grid connection barriers, customer and grid related tariffs and incentive approaches, as well as grid codes and regulation, influence the selection of energy storage technologies at grid user sites.

In conclusion, the last outcome will include recommendations to modernise both the international and national levels of the CNC grid codes, in order to enable the commercial acceptance of the AGI concept.

Overall, this work package will conduct an analysis of the non-technical hurdles to the integration of energy storage for the grid users that are the primary focus of the project, and then develop recommendations and supports to help minimise these concerns.

The analysis of the potential financial advantages offered by new storage that is linked via adaptive AGI topologies will help identifying business models and current market barriers for AGISTIN.

2.1 List of tasks and sub-tasks

Work Package 2 is composed of five tasks, listed in Table V together with the respective subtasks division.

The WP structure and the dependencies between tasks is described in Figure 5.

Table V - List of activities in WP2

Activity	Description	Lead partner
T2.1	Assessing and monitoring regulatory, network code & economic barriers of integrating storages at industrial sites	RINA
T2.1.1	*Assessment of the Connection Network Codes (CNC)*	
T2.1.2	*Analysis if different AGI topologies and combinations of storage, generation and load*	
T2.1.3	*Matching AGI topologies with relevant different connection rules*	
T2.1.4	*CNC updates for storage integrations according to AGISTIN findings and design criteria*	
T2.2	Functional requirements of industrial users for integrating innovative storages	RTE
T2.2.1	*Examine the technical requirements needed for innovative energy storage and AGIs to integrate with grids, on-site renewables and demand and to provide grid services*	
T2.2.2	*Review of connection codes, market codes, grid service descriptions and qualification requirements*	
T2.2.3	*Determine common plant designs and communication standards*	
T2.2.4	*Further focus on specific requirements and needs related to AGISTIN three focus industrial use cases and their locations*	
T2.3	Identify business model opportunities for storage embedded in AGI	RINA
T2.3.1	*Document how current grid connection barriers, customer and grid related tariffs and incentive approaches influence the selection of energy storage technologies at grid user sites*	
T2.3.2	*Assess how grid codes, policies and regulations influence the selection of the integration approaches outlined in D2.1*	
T2.3.3	*Develop improved estimates of the addressable markets in the three targeted use cases by assessing policy and industry statistics.*	
T2.3.4	*Additional extrapolation to other possible areas of application*	
T2.3.5	*Gather input from industry advisors and the demonstration sites' participants to identify feasible models for AGIs*	
T2.3.6	*Analysis of potential business models for the ownership and operation of advanced grid interfaces*	
T2.4	Devise methodology to conduct LCA for energy storage integration via AGI by focus grid users	CTF
T2.4.1	*Analysis of existing standards and well-established frameworks and their relevance and applicability in AGISTIN*	
T2.4.2	*Extract main guidelines and adapt them to the specific storage technologies to be used in AGISTIN*	
T2.4.3	*Provide a common framework to address the most relevant aspects for the analysis, deriving the environmental benefits/burdens of AGISTIN technologies*	

Activity	Description	Lead partner
T2.4.4	*Carry out a robust comparative evaluation of AGISTIN specific technologies with existing solutions.*	
T2.4.5	*Hand over methodology to be tested in the WP5 and WP6 demo activities, for the Life Cycle Assessment (LCA) of storage concept focused on green hydrogen (T5.5) and the Segrià-Sud demo (T6.6), supporting the development of low-footprint solutions for AGI integration.*	
T2.5	Propose guidelines for future requirement for the integration of innovative storage embedded in AGI	RTE
T2.5.1	*Analyse new potential services that the storage (or coupled storage) embedded in AGI can deliver to both the grid and the industrial grid user*	
T2.5.2	*Derive technical and economic specifications that have raised during the project*	
T2.5.3	*Prepare a roadmap to ensure the fast and safe development of the AGI concept at EU level and in the member states represented in the AGISTIN project*	
T2.5.4	*Coordinate with WPs 3, 4, 5 and 6 to collect input*	
T2.5.5	*Prepare recommendations to update the CNC grid codes at international and national level, with the aim to facilitate the AGI concept market uptake*	

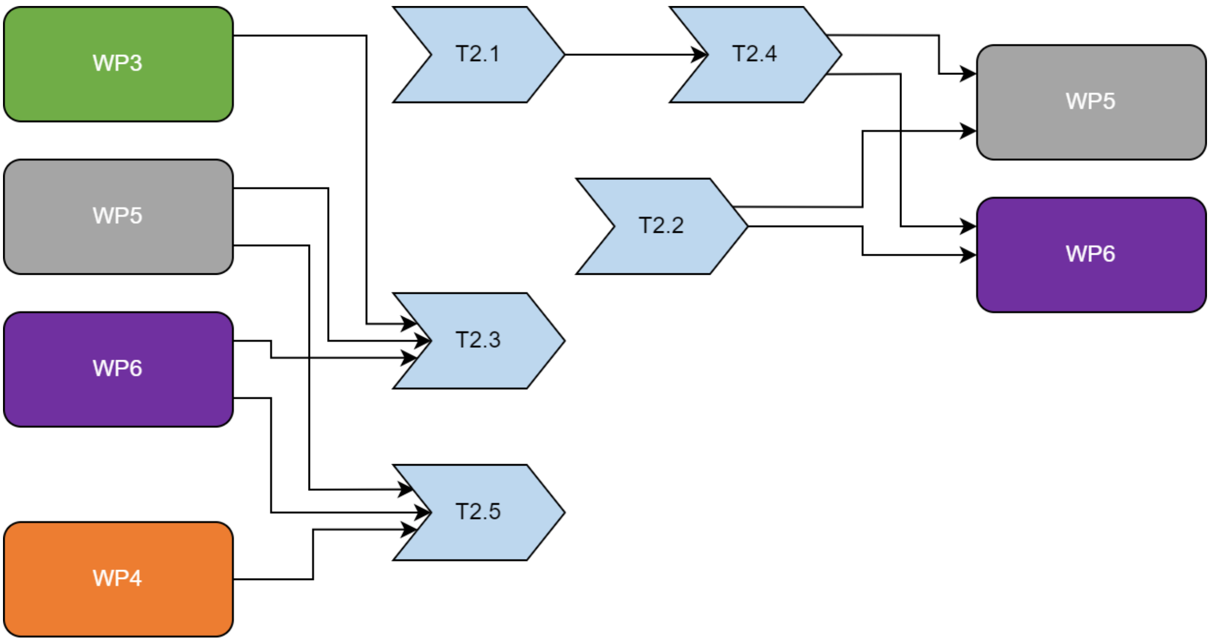

Figure 5 - PERT chart for WP2

3 WP 3 – Enhanced AGI Design for inclusion of innovative forms of storage

WP3 aims at identifying the key trade-offs in AGI design that optimally use synergy between individual loads, generators and innovative forms of storage, understanding their respective characteristics and scalability. Furthermore, it will identify the most promising AGI design options (in terms of grid services, consumer services and cost) together with common templates of pairing innovative forms of storage, inverter controls and end users, including hardware topologies, control strategies and internal/external (ICT) interfaces & requirements for coordination.
WP3 will develop generic open-source simulation models and provide a basis for their customisation, depending on additional requirements and use cases. In parallel, it will develop tools to generate grid connection options and sizing of innovative storage technologies, based on the grid user characteristics and their location in a power system.
Finally, it will develop real-time operation and control tools for the AGI, providing ancillary services to the grid and internal energy balancing, supported by advanced optimisation and control techniques. These tools will also aim at improving AGI performances, focusing on robustness and real-time adaptivity to varying ambient grid, demand, and weather conditions. Furthermore, they will facilitate the development of specific solutions as well as higher level decision making by regulators and investors on placement & integration of storage systems by means of availability of models & benchmark simulations.
Overall, WP3 will broaden the research landscape and improve the cooperation among research projects, by means of developing useful open-source simulation models.

3.1 List of tasks and sub-tasks

The list of tasks in Work Package 3 is reported in Table VI. For each tasks a detailed list of subtasks is described.

The overall WP structure planning is depicted in Figure 6.

Table VI - List of activities in WP3

Activity	Description	Lead partner
T3.1	Verification of potential and alignment with customer and system needs	UniK
T3.1.1	*Study the technical capabilities and needs of different DC connected grid users*	
T3.1.2	*Literature review on the topologies and diffusion of current and likely future co-location of respective grid users*	
T3.1.3	*Prepare and conduct survey of stakeholders to cover possible gaps in the available data.*	
T3.1.4	*Determine most promising types and combinations of loads, generators, storage and grid coupling technologies to be considered by grid users*	
T3.1.5	*Derive technical and economic requirements for grid users to establish criteria for reliability and flexibility and evaluate regulatory requirements across EU countries*	

Activity	Description	Lead partner
T3.1.6	*Define reference use cases, based on network connections and service-related requirements as well as additional business opportunities by provision of optional services*	
T3.2	AGI power and ICT topology for storage integration and external interface definition	UniK
T3.2.1	*Definition of coupling points (e.g., DC/AC-buses) for the individual components based on the SoA in conversion technology and the requirements of the connected components*	
T3.2.2	*Derive sizing rules for the interconnection between the coupling points and power electronic control strategies to combine needs and capabilities of components (loads, generators & storage systems) for the provision of functions at common grid coupling point*	
T3.2.3	*Investigation of requirements on internal communication technology among the units comprising the AGI and definition of minimum requirements for each service*	
T3.2.4	*Definition of interfaces with specific external stakeholders, including the need for ICT connections and commands or parameters to be transmitted*	
T3.2.5	*Identify the minimal upgrades to legacy equipment so that the pool of devices can form an AGI able to provide ancillary services.*	
T3.2.6	*Identify high-level structures of interfaces (to grid, storage, load, generation) appropriate for the inclusion of innovative storage*	
T3.2.7	*Develop tool for AGI topology and storage selection that can be applied to the pertinent use-cases*	
T3.3	Development of generic AGI model templates	UniK
T3.3.1	*Develop generic AGI simulation models on the appropriate time scales and level of detail, based on input from T3.1*	
T3.3.2	*Combine existing models of energy storage, end users, AC/DC and DC/DC converters into AGI templates for a wide variety of topologies to be investigated, along with multiple control options*	
T3.3.3	*Further implementation of AGI models in a range of tools from static to EMT time-scales*	
T3.3.4	*Consolidate models as basic blocks to construct the simulative benchmarking in T3.6*	
T3.3.5	*Hand over simulation models to demonstration work packages, where customisation for the individual applications will be conducted*	
T3.3.6	*Make the generic models publicly available as open-source content*	
T3.4	Modelling of Innovative Storage	FHG
T3.4.1	*Development of models of the most AGISTIN-relevant storage units, primarily the model of the aqueous ECR battery (GSR), the modelling of the irrigation system, as well as other relevant storage types, including further innovative chemical batteries such as Aluminium-ion batteries.*	
T3.4.2	*Identification of technical requirements for the other types of storages, such as critical timescales and the power ramp rates*	
T3.4.3	*Modelling of further solutions (LiOn-based battery system and one supercapacitor) for benchmarking and comparison with GSR's battery*	
T3.4.4	*Development of model of demonstrator for AGI use cases definition*	
T3.4.5	*Further refine modelling of GSR's battery using results of tests*	

Activity	Description	Lead partner
	performed at FHG-IEE's SysTec in T4.3, providing data to parameterise and verify the model of the aqueous ECR battery	
T3.4.6	*Further refine modelling of the irrigation systems with dedicated MATLAB Simulink simulations and integration of current and future hydro system elements to obtain an accurate dynamic representation of the future irrigation canal-based storage system*	
T3.5	Development of Optimisation and Control Methods for Real-Time AGI Operation	ETH
T3.5.1	*Study of the SoA of methods for control and optimisation architecture that have been previously developed for related problems (e.g. dynamic virtual power plants and microgrids) and specialise them to the AGI scenario*	
T3.5.2	*Definition of hierarchical decision-making framework for fast and decentralised control implementations, leveraging on dynamic participation factors for disaggregating AGI specifications and dual port grid-forming control for hybrid dc/ac grids*	
T3.5.3	*Definition of hierarchical decision-making framework for real-time operation and energy management tasks, utilizing optimisation-based approaches such as feedback optimisation, model predictive control, and controllers based on multilinear models*	
T3.5.4	*Development of custom methods for enhancing robustness and real-time adaptivity of the AGI to varying ambient grid conditions as well as internal variable generation and demand*	
T3.5.5	*Define criteria for ranking different approaches in benchmark case studies*	
T3.5.6	*Develop customised optimisation and control tools for real-time operation of the AGI, providing ancillary services to the grid, and internal energy balancing*	
T3.6	Simulative benchmarking of the AGI options	UniK
T3.6.1	*Definition of relevant test cases to evaluate if the AGI effectively meet the needs of both system and customers*	
T3.6.2	*Definition of evaluation criteria for successful passing of these test cases*	
T3.6.3	*Development of operational scenarios to allow comparison of conversion losses and cyclic stress on storage systems*	
T3.6.4	*Implementation of the test cases, as well as scenarios for 'normal operation', in simulation environments for the respective time scales*	
T3.6.5	*Matching of test cases and scenarios with analytical models and tools in order to assure applicability and generality of the results*	
T3.6.6	*Simulation of test cases and evaluation of overall hardware needs and losses (efficiency) during normal (day to day) operation*	
T3.6.7	*Evaluation of the effect of the developed AGISTIN concept on the system stability to quantify its impact on the system strengths*	
T3.6.8	*For each AGI use-case, the amount of system and customer services, necessary hardware, ICT and operational losses will be determined*	
T3.6.9	*Provide input for the evaluation of business cases (T2.3) and their alignment with regulatory challenges (T2.5)*	

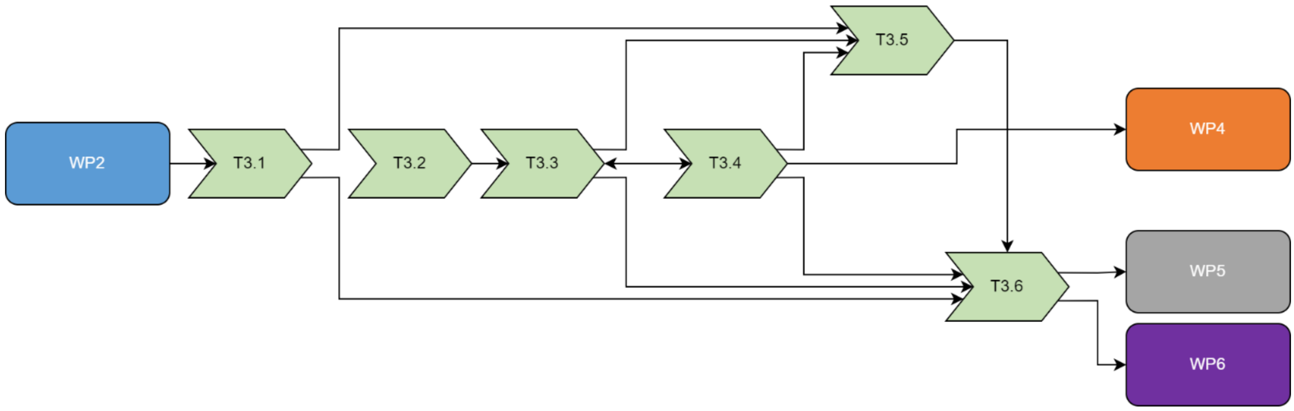

Figure 6 - PERT chart for WP3

4 WP 4 – Performance assessment for AGI-integrated innovative storage for industrial processes

WP4 aims at testing innovative forms of storage, including electrochemical storage technologies, as well as their innovative integration/operation in electrical grid architectures with high share of renewable energies. In particular, WP4 will study and implement innovative aqueous ECR batteries and their applications to V2G and/or Grid Forming Inverter. For achieving this objective, a suitable aqueous ECR battery will be developed and deployed for use in laboratory testing.

Additionally, it will validate individual simulation models of the AGI components in real grid settings and assess optimal their operation in low voltage grids, in grid connected as well as in island mode.

Different scenarios will be analysed and studied, such as solutions for partial disconnection from public grid with the support of fast charging stations or provision of inertia to the grid with bidirectional fast charging stations and/or grid forming inverters (GFIs).

WP4 will demonstrate the AGI controller behaviour in monitoring and controlling power production and consumption for optimal charging services of fast charging stations. It will also develop new control algorithms for advanced control with GFIs, also to increase power quality using GFIs as standalone battery inverter or bidirectional fast charging stations.

Finally, it will validate new grid forming controls or additional controls and ancillary services in the demonstration grid.

A dedicated task will aim at developing and test a tool to determine optimal upgrades to pumping systems to enable energy storage flexibility, considering both electrical and hydro upgrades.

4.1 List of tasks and sub-tasks

The sub-tasks details are listed in Table VII and the overall WP4 structure is described in Figure 7

Table VII - List of activities in WP4

Activity	Description	Lead partner
T4.1	Alignment of test scenarios, use-cases and testing activity	FHG
T4.1.1	*Identify the storage configuration, measurement and test equipment needed to perform the tests*	
T4.1.2	*Elaboration of a concept for the interconnection of the test centre equipment in order to emulate an industrial network for the validation of the AGI storage components*	
T4.1.3	*Selection and preparation of necessary test centre equipment for:* • *realisation of tests on the advanced grid interfaces for Vehicle-to-Grid (V2G);* • *realisation of tests on advanced battery power station;* • *the integration of aqueous ECR battery in the test grid environment;*	

Activity	Description	Lead partner
	• *performing advanced controller tests for integration of alternative energy storage with EV charging.*	
T4.1.4	*Alignment of test scenarios and control concept for validation in the test centre*	
T4.2	Implementation structure for validation of the fast-charging technology of electric vehicles	FHG
T4.2.1	*Preparation of the test centre setup, devices and measurements for the use cases according to the needs*	
T4.2.2	*Preparation of a real-time capable controller systems for plant level controllers*	
T4.2.3	*Development and implementation of a generic controller template (plant level control)*	
T4.2.4	*Development and adaptions of controls for the HiL Systems and the test setup*	
T4.2.5	*Development and enhancement of GFI control algorithms to satisfy the test scenarios in different use-cases*	
T4.2.6	*Realisation of different grid conditions by changing topology and impedances of the grid for controller and system stability to find and test a stable AGI operation*	
T4.2.7	*Implementation of the concept for the interconnection of the test centre equipment for the validation of the EV fast charging station*	
T4.2.8	*Establishing parallel operation of renewable resources with GFI and incorporating different states of battery charge*	
T4.2.9	*Elaboration and determination of time constants in different network topologies and interconnections of EV fast charging stations*	
T4.3	Implementation of AGI-models on prototype inverters	FHG
T4.3.1	*Install a rapid control prototyping inverter for testing AGI functionalities and controls of models developed in the project*	
T4.3.2	*Fast realisation from simulation into practice for validation of the models*	
T4.3.3	*Develop adaptions for the rapid inverter control prototyping solution for the test setup and use-cases*	
T4.3.4	*Develop controls for the AGI components*	
T4.3.5	*Produce two samples of a bidirectional onboard charger (OBC) and develop software for Grid Forming Inverter (GFI) operations including an interface for the AGI*	
T4.3.6	*Perform tests as defined in the use-cases*	
T4.3.7	*Develop a hardware interface and controls for the rapid inverter control prototyping system for partner batteries (e.g. GSR) for tests defined in the use-cases*	
T4.4	Laboratory tests and characterisation of Aqueous ECR batteries	GSR
T4.4.1	*Derive dedicated methods for evaluation of modules performances and deployment of specific measurement equipment*	

Activity	Description	Lead partner
T4.4.2	*Perform accurate characterisation of the battery for deriving suitable control parameters for the GFI*	
	Design and development of a battery module for stationary applications, using typical load profiles for grid applications as reference	
T4.4.3	*Assembly of out of the cellblocks at the GSR Batteries facilities, to be delivered for integration into a testing setup at FHG-IEE facilities.*	
T4.4.4	*Testing performance of series-connected battery modules, including cell block balancing issues, validating parameters for customised battery models*	
T4.4.5	*Determine key figures for the design of suitable battery cabinets for DC or AC grid configurations*	
T4.5	Execution of the tests to validate AGI storage usage in the defined use cases	FHG
T4.5.1	*Acquire results from T4.1, T4.2, T4.3 and T4.4 for preparing and carrying out selected test scenarios*	
T4.5.2	*Perform various sets of validation experiments:* • *Fast charging station with advanced vehicle to grid interface (AGI+) to provide system inertia;* • *Parallel operation of fast charging stations with AGI+ to prove multi master capability;* • *Advanced Battery Power Station Module equipped to high power battery/batteries (from GSR) with AGI+ interface to prove performance of high-power battery;* • *Advanced Battery Power Station Module equipped to high power battery and AGI+ interface to show parallel operation with grid following interfaces e.g., from PV systems;* • *Improvement of local voltage control using the local gird controller in combination with the grid forming inverter(s);* • *Demonstration of black start and island mode capability utilising fast charging station with GFI interface and the V2G capability of battery electric vehicles;* • *Evaluation of characterization of models and parameters of the high-power battery modules (GSR battery).*	
T4.5.3	*Evaluate deviations of tests results from the expected results of the simulations and revise simulation models accordingly, if needed*	
T4.5.4	*Execute multiple simulation and testing loops, until the simulation models sufficiently represent the measurements, to take into account:* • *inaccurately set time constants and gains of the control;* • *inaccurate specification of network parameters, such as impedance;* • *uncompensated influences of the P-HiL hardware;*	

Activity	Description	Lead partner
	• *insufficient battery parameters.*	
T4.6	AGISTIN techno economic design tool for transforming irrigation canals into innovative energy storage systems	UPC
T4.6.1	*Formulation of the optimisation problem and definition of different scenarios (objectives) for optimisation*	
T4.6.2	*Design a sizing optimisation tool to define the key changes to transform the irrigation canal into a flexible energy storage system, considering:* • *AGI converter basic power design;* • *additional short term storage assets sizing;* • *installed PV, pumps enabled as turbines, pumps replaced by reversible pumps/turbines and new turbines;* • *multi-year analysis, including real weather conditions (using historic values).*	
T4.6.3	*Apply the tool to the Segrià-sud irrigation canal, located in Maials area (Spain), using real data from the installation and operating parameters of the hydraulic machines.*	
T4.6.4	*Further evaluate different future possible operating scenarios, in order to obtain different possible system designs* *Consider and execute sensitivity analysis on costs*	
T4.6.5	*Preliminary test of first version of the tool in CDR facilities, combining scaled kW-range testing system with hydro and electrical assets*	
T4.6.6	*Extract parameters for the sizing of the short-term energy storage asset (energy and power sizing) for the optimisation of the energy performance of the system*	
T4.6.7	*Prepare field testing for innovative storage technologies:* • *aqueous ECR storage system (GSR) to be sized and tested in the Segrià-Sud canal* • *Al-ion battery to be tested in the CDR facilities*	

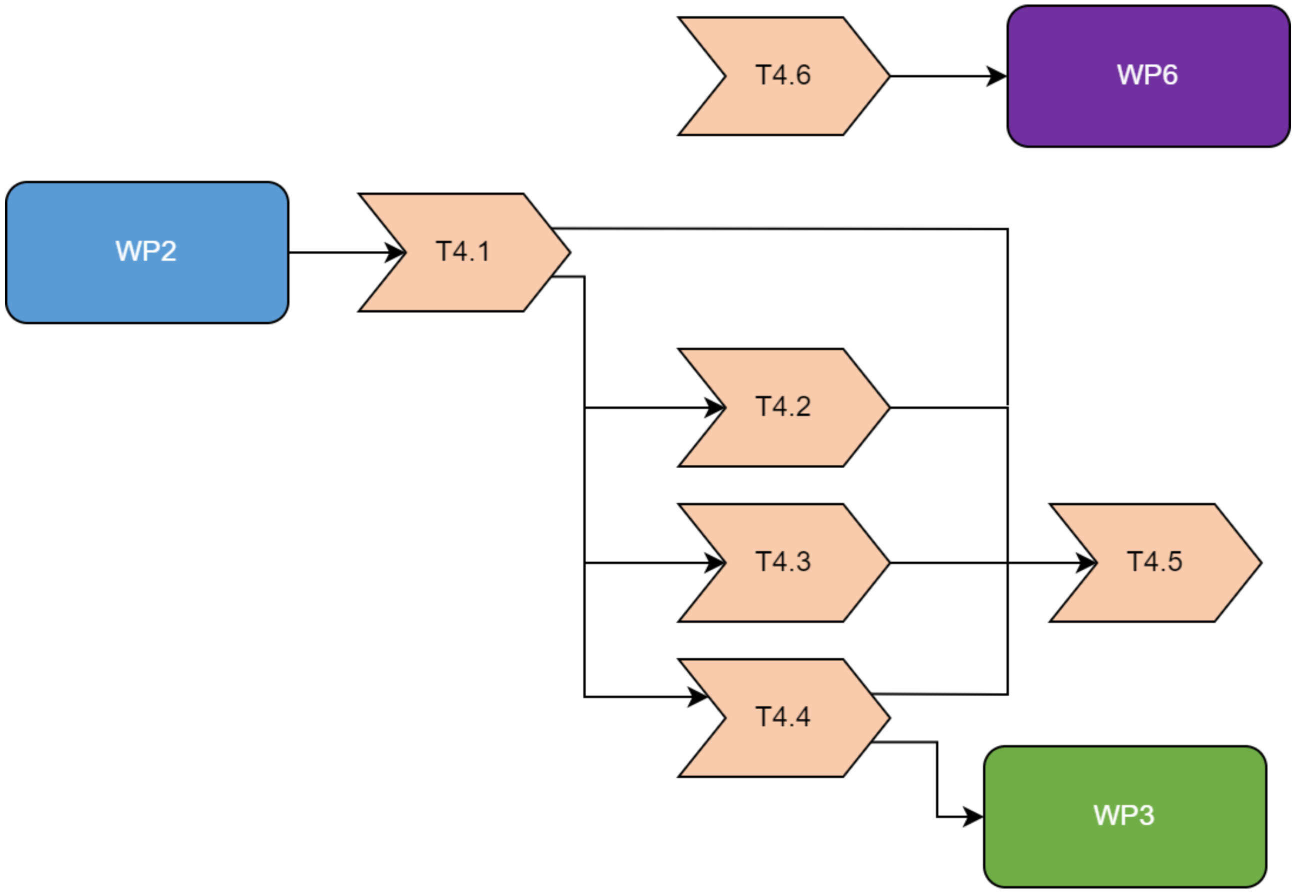

Figure 7 - PERT chart for WP4

5 WP 5 – Demonstration of AGI-integrated innovative storage for green H2 production

WP5 is dedicated to the demonstration of the technologies developed in AGISTIN in a real industrial environment for green Hydrogen production. This demonstration campaign will focus on reducing the grid connection cost by minimising the grid hosting capacity for green hydrogen production and improving the electrical integration of electrolysers by increasing their poor power quality and poor dynamics, which usually deteriorate the local network and limit their integration capabilities.

Moreover, an additional objective of the demonstration is to improve electrolyser's efficiency and lifetime by minimising large transients acting on the electrolyser/stack.

By equipping green H2 production with required grid-supporting functionalities, AGISTIN will enable additional system services instead of constant load operation, which also helps the integration in weak (onshore and offshore) grids.

5.1 List of tasks and subtasks

Work Package 5 is composed of five tasks, listed in Table VIII and the relationship between them as well as with other Work Packages is depicted Figure 8.

Table VIII - List of activities in WP5

Activity	Description	Lead partner
T5.1	Data-verified EMT models replicating SHL's green hydrogen site including storage	FHG
T5.1.1	*Study of flexible operation of battery, including impact of sizing in terms of power and capacity of the battery on the plant dynamics*	
T5.1.2	*Collect results from modelling tasks from WP3 and derive detailed storage model, together with dynamic behaviours of GSR battery investigated in WP4*	
T5.1.3	*Execute sets of of test on a 1 MW alkaline electrolyser for modelling the system and identify the limiting time constants, including the balance of plant (BoP) components*	
T5.1.4	*Extract accurate representation of the electrolyser beyond common simplification and taking into consideration dynamic response of electrolysers*	
T5.1.5	*Identify boundary conditions for overload regarding temperature management and H2 sinks (purification, compression and storage capacity)*	
T5.1.6	*Develop a detailed model, based on the final installation components, such as:* • *PV installation;* • *electrolyser;* • *installed battery.*	
T5.2	Translating models into a real-time simulation platform	FHG
T5.2.1	*Acquire models developed in T5.1 and translate them into the suitable format of the real-time simulator (RTS) of PLECS*	

Activity	Description	Lead partner
T5.2.2	*Identify the fastest transients that must replicated at the grid emulator and determine the required sampling frequency*	
T5.2.3	*Quantify the trade-off between the model complexity and the fast-sampling frequency limited by the computational power of the RT-Boxes in order to accommodate all devices plus the interconnection of the grid present in the demonstration site*	
T5.2.4	*Prepare required models and test scenarios for the campaign at PQ4Wind, including code generation for the RTS system and perform needed model adjustments*	
T5.3	Evaluating AGISTIN storage concept by PHiL testing of SHL's converter at PQ4Wind	FHG
T5.3.1	*Test SHL's converter at PQ4Wind test bench emulating the green H2 production, investigating different set-ups, grid conditions and events*	
T5.3.2	*Coordinate and engage with the SHL's vendor during the commissioning and installing the converter, jointly defining the test scenarios and exact safety measures (maximum current and voltage) of the converter*	
T5.3.3	*Verify the right communication with converter software and basic functionality of the whole set-up using, by performing data management test of the adapted PLECS models and evaluate the results from the test campaign*	
T5.3.4	*Adjust models and controls and evaluate new scenarios, based on successive iterations of the test campaign*	
T5.3.5	*Perform further test of AGISTIN developments, in a relevant MW-scale environment, with different set-ups beyond the field demo*	
T5.4	Testing AGISTIN developments at SHL's industrial green H2 production site	SHL
T5.4.1	*Planning of the measurement campaign (required location of the probes, sampling frequency, accuracy, synchronisation), and the data management between SHL and FHG-IWES*	
T5.4.2	*Demonstrate which rectifier type (thyristor based, IGBT-based) is beneficial with a limited grid connection (e.g. speed of response, handling of harmonic content, reactive power compensation, grid stability)*	
T5.4.3	*Demonstrate the required power grid hosting capability in relation to the installed renewable hydrogen plant block and how battery storage could improve the power grid hosting capability*	
T5.4.4	*Demonstrate the ancillary services that renewable hydrogen plant block w/o battery storage could offer with the support from the advanced power plant control block*	
T5.4.5	*Additional task may arise depending on the results of the test campaign in the field and from Task 5.3*	
T5.4.6	*Finalize the development and consolidate the findings of the AGISTIN concept adapted to field demonstrations*	
T5.5	Technical, economic and sustainability assessment of the AGISTIN storage concept for green H2	CTF
T5.5.1	*Gather results from previous tasks and evaluate the impact of the AGISTIN concept in terms of the technical improvement of the plant, the*	

Activity	Description	Lead partner
	potential reduction of costs, and its impact on the sustainability of the plant.	
T5.5.2	*Comparison between the SHL's topology (AC) and a comparable DC topology to analyse and quantify the benefits and downsides of the different AGISTIN concepts*	
T5.5.3	*Extract and propose recommendations for requirements for AGISTIN certification*	
T5.5.4	*Extract and propose recommendations for requirements for grid connection*	
T5.5.5	*Perform Life Cycle Assessment of the AGISTIN storage concept applied to the green H2 pilot, following the tailored methodology defined in T2.5 to address the environmental dimension, evaluating benefits/burdens and potential trade-offs for all the life-cycle stages of the concept and comparing with Business-as-Usual scenarios*	
T5.5.6	*Assess the impact of the results on green hydrogen production and evaluate the improvement of the integration according to key figures*	

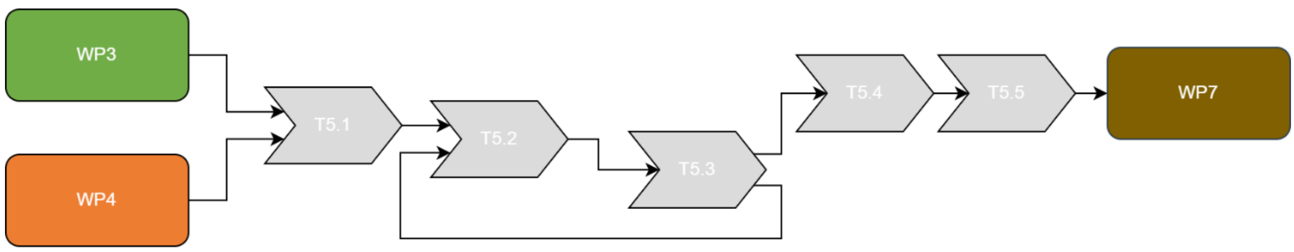

Figure 8 - PERT chart for WP5

6 WP 6 – Demonstration of AGI-integrated innovative storage for large pumping loads

In the WP6 demonstration site, AGISTIN will aim at transforming sectorial large-scale irrigation canal into a flexible innovative hydropower-based storage system and enable innovative services provision both for end-users and network operators from irrigation-based energy storage systems, thanks to the AGISTIN concept;

For this objective, in WP6 we will construct the AGI-based specific hardware, control and operation system for irrigation canal-based energy storage systems and, in parallel, explore the benefits of the AGI applied to different energy storage systems with different time scales (short term: aqueous ECR batteries and Al-ion batteries; long term: multi-reservoir hydro storage system). The demonstration will focus on maximising renewable power usage, considering both PV and potential hydropower generation.

The irrigation canal-based energy storage system will be validated both in a small-scale field-testing system (CDR) and in a real pumping station (Segrià-sud canal), but also set the bases for deployment of the AGISTIN concept in the rest of the Segrià-Sud canal pumping stations and across similar installations across EU.

6.1 List of tasks and sub-tasks

An overview of the work package activities is reported in Table IX and the WP structure is described in Figure 9.

Table IX - List of activities in WP6

Activity	Description	Lead partner
T6.1	AGISTIN real-time operation & control for innovative irrigation canal-based energy storage systems	UPC
T6.1.1	*Design of a real-time operation tool (high-level) to provide set-points to the different devices installed across an irrigation system to optimally operate the innovative energy storage system,*	
T6.1.2	*Gather and port algorithms developed in T3.5 (e.g., feedback optimization or model predictive control) for the operation of the irrigation system, needed for optimal operation planning (rolling horizon), considering current and future system state (including reservoir levels, battery levels, flow rates, weather forecast, flexibility services to be provided, etc.).*	
T6.1.3	*Define criteria for the operation of the irrigation system (e.g., operational cost reduction, irrigation priority, optimal water consumption, maximum stored water, etc.)*	
T6.1.4	*Design of a real-time operation tool (high-level) to provide set-points to the different devices installed across an irrigation system to optimally operate the innovative energy storage system following the previously defined criteria*	
T6.1.5	*Definition of different possible objective functions and corresponding constraints for the planning tool and operation setpoints selection for all system components (AGI, pumps, turbines, batteries, PV, etc.)*	

Activity	Description	Lead partner
T6.1.6	*Definition of the control specifications for the system and its individual devices, including their respective limitations, operation modes and services to be provided, for low level control strategy*	
T6.1.7	*Construction of the complete system model (including reservoirs, hydraulic system, pumps, motors, PV, PV inverters, turbines, AGIs, batteries, etc.) using WP3 inputs (generic models and assets models) to capture the hydro and electrical system dynamics*	
T6.1.8	*Implement, following T3.5 methodology control design procedure, the controls to ensure accurate set-points tracking, operating in different modes and providing the required services, while respecting the system and devices limitations.*	
T6.1.9	*Development of different temporal horizon simulation tools for the AGISTIN operation and control tools validation (based on WP3 models):* • *energy-based (hour to minutes horizon) for operation tool validation;* • *short-term electrical simulation (EMT) for control validation.*	
T6.1.10	*Testing and validation of AGISTIN operation and control tools in time-domain simulation, both in the CDR microgrid system (including pump+turbine system, PV and innovative battery system installed) and the future Segrià-Sud upgraded irrigation-based energy storage system, including the innovative elements defined in T4.6.*	
T6.2	Design and preparation for the demonstration of integrated energy storage, solar and irrigation systems	UPC
T6.2.1	*A specific construction of the AGI system for 'Pumping Station 3' of the Segrià-Sud canal will be conducted (DC-based coupling, following WP3 methodology)*	
T6.2.2	*The specific AGI asset will be constructed at IRDE facilities, considering its essential control features of the individual converters (e.g. modulation, inner controllers).*	
T6.2.3	*The AGI will be mounted in a cabinet format to facilitate its deployment in the field (T.6.5).*	
T6.2.4	*Implementing of AGI functionalities (from WP3) on top of the basic converter controllers and these will be validated at UPC facilities, before the field testing*	
T6.2.5	*Innovative aqueous ECR battery sized and developed (in WP4) to be prepared to be connected to the AGI to enable the AGISTIN concept together with the pumping system and the PV generation*	
T6.2.6	*Prepare the aqueous ECR battery to ensure an adequate AGI integration and later field deployment:* • *strings/modules definition;* • *cabinet sizing;* • *cabinet mechanical requirements;* • *thermal and electrical development;* • *communication development;* • *monitoring of battery management system for cabinets;* • *manufacturing of blocks and assembly of modules to be used in cabinets at GSR Batteries facilities;* • *assembly of the cabinet solution.*	

Activity	Description	Lead partner
T6.2.7	*Definition of the optimal components and systems for the Segrià Sud canal upgrade*	
T6.2.8	*Capture additional system data to ensure accurate system designs*	
T6.3	Testing Al-ion battery & AGI in pumping applications	CDR
T6.3.1	*Revision of the use cases and experiments to be tested in the field;*	
T6.3.2	*Installation and configuration of Al-ion battery for use with the pumping and turbining application*	
T6.3.3	*Initial electrical and physical assessment of the installation of the new elements: AGI system and innovative storage.* *Study of the different elements that will be composing the test system*	
T6.3.4	*Installation of the innovative storage+converter in the field (hut construction) and initial grid connection tests to ensure adequate performance*	
T6.3.5	*Construction of a specific AGI system based on the combination of existing and newly installed converters (storage converter) to interconnect the different assets*	
T6.3.6	*Installation of measuring equipment for AGI control in all the generation/storage systems, taking into account the previous design carried out in WP3*	
T6.3.7	*Conduction of initial AGI commissioning tests will be to ensure its adequate operation, blending the different resources (pumps, turbines, PV, storage (including innovative storage) and loads)*	
T6.3.8	*Testing different AGI operation and use cases to validate its performance in a flexible environment. Assessment of potential problems before deploying the real AGI converters into the field*	
T6.3.9	*Transfer lessons learned to T6.4*	
T6.4	Demonstration of innovative energy storage integrated with irrigation pumping	ICAT
T6.4.1	*Initial electrical and physical assessment of the existing pumping station*	
T6.4.2	*Assessment of the electrical and constructive modifications to integrate the AGI system and the aqueous ECR battery (new elements) into the pumping station electrical system*	
T6.4.3	*Identification of the electrical connection points, decision on the placement (location) of the devices in the facility, new connections requirements, protection systems requirements*	
T6.4.4	*Prepare an action plan on the specific EPC related services to be requested for location installation*	
T6.4.5	*Installation: placement of the devices in the installation and real interconnection of the AGI with the devices (pumps, PV, battery), DC-coupling busbar, connection verification and testing*	
T6.4.6	*Initial testing (device level): initial configuration of the converters on-site, adaptation of the converter optimisation, control developed in T6.1*	
T6.4.7	*AGI-pumping SCADA system configuration (communications) to enable the operation*	
T6.4.8	*Individual testing of the devices to ensure an accurate performance of the AGI:* • *grid-connected PV (via AGI);*	

Activity	Description	Lead partner
	• *AGI-grid-connected battery (via AGI);* • *grid-connected pumping system (via AGI);* • *combined tests with the different devices (PV+battery, PV+pumping, battery+pumping)*	
T6.4.9	*Different operation modes testing:* • *MPPT and curtailment for PV, ramping up/down pumping;* • *ramping up/down storage charge/discharge (with suitable combinations)*	
T6.4.10	*Complete validation tests, performing nominal power tests with the complete AGI system including the different elements involved (pumps, PV, battery). Bidirectional and nominal extreme power cases will be conducted to ensure the adequate performance of the AGI in any condition*	
T6.4.11	*Use-cases validation*	
T6.5	Technical, economic and sustainability assessment of the AGISTIN storage concept for irrigation and pumping applications	RINA
T6.5.1	*Technical evaluation: analysis of the benefits and downsides of the AGISTIN concept applied to the irrigation site in Segrià Sud and CDR demo sites will be conducted considering the innovative modifications of the system*	
T6.5.2	*Economic evaluation: considering, among the others, the outputs produced by T6.2, several running and maintenance costs scenario will be calculated to evaluate the economic impact of the new irrigation canal-based system*	
T6.5.3	*Environmental and Sustainability evaluations: country specific data for the environmental impact of energy, material and other resources used will be evaluated for the sustainability assessment of the new layout*	
T6.5.4	*Life Cycle Assessment (LCA) of the AGISTIN storage concept applied to the Segrià Sud and CDR demo sites*	
T6.5.5	*Provide results of the three assessments to be used for the exploitation and replication analysis in WP7*	
T6.5.6	*Derive specific recommendation for the requirements for AGISTIN certification, installation and grid connection*	

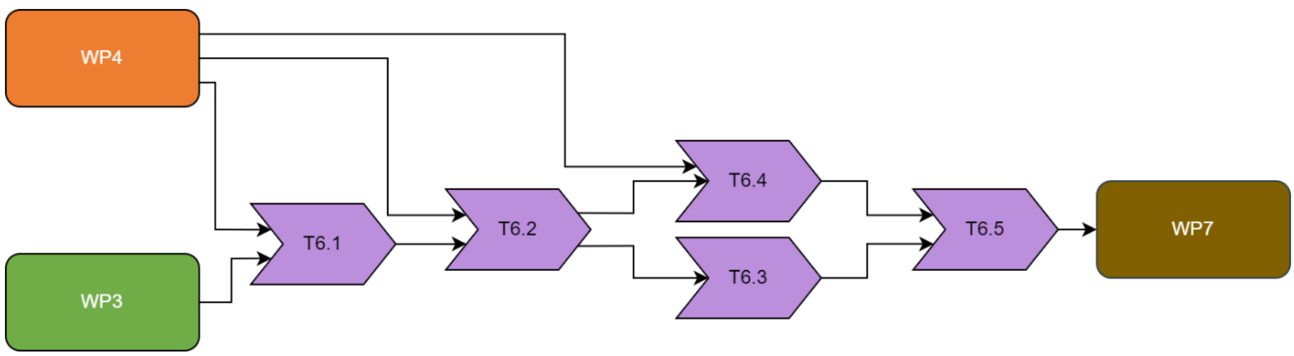

Figure 9 - PERT chart for WP6

7 WP 7 – Dissemination, Communication and Exploitation

- Work Package 7 will promote the dissemination and visibility of the results and findings of AGISTIN to a wide range of stakeholders through presentations at webinars, technical conferences and workshops, as well as through the project website, social media channels and newsletters.
The objective is to maximise the communication of project results and findings through exchanges with stakeholders that can be interested in implementing and utilising the project's findings, such as industry representatives, technology suppliers and regional, national and EU authorities;
WP7 will implement an optimal knowledge management of the project's findings, including appropriate IPR strategies. Additionally it will foster technology transfer and implementation of the project's results and findings to interested stakeholder in view of accelerating their exploitation.
AGISTIN will engage proactively in Communication and Dissemination activities with similar projects and initiatives to create synergies and collaborations between EU-funded programme and other actions. In particular, the project consortium will actively participate into BRIDGE activities and be represented in different BRIDGE working groups.
Finally, AGISTIN will contribute, upon invitation by the CINEA, to common information and dissemination activities to increase the visibility and synergies between Horizon Europe supported actions.

7.1 List of tasks and sub-tasks

Work Package 7 is composed of only two tasks aimed at creating the communication channels to promote the AGISTIN results, to disseminate them through workshops, conferences, and other public events, and to create the basis for their exploitation. Additionally, a task dedicated to the definition and implementation of exploitation plans and the rollout of the relevant business plans is planned, in order to maximise the impact of the project and foster the uptake of AGISTIN results. Table X shows the detailed plan of the activities that will be performed to divulgate the AGISTIN achievements. Figure 10 shows the structure and relationships of WP7.

Table X - List of activities in WP7

Activity	Description	Lead partner
T7.1	Dissemination and Communication Actions	EPRI
T7.1.1	*Develop and provide the necessary material and tools to perform the C&D activities, including:* • *project "corporate" identity with logo, documents and presentations templates* • *video and project website* • *supporting dissemination material including brochure, poster, roll-up and public presentations* • *development and setup of social media tools* • *press releases announcing start of the project and significant milestones*	

Activity	Description	Lead partner
	• *update and maintenance of the project website and social media accounts with regular input from the partners*	
T7.1.2	*Monitor the website visits and social media activities and report on their evolution and results*	
T7.1.3	*Send bi-annual newsletter with news concerning the project, the future events related to the project and information and events from other project of interest for specific field and community*	
T7.1.4	*Participation in and co-organisation of (scientific and industrial) conferences including special workshops, public events, tutorials or industry days where feasible*	
T7.1.5	*Prepare and monitor the correct execution of a detailed Communication and Dissemination Master Plan to maximise the impact of the project results*	
T7.1.6	*Identify crucial key players, possible end users and stakeholders for the project and engage with them with tailored set of messages and events, according to CD&E Plan*	
T7.1.7	*Active participation in BRIDGE activities and Working Groups*	
T7.1.8	*Revise and update the Communication, Dissemination and exploitation plan through the project and prepare a final report on Communication, Dissemination and Exploitation activities*	
T7.2	Exploitation and Business Plan Rollout	EASE
T7.2.1	*Prepare exploitation plans after each innovation cycle (midterm and final exploitation plans)*	
T7.2.2	*Prepare detailed arrangements for IPR, access to partner owned knowledge and exploitation rules*	
T7.2.3	*Manage the exploitation activities, including:* • *Securing of intellectual property developed within the project;* • *Long term R&D strategy beyond the project duration.*	
T7.2.4	*Generation and execution of exploitation plans, first version included under D7.1 and final exploitation roadmap, including Business Plans and IPR report, included in D7.3*	
T7.2.5	*Set up of project Innovation Board, with a dedicated Exploitation Manager and representatives from other industrial partners of the project*	
T7.2.6	*Prepare and publish EU policy-oriented positioning paper including policy recommendations for AGISTIN outcome promotion, targeting energy utilities, institutions, committees etc*	

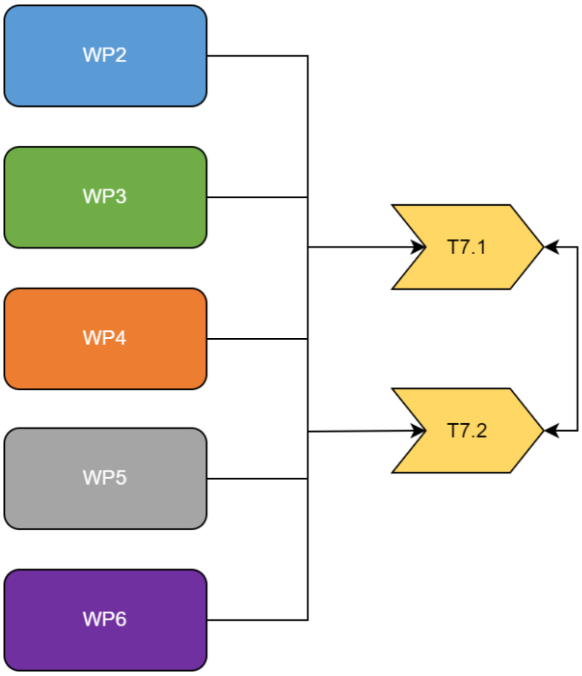

Figure 10 - PERT chart for WP7

LIST OF FIGURES

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