



eneuron

optimising local **energy** communities

Annual progress report (first year)

31/10/2021 (M12)

D1.7: Annual progress report (first year)

WP1 “Coordination and project management”, Task 1.1 “Procedural and quality management”

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¹ PU = Public

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Summary

This deliverable describes the status of the eNeuron project at the end of the first project year, as well as the activities planned for the second project year.

During the first project year, most of scientific and dissemination activities started, with the deliverables and milestones for this period having been accomplished. This progress has been achieved thanks to the active involvement of all eNeuron partners in the project's activities, their close collaboration, and the efficient monitoring and management procedures established by the Consortium. Indeed, the work plan has been structured to allow a logical progression of the needed activities, and has closely followed the objectives and methodology proposed in the Description of Action.

This document first describes eNeuron's overall status by reporting the deliverables and milestones of this first year and the main results from both technical and dissemination & communication perspectives. Progress towards the scientific and dissemination objectives is also discussed in details with reference to individual work packages (WPs).

In addition, the document describes the tasks and activities planned for the second project year, including deliverables and milestones.

Finally, a critical assessment of the project progress is presented, by describing the risks already identified during the first project year and foreseen for the second project year, with corresponding status and corrective actions taken and/or proposed. The progress of each WP and the effective activity of the related WP team with reference to the first project year is also assessed against a series of internal Key Performance Indicators, by taking into account both technical and organizational aspects.



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APPENDIX 1: PROJECT CALENDAR

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1 Introduction

The main goal of the eNeuron project is to develop innovative tools for the optimal design and operation of local energy communities (LECs) integrating distributed energy resources (DER) and multiple energy carriers at different scales. This will be achieved by having in mind all the potential benefits achievable for different stakeholders and by promoting the Energy Hub concept as a conceptual model for controlling and managing multi-carrier and integrated energy systems. This model will allow optimization of their architecture and operation. In order to ensure both the short-term and the long-term sustainability of this new energy paradigm and thus support an effective implementation and deployment, economic and environmental aspects will be taken into account in the optimization tools through a multi-objective approach.

eNeuron's proposed tools enable tangible sustainability and energy security benefits for all the stakeholders in the LEC. Local prosumers (households, commercial and industrial actors) stand to benefit through the reduction of energy costs while leveraging local, low carbon energy. Developers and solution providers will find new opportunities for technologies as part of an integrated, replicable operational business model. Distribution system operators (DSOs) benefit from avoiding grid congestion and deferring network investments. Policy makers benefit from increasingly sustainable and secure energy supply systems.

eNeuron is a high TRL project in line with the Work Programme. It develops innovative approaches and methodologies to optimally planning and operating integrated LECs. This is achieved through the optimal selection and use of multiple energy carriers and by considering both short- and long-run priorities characterized by the economic and environmental sustainability. By optimally coordinating all energy carriers and vectors, the project will provide cost-effective and low-carbon solutions to help deploy this new energy paradigm across Europe.

The project has 8 work packages (WPs), each with a specific and measurable objective, which are described below.

Research objectives:

- **O1. Critical assessment of the current deployment of integrated local multi-vector energy systems (power, storage, heating & cooling (HVAC), transport) and corresponding supporting mechanisms, tools and technologies in Europe (WP2):** eNeuron will identify current barriers and shortcomings to the optimal use of local energy resources within a multi-carrier energy system and will work on the solutions and the recommendations for overcoming them.
- **O2. Identification of the “Integrated Local Energy Community” subject (WP3):** eNeuron will critically assess existing and emerging EU regulatory developments, map the main enabling technologies for LECs and identify the key actors with a potential interest for the implementation of this new energy paradigm.



- **O3. Development of the use cases and new business models for the eNeuron tool (WP3):** In order to meet the needs of the key actors of energy communities, the consortium will identify and develop value propositions and use cases for LECs along with new business models that can be tested through the pilots.
- **O4. Development of multi-objective optimisation framework for an energy hub (WP4):** The design optimisation framework for an energy hub will be developed through a general formulation problem taking into account all different carriers and technologies having multi-objective criteria. This will be the basis of the eNeuron tool.

Innovation objectives:

- **O5. Development of the eNeuron tool (WP4):** The eNeuron tool will be developed through a general and operational architectural model for multi-carrier energy systems that will allow optimal integration of the different energy carriers and vectors in the context of LECs. The tool will have two layers to achieve optimal design and operation as will be analysed in the next.
- **O6. Development of innovative software and hardware devices (WP4):** These devices will allow optimisation based on a hybrid approach of central optimization and a peer to peer energy trading approach under a local integrated spot market following the business models developed.
- **O7. The integrated local spot market (WP4):** eNeuron envisages an integrated local real time market where all carriers are intertwined and that is the means of interfacing Peer-to-Peer (P2P) (decentralised) and central dispatch operation within the LEC.

Demonstration and Replication objectives

- **O8. Validation of the eNeuron technical solutions for the multi-energy hubs in the lab environment (WP5):** Through different laboratories made available in the consortium and by using the common testing methodology developed as part of the H2020 project ERIGrid, the project's innovative technical solutions will be evaluated before roll-out at the pilots.
- **O9. Pre-demonstration testing of the eNeuron tool:** eNeuron tool and devices will be tested and optimised before being delivered in the pilots.

Pilot roll out objectives

- **O10. Test the eNeuron approach in the pilots across Europe (WP6):** eNeuron technical solutions will be implemented and tested into pilots to provide the functionalities required in each context. These should be evaluated under technical and economic terms.

Dissemination, Replication and Exploitation objectives

- **O11: Replication (WP7):** Development of a replication plan for the eNeuron approach leveraging insights from pilots to ensure wide replicability across the EU.
- **O12: Stakeholders' engagement (WP8):** Organisation of stakeholder workshops and other consultation activities to enable LEC stakeholders to appreciate the added value that



eNeuron can provide. Various means to embed the eNeuron tool functionalities in stakeholders' business models and means to increase the project's socio-economic impact.

- **O13. Research communication and outreach to the broader community (WP8):** Set up of effective communication channels and tools addressing wider target groups, including citizens and broader communities of stakeholders to increase awareness about the goals, achievements, benefits and impacts of the project.
- **O14. Dissemination of eNeuron outcomes to R&I community (WP8).** Development of exploitation-oriented dissemination formats, publications in scientific journals and participation in relevant conferences, the BRIDGE initiative and public webinars. In addition, the active use of academic and research organisations such as EERA as multipliers to spread the eNeuron outcomes and encourage their uptake by academia and the stakeholder community (WP8).
- **O15. Enabling exploitation and sustainability (WP8):** Design of an effective roadmap to market for each exploitable result and assessment of a sustainability framework supporting both exploitation and replication strategies.

Beyond these eight WPs, there is a ninth WP, dedicated to the project's ethics requirements.

By the end of the first project year, most eNeuron WPs had started with the related scientific and dissemination activities, with the deliverables and milestones for this period having been accomplished. This progress has been achieved thanks to the active involvement of all eNeuron partners in the project's activities, their close collaboration, and the efficient monitoring and management procedures established by the Consortium. In such a perspective, the work plan has been structured to allow a logical progression of the needed activities, and has closely followed the objectives and methodology proposed in the DoA of the project.

During the first project year, all the planned eleven deliverables were released, and one milestone was achieved. The coordination and management activities, as well as most of technical activities, proceeded on time without any critical issues. As for dissemination and communication activities, the promotional and marketing materials were produced, and the eNeuron website was created. Moreover, eNeuron project was already present at several international scientific events, obtaining a good level of networking activities and dissemination of the results attained during the first project year.

The eNeuron project was also actively involved in all the working groups (WGs) of the BRIDGE initiative, and in the Replicability and Scalability Task Force. The second year will involve continuing those ongoing activities that started in the first year. It will also see new activities. These include the preparation of the periodic reports to be released at the end of the first reporting period (M16), as well as the preparation of the review meeting with the European Commission.

This annual progress report (first year) is designed to be used in conjunction with:

- The Grant Agreement (GA) including its Annexes, and in particular the Annex 1: Description of Action;



- All the deliverables and related Annexes released during the first project year in the period [M1-M12];
- The eNeuron website (<http://eneuron.eu/>), and eNeuron social media platforms (LinkedIn, Twitter) with reference to all aspects related to dissemination and communication activities.

1.1 Purpose and scope of the document

The deliverable D1.7 falls within the scope of WP1 dedicated to the Coordination and Project Management, and describes the progress achieved by the eNeuron project during the first year. The main objectives of this deliverable are described below:

- Describing the overall status of the project at the end of the first year, including the status of deliverables and milestones;
- Describing in detail the progress achieved under individual WPs;
- Describing the progress achieved in BRIDGE activities;
- Describing the activities planned for the second project year, including the deliverables and milestones set out for the next project year;
- Presenting a critical assessment of the project progress with reference to the first year, through the identification of risks for each WP, with related status and mitigation measures;
- Assessing the progress of each WP and the effective activity of the related WP team with reference to the first project year against a series of internal Key Performance Indicators (KPIs), by taking into account both technical and organizational aspects.

1.2 Structure of the document

In the following, the progress of eNeuron project and results achieved during the first year are described in Section 2. The activities planned for the second project year under each WP are discussed in Section 3. Finally, the critical assessment of the project progress with reference to the first project year is presented in Section 4.



2 Progress of eNeuron project and results achieved during the first year

2.1 Overall status of eNeuron project

During the first year of eNeuron project, most of scientific and dissemination activities started, with the deliverables and milestones for this period having been accomplished. These are presented in Figure 1.

During the first year, 11 deliverables have been released as indicated in Table 1.

The milestone MS14 “Launch of the communication and dissemination strategy” was reached on time at M4, and consisted of the first release of the communication and dissemination plan.

As for dissemination and communication aspects, during the first year, the promotional and marketing materials for the project were produced, and the eNeuron website and social media platforms (LinkedIn, and Twitter) were created.

Moreover, eNeuron project was already present at several international scientific events, obtaining a good level of networking activities and dissemination of the results. The events/workshops in which eNeuron participated are listed below:

- **BRIDGE general assembly**, online event, 2-4 March 2021.
- **Italian G20 Presidency at the First Energy Transition Working Group** under the guiding topic of smart, resilient and sustainable cities, online event, 22-23 March 2021;
- **Grid Futurability Matera** organized by the Italian DSO, e-distribuzione, online event, 16 June 2021;
- **Sector integration cluster meeting**, online event, 16 July 2021;
- **9th annual edition of Sustainable Places (SP2021)**, a hybrid event with both virtual and physical sessions in Rome, 29 September-1 October 2021.



The eNeuron Time Plan												
Month	1	2	3	4	5	6	7	8	9	10	11	12
WP1: Coordination and project management												
Task 1.1 Procedural and quality management		D1.1	D1.5			D1.6						D1.7
Task 1.2 Management and reporting on administrative and financial aspects												
WP2: Limitations and shortcomings for optimal use of local resources												
Task 2.1 Preliminary scoping of the study based on the Pan-European decarbonisation targets, regulatory acts and roadmaps						D2.1						
Task 2.2 Status for deployment of integrated local multi-vector energy systems and corresponding enabling technologies and solutions									D2.2			
Task 2.3 Identification of limitations and shortcomings, input to specification of demonstration and test programs.												
WP3: Identification of the "Local Integrated Energy Community" subject and definition of the Use Cases												
Task 3.1 Identification of the "Local Integrated Energy Community" subject through the assessment of the current regulatory framework in Europe												
Task 3.2 Mapping of the emerging technologies and analysis of the key actors in the implementation of energy communities at local level												
Task 3.3 Definition of e-Neuron use cases and new business models.												
WP4: Analysis, design and operation optimization of the local energy systems: emergence of energy hubs												
Task 4.1 Identification and analysis of the multi-objective problem and the innovative approach of Energy Hub												
Task 4.2 General methodology approach for optimal design and operation of an Energy Hub												
Task 4.3 eNeuron tool development												
WP5: Simulation and Lab testing												
Task 5.1 Modelling of flexibility elements and distribution grids												
Task 5.2 Design of scenarios for simulation												
Task 5.3. Simulation of energy hub solutions in selected scenarios												
Task 5.4. Validation of the operation of energy hubs in a lab environment												
WP6: Pilot Roll out and Real world Testing												
WP7: Evaluation of results: Replicability and scalability												
Task 7.1: Cross-comparison of demonstration results, assessment of impacts and extraction of the added value for the European framework												
Task 7.2: End-users engagement and assessment of social impacts												
Task 7.3: Assessment of Scalability and Replicability at European level												
Task 7.4: Roadmap and guidelines for optimising the LECs /energy islands												
WP8: Communication, Dissemination and Exploitation												
Task 8.1 Communication and Dissemination Strategy				MS/D8.1								
Task 8.2 Project identity and communication channels					D8.3	D8.4						
Task 8.3 Public outreach and awareness												
Task 8.4 Dissemination and stakeholders' dialogue												
Task 8.5 Mapping Exploitable results												
Task 8.6 Exploitation Plan												

Figure 1 - eNeuron Gantt chart with reference to the first project year



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Table 1- List of deliverables released during the first project year

Deliverable number	Deliverable title	WP / Lead beneficiary	Type / Dissemination level	Due date (in months)
D1.1	Project management plan (first version)	WP1 / ENEA	Report / CO	M2
D1.5	Project Handbook (DoW)	WP1 / ENEA	Report / PU	M3
D1.6	Data Management Plan (first version)	WP1 / ENEA	ORDP / CO	M6
D1.7	Annual progress report (first year)	WP1 / ENEA	Report / PU	M12
D2.1	Local multi-vector energy systems within the European political and regulatory landscape: scope and key priorities for the study	WP2 / SINTEF	Report / PU	M6
D2.2	Technical solutions for multi carrier integrated systems under the LEC concept: A review	WP2 / UNIVPM	Report / PU	M9
D8.1	Communication and dissemination plan (first version)	WP8 / ICONS	Report / CO	M4
D8.3	Website online	WP8 / ICONS	Websites, patents filling, etc. / PU	M5
D8.4	Presentation video and brochure	WP8 / ICONS	Websites, patents filling, etc. / PU	M6
D9.1	H - Requirement No. 1	WP9 / ENEA	Ethics / CO	M3
D9.2	POPD - Requirement No. 2	WP9 / ENEA	Ethics / CO	M3

The progress achieved under the coordination and management perspective, and towards scientific and dissemination objectives is discussed in detail in the following.



2.2 Progress under the coordination and project management perspective

The coordination and management of eNeuron project is covered by WP1, which aims to ensure a successful completion of the project goals on time, within the limits defined by the budgetary framework, and quality adequate for European standards.

WP1, led by ENEA, consists of two tasks:

- **Task 1.1** Procedural and quality management [M1 – M48];
- **Task 1.2** Management and reporting on administrative and financial aspects [M1 – M48].

All partners are involved in them.

With reference to Task 1.1, the main results achieved during the first year are reported below:

- The first version of the Project Management Plan was provided. In detail, the project organisation, procedures, roles and responsibilities related to the quality control and quality assurance activities carried out in the project were set out. The guidelines for all the project partners were established to ensure quality assurance of project processes and outputs and prevent possible deviations from the project work plan as described in the DoA.
- The eNeuron project handbook (DoW) was drawn up with a detailed description of the work to be done in the project. It aims to promote an effective trans-disciplinary work in the consortium and ensure adequate communication among partners. To guarantee the flexible coordination of eNeuron's activities, the management structure and procedures were also established along with the quality control mechanisms for deliverables.
- The first version of the data management plan was provided. It related to the data to be collected, processed and/or generated by eNeuron project. An analysis of the main elements of the data management policy with regard to the project research data was carried out, and a preliminary list of indicative types of research data that eNeuron project will produce was identified with reference to the technical WPs (WP2 – WP7).

During the first year, three deliverables were submitted on time:

- D1.1 “Project management plan (first version)”, released at M2.
- D1.5 “Project Handbook (DoW)”, released at M3.
- D1.6 “Data management plan (first version)”, released at M6.

Among these, D1.5 is a public deliverable, whereas all the rest are confidential.

Task 1.2 aims to manage the compilation of periodic activity and financial reports according to the Financial Guidelines of the European Commission. The main results achieved in this task are mostly related to the preparation of 6-monthly internal reports provided by all the project partners. In detail, these reports consist of financial (use-of-resources) reports, and aim to monitor the budget



spending for early detection of any issues that might arise from both technical and financial points of view.

WP1 also took in charge of leading and monitoring of the interaction between eNeuron partners and BRIDGE initiative related to the four active working groups which are Consumer and Citizen Engagement, Regulation, Business Models and Data Management and TF Replicability and Scalability that concludes on October 2021.

2.3 Progress towards the scientific objectives

In the following, the overall status of the scientific activities carried out by the eNeuron consortium and the progress achieved under individual technical WPs during the first year are discussed.

2.3.1 Overall status of the scientific activities carried out during the first project year

As shown in the GANTT chart in Figure 1, most of scientific activities started in the first year, and some have been already completed (activities related to Task 2.1 and Task 2.2). The first year's scientific activities progressed on schedule: In full consistence with the actions planned for the first year, the progress of the project concerned the following scientific activities:

- Delivery of a detailed assessment of the most recent regulatory framework status and roadmaps related to the optimal use of local energy resources in Europe (WP2);
- Delivery of a detailed assessment of the current status of local multi-vector energy system deployment, architectures, involved actors and interactions between them, with the identification of the energy conversion and storage systems that grant integration capabilities among different energy carriers and the control/management architectures to coordinate such complex systems (WP2);
- Identification of the main limitations and shortcomings for the local multi-vector energy systems deployment, from the technical, economical and regulatory point of view (WP2);
- Analysis of LECs in European countries with main characteristics, organizational models and key stakeholders (WP3);
- Preliminary analysis of key actors and their interest in the implementation of LECs (WP3);
- Critical state-of-the art of the scientific literature regarding the approaches for optimization of energy hubs with multiple energy carriers (WP4);
- Identification and development of models of energy technologies and grids made available by the consortium to be used in simulations for validation purposes (WP5);
- Identification and collection of time series under a data repository associated with the generation resources, the different types of loads and grids made available by the consortium for simulations (WP5);



- Identification of technical, environmental, economical and social KPIs for the purpose of evaluating the project results (WP7);
- Preparation of questionnaires for the project pilots to define their socio-economic contexts, existing engagement frameworks and top-level social objectives (WP7).

2.3.2 Progress achieved under WP2 “Limitations and shortcomings for optimal use of local resources”

The main objective of WP2 is to scope the study based on the Pan-European decarbonisation targets and consequent regulatory acts, trends and roadmaps, e.g., European Technology & Innovation Platform - Smart Networks for Energy Transition (ETIP-SNET) "Vision 2050". The study further identifies and benchmarks the indicative status for the deployment of integrated local multi-vector energy systems (including batteries and electric vehicles - EVs) and corresponding supporting mechanisms, tools and technologies in the Member States. The next step will identify the present (technical) limitations, shortcomings, and obstacles to innovation, which may prevent the intended transformation of the European energy landscape towards local multi-vector energy systems with a high level of decarbonisation. Potential implications of the identified gaps, limitations and shortcomings will be qualitatively evaluated, and the results will be used as an input to the specification of the pilots

WP2, led by SINTEF, includes three tasks:

- **Task 2.1** Preliminary scoping of the study based on the Pan-European de-carbonisation targets, regulatory acts and roadmaps (**SINTEF**, ENEA, UCY, IREC, TEC, EPRI, UNIVPM, UPM) [M1-M6]
- **Task 2.2** Status for deployment of integrated local multi-vector energy systems and corresponding enabling technologies and solutions (**UNIVPM**, ENEA, UCY, IREC, SINTEF, TEC, DERlab, EPRI, UPM, EDP LABELEEC, CoB) [M1-M9]
- **Task 2.3** Identification of limitations and shortcomings, input to specification of demonstration and test programs (**UPM**, ENEA, UCY, IREC, SINTEF, TEC, DERlab, EPRI, UNIVPM, CoB) [M6-M15]

The main results for the first project year are as following:

Task 2.1: The activity applied qualitative evaluation methods, based on data collected through literature screening of a selected documents from the key European stakeholders. The study was limited to pre-defined "topics of interest" – those which are critically important for the eNeuron project. These represent either some key assumptions made within the project, or/and some attributes, which can be directly and indirectly decisive for the development and later for the implementation of the project outcomes.

The results were presented in the technical report: “D2.1 Local multi-vector energy systems within the European political and regulatory landscape: scope and key priorities for the study.” The



document assesses the project's scope based on the Pan-European decarbonisation targets and consequent regulatory acts, trends and roadmaps. The aim is to ensure that the project outcomes comply with the overall Pan-European political targets.

Task 2.2: The activity focused on the present status of local multi-vector energy system deployment, architectures, the players involved and their interactions. The results are presented in the technical report “D2.2 Technical solutions for multi-carrier integrated systems under the LEC concept: A review”, which provides an overview of technological solutions enabling the eNeuron concept. The document includes a comprehensive review of the connecting technologies, which are the technologies enabling interaction between different energy carriers/networks. Connecting technologies are presented for both micro-energy hub and energy hub level in order to consider the differences in terms of size, efficiency and capital/O&M costs. The document also includes a critical review of the existing planning tools and overview of the four pilots where the eNeuron tools will be tested.

Task 2.3 is currently active. An exhaustive list (33) of different energy generation and storage technologies have been identified and analysed to evaluate the main barriers which may obstruct the deployment of multi-vector local energy systems in Europe. One survey (including the main technical, economic and regulatory limitations) for each of the technologies analysed has been generated. These documents have gone through a double review process involving all partners. The main conclusion of this work, including potential recommendations to overcome the identified limitations and shortcomings will be presented in “D2.3 Limitations and shortcomings for optimal use of local resources” [M15]. Therefore, in summary, during the first year, two deliverables have been submitted on time as specified below:

- “D2.1 Local multi-vector energy systems within the European political and regulatory landscape: scope and key priorities for the study”, released at M6
- “D2.2 Technical solutions for multi-carrier integrated systems under the LEC concept: A review”, released at M9

2.3.3 Progress achieved under WP3 “Identification of the Local Integrated Energy Community subject and definition of the Use Cases”

WP3 aims to identify the "Local Integrated Energy Community" subject by analysing the most recent regulatory developments and policies across Europe and in the countries represented in the consortium. It also involves detailed mapping of the key technologies and players for bringing about this energy paradigm locally. The definition of the eNeuron use cases and business models is also covered by WP3, considering the characteristics of the project pilots.

WP3, led by ENEA, consists of three tasks:



- **Task 3.1** Identification of the “Local Integrated Energy Community” subject through the assessment of the current regulatory framework in Europe [M6-M14]. The partners involved in the task are ENEA, UCY, IEn, IREC, SINTEF, DERLAB, EPRI, UPM.
- **Task 3.2** Mapping of the emerging technologies and analysis of the key actors in the implementation of integrated energy communities at local level [M12-M22]. The partners involved in the task are ENEA, UCY, IEn, IREC, EPRI.
- **Task 3.3** Definition of eNeuron use cases and new business models [M17-M33]. This task sees the involvement of ENEA, UCY, IEn, IREC, SINTEF, DERLAB, EPRI, UNIVPM, UPM, EDP LABELEC, Eneida, Marinha.

Task 3.1, led by SINTEF, analyses the most recent regulatory developments in order to identify the main characteristics of LECs and their expected roles and responsibilities. This will also feed into the creation of business models in Task 3.3. The task 3.1 will also consider how local conditions (e.g. generation mix, existing infrastructure and availability of resources), current policies and practices will influence development of future energy communities in Europe.

The work accomplished so far has been the analysis of existing LECs and their countries, with emphasis on mapping energy communities in eNeuron consortium countries and some others. In total, 89 local energy communities in 11 countries have been reviewed. The country descriptions are available for 10 out of 11 countries;

Task 3.2, led by ENEA, aims to provide a detailed mapping of the emerging technologies (at both household level and community level), which could be part of a Local Integrated Energy Community, and an overview of the key actors and their interests in the implementation of LECs.

The activities under Task3.2 that started during the first year are reported below:

- definition of key actors and their interests at private and system level in the implementation of LECs;
- definition of main attributes of an integrated local energy community.

Task 3.3, led by EPRI, aims to define the eNeuron use cases and business models. It will start at M17, during the second project year.

2.3.4 Progress achieved under WP4 “Analysis, design and operation optimisation of the local energy systems: emergence of energy hubs”

This work package covers the core of the eNeuron project and aims to develop a technical solution that is optimal in both architecture and operation for multi-carrier energy systems employing the energy hub concept. This optimal solution should be developed within the context of business environments and models that are proven to be effective and sustainable.



WP4, led by UCY, consists of three tasks and the following subtasks:

Task 4.1 Identification and analysis of the multi-objective problem and the innovative approach of energy hub [M6-M16] (**UCY**, ENEA, IEn, IREC, SINTEF, TECNALIA, DERlab, EPRI EUROPE DAC, UNIVPM, UPM, EDP LAbELEC, Eneida, CoB)

Task 4.2 General methodology approach for optimal design and operation of an energy hub [M11-M36] (**EPRI**, ENEA, UCY, IEn, IREC, SINTEF, TEC, DERlab, EPRI, UNIVPM, UPM, EDP LAbELEC, ENEIDA, CoB)

Task 4.3 eNeuron tool development [M14-M48] (**SINTEF**, ENEA, UCY, IEn, TEC, DERlab, EPRI, UNIVPM, UPM, EDP LAbELEC, ENEIDA, CoB)

- **Sub-Task 4.3.1:** eNeuron core software [M14-M48]
- **Sub-Task 4.3.2:** eNeuron functionalities toolbox [M20-M48]
- **Sub-Task 4.3.3:** Hardware device development [M14-M33]

As WP4 kicked off on M6, only T4.1 and T4.2 were active during the first project year.

With reference to Task 4.1, the main activities pursued during the first year are reported below:

- An exhaustive list of topics of interest (24) was identified. These relate to research topics to be tackled under the eNeuron activities to serve the project objectives;
- An exhaustive list of documents of interest (117) were collected based on the topics for performing an exhaustive literature review;
- The documents underwent an extensive 2-stage review process where all partners contributed according to their efforts.

With reference to Task 4.2 that has recently kicked off, the following preparatory actions were carried out:

- Brainstorming activities for well defining the needs of the optimization problem to be tackled;
- Brainstorming to identify the interactions with other eNeuron tools/solutions.

2.3.5 Progress achieved under WP5 “Validation of energy hub solutions through simulation and testing in a lab environment”

This work package, led by TECNALIA, comprises the simulation and laboratory validation of the energy hub software functionalities before they are deployed at the pilots. In this phase of the project, it is essential to establish a link between the use cases and business models of eNeuron (from the WP3) and the functionalities designed to enable the optimal design and operation of the local integrated energy communities developed in WP4, when applied to key scenarios. From these key scenarios, a subset will be later tested in real conditions in the pilots within WP6. This WP will



also test the new solutions developed (energy hub solutions) to detect the bottlenecks that may exist prior to testing/implementing them in realistic large-scale scenarios.

WP5 has four tasks:

Task 5.1 Modelling of flexibility elements and distribution grids (**UCY**, ENEA, IREC, TEC, UNIVPM, EDP LABELLEC) (M6-M17)

Task 5.2 Design of scenarios for simulation (**UPM**, ENEA, UCY, TEC, UNIVPM, EDP LABELLEC) (M9-M20)

Task 5.3 Simulation of energy hub solutions in selected scenarios (**UCY**, ENEA, IREC, TEC, DERlab, UNIVPM, UPM) (M20-M43)

Task 5.4 Validation of the operation of energy hubs in a lab environment (**TEC**, IREC, DERlab, UPM, ENEIDA) (M27-M48)

Tasks 5.1 and 5.2 started in year 1 and are described below:

T5.1 Modelling of flexibility elements and distribution grids (M6-M17)

Aims:

- Modelling of energy components including distributed generation units (such as PV facilities), energy storage systems (such as electric vehicles (EVs)), and thermal components (heat pumps, combined heat and power (CHPs), etc.) to be able to design hybrid models of the energy hubs.
- Preliminary state-of-the art review in order to select grid models to test the developments of the project to find a set of grids with a trade-off between size, accuracy and tractability, while also considering which topologies are more suitable for representing LECs that can behave as energy hubs (residential/commercial, urban/rural, etc.).
- Preliminary state-of-the-art review to select grid models. These will test eNeuron's work to reach a trade-off between size, accuracy and tractability. Topologies will also be considered for their suitability in representing LECs able to behave as energy hubs residential/commercial, urban/rural, etc.).

Based on the above, the following activities were carried out:

- **Subtask T5.1.1:** Gathering and selection of distributed generation models/storage to meet the requirements of the energy hubs/local energy communities (PVs, EVs, heat pumps etc.) [M6-M12]
 - Finding and registering the existing models from the partners involved.
 - Gather the information for the existing models and populate the library.
 - Identify what is missing from the existing library of models.



- **Subtask T5.1.2** Preliminary state-of-the-art, development/selection of suitable grid models (residential/commercial, urban/rural, etc.) [M8-M13]
 - The characteristics to be considered for the grid models were defined.
 - Available and reference grid models were gathered from the partners involved and then analysed.
 - A discussion was opened about to consider different grid models or only one enough flexible and modular to cover the different grids considered. This activity remains active in M12.

T5.2. Design of scenarios for simulation [M9-M20]

The objective of T5.2 is the design of selected scenarios for their simulation. These scenarios are characterised by time series associated with the generation sources and the different kinds of loads considered and consistent with the energy components models in the T5.1.

This task was broken down into sub-tasks:

- **Sub-Task 5.2.1** Time series definition [M9-M10]:
 - Definition of time resolution and time horizon, data interests, data formats, etc.
 - Definition of administrative aspects (ownership, DBMS, repositories...).
- **Sub-Task 5.2.2** Time series compilation, processing and homogenization [M11-M15]:
 - Historical and synthetic time series availability gathered by means of specifically design templates.
 - New data creation started and remains active for the next reporting period.
- **Sub-Task 5.2.3** General Scenarios definition [M12-M15]
 - Just kicked off in M12 with the identification of the technologies without existing time series identified and the discussion about the options to create them.

2.3.6 Progress achieved under WP7 “Evaluation of results: Replicability and scalability”

WP7 aims to assess the impacts of the solutions implemented in the demo pilots. It also involves assessment of their potential to be scaled up and replicated.

Additionally, it identifies key factors at play such as barriers to innovation and requirements of other energy islands. It will provide guidance and joint policy action to help increase the share of RES in the LEC energy mix in Europe and to enable large-scale replication of the eNeuron solutions.



At the end it is aimed to present recommendations and general guidelines - extracted from the results of the project and validated through direct consultation with stakeholders – to foster optimising the LECs / energy islands.

The WP, led by DERlab, consists of 4 tasks:

Task 7.1 - Cross-comparison of demonstration results and assessment of technical, regulatory, environmental and economic impacts (M6-M42) (**DERlab**, ENEA, UCY, IEn, IREC, SINTEF, TEC, UNIVPM, ENEA OPERATOR, LEDE, EDP LABELLEC, ENEIDA, CoB).

- **Sub-task 7.1.1** - Technical assessment.
- **Sub-task 7.1.2** - Regulatory assessment.
- **Sub-task 7.1.3** - Environmental assessment - Life Cycle Assessment (LCA).
- **Sub-task 7.1.4** - Economic assessment -Life Cycle Cost (LCC).

Task 7.2 - End-users engagement and assessment of social impacts (M6-M42) (**ICONS**, ENEA, UCY, IEn, SINTEF, TEC, DERlab, UNIVPM, ENEA OPERATOR, LEDE, EDP LABELLEC, ENEIDA, Marinha, CoB).

Task 7.3 - Assessment of scalability and replicability at European level (M12-M48) (**IREC**, ENEA, UCY, IEn, SINTEF, TEC, DERlab, UNIVPM, ENEA OPERATOR, LEDE, EDP LABELLEC, ICONS, ENEIDA, CoB).

Task 7.4 - Roadmap and guidelines for optimising the LECs /energy islands (M18-M48) (**DERlab**, ENEA, UCY, IEn, IREC, SINTEF, TEC, UNIVPM, EDP LABELLEC, ICONS, ENEIDA, CoB).

In the first project year, the first two tasks kicked-off and the following activities were performed.

Partners discussed plans and first steps. This allowed them to produce a template for collecting and identifying KPIs which will enable the project results to be evaluated. These KPIs cover technical, environmental, economic and social aspects. The template is currently being used for this purpose. In addition, the project pilots filled in questionnaires about their socio-economic contexts, existing engagement frameworks and social objectives. At the moment, social engagement methods are being screened.

2.4 Progress towards the communication, dissemination and exploitation objectives

Communication and dissemination is covered by WP8 which aims to raise awareness and engagement with multiple audiences. The overall purpose is to increase stakeholders' acceptance of project results when these become available and to promote uptake and replication of these results.

Exploitation activities also form part of WP8 and aim at identifying the project's exploitable results and to design an ad hoc strategy for their deployment and uptake beyond eNeuron's duration.



WP8 comprises the following tasks that see the involvement of all partners:

Task 8.1 Communication & Dissemination Strategy [M1 - M48]

Task 8.2 Project identity and communication channels [M1 - M48]

Task 8.3 Public outreach and awareness [M1- - M48]

Task 8.4 Dissemination and stakeholder dialogue [M6 - M48]

- **Sub-task 8.4.1** Dissemination formats.
- **Sub-task 8.4.2** Networking and clustering.

Task 8.5 Mapping exploitable results [M6 - M18]

Task 8.6 Exploitation Plan [M12- 48]

With reference to T8.1, here are the first year results.

This task started at M1 and continues until (and beyond) M48. As such it is constantly evolving. The main activities in this first year have been to set out a communication and dissemination strategy and to start applying it. Broad target audiences have been identified and these will be refined in line with the exploitation activities. Deliverable D8.1 (communication & dissemination plan – first version) was submitted in M4 as planned.

With reference to T8.2, here are the first year results.

This task also spans the project's lifetime and started in M1. The project's visual identity was designed with participation from all partners and from this, a set of graphic elements were created – logos, templates for presentations and reporting purposes. Twitter and LinkedIn accounts had been set up by M2. Since then, they have been actively used to disseminate project updates and to relay posts from other sources of interest. A landing page for the project website was set up and online by M2 while awaiting the full version of the website, which went live as planned in M5.

In addition to these channels, a project brochure was produced in M6 along with an introductory video which are both available on the project website. A YouTube channel was also created to accommodate the video and future videos and webinars etc.

With reference to T8.3, here are the first year results.

Since the social media channels have been set up, mini-campaigns have been conducted to highlight project features and the broader background to energy communities. In addition, news items have been issued for the website and social media where partners have attended events. These have been actively relayed by partners via their own networks. This activity will be continued in line with project development.



With reference to T8.4, here are the first year results.

This task blends in with the previous ones but will take on more importance as the project produces results for dissemination. Activities in the first year include active participation in the BRIDGE initiative where project partners are involved in all the four Working Groups and one TF, as will be described later in detail.

With reference to T8.5, here are the first year results.

This task represents the setup of eNeuron exploitation strategy. Within Task 8.5, ICONS, in collaboration with project's partners, will map eNeuron Key Exploitable Results (KERs) and define their IPR strategy to timely address any issue that may hamper future exploitation.

During the first year, three deliverables were submitted on time:

- D8.1 Communication & dissemination plan (M4).
- D8.3 Website online (M5).
- D8.4 Presentation video and brochure (M6).

2.5 Progress achieved in the BRIDGE initiative

The eNeuron project was officially joined the BRIDGE initiative at the General Assembly held on 2-4 March 2021. The project was presented by the Project Coordinator in order to identify the content area matching with the current work in BRIDGE.

eNeuron currently has project partners across all the BRIDGE WGs, namely Consumer and Citizen Engagement, Data Management, Business Models and Regulation. This allows the project to follow all the work carried out in European Commission's initiative and to collaborate towards best standards in Europe. In addition, eNeuron partners have been engaged in the Replicability and Scalability TF of BRIDGE for the last year. This TF will be concluded by end of October 2021.

The progress achieved by eNeuron in BRIDGE during the first project year is briefly discussed below with reference to the various WGs:

- **Consumer and Citizen Engagement:** as part of this WG, eNeuron is involved in the subgroup dedicated to "Organisational and governance models". The main objective of this subgroup is to analyse the energy communities' interactions with their ecosystem with the aim to provide recommendations for better integrating them into the electricity market. eNeuron took part in five meetings in total during the first project year, during which the project participated in the discussion related to the main goals of the WG and the gaps identified during the last years as well as the next steps. In this regard, eNeuron is currently involved in a survey which has the goal to collect data on BRIDGE project engagement strategies and methods in order to provide a broad overview of the type of collective action mechanisms implemented by BRIDGE projects. The main points covered by the survey are listed below:



- general information about the project;
- identifying users of the project;
- identifying a strategic direction for engagement;
- identifying the specific organizational models and regulatory barriers;
- identifying the tools used to engage with consumers.

Furthermore, emphasis was placed on the EC's digitalization strategy. This issue along with the market integration of energy communities will be the topics of a workshop to be organised in November 2021.

- **Data Management:** this WG focuses on all the technical aspects about data management. These include: establishing rules for exchange, along with security issues and responsibility distribution in data handling. The three areas of collaboration in the Data Management WG are:
 - Communication Infrastructure, embracing the technical and non-technical aspects of the communication infrastructure needed to exchange data and the related requirements
 - Cybersecurity and Data Privacy, entailing data integrity, customer privacy and protection
 - Data Handling, including the framework for data exchange and related roles and responsibilities, together with the technical issues supporting the exchange of data in a secure and interoperable manner, and the data analytics techniques for data processing

eNeuron project attended the WG meetings and provide the information for the 2021 survey and answered the questionnaire related to interoperability assets: Feedback on reference framework and generic business processes that will be used as the methodology from architecture perspective.

- **Business Models:** The main objectives of this WG are the following:
 - Defining common language and frameworks around business model description and valuation
 - Identifying and evaluating existing and new or innovative business models from the project demonstrations or use cases
 - The development of a simulation tool allowing for the comparison of the profitability of different business models applicable to smart grids and energy storage solutions is being developed and tested by the WG members

This WG stalled for a while and resuming activities during the summer of 2021. The Core Team has shared with all projects the work plan for the next year (<https://www.h2020-bridge.eu/wp-content/uploads/2021/08/WG-BUSINESS-MODELS-WORK-PLAN-final.pdf>)



In this respect and in view of project objectives, eNeuron partners selected the *Task 1: Value Analysis Methodology definition: the relationship of Use Cases, Business Models, Services, Actors, and value chain segments*, to interact with

Within this topic, the eNeuron partners contribute to the following topics:

- TOPIC 2 Design of tools to evaluate the benefit of the services and solutions (to be addressed in 2022)
- TOPIC 3 Design of business models (BM) to better include data value chain observability (to be addressed in 2022)

For Topic 2, eNeuron will follow the tasks below:

- Task 2: Proposal of quantification method for BM benefits of services and solutions under various UC scenarios using the proposed Value Analysis Methodology
- Task 3: Baseline scenarios definition for quantitative comparison of services and solutions to highlight their benefits and compare it to the cost/benefit of their alternatives (e.g. flexibility services vs. grid reinforcement)

For Topic 3, eNeuron will follow the tasks below

- Task 1: Investigation of the types and characters of the data value chains in BRIDGE projects
- Task 2: Proposal of a methodology to increase the observability of data value chain in a demonstration project

eNeuron representatives will co-lead Task 1.

- **Regulation:** in the past years, the Regulation WG has focused on market design, in particular Products and Services, Coordination Models and Market Integration. In order to continue the work, four tracks have been set out and will focus on several integration/harmonization aspects of market design. During the first project year, eNeuron has been involved in the following tracks/ aspects:

(1) Harmonization at the level of products and services, including the role of energy communities as service provider.

(2) Cross-border and regional cooperation.

(3) Integration of market -based and non-market based flexibility mechanisms.

(4) Coordinated flexibility markets for system services.

These activities have been recently kicked off. There will be calls for inputs collection and the aim is to deliver a "Regulation WG report" by the end of February 2022 and organise a webinar for each track by the end of the year.

- **Replicability and Scalability TF.** This TF aims to develop a solid methodology that will provide quantifiable indexes of scalability and replicability for the R&I projects of the



community. The eNeuron project has been extensively involved in this TF over the last year and co-chaired the TF and achieved the following.

- Solid methodology on replicability and scalability indexing development
- Validation of the methodology
- Linking with the WG on data management
- Linking the methodology with the EIRIE platform
- Develop the final report



3 Activities planned for the second project year

For its second year, eNeuron will focus on the following areas:

- Completion of the analysis regarding limitations and shortcomings of enabling technologies for LECs with provision of recommendations to overcome these shortcomings (WP2);
- Completion of the assessment of the current regulatory framework in Europe regarding energy communities (WP3);
- Mapping of the emerging technologies and analysis of the key actors in the implementation of energy communities at local level (WP3);
- Preparation of use cases and business models (WP3);
- Completion of the state-of-the-art related to the approaches for optimization of energy hubs with multiple energy carriers (WP4);
- Preparation of a general methodology for the optimal design and operation of energy hubs with multiple energy carriers (WP4);
- Activities related to eNeuron tool development (WP4);
- Completion of activities related to modelling of flexibility elements and distribution grids (WP5);
- Completion of definition of scenarios for simulations (WP5);
- Preparation of activities for starting simulations of eNeuron technical solutions (WP5);
- Activities related to the preparations of the four eNeuron pilot and the use cases to be employed within (WP6);
- Cross-comparison of demonstration results, assessment of impacts and extraction of the added value for the European framework (WP7);
- Activities related to the end-users engagement with assessment of social impacts of eNeuron project (WP7);
- Assessment of scalability and replicability of eNeuron tool and related solutions (WP7);
- Dissemination, communication and exploitation activities (WP8).

In addition to the above, periodic reports will be produced for the end of the first reporting period (M16), and the project review meeting will be organised.

The progress towards the deliverables and milestones planned in the second project year, as well as the detailed activities planned under each active WP are described in detail below.

3.1 Progress towards Deliverables and Milestones foreseen in the second project year

During the second project year, 13 deliverables will be released (Table 2) and 3 milestones will be achieved (Table 3).



Table 2 - List of deliverables to be released during the second project year

Deliverable number	Deliverable title	WP / Lead beneficiary	Type / Dissemination level	Due date (in months)
D1.2	Project management plan (second version)	WP1 / ENEA	Report / CO	M15
D1.8	Annual progress report (second year)	WP1 / ENEA	Report / CO	M24
D2.3	Limitations and shortcomings for optimal use of local resources	WP2 / UPM	Report / PU	M15
D3.1	Introduction and development of Local Energy Communities in Europe	WP3 / SINTEF	Report / PU	M14
D3.2	Attributes of an integrated local energy community: mapping of emerging technologies, key actors and driving forces for implementation and adoption	WP3 / ENEA	Report / PU	M22
D4.1	Report on the energy hub concept and the multi objective programming approach of an energy hub	WP4 / UCY	Report / PU	M16
D5.1	Design of scenarios for eNeuron tool simulations	WP5 / UPM	Report / PU	M20
D7.1	The outcome of technical, regulatory, environmental and economic impacts assessment (first version)	WP7 / DERlab	Report / PU	M24
D7.3	The outcome of end-user engagement and social impacts assessment (first version)	WP7 / ICONS	Report / PU	M24
D8.2	Communication and dissemination plan (final version)	WP8 / ICONS	Report / CO	M24
D8.7	Report on C&D activities including impact analysis (first version)	WP8 / ICONS	Report / PU	M22



D8.9	Library of exploitable results	WP8 / ICONS	Report / CO	M18
D8.10	Exploitation plan (first version)	WP8 / ICONS	Report / CO	M24

Table 3 - List of milestones to be reached during the second project year

Milestone number	Milestone title	WP / Lead beneficiary	Means of verifications	Due date (in months)
MS1	The critical analysis of the deployment status of integrated local multi-vector energy systems is complete	WP2 / SINTEF	Completion of the analysis on the deployment status of integrated local multivector energy systems at pan-European level	M15
MS3	Preliminary version of eNeuron tool is ready to be shared with WP5 and WP6	WP4 / SINTEF	The preliminary version of eNeuron tool is developed and ready to be shared with the other relevant WPs.	M24
MS15	Identification of eNeuron exploitable results	WP8 / ICONS	Release of the library of exploitable results	M18

3.2 Activities planned under each individual Work Package

3.2.1 Activities planned under WP1 “Coordination and Project Management”

During the second project year, the coordination and project management activities will continue under WP1, and the related deliverables D1.8 “Annual progress report (second year)” will be produced.

Moreover, WP1 will continue monitoring the interactions between eNeuron partners and the BRIDGE initiative, by promoting the discussion during every monthly Technical Committee meeting.

Beyond these activities, WP1 will focus on the preparation of the periodic reports due at the end of the first reporting period. According to the Grant Agreement (GA) (Article 20.2), the eNeuron project has three reporting periods covering M1-16, M17-M32, M33-M48. The periodic reports related to the first reporting period are due after M16, within 60 days following the end of this period.

These reports will include a technical and a financial report. The periodic technical report will include:



- progress reports per WP / Task;
- a list of publications;
- a list of dissemination and networking activities;
- a deliverable and milestone table;

The contributions of the WPLs will encompass the overall reporting period, covering all the activities carried out in the previous 16 months.

The periodic financial report consists of:

- an individual financial statement;
- use-of-resources;
- a periodic summary financial statement.

To guarantee that the financial periodic reports will be prepared efficiently and submitted on time, a 6-month internal progress reporting will be continued during the second project year.

Moreover, WP1 will also focus on the preparation of the first review meeting (RV1) with the EC, which is scheduled for M19 according with the GA.

3.2.2 Activities planned under WP2 “Limitations and shortcomings for optimal use of local resources”

This WP will accomplish its third and final task – T2.3 Identification of limitations and shortcomings – contributing to the demonstration specifications and test programmes.

This task involves identifying the existing limitations and shortcomings detected by the crossed analysis performed in the preceding T2.1-2.2. Such identification will be performed by each country where restrictions may differ. In this regard, potential recommendations to overcome such limitations will be given. In addition, both will be used as input for the specification of the pilots.

According to the DoA, the results will be presented in the technical report “D2.3 Limitations and shortcomings for optimal use of local resources” (due by M15). In addition to this, the activity will be validated by milestone MS1 “The critical analysis of the deployment status of integrated local multi-vector energy systems is completed” by M15.



3.2.3 Activities planned under WP3 “Identification of the Local Integrated Energy Community subject and definition of the Use Cases”

During the second project year, the activities planned under WP3 will continue for all the three tasks described earlier.

Based on the descriptions of the countries and the different energy communities addressed during the first year, the analysis under Task 3.1 will include the following parts:

- characterization of energy communities;
- consideration of how local conditions, current policies and practices will influence the development of future energy communities in Europe.

According to the DoA, the associated deliverable, D3.1 “Introduction and development of Local Energy Communities in Europe”, will be released at M14.

During the second project year, the analysis under Task 3.2 will include the following parts:

- mapping of the emerging energy and ICT technologies which could be part of a LEC at both household level (micro-energy hub (mEH)) and community level (energy hub (EH));
- analysis of demand-side flexibility technologies;
- identification of the key issues (technological, socio-economic, environmental and regulatory) for implementation and adaptation.

According to the DoA, the associated deliverable, D3.2 “Attributes of an integrated local energy community: mapping of emerging technologies, key actors and driving forces for implementation and adoption”, will be released at M22.

The analysis under Task 3.3 will start at M17. This will be related to the following aspects:

- identification of local energy community customer value propositions by using the enabling technologies identified in T3.2;
- once the value propositions are defined, the analysis related to the construction of use cases and business models will start.

3.2.4 Activities planned under WP4 “Analysis, design and operation optimisation of the local energy systems: emergence of energy hubs”

During the second project year, WP4 will complete T4.1 activities and proceed with developing T4.2.

With reference to Task 4.1, the following activities will be completed:

- The final reviews of the collected documents of interest will be completed;



- The main innovations shall be defined based on the state of the art.

By completing this task on M16, the related deliverable will be submitted:

D4.1 Report on the energy hub concept and the multi-objective programming approach of an energy hub [M16]. This public report will provide an in-depth analysis of the literature surrounding the existing state of the art approaches, and set out a path for how these can be improved and extended to fit the eNeuron approach as identified above.

Task 4.2 will draw extensively on the feedback from T4.1. It will be pivotal in establishing the general optimisation methodology for both levels. The following tasks will be performed:

- Definition of long-term optimisation objective(s) based on preliminary use cases;
- Determination of required inputs from LEC and various energy carriers;
- Development of long-term optimisation problem considering inputs and objectives.

The WP's third task will start in the second year.

Task 4.3 eNeuron tool development (SINTEF, ENEA, UCY, IEn, TEC, DERlab, EPRI, UNIVPM, UPM, EDP LABELEC, ENEIDA, CoB) [M14-M48]

3.2.5 Activities planned under WP5 “Validation of energy hub solutions through simulation and testing in a lab environment”

During the second project year of the project, the following tasks will be active:

- T5.1 Modelling of flexibility elements and distribution grids [M6-M17]
- T5.2. Design of scenarios for simulation [M9-M20]
- T5.3. Simulation of energy hub solutions in selected scenarios [M20-M43]

T5.1 and T5.2 are set to finish in this reporting period and T5.3 will start at M20 for 5 months.

Details of each task are shown below:

T5.1 Modelling of flexibility elements and distribution grids [M6-M17]

- **Subtask T5.1.2** Preliminary state-of-the-art, development/selection of suitable grid models (residential/commercial, urban/rural, etc.) [M8-M13]
 - Development of the technologies being considered in the demos but with no model available among the partners.
 - Analysis and possible selection of the available grid models or, as an alternative, the discussion and decision about to consider and select a unique grid model able to cover the different grids to be simulated and evaluated.



- **Subtask T5.1.3** Combination of the findings from sub-tasks 1 and 2 [M13-M15]
 - Compilation and integration of all the short documents prepared by partners into a single report.
 - Gathering in an ordered and structured way the energy components and grid models provided by the partners.
- **Subtask T5.1.4** Verification of the content of the report from partners [M15-M17]
 - Distribution of the report produced in T5.1.3 to partners for its revision and improvement.

T5.2. Design of scenarios for simulation [M9-M20]

- **Sub-Task 5.2.2.** Time series compilation, processing and homogenization [M11-M15],
 - New data creation from scratch for those time series not available among the partners.
- **Sub-Task 5.2.3.** General Scenarios definition [M12-M15]
 - The creation of a number of representative and diverse scenarios considering the combination of the technologies involved, the addressed sector and the geographic location.
- **Sub-Task 5.2.4.** Use Cases and Business Models Scenarios [M14-M16]
 - Revision of the defined scenarios according to the preliminary use cases and business models defined in T3.3.
- **Sub-Task 5.2.5.** Pilot Scenarios – [M15-M17]
 - Final refinement and gathering of the different scenarios selected, represented by their corresponding descriptive document and time series.
- **Sub-Task 5.2.6.** Verification of the content for the full report and feedback from partners [M18-M19]
- **Sub-Task 5.2.7.** Compilation of D5.1 report [M20]

In this period, deliverable, “D5.1. Design of scenarios for eNeuron tool simulations”, will be produced at the end of the task [M20].

T5.3. Simulation of energy hub solutions in selected scenarios [M20-M43]

The main objective of T5.3, led by UCY, is to verify the eNeuron tool functionalities under modelling and simulation approaches run and analysed for the grids selected in T5.1 and the scenarios of T5.2. This modelling will consider sensitivities and variants to be produced, if necessary, in order to



analyse uncertain variables. The results will be evaluated in order to identify gaps and potential improvements for the eNeuron tool and also, if needed, to serve as an input for the refinement of the algorithms of WP4.

The deliverable “D5.2 Simulation results of eNeuron solutions” is planned for M43 as the main result of this task.

T5.3 has been structured as follows:

- T5.3.1. Integration of eNeuron tool functionalities, models of flexibility elements and distribution grids and scenarios time series in the simulation framework [M20-M30].
- T5.3.2. Simulation and analysis of selected scenarios [M28-M40].
- T5.3.3. Sensitivity analysis to evaluate the response to uncertain variables [M38-M43].
- T5.3.4. Evaluation of results and proposal of refinements for the algorithms of WP4 [M30-M43].
- T5.3.5. Compilation of the D5.2 report [M42-M43].

Sub-task T5.3.1 will be active during M20-M24. Activities are shown below:

- Definition and setup of the simulation framework defined. Initially, **ILOG CPLEX** or **GAMS** (for optimization validation) and **PowerFactory** (for technical validation) have been chosen as the reference tool for the simulation campaigns.
- Preparation (as far as needed) and integration the energy components and grid models selected in the task T5.1, and the scenarios time series agreed in T5.2. into the simulation framework. This activity may remain active after M24 depending on the number and complexity of the scenarios time series selected.
- Launch of programming of the eNeuron tool functionalities in the simulation framework. This activity will remain active beyond M24.

3.2.6 Activities planned under WP6 “Pilot Roll out and Real world Testing”

WP6 will be kicked-off in M13, at the beginning of the second year of the project. The main activities will be related to the preparations of the four eNeuron pilot in order to guarantee a duly start of demonstration phase at the end of the third year and to have a full year of optimisation cycles and lessons learned are captured by the end of the fourth year. The eNeuron pilots consist of:

- Polish pilot: City of Bydgoszcz;
- Norwegian pilot: Skagerak Energy Lab;
- Portuguese pilot: Lisbon naval base;
- Italian pilot: University campus in Ancona.



Each demo will tailor the use cases and business models developed in Task 3.3. The activity will also include the preparations of both software and hardware to be deployed in each demo.

In the second year, four tasks will be active:

- **Task 6.1** Pilot roll out-Poland [M13-M48]
- **Task 6.2** Pilot roll out-Norway [M13-M48]
- **Task 6.3** Pilot roll out-Portugal [M13- M48]
- **Task 6.4** Pilot roll out-Italy [M13-M48]

In the second year, there are no deliverables or milestones scheduled for this WP.

3.2.7 Activities planned under WP7 “Evaluation of results: Replicability and scalability”

During the second project year, the task 7.3 will kick off and the following deliverables will be produced:

- D7.1 The outcome of technical, regulatory, environmental and economic impacts assessment (first version) [M24].
- D7.3 The outcome of end-user engagement and social impacts assessment (first version) [M24].

The most suitable social engagement methods will be identified and implemented. A framework for reviewing the collected KPIs will be prepared and the most feasible and coherent KPIs will be selected. The initial demonstration results will be collected and evaluated, and the outcome will be reported in the deliverables mentioned.

3.2.8 Activities planned under WP8 “Communication, Dissemination and Exploitation”

During the second project year, the communication–dissemination–exploitation WP8 will continue to roll out the C&D strategy. All tasks will be active and four deliverables will be produced:

D8.9 Library of exploitable results [M18].

D8.7 Report on C&D activities including impact analysis (first version) [M22].

D8.10 Exploitation plan (first version) [M24].

D8.2 Communication & Dissemination plan (final version) [M24].

Contrary to most other WPs, the tasks in WP8 are long term in that they run until the end of the project and overlap to some extent.



For project year 2, Task 8.1 will include the following:

Now that the first deliverables in WP2 have been produced and progress made on other WPs, local dissemination teams will be set up. They will be tasked with social media and news campaigns at pilot site level. Key messages will be refined according to stakeholder groups in line with input from the ongoing exploitation tasks.

For M22, a first report on C&D activities will be produced. This will then be used to update the C&D plan (final version D8.2) in M24. This updated version will also draw on the parallel exploitation plan (first version D8.10) and the report on technical, environmental and economic impact assessment to be produced under WP7 as D.7.1.

For project year 2, Task 8.2 will include the following:

The initial part of this task was set up in the first few months of the project. This second year will use printed materials and a roll-up poster for events, more of which are now taking place physically. As indicated for T8.1, local social media campaigns will be conducted with help from partners at the pilot sites. In addition, outreach on the EU level will be stepped up in light of project progress and deliverables across the other WPs.

For project year 2, Task 8.3 will include the following:

News releases and events news will continue to be produced and relayed through the project channels. A particular emphasis will be put on reaching out to local communities where the pilot sites are located (see above). However, all partners will be tasked with providing project updates about their deliverables and WPs.

One or two journalistic articles will be commissioned this coming year, highlighting the issues addressed by eNeuron against the broader backdrop of the energy transition.

For project year 2, Task 8.4 will include the following:

A newsletter will shortly be published and two more are planned for the next year. These will include spotlights on the pilots, interviews with expert partners, highlights of particular project achievements and challenges.

In line with exploitation activities, a database of stakeholders will be set up for use by eNeuron for dissemination purposes. This database will be a merger of existing stakeholder lists. Each partner relays dissemination material to its own stakeholders, even if the material may come from a different part of the project in which the partner is not involved.

According to the deliverables scheduled in other WPs, it may be possible to produce two or three technical publications this coming year.



Activities related to BRIDGE will continue across the four working groups. A specific file has been created to record the work done and also to record the ideas of benefit to eNeuron from the other member projects. This will also be used for clustering purposes.

For project year 2, Tasks 8.5 and 8.6 (exploitation) will continue by mapping KERs with project partners and establishing their exploitation strategies. A particular focus will be given to the eNeuron tool and its sustainability beyond the project. Main activities will be:

- **One-to-one discussions with partners & continuous feedback cycle:** ICONS will schedule one-to-one discussions with all project partners in order to identify and validate exploitable results, agree on their IP and IPR measures, and set out an initial exploitation pathway to be further studied in Task 8.6. As a basis for the discussions, the library of KERs and guidelines will be used.
- **Setup of the library of exploitable results.** Based on the previous step, the eNeuron library of exploitable results will be set up.
- **First exploitation workshop.** While one-to-one calls are useful to define partners' individual exploitation strategies, an internal workshop will guide the discussion on the joint exploitation of some of the key results (e.g. the eNeuron tool). The workshop will cover also IP and IPR issues connected to joint results.
- **Reviews, updates and continuous feedback cycle; Delivery of D8.9 at M18.**
- The setting up of the library of exploitable results should be considered more as a continuous improvement process/discussion, where frequent communications and reviews will be performed between ICONS and eNeuron partners to refine and update the information in the database. In the last step, ICONS will consolidate the library to level out all the results in terms of both format and content and prepare D8.9 at M18.
- **Drill down into the initial exploitation pathways,** via additional interviews and workshops to set out a detail roadmap to exploitation for project results, both at individual and joint level as follows:
 - Individual level: Definition of partners' individual exploitation plans after the project's end to leverage KERs for commercial and non-commercial purposes in their operations, service portfolio, scientific activities, knowledge transfer, etc.
 - Joint level: Creation of a joint plan to ensure the sustainability of the eNeuron tool, by leveraging the appropriate governance and business model.

The delivery of D8.9 "Library of Exploitable results" at M18 will also serve as the means to verify MS15 "Identification of eNeuron exploitable results". The identification of all KERs is a prerequisite to build an effective exploitation strategy for the project. The library will also be key in drafting the first version of the Exploitation Plan (M24).



4 Critical assessment of the project progress

4.1 Risks identified and/or foreseen with related mitigation measures

The risks identified during the first project year and foreseen for the second project year with corresponding corrective actions are presented in the table below.

Table 4: List of risks identified and foreseen with corresponding corrective actions

Risk / associated WP	Status	Corrective actions taken	Corrective actions proposed
Delay in assessment of procedures and methodologies/ WP1	Mitigated so far	During the first project year, monthly technical committee meetings have been organized by the Project Coordinator (PC) and the Technical Project Coordinator (TPC) to monitor the overall status of the project and of individual WPs. Moreover, a 6-month internal progress reporting has been implemented.	The corrective actions taken during the first year will be implemented throughout the entire duration of the project.
Milestones/deliverables deadlines are not met and the time frame for the execution of the project is exceeded/ All WPs	Mitigated so far	Monthly technical committee (TC) meetings have been organised to monitor the overall status of the project and of individual WPs. Moreover, regular meetings have been also organised for individual WPs, to discuss the status of each WP and the next steps to be followed by partners.	The corrective actions taken during the first year will be implemented throughout the entire duration of the project.
Poor quality of deliverables/ All WPs	Mitigated so far	This risk has been mitigated through organising regular meetings dedicated to individual WPs, which allow the status of each WP to be monitored. Furthermore, a	The corrective actions taken during the first year will be implemented throughout the entire duration of the project.



		<p>detailed project management plan has been established at the beginning of the project, to define the procedures, the roles and the responsibilities related to quality control and quality assurance activities that will be carried out during the project.</p>	
<p>Discussion of use cases and business models is required from WP4 and WP5 prior to the official start of Task 3.3/ WP3</p>	<p>Mitigated so far</p>	<p>During the first project year, a coordination meeting was organized by the WP3 leader, the PC and the TPC with the involvement of the Task 3.3 leader to set out a sustainable strategy for deriving initial use cases and business models that will represent the basis for the work to be done at the official start of Task 3.3.</p>	<p>The corrective actions taken during the first year will be implemented until the official start of Task 3.3.</p>
<p>Low/ no availability of demonstration data and results (technical, social, environmental, economic) to be evaluated in the second year of the project / WP7</p>	<p>anticipated risk</p>	<p>Not applicable</p>	<p>Holding regular discussions (e.g. in the TC meeting) with pilots and other WP leaders to monitor the status and identify alternative solutions such as analysing simulation results for the cases that the demonstration results are not available.</p>
<p>Coordination between T5.2 and T3.3. T3.3 is an input for T5.2 (use cases and business models) and starts 4 months prior to T5.2 / WP5</p>	<p>Mitigated so far</p>	<p>T3.3 kicked off earlier for coordinating the relationship with other tasks including T5.2. Considering the derivation of initial use cases and models as the basis to share with these tasks</p>	<p>To keep a close coordination between both tasks while T5.2 is active</p>
<p>Coordination between T5.2 and T4.2. T4.2 could/should be an input and ends after T5.2 end / WP5</p>	<p>Mitigated so far</p>	<p>Possible inputs from T4.2 to T5.2 will be specifically considered, analysed and</p>	<p>To keep a close coordination between both tasks while T5.2 is active</p>



		anticipated during the coexisting 10 months	
SINTEF and Skagerak/Lede, involved in the Norwegian pilot, are not taking part in T5.2 while pilots data are needed / WP5	Mitigated so far	UPM, leader of T5.2 have effectively managed with SINTEF and Skagerak/Lede their kind provision of the required data.	Data is already provided. No additional data would be required in T5.2 for the Norwegian pilot.

4.2 Progress towards internal Key Performance Indicators

The progress of each WP and the effective activity of the related WP team with reference to the first project year are assessed against a number of internal KPIs in the following tables, which take into account both technical and organization aspects.

Table 5: List of KPIs and related status for WP1

Technical KPIs	
Delivery date of deliverables respected	Yes
Achievement of the foreseen Milestones	No milestones to be in during the first year
Due interactions with other WPs	Yes
Keeping of the time planning of the single Tasks	Yes
Identification of risks, proposal of countermeasures and contingency management	Yes
Organizational KPIs	
No. of physical meetings in the period	0
No. of Remote (WebCo) meetings in the period	6
Participants in the meetings	All partners
Availability of the minutes	Yes
Publications by the WP	None

Table 6: List of KPIs and related status for WP2

Technical KPIs	
Delivery date of deliverables respected	Yes
Achievement of the foreseen Milestones	No milestones in first year



Due interactions with other WPs	Yes
Keeping of the time planning of the single Tasks	Yes
Identification of risks, proposal of countermeasures and contingency management	Yes
Organizational KPIs	
No. of physical meetings in the period	0
No. of Remote (WebCo) meetings in the period	21
Participants in the meetings	All partners
Availability of the minutes	Yes
Publications by the WP	None

Table 7: List of KPIs and related status for WP3

Technical KPIs	
Achievement of the foreseen Milestones	No milestones in the first year
Due interactions with other WPs	Yes
Keeping of the time planning of the single Tasks	Yes
Identification of risks, proposal of countermeasures and contingency management	Yes
Organizational KPIs	
No. of physical meetings in the period	0
No. of Remote (WebCo) meetings in the period	17
Participants in the meetings	All partners involved in the active task
Availability of the minutes	Yes
Publications by the WP	None

Table 8: List of KPIs and related status for WP4

Technical KPIs	
Achievement of the foreseen Milestones	No milestones in the first year
Due interactions with other WPs	Yes
Keeping of the time planning of the single Tasks	Yes



Identification of risks, proposal of countermeasures and contingency management	Yes
Organizational KPIs	
No. of physical meetings in the period	0
No. of Remote (WebCo) meetings in the period	7
Participants in the meetings	All partners involved in the active task
Availability of the minutes	Yes
Publications by the WP	None

Table 9: List of KPIs and related status for WP5

Technical KPIs	
Delivery date of deliverables respected	No deliverables for the first year
Achievement of the foreseen Milestones	No milestones in the first year
Due interactions with other WPs	Yes
Keeping of the time planning of the single Tasks	Yes
Identification of risks, proposal of countermeasures and contingency management	No
Organizational KPIs	
No. of physical meetings in the period	0
No. of Remote (WebCo) meetings in the period	7
Participants in the meetings	All partners involved in the WP5
Availability of the minutes	Yes (meetings recording basically)
Publications by the WP	None yet

Table 10: List of KPIs and related status for WP7

Technical KPIs	
Delivery date of deliverables respected	No deliverables for the first year
Achievement of the foreseen Milestones	No milestones in the first year
Due interactions with other WPs	Yes
Keeping of the time planning of the single Tasks	Yes



Identification of risks, proposal of countermeasures and contingency management	Yes
Organizational KPIs	
No. of physical meetings in the period	0
No. of Remote (WebCo) meetings in the period	5
Participants in the meetings	All partners
Availability of the minutes	Yes
Publications by the WP	None

Table 11: List of KPIs and related status for WP8

Technical KPIs	
Delivery date of deliverables respected	Yes
Achievement of the foreseen Milestones	Yes
Due interactions with other WPs	Yes
Keeping of the time planning of the single Tasks	Yes
Identification of risks, proposal of countermeasures and contingency management	Yes
Organizational KPIs	
No. of physical meetings in the period	0
No. of Remote (WebCo) meetings in the period	6
Participants in the meetings	All partners
Availability of the minutes	Yes
Publications by the WP	Various news items



5 Conclusions

Most of eNeuron's scientific and dissemination activities started in the first project year. They have progressed well, with all the 11 year 1-deliverables submitted on time. Coordination, management and technical activities took place without any critical issues. Promotion and marketing materials were produced and the eNeuron website and social media platforms were generated. Moreover, eNeuron project was present at several international scientific events, by reaching a good level of networking activities and dissemination of the results attained during the first project year.

The second project year has 13 deliverables and 3 milestones scheduled. Activities will include the preparation of the periodic reports for the first reporting period (due in M16), as well as the preparation of the review meeting with the European Commission.

Lastly, some risks and mitigation measures have been identified for each WP and KPIs assessed in terms of technical and organisational aspects.



Abbreviations and acronyms

BM	Business Model
C&D	Communication and Dissemination
CHP	Combined Heat and Power
DER	Distributed Energy Resources
DoA	Description of Action
DoW	Description of Work
DSO	Distribution System Operator
EC	European Commission
EERA	European Energy Research Alliance
EH	Energy Hub
ETIP SNET	European Technology & Innovation Platform - Smart Networks for Energy Transition
EU	European Union
EV	Electric Vehicle
GA	Grant Agreement
HCPV	High-Concentration PV Systems
HVAC	Heating, Ventilation & Air Conditioning
ICT	Information and Communication Technologies
IP	Intellectual Property
IPR	Intellectual Property Rights
KER	Key Exploitable Result
KPI	Key Performance Indicator
LEC	Local Energy Community
mEH	Micro Energy Hub
MS	Milestone
O&M	Operation & Maintenance



P2P	Peer-to-Peer
PC	Project Coordinator
R&I	Research and Innovation
TC	Technical Committee
TF	Task Force
TPC	Technical Project Coordinator
WG	Working Group
WP	Work Package



APPENDIX 1: Project calendar

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	43	44	45	46	47	48
	2020-11-01	2020-12-01	2021-01-01	2021-02-01	2021-03-01	2021-04-01	2021-05-01	2021-06-01	2021-07-01	2021-08-01	2021-09-01	2021-10-01	2021-11-01	2021-12-01	2022-01-01	2022-02-01	2022-03-01	2022-04-01	2022-05-01	2021-06-01	2022-07-01	2022-08-01	2022-09-01	2022-10-01	2022-11-01	2022-12-01	2023-01-01	2023-02-01	2023-03-01	2023-04-01	2023-05-01	2023-06-01	2023-07-01	2023-08-01	2023-09-01	2023-10-01	2023-11-01	2023-12-01	2024-01-01	2024-02-01	2024-03-01	2024-04-01	2024-05-01	2024-06-01	2024-07-01	2024-08-01	2024-09-01	2024-10-01



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