D9.1 SYNERGY Living Lab Activities Plan and Evaluation Report (v1)

This project has received funding from the European Union's Horizon 2020 Research and Innovation programme under Grant Agreement No 872734.

Digitising and transforming European industry and services: digital innovation hubs and platforms

Deliverable nº:	**D9.1**
Deliverable name:	**SYNERGY Living Lab Activities Plan and Evaluation Report v1**
Version:	**1.0**
Release date:	**14/05/2020**
Dissemination level:	**Public**
Status:	**Final**
Author:	**GECO**

This project has received funding from the European Union's Horizon 2020
Research and Innovation programme under Grant Agreement No 872734.

Document history:

Version	Date of issue	Content and changes	Edited by
0.1	13/02/2020	Draft ToC	GECO – Paul Tobin / Christophe Dromacque
0.2	09/04/2020	Draft V1	GECO – Paul Tobin / Christophe Dromacque
0.3	28/04/2020	Draft V2	GECO – Paul Tobin / Christophe Dromacque
0.4	08/05/2020	Draft V3	GECO – Paul Tobin / Christophe Dromacque / Bonnie Murphy
1	14/05/2020	Final Version	GECO – Paul Tobin / Christophe Dromacque

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Deliverable beneficiaries:

WP / Task
WP9 / Task 9.1

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Abbreviations and Acronyms

Acronym	Description
TL	Task Leader
ToC	Table of Contents
WP	Work Package
WPL	Work Package Leader
R&D	Research and Development
RES	Renewable Energy Source
LL	Living Labs
PC	Project Coordinator
TC	Technical Coordinator
DP	Demo Partners
DOA	Description of Action
B2B	Business-to-Business
B2C	Business-to-Consumer
KPI	Key Performance Indicators

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Executive summary

SYNERGY will develop a big data analytics platform that will facilitate electricity data value chain stakeholders to enhance their data reach and intelligence in the electricity sector. The platform development and pilot phases will utilise feedback from internal and external electricity data value chain stakeholders to ensure the end-user's perspective is considered in all stages of product development as opposed to only at the exploitation phase. This deliverable will present a LL methodology (Figure 1) that will be implemented throughout the SYNERGY project.

Figure 1. Living labs methodology

The LL methodology allows for the gathering of information on task specifics and goals as well as identifying the relevant stakeholders that need to be engaged to generate the required feedback necessary for each task within work packages. The engagement planning phase is used to determine an appropriate method of engagement that is tailored to generate this feedback in an optimal and efficient manner. Toolkits, guidelines and materials are provided to ensure task leaders can carry out planned engagements effectively and record gathered information and feedback from the engagements. This gathered feedback and information can then be used to evaluate the success of engagements and plan the next steps.

Collectively, the methodology and toolkits provided here will allow for all SYNERGY partners to effectively organise and plan stakeholder engagements to generate the required user feedback which is essential in all phases of the SYNERGY project.

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1 Objectives of the report

1.1 Purpose of the document

This deliverable will define how a LL methodology can be implemented in the context of the SYNERGY project. The individual stages undertaken as part of this methodology will be explained in detail.

Development work done as part of the LL methodology is presented, including details on the stakeholder identification process, such as the various categories and roles of stakeholders. The initial work on identifying tasks and goals related to various work packages, and how it is required for effective engagement planning will also be explained.

This deliverable will also provide information, guidelines and examples related to potential engagement activities that can be conducted as part of stakeholder engagement for both B2B and B2C LL. Furthermore, materials and resources to assist with the planning, delivery and evaluating of engagement activities will also be provided.

1.2 Scope of the document

This document is produced in the initial stages of the SYNERGY and LL process. Therefore, it should not be considered as an all-encompassing document in which every engagement activity is defined for the entire duration of the SYNERGY process. The concrete actions for the LL will be further developed during the project lifetime together with the WPL and demos prior to the need for engagement and subsequent versions of this deliverable will be presented on M12, M24 and M36 of the project.

As well as the high-level framework of the LL methodology, this deliverable will describe the planning and implementation work that is currently underway. The known details of tasks that are used for planning stakeholder engagements will be provided alongside potential activities to be implemented as part of the LL process. The steps taken after engagements have been completed to incorporate feedback into the SYNERGY project and evaluate the LL process will also be explained.

It is important to consider that the LL process is of a dynamic nature and its success is reliant upon constant evaluation and updates, as well as proactive engagement from demo partners, project partners and work package leaders. LL require involving internal and external

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stakeholders during project development to gain feedback to inform the decision-making process or updates in our agenda. Consequently, continual updating and re-strategising need to be at the front of project partner's thinking.

1.3 Structure of the document

Chapter two will provide the motivations for implementing a LL methodology within the context of SYNERGY. It will map this methodology onto the SYNERGY process highlighting how LL can facilitate the feedback loops from both internal and external stakeholders at all phases of the SYNERGY project. It will also define the roles and responsibilities of consortium partners associated with LL.

Chapter three will describe each stage of the LL methodology in detail. This includes details of the process and toolkits used at each stage of this methodology. Specifically, how questionnaires used for stakeholder and task identification form the basis of the preliminary work which in turn advises the planning of engagement activities. The materials and tools used for carrying out engagements. Steps undertaken after engagements have taken place are also explained, including how feedback from stakeholder engagement is dispersed to project partners and how the LL activities are evaluated.

Finally, chapter four will present tables displaying an overview of all current planned tasks and engagements for WPs.

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2 Defining Living Labs in the context of SYNERGY

The European electricity sector is undergoing a significant change through digitalisation and the introduction of smart meters. The expansion of distributed energy resources (DERs) is increasing the number of controllable assets and data, as well as the network's operational complexity. Hence, the amount of controllable assets (and data) is growing exponentially and coordination between all value chain stakeholders will be critical for meeting their requirements and safeguarding their operational and business interests. Today we observe a meshed network of contributors transforming the traditional top-down business model into a more horizontal one based on transversality and interconnection in which every decision is both individual and collective. Efficiency necessitates much automation; machine-to-machine technologies, Artificial Intelligence, Edge and Cloud Analytics to drive automation processes will become more important. Consequently, the need for "end-to-end" coordination between the electricity sector stakeholders, not only in business terms but also in exchanging information is becoming a necessity to enable the realization of the high level objective of increasing electricity networks' stability and resilience, while satisfying individual operational optimisation objectives and business case targets of all stakeholders.

The generation of vast amounts of data brings forward a significant opportunity for all electricity data value chain stakeholders; the big data AI analytics can offer easily digestible intelligence extracted from the advanced processing and analysis of highly diverse, variable and volatile data streams (through ready to use trained algorithms that can be easily utilized in different contexts and business cases) towards enabling the realization of data-driven optimization functions that can pave a ROI-positive path to effectively solving operational and business challenges and highlighting the value of the big distributed data generated at the wealth of end-points of the power system.

Nevertheless, the real value of big data produced along the value chain of the electricity sector is hidden in the sharing of such information between the different stakeholders. Improved accessibility and sharing of data in higher granularity comprise key factors towards optimizing the "end-to-end" management of the electricity networks and introducing innovative energy services to the involved stakeholders. SYNERGY will develop a big data analytics platform which will facilitate electricity data value chain stakeholders to enhance their data reach and intelligence in the electricity sector. Through SYNERGY, electricity value chain stakeholders can leverage primary and secondary data sources such as APIs, historical data, statistics,

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sensor / IoT data, weather data, energy market data and various other open data sources to inform the decision-making process.

The participation of all electricity data value chain stakeholders is critical for the successful exploitation of an effective framework that will facilitate energy system optimization through AI big data analytics, data sharing and innovative energy services and applications. The SYNERGY project will place focus on the end-users and project beneficiaries (which cover the totality of the stakeholders of the electricity data value chain, i.e. DSOs, TSOs, RES operators, Electricity Retailers, Aggregators, Facility Managers, ESCOs, City Authorities, Electricity Consumers/ Prosumers and Local Communities) for technology configuration, innovation, demonstration and communication/exploitation activities. End-user involvement throughout all stages of the project allows for end-user needs to be addressed in the design and development phase, as well as the demonstration and validation phase.

LL can provide a methodology for the user and business driven open innovation and co-creation approach in SYNERGY. The crucial element of LL is considering the user in all phases of R&D and all stages of product development as opposed to only at the end phase (Ballon et al., 2005). In this context the LL process involves addressing critical aspects of product development including the conceptualization of end-user needs, the definition of their requirements, the provision of continuous feedback during the development phase, the evaluation of user experience, including the UI design, ergonomics and user acceptance developed through user co-design, along with the collaborative validation of benefits and added value achieved out of the deployment and demonstration of innovative solutions and services that will reinforce market positioning and accelerate market launch (Schumacher & Feurstein, 2007). Therefore, LL can be used as a methodology in the SYNERGY project to ensure all value chain stakeholders are engaged in the development, pilot and exploitation stages. These continual engagements will allow for feedback incorporation into the design of solutions to maximise their potential impact and reflect real market needs.

2.1 Living Labs Methodology applied to SYNERGY

The SYNERGY implementation model (Figure 2) specifies the working stages in the current project.

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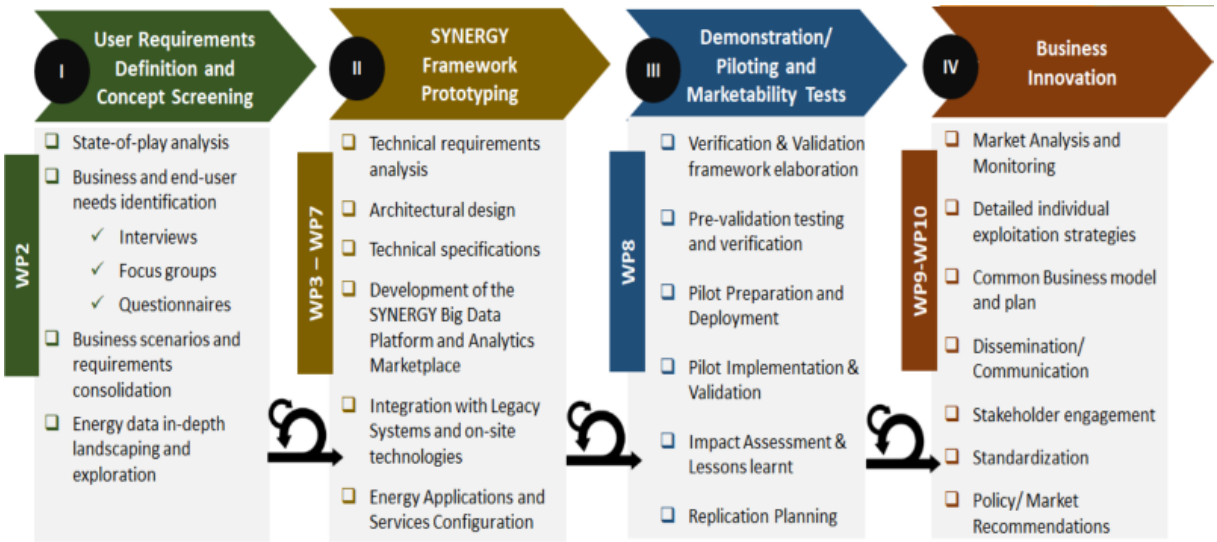

Figure 2. SYNERGY implementation methodology.

- Phase 1: User Requirements Definition and Concept Screening. Screening of the SYNERGY project based on end-user needs and business model requirements. Detailed design of technological components will be undertaken at this first stage alongside the drafting of detailed specifications for fine-tuning the SYNERGY solution. Detailed audits at demo sites to landscape data sources and availability, investigate integration needs of legacy systems and relevant digital technologies, understand operational processes and needs and motivate local demo partners to actively participate and share their experiences throughout the whole project duration.
- Phase 2: SYNERGY Framework Prototyping: Integration of legacy systems and solutions from technology partners into the SYNERGY big-data framework occurs at this stage. Thus, enabling the delivery of a functional prototype which will be demonstrated to elicit user feedback and realise significant impact achievements. Activities for optimising and fine-tuning the SYNERGY framework through demonstration activities also occur at this stage.
- Phase 3: Demonstration/ Piloting and Marketability Tests. In this stage, consortium beta tests are undertaken to obtain unbiased feedback on the operation of the SYNERGY framework. Validation tests will involve a vast number of internal and external stakeholders. Another goal of this phase is the validation of the impact claims regarding the optimisation of energy systems. This step includes demonstration, performance verification, testing and validation towards market replication. As part of

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this step, pre-validation testing activities will be applied to ensure fulfilment of functional and non-functional requirements and specifications, prior to proceeding in the roll-out of the integrated framework in the pilot sites.

- Phase 4: Business Innovation Planning. Planning for the exploitation at the project's end will be prepared for simultaneously to the implementation activities. This plan includes sales and marketing strategies and analysis as well as business and operational plans amongst many other factors which will be described in WP10.

An integral element of all stages in the SYNERGY process is the incorporation of feedback from internal and external stakeholders in the electricity data value chain. Internal stakeholders are defined as experts from the project partner companies who may not be directly involved in the project (e.g. other departments) but who may provide complementary knowledge or viewpoints. External stakeholders are external parties to the consortium. External stakeholders will be essential for providing objective and unbiased feedback to the project developments. The contribution of internal stakeholders is equally important as they provide expertise and initial feedback during interactions which then enables the realisation of focused interactions with external stakeholders. The feedback gained is geared towards developing the big data platform and data sharing mechanisms envisaged in SYNERGY to directly meet and address the needs of stakeholders, including identifying new relevant stakeholders for the platform design, development, validation and exploitation. Figure 3a displays the feedback loops between the various stages of SYNERGY and both internal and external stakeholders. This feedback process will allow for the implementation of the co-creation principles of the LL methodology. Figure 3a also highlights the distinction between the different types of stakeholders, internal and external at both the platform and pilot stages of the SYNERGY process. For example, in the platform design and development phases, stakeholders are expected to be involved with providing feedback related to the Use cases, Requirements, Data, Regulation, Architecture, etc.

To ensure all electricity value chain stakeholders are reached efficiently and feedback is incorporated and shared amongst consortium partners to maximise collaboration, a LL methodology can be added as an extra 'layer' to the SYNERGY process (Figure 3b). Figure 3b displays the steps involved for implementing the LL methodology. This LL methodology can be used to identify tasks and aims of WPL and DPs, identify relevant stakeholders, plan and execute engagement activities and guide the next steps following stakeholder engagement activities.

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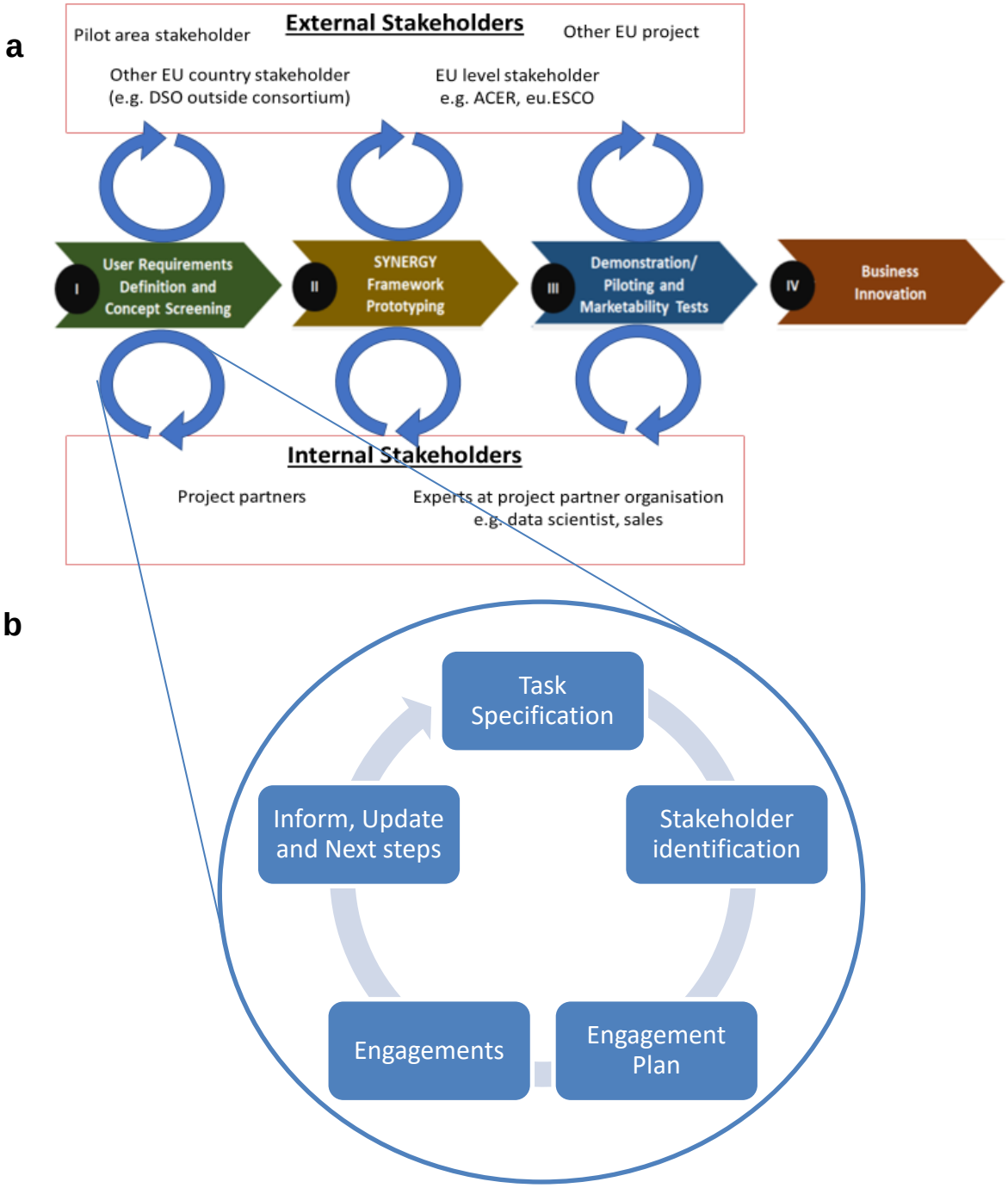

Figure 3. a) feedback loops and stakeholders involved in Synergy. b) Living labs methodology

The LL methodology can be broken down into five stages, these are described in detail in section three. A summary of each stage is provided below.

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- Task specification: Identification of the tasks and aims from WPLs and DPs, including when they intend to carry out activities and how they are linked to individual stakeholders.
- Stakeholder identification: This stage should be used to identify who the relevant internal and external stakeholders are that need to be engaged from both the WPLs and DPs perspective.
- Engagement plan: This stage requires a plan for the method of engagement to be used for both internal and external stakeholder interactions. This stage is also an opportunity to identify the possible collaborations between consortium members across different work packages with common aims or targeted stakeholders.
- Engagements: Organising of engagement activities alongside relevant WP or task leaders or DPs for internal validation or external validation to generate feedback.
- Inform, Update and Next Steps: The feedback/knowledge gained from the engagements needs to be used to update relevant findings. A LL task force (see section 3.5 for more information on the LL task force) will be used to disperse information from LL activities and evaluate the LL engagement activities before the cycle starts again.

2.2 Project partner LL responsibilities

To ensure the successful implementation of LL, consortium partners will need to adopt specific roles and responsibilities which are listed in Table 1.

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Table 1.

Roles and responsibilities as part of LL methodology.

LL Leader	
Role	Provide guidance for the high-level planning of the engagement activities
Responsibilities	• Creating and regularly updating the engagement strategy based on the on-going evolution of the community • Evaluation of LL and engagement activities • Providing guidance on selecting target audience • Providing guidance on communication material development • Supporting with workshop facilitations • Market research methodology design and analysis
WP Leaders	
Role	Primary facilitator of the engagement initiatives at all stages. Information provider on SYNERGY WPs and tasks
Responsibilities	• Inform LL leader about tasks and targeted stakeholders • Being the primary point of contact of stakeholders • Collaborate with GECO to determine appropriate engagement activities • Organizing meeting and events (emails, invitations, arranging meeting space and materials, etc.) • Providing communication content • Facilitating workshops (or arranging for a facilitator) • Recruiting stakeholders
Demo partners	
Role	The primary facilitator of the engagement initiatives at pilot sites and at local level.
Responsibilities	• Being the primary point of contact of local stakeholders • Collaborate with GECO to determine appropriate engagement activities • Organizing meeting and events (emails, invitations, arranging meeting space and materials, etc.) • Providing communication content • Facilitating workshops (or arranging for a facilitator) • Recruiting stakeholders
Project and Technical Coordinator	
Role	Engage with external/ non-local stakeholders that are of importance to the overall project activities
Responsibilities	• Representatives of the project in BRIDGE, BDVA and other initiatives (T9.4) • Organize relevant activities and facilitate such activities

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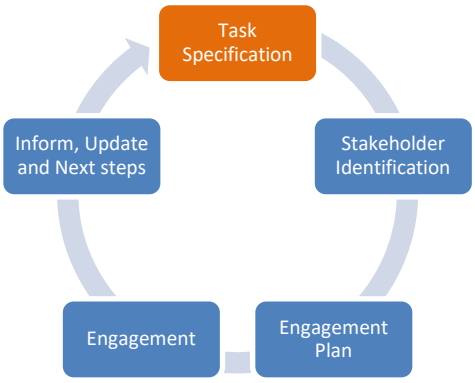
3 Living Labs Methodology

3.1 Tasks specification



To effectively plan how to engage stakeholders, it is essential to establish the tasks and related aims of these tasks within each WP. More specifically, which tasks require the involvement of which type of stakeholder and what is the goal of the engagement. For example, does the task require a discussion on potential data exchanges, data sharing, data validation, data analytics results, new business models, the features of the interfaces, market appetite for the services being tested, the potential drivers and barriers to innovation adoption.

To ascertain information on upcoming LL tasks and the related aims, a task identification questionnaire has been administered to WPLs (Appendix A) and DPs (Appendix B). These questionnaires provide an overview on the tasks and concepts that will need validation from the perspective of both WPLs and DPs. The information from DPs will provide a localised insight that covers aims and goals related to demo sites. WPL can provide expert feedback on tasks connected to their individual work packages. Table 2 displays an example of a response to the task identification questionnaire from task T2.1 in WP2. This example shows how the questionnaire can be used to provide information on not only an identified task, but also how this task can be linked to various aims spanning multiple business areas.

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Table 2.

Activity and aims of task T2.1 in WP2.

Activity to be performed	Aim of stakeholder engagement
WP2 – Task 1. Validation of Use Cases (UCs) and Business Requirements (BRs) deriving from Synergy's Business Scenarios. Specifically, engaged stakeholders to this activity could be presented with the description of the relevant UCs as well as preconditions and postconditions of their implementation in order to provide feedback on a) the availability of necessary data b) willingness and existence of legal framework to share/purchase those data c) feasibility of reported preconditions d) overall necessity and/or feasibility of the UCs and BRs and e) market appetite f) regulatory barriers depending on the type of stakeholder.	Business Area 1: Launching/enhancing flexibility and ancillary markets to enhance D&T Network resilience and Investment deferral (e.g. UC_5_3, UC_5_4*) **UC ID's according to Use cases reporting in Trello*
	Business Area 2: Distribution & Transmission Networks performance assessment, sizing, monitoring of status & health, preventive maintenance scheduling. (e.g. UC_5_1, UC_5_2, UC_5_7, UC_5_8)
	Business Area 3: PV plants performance and health monitoring, O&M, optimized monetization approach (UC_5_5, UC_5_6, UC_5_9).
	Business Area 4: Retailers' and Aggregators' portfolio management and flexibility asset exploitation: advanced analytics, demand forecasting, DSM strategies, alternative (dynamic) billing strategies, VPP configuration, flexibility contracts and settlement (All WP6 related UCs)
	Business Area 5: Building-level energy real-time monitoring and visualization, performance simulation and optimization, predictive maintenance scheduling, energy performance certifications (All WP7 UCs).

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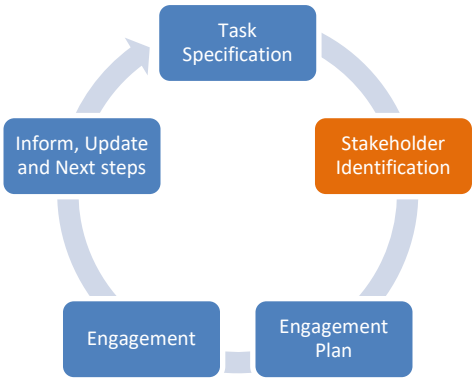
3.2 Stakeholder identification

The second stage of the LL process involves gathering information from both WPLs and DPs on the relevant stakeholders they intend to engage. An integral component of the SYNERGY project is the inclusion of stakeholder feedback in all phases of the design and development process. Therefore, it is essential to consider the stakeholders initially identified in the DOA and then complement and build on these with input from the perspective of WPLs and DPs.



3.2.1 Initial stakeholder identification

The starting point for stakeholder identification is categorising those listed in the DOA as well as those identified as part of the task T2.1 activities related to use cases and business scenarios in WP2. Figure 4 displays the 'vertical' stakeholders who are involved in the energy industry. Figure 5 displays the 'horizontal' stakeholders who are not necessarily related to the energy sector but can have significant input towards the development, piloting and/or exploitation of the SYNERGY solutions.

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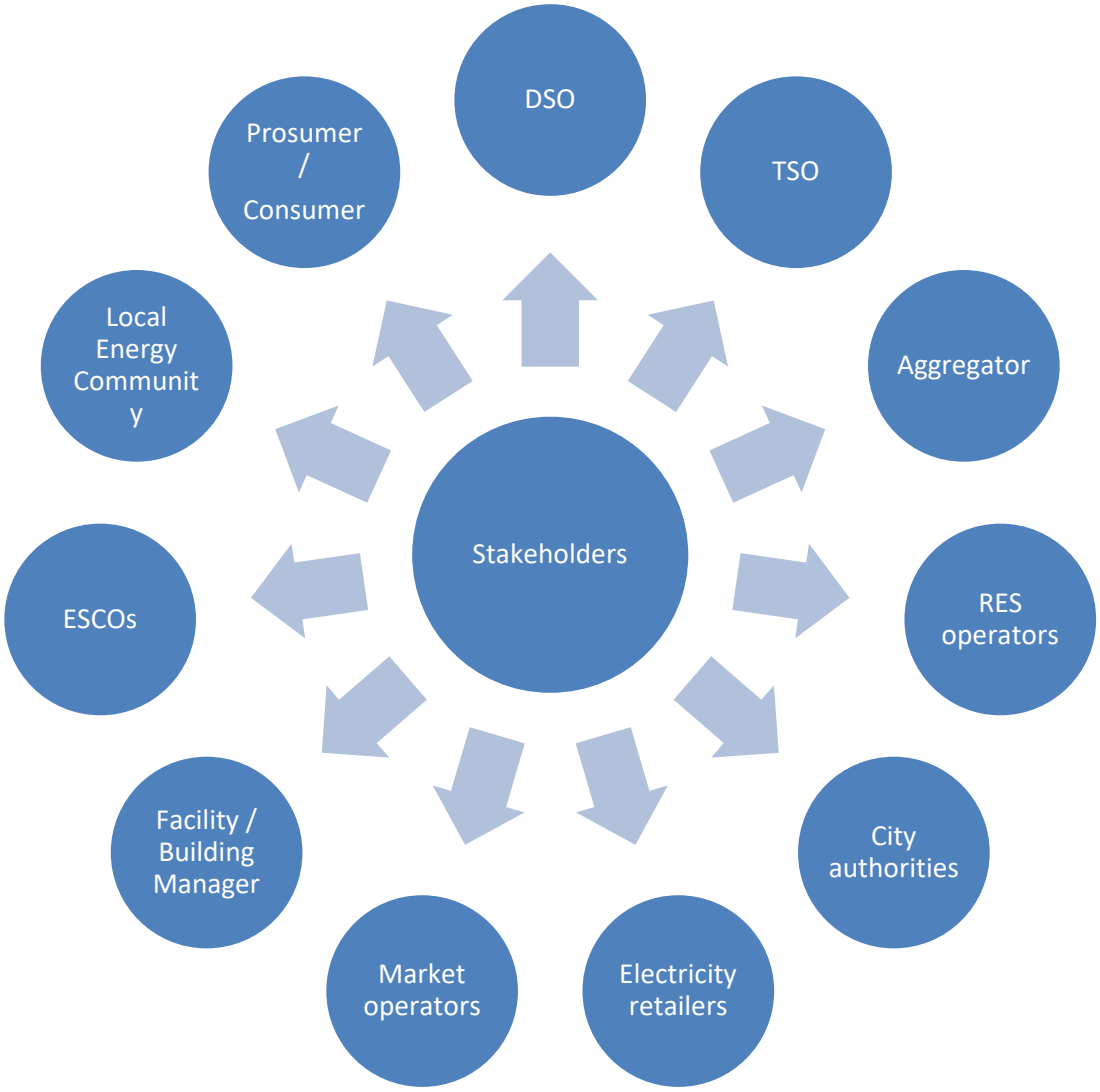

Figure 4. "Vertical" Electricity Data Value Chain Stakeholders (non-exhaustive)

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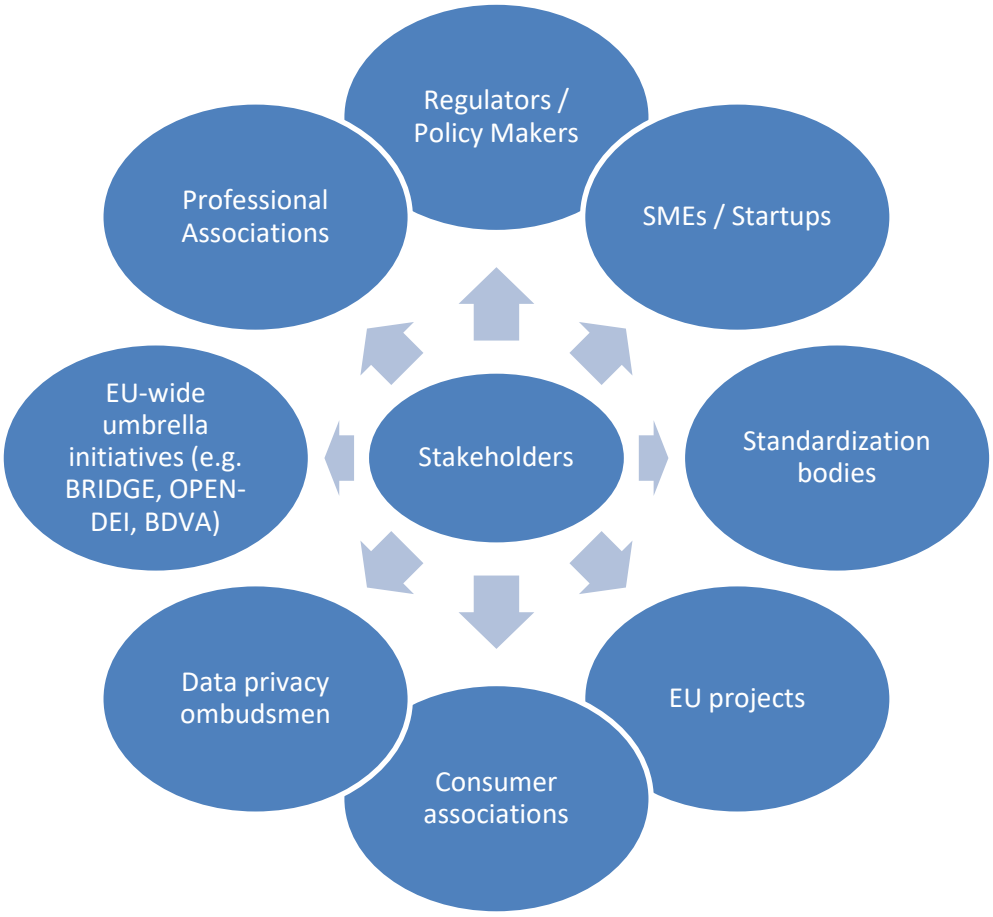

Figure 5. "Horizontal" Electricity Data Value Chain Stakeholders (non-exhaustive)

As well as the different stakeholder categories, various targeted profile functions (Table 3) within stakeholder organisations need to be considered in the SYNERGY project activities. For example, operations personnel will facilitate the definition of business needs, data management professionals will provide important input about their needs in terms of technologies, the restrictions we need to consider when dealing with data collection and data sharing from a technology point of view and the availability and technicalities of data. Data protection officers and legal personnel can reveal potential constraints or conformity considerations with regards to data sharing, data protection and the processing of consumer-related data.

Table 3.

Targeted profile functions within Electricity Data Value Chain Stakeholders organisations (non-exhaustive).

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Targeted Profile Functions
• Operations Personnel • Data Management Personnel (management, interoperability, sharing, protection, security) • Data scientists / analysts • Legal Department / Data Protection Officers • Marketing Department • Business development and strategy department

3.2.2 Stakeholder identification from WPLs and DPs

To ensure that all the relevant stakeholders in the electricity data value chain are identified, questionnaires were sent to both WPLs and DPs. Considering both these perspectives not only ensures no stakeholder is missed, but also provides essential information on the details of stakeholders which are crucial for a successful LL methodology. This includes details on the internal and external stakeholders WPLs consider to be significant for the platform development phase and the local perspective with a view towards local exploitation from the perspective of DPs. Table 4 shows the high-level internal and external definitions of stakeholders within the questionnaire sent to WPLs, and Table 5 shows the definitions sent to DPs.

Table 4.

High-level categorisations of stakeholders sent to WPL.

1) Internal stakeholders	a- Expert from project partner organisation working on the project
	b- Other relevant departments / experts at partner organisations (e.g. sales, CRM, businesspeople, IT people, data scientists, data protection officer, etc.) not directly involved in the project

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2) External stakeholders	a- Partner country stakeholders (contextualising the stakeholder exchanges to your local circumstances and needs are important)
	b- Other EU country stakeholders (e.g. DSO from another EU country not represented in the consortium, etc.)
	c- EU level stakeholders (e.g. umbrella organisations such as ACER, eu.ESCO, Bridge, BDVA)
	d- Other EU-funded projects

Table 5.

High-level categorisations of stakeholders sent to DP.

Internal stakeholders	Project partners
	Other relevant departments / experts at partner organisations (e.g. sales, CRM, businesspeople, IT people, data scientists, etc.)
External stakeholders (for instance but not limited to: DSOs, TSOs, Aggregators, RES Operators, ESCOs and City Authorities, Electricity Retailers, Prosumers (including facility managers, Communities, regulator, policy makers, etc.)	Pilot area stakeholders (contextualising the stakeholder exchanges to your local circumstances and needs are important)
	Pilot national stakeholders
	EU level stakeholders (e.g. ACER, eu.ESCO)
	3rd EU country stakeholders

To ensure the questionnaires produced relevant information on key stakeholders, guidance was provided within the questionnaires to steer DPs and WPLs from high-level categorisations towards a more precise definition of the relevant stakeholders. For example, they were instructed to avoid terms such as 'Customers' as stakeholders and encouraged to explain who the 'Customers' are (e.g. household, office building, solar plant, etc.), or even provide a specific contact within an organisation. The stakeholder questionnaire issued to WPLs can be seen in Appendix A and the questionnaire sent to DPs can be seen in Appendix B. Table 6 displays an example of the stakeholders that were identified as part of task T2.1 in WP2.

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Table 6.

Electricity data value chain stakeholders for task T2.1 in WP2[1].

Electricity data value chain stakeholders
<u>Internal</u> • DSO/Greek DSO/HEDNO/Internal (a): Mr. X (email), Internal (b): Targeted Profiles: Operations, planning, strategy and regulatory personnel • TSO/Greek TSO/IPTO/Internal (a): Mr. X (email)., Internal (b): Targeted Profiles: Operations, planning, strategy and regulatory personnel • Electricity retailer / Greek / EPA / Internal (a): Mr X (email), Targeted Profiles: Operations, Innovation and Business Development personnel • DSO/Spanish DSO/ CUERVA (CUE)/ Targeted Profiles: Operations, planning, strategy and regulatory personnel • Aggregator/Spanish Aggregator/URBENER (URB) Targeted Profiles: Operations, Innovation and Business Development personnel • DSO/Austrian DSO/ ENERGIE GUSSING (GUS)/ Targeted Profiles: Operations, planning, strategy and regulatory personnel • Aggregator/Austrian Aggregator/ EUROPAISCHES ZENTRUM FUR ERNEUERBARE ENERGIE GUSSING GMBH (EEE)/ Targeted Profiles: Operations, Innovation and Business Development personnel
<u>External</u> • Regulators - Policy Makers / European Organizations/ CEER • Professional Associations / European-level Energy Regulatory Agency / ACER • Professional Associations/TSO European association/ENTSO-E/ Targeted Profiles: Strategy and regulatory personnel

[1] Names and email addresses were removed from this public deliverable

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- Professional Associations/DSO European association/E.DSO/ Targeted Profiles: Strategy and regulatory personnel
- Professional Associations/DSO European association Eurelectric (DSO-Entity)/ Targeted Profiles: Strategy and regulatory personnel

3.2.3 Stakeholder Mapping

A follow-up questionnaire (Appendix C) which builds on the stakeholder identifications by determining each stakeholder's level of influence and interest on the project has also been created. Analysing stakeholders across these two variables was originally proposed by Mendelow (1991) and is a well-established technique used for stakeholder mapping within projects (Ginige, Amaratunga & Haigh, 2018). This questionnaire is based on a Likert scale design in which stakeholders are rated on a scale of 1-5 with regards to the degree to which they can 1) influence the factors related to the pilot and 2) are interested in participating in the pilot. More precisely, interest is to what extent the stakeholder is motivated to participate. For example, who may be affected by the project or the services developed. Influence refers to what extent the stakeholder is able to direct or control factors related to the platform development, pilot demonstrations or the services developed in the pilot if taken to the market phase. For example, who oversees assigning or procuring of resources or facilities at the pilot participant organisations? Who has the expertise which is crucial to the project?

From these scores, stakeholders can then be mapped into a matrix to determine the appropriate level and type of engagement. Figure 6 describes the four stakeholder categories that determine the type of engagement required for each stakeholder; inform, consult, involve and collaborate. This mapping process is important for proposing more tailored engagement strategies via the LL activities.

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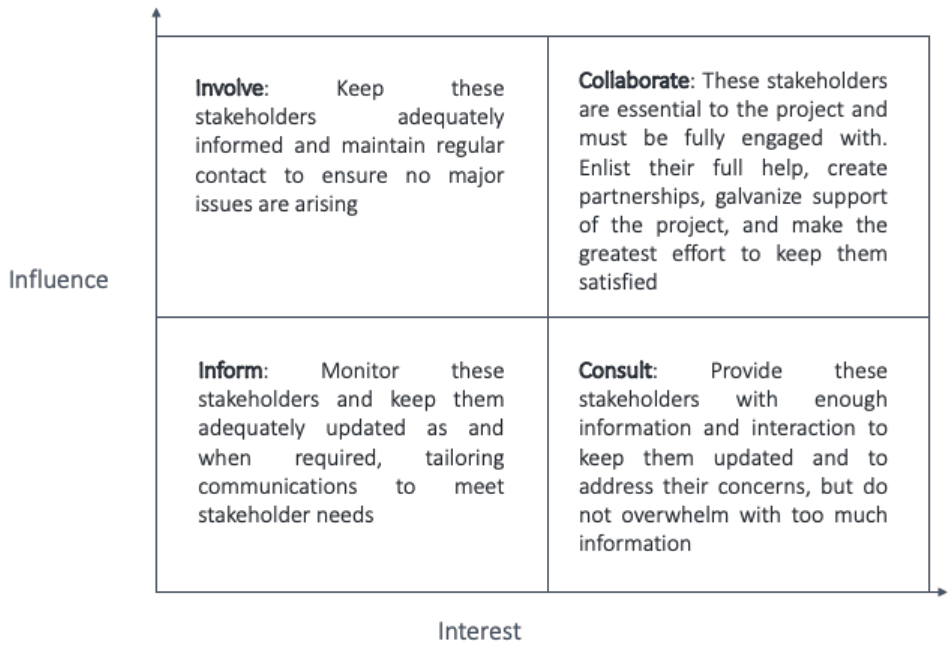

Figure 6. Mendelow (1991) stakeholder mapping matrix.

3.2.4 Stakeholder Re-evaluation

It is important that stakeholders are continually evaluated as the SYNERGY project progresses. Stakeholders identified as important at the start of the project may become less influential as work and activities progress, and vice versa. Considering Mendelow's (1991) interest x influence analysis, evolving roles will result in stakeholders moving along either axes depending on the feedback gained from engagement activities. The dynamic nature of stakeholder roles will relate to all phases of the SYNERGY project, from the design and development phase to the pilot and exploitation phases. Furthermore, continuous feedback and developing technologies will reveal new stakeholders, beyond what can be predicted at the onset of SYNERGY, who are crucial to realising project goals. As SYNERGY progresses with the requirement definitions and concept screening there will likely be further stakeholders that will need to be engaged in the project activities to facilitate demo activities, provide feedback on technology solutions or consult with to address barriers and constraints.

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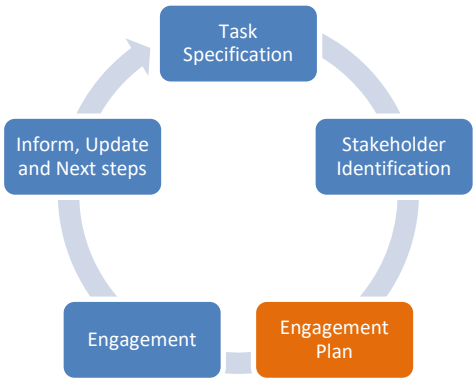
3.3 Living Labs: Engagement Plan

Ensuring all relevant stakeholders are engaged efficiently requires an appropriate engagement plan. This plan not only allows for the scheduling of engagement activities, it also enhances collaboration opportunities between WPLs across the SYNERGY project. Furthermore, efficient planning also optimises the initial approach towards stakeholders which can assist with securing a long-term relationship with the external stakeholder.



The primary source of information for the planning of engagement is gathered from the task and stakeholder identification questionnaires (Appendices A and B) which include details on what a planned engagement is supposed to achieve, when it is expected to occur, with whom, and also which other work packages or tasks are affected (see Table 7).

Table 7.

Table showing the engagement dates and related WPs to a specific task.

Activity to be performed and Aim of stakeholder engagement		Impact to the project	Timeline
WP2 – Task 1.	Business Area 1:	WP2 – Task 4, WP3-5 WP8 WP10	**Internals**: M5 (1st iteration), end of M14 (2nd iteration) **Externals**: end of M6 (1st iteration), end of M16 (2nd iteration)

From the information above, a planned engagement chart (illustrated in Figure 7) can be generated to not only determine when engagements are due to take place, but also as a reference to identify when simultaneous activities are occurring across different WPs. This

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information is important to promote awareness of upcoming opportunities for collaboration in stakeholder engagements.

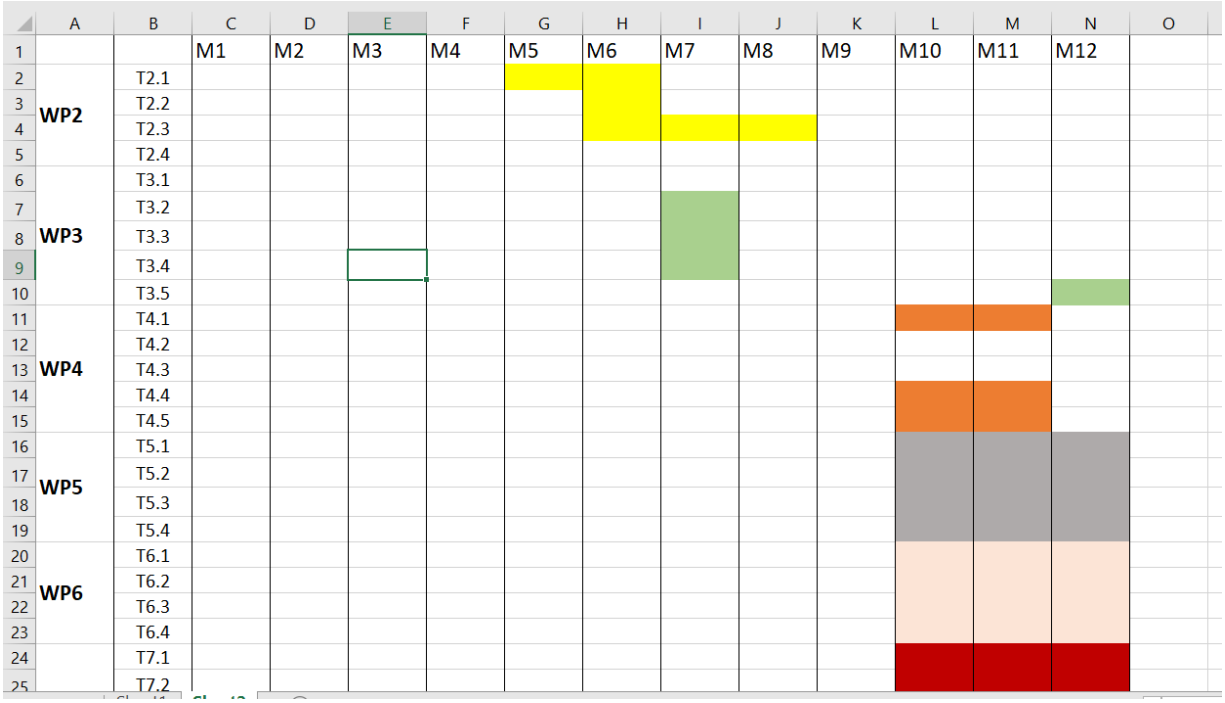

Figure 7. Planned engagement chart (for illustration purposes).

The temporal information related to tasks is just one consideration for engagement planning. To effectively plan appropriate engagement activities, information beyond when an engagement is due to occur is also required. This includes information on which stakeholders will be engaged and for what purpose. Therefore, to effectively plan engagements and coordinate across WPs efficiently, a Trello page (illustrated in Figure 8) is currently being created to document the additional details of the planned engagement tasks. The information within this Trello work page is collated from stakeholder and task identification questionnaires as well as from initial SYNERGY activities and communication. Trello acts as a toolkit which provides all additional information related to WP tasks, such as goals and sub-goals, supplementary stakeholder information (e.g. specific goals or tasks related to types of stakeholders), comments from WPL, etc.

Combining the information from the planned engagement chart with that from Trello produces a toolkit for collaboration as cross-referencing between WPs, in terms of when engagements will take place, who is being engaged and for what purpose, can be undertaken.

The details and information in the planned engagement chart and the Trello resource will be updated when further information is received from WPLs and DPs through the task and

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stakeholder identification questionnaires. It will also be refined throughout the SYNERGY project from the feedback generated from the engagements.

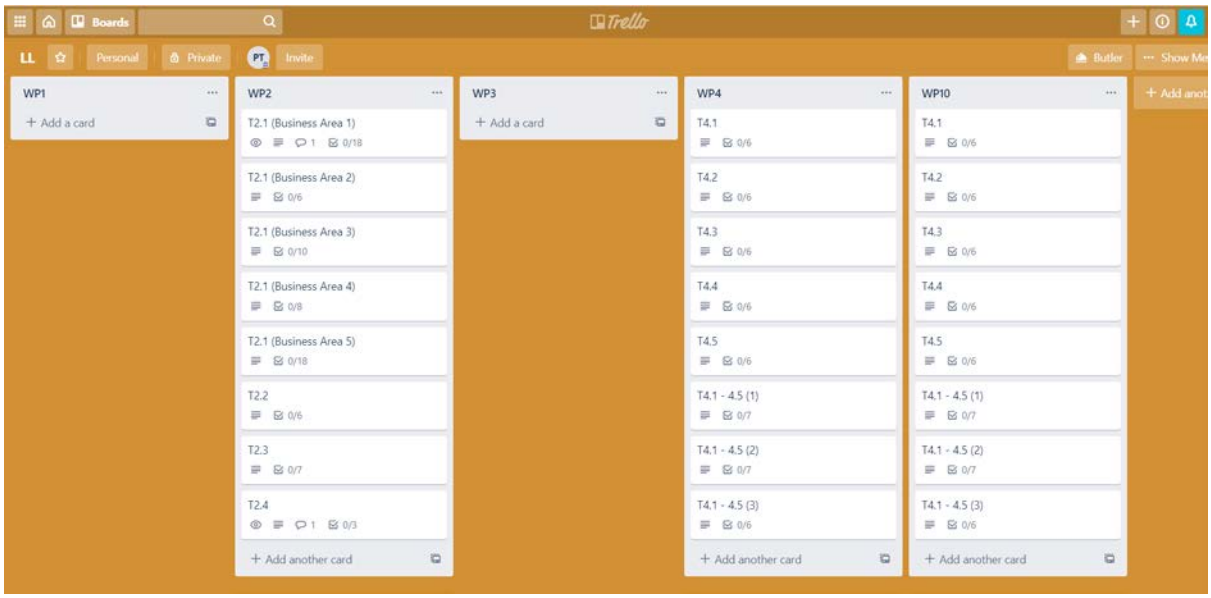

Figure 8. Trello overview of tasks and related engagements associated with each WP and demo

3.3.1 Pre-engagement Discussion Meeting(s)

A vital part of the engagement planning phase is a pre-engagement discussion meeting, or multiple meetings if required, between the LL leader and WPLs or DPs. The primary goal of this meeting is to devise a concrete plan of engagement to make the interactions with the stakeholders happen. These meetings should take place before the planned dates of engagements. However, this meeting should not take place too far in advance to avoid the risk that the engagement is not up to date with current goals of specific WP tasks or other developments in the SYNERGY project. The issues that will be covered in this pre-engagement discussion meeting include:

- Clarification on any ambiguous information from the questionnaires, (e.g. missing information, explanation on what exactly needs validated, and with whom).
- Stakeholder groups or categories can be refined to a specific contact.
- The most appropriate type of engagement can de decided.
- Devising a plan for how to recruit stakeholders and schedule activities with them.

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- Refine what exactly needs validated (e.g. elements of the use case, business requirements or concept).
- Determine if different engagement strategies are required for the various identified stakeholders or if tasks goals can be addressed through combined stakeholder group engagements to maximise efficiency.
- Identify the expected output from the engagements.
- Determine how the use case or business requirement will be presented to the stakeholder (e.g. Trello, Word/Excel file, PowerPoint Presentation, Infographics).
- Determine if the material being presented needs to be different for internal and external stakeholders.
- Identify the most appropriate channel or format for the engagement (e.g. email exchanges, video conference, etc.).
- Discuss how the WPLs or DPs plan to recruit identified stakeholders and identify if all the stakeholders outlined in the questionnaires are required.
- Discuss how GECO and other project partners can help with any issues related to the engagements.
- Determine the most efficient way to document the outcomes from the engagements to enable feedback loops.
- Discuss what KPIs can be set as part of the engagements (see section 3.6 for more information on KPIs).

This is not an exhaustive list of topics to be discussed at the pre-engagement meeting. Each task and related engagements will have its own unique issues to be resolved at this stage of the LL process.

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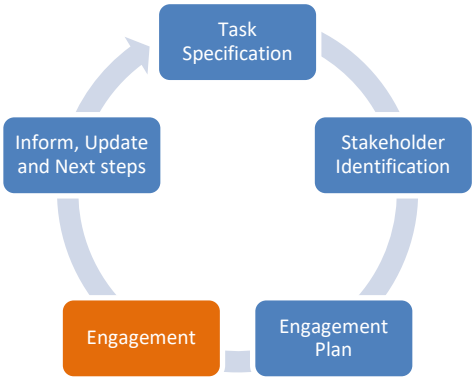
3.4 Living Labs: Engagements Activities and Toolkits



Successful LL engagements are reliant upon the communication and collaboration between LL leaders and WPLs or DPs. This starts at the preliminary identification stages and then progresses to the key pre-engagement discussion meeting explained in section 3.3.1. Subsequent to the engagement planning, appropriate engagement activities and supplementary toolkits can be provided to achieve optimal engagement of all stakeholders. This collaborated effort for conducting LL engagement activities requires input from all perspectives. WPLs and DPs are required to provide their expertise, experience and knowledge in their professional fields which can then be combined with GECO's experience in stakeholder engagement to ensure effective planning and the smooth running of LL engagement activities.

A multitude of engagement activities will take place over the course of the SYNERGY project. These activities will vary depending on factors such as the aim of the tasks, the type of stakeholder being engaged, logistics and considerations for WPL, DP and stakeholder preferences. Table 8 displays potential planned activities as part of Task T2.1 in WP 2. The column in the table which refers to the recommended engagement provides, at this stage, only potential engagements. These recommended engagements will be refined through coordination between GECO and WPLs and DPs to ensure the most appropriate engagement is conducted to achieve the required feedback to address the WP/task aims.

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Table 8.

Potential planned activities for task T2.1 in WP 2.

Activity to be performed and Aim of stakeholder engagement		Impact to the project	Timeline	Recommended Engagement
WP2 – Task 1.	Business Area 1:	WP2 (Task 4) WP3-5 WP8 WP10	Internals: M5 Externals: M6	**Face-to-face meeting/workshops with Greek internal stakeholders.** **Telco, remote workshop or phone interview with Internal Spanish and Austrian DSO & Aggregators** **External stakeholders through focus groups, interviews (in person if possible) and surveys**

Note: LL activities and especially face-to-face meetings may be affected due to the current Covid-19 global situation. Risk assessment details can be found in the risk management deliverable D1.4 under WP1.

Defining the engagements at this stage is done so with the purpose of providing an example of potential engagements, it is not intended to provide an exhaustive list of all available activities. The pre-engagement discussion meeting (see section 3.3.1) is the stage at which exact engagements can be defined. To determine specific engagements before this stage of the LL process would result in potentially sub-optimal activities being proposed due to the diverse nature of stakeholders and tasks involved in SYNERGY. The nature of engagements will vary depending on the type of stakeholder (see Figure 9). For example, an internal stakeholder can be engaged through email correspondents, whereas appealing infographics may be necessary for external stakeholder interaction. A local stakeholder might be engaged via a face-to-meeting, whereas a non-local stakeholder may require a Telco. The stage at which the engagement will take place will also impact how to interact with the stakeholder, circulating documents to stakeholders for feedback and comments may be used at the

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requirement definition stage, whereas workshops may be more suitable to demonstrate platform capabilities at the piloting stage. Engagement strategies will also depend on the project partner and the stakeholder preferences, one may prefer a phone call whilst another may prefer an email. The engagement approach will also vary depending on the whether the stakeholder engagement is geared towards industry experts such as network operators, aggregators and ESCOs (B2B) or targeted towards pilot participants and consumers (B2C).

In summary, there are endless possibilities for engagements and there is no pre-defined script for what engagement to use in each situation. Therefore, the approach for determining an engagement activity should be focussed towards how the project partner can best achieve the right type and level of feedback. Determining this will be decided at the engagement discussion phase on a case by case basis.

External	Face-to-face Interviews Focus groups Questionnaires/Surveys	Remote interviews Dissemination events Awareness activities (e.g. social media)
Internal	Face-to-face meeting Questionnaires/Surveys Workshops	Telco Questionnaires/Surveys Workshops
	Local	**Non-local**

Figure 9. Matrix showing potential engagements across various stakeholder groups

As the engagement are ultimately geared towards gathering the right type of feedback, an important element to the engagement activities is having access to toolkits that can assist WPLS and DPs to collect the required information from stakeholders. The following subsections describe some of the engagement types and toolkits that have been used as part of previous SYNERGY tasks (e.g. questionnaires and surveys in WP2) and some potential engagements that are likely to be used in future WP activities. Toolkits are tailored based on the type of engagement, the stakeholders involved and the goals of the engagement activity. However, an example of various toolkits is provided below.

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3.4.1 Questionnaires/Surveys

Questionnaires and surveys can be utilised to gather information or feedback on a wide variety of topics or issues related to SYNERGY. Furthermore, they require very little logistical planning compared to other activities and can generate large amounts of quantifiable data. Questionnaires have been used as part of WP2 and WP9 on task and stakeholder identification (Appendices A and B, respectively) and also surveys have been used as part of T2.2 in WP2 for identifying the regulatory, socio-economic and organisational barriers to innovation (Appendix D).

3.4.2 Event Participation Toolkit

The LL process will incorporate many activities across a variety of contexts. Therefore, it is essential that each activity is properly monitored and recorded. The Event Participation Toolkit is a framework recording details that may be required to be documented. This toolkit presented here is intended as an example, depending on the engagement, some of the details may not be necessary and some additional details not specified may be required, these specific can be determined in the engagement planning phase.

Event Participation Toolkit	
Partner:	
Type of event	*Seminar / workshop/focus group*
Point of contact	*Name and contact details*
Event title	
Place	
Dates	
Language	

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Event aim & purpose	*Write 2-4 lines to describe the aim of the event and link to the project aim*
Impact to the project	*Write 2-4 lines about the impact of such activity to the project, e.g. Create awareness about the project's outcomes, encourage involvement, collaboration agreements with third existing parties, consolidate replication position, etc.*
Type of audience	*Describe the type of audience which attended the event (stakeholder group, be specific)*
Size of audience	
Coverage	*Local / regional / national / European level*
Feedback or questions expressed by audience	*Write any comment you received from the audience that you consider useful and explain how the consortium should utilise this*
Possible follow-up / outcomes	*Write about any follow-up / post-meeting you have arranged with any extended stakeholder contacts*

3.4.3 Demonstration workshops

One type of engagement that can be utilised is a workshop in which the SYNERGY platform is demonstrated and applied to real-life data. This workshop can potentially be done through video demonstrations of how services work or use cases apply to demo site stakeholders.

Promotional videos that demonstrate how the platform can be applied will showcase how various data value chain stakeholders interact with the platform, such as its value to data providers and its application for data analysts.

3.4.4 Stakeholder interview toolkit

Interviews give WPLs and DPs the opportunity to gain an in-depth insight into services and products from the perspective of a variety of data value chain stakeholders. This can be vital

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for understanding how different individual from various sectors view SYNERGY solutions in terms of their application and sustainability. Interviews with internal and external stakeholders are likely to be required throughout the course of the SYNERGY project. Although the specific stakeholder, their role and the aims of the interview will vary, a basic framework can be used to guide this activity, such as the example provided below.

Stakeholder Interview Toolkit

Stakeholder Interviews: Question Guide

BACKGROUND

Purpose of this document:

The interviews should be approached as a relaxed conversation between industry colleagues. With each question prompt, let the interviewee explore any thoughts or ideas they have, and as the interviewer you can also engage with these ideas/thoughts and ask follow-up questions. This way you can allow the interviewee to discuss their perspective as opposed to routinely going through *your* list of questions. There are topics you will want to cover with each stakeholder (outlined in the table) but the journey to these topics can be as long as necessary to allow for a broader discussion.

Interview objectives:

- Support the development of the platform and pilot work and related business cases
- Form connections/relationships with key stakeholders
- Collect inputs to inform engagement strategy. For example:
    - What barriers or challenges are foreseen?
    - What are the potential benefits for the stakeholder? The community?
    - What specific opportunities do they see for collaboration?

Stakeholder participants:

DSO	*Name, Role, additional info (e.g. stakeholder category)*
Aggregator	Name, Role, additional info (e.g. stakeholder category)
Data provider	Name, Role, additional info (e.g. stakeholder category)

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DISCUSSION STRUCTURE

Introduction

- Welcome
- Introductions (5-10 mins)
    - We've asked you to participant today because we think you can help to give insights into how our project activities effect X
    - To start, we'll ask you a few background questions
    - Then we will briefly present the SYENRGY project and explain how it might relate to you
    - From there, we will have a conversation with you about the local opportunities, challenges, and needs related to project's success.
- Audio recording consent
    - Do you consent to having the conversation recorded? It will help with our analysis and reporting work.
    - [Turn audio recording on]
- Confirm consent form is signed

Warm up

- Tell us a bit about yourself
    - Current role
    - Background/area of expertise

SYNERGY project introduction

- Brief description on SYNERGY project and related technology/pilot/business scenario

SYNERGY project discussion

DSO	• What value do you see in the SYENRGY initiatives? • What are the potential challenges/opportunities? • Have you worked with/seen similar projects in the past? Were those projects successful? What could be learned from those past experiences? • What is currently happening in the area in terms of data analytics? • Are there other people/organizations in their network that are interested in getting involved with? • Etc
Aggregator	• Etc

Wrap up

- Final questions or comments?
- Debrief
- Thank you

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3.4.5 Focus group toolkit

Focus groups can provide qualitative feedback from various stakeholder groups. As with the interview discussion, the focus group discussion guide will vary depending on the targeted stakeholder. However, a basic framework is provided below.

Focus Group Toolkit

SUPPLIES

- Note paper
- Pens
- Nametags

INTRODUCTION (~5 MINUTES)

- Welcome and thank you for your time today.
- My name is _____ and I will be running the focus group. I work at _____ which is one of the partners of the SYENRGY project.
- I also have my colleague _____ sitting with me. He/she will be tasking notes during the session and may occasionally jump in with some questions.
- Please take a moment to review and sign the consent form

[ENSURE ALL FORMS ARE SIGNED BEFORE CONTINUING]

- I will be recording our session so I can transcribe the things we discuss. Please be assured that I will keep your information secure and your name will not be included in the report.
- This focus group will take approximately 90 minutes to an hour of your time.
- **Purpose of research:** To test/gather feedback on …..
- Before we begin I'd like to give you a quick run-down of the session will go.
    - First we'll begin with a few introductions, I'll provide you with an overview of the SYNERGY project, and I'll set some ground rules
    - Then I'll set you up with the X.
    - After that you'll complete a short questionnaire where you'll rate X
    - Then, I will give you a few tasks to test X
    - Finally, we'll have a group discussion on your general experience with X.
- If you have any questions during the process please feel free to ask. I might not always be able to answer them, as I don't want to bias your responses, however, I will try to answer them at the end.
- Any questions before we begin?

Warm up (~10min)

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- Moderator introduces themselves
- Ask each participant to introduce them self
- Warm up question: What is your favourite app on your phone and why?

SYENRGY INTRO (~2 MINUTES)

- General project summary
- Relevant use case summary

Ground rules (~2 minutes)

- We encourage respectful discussion and debate. Different options are welcome.
- Please listen to the instructions carefully. There will be times when I'll ask you to perform tasks independently, or when I want discuss things as a group. If you have questions, please ask.
- Please participate in the discussion as much as possible. I'm always interested to hear when you agree or disagree with someone.
- Let's try and keep the conversation balanced. Let's make sure everyone has a chance to share their opinion.
- Remember, today we are testing the app, not you. If you find something confusing or frustrating please let me know. There are no wrong answers.

App test (if required)

- Download/assess the app
- Explore app

User Experience Questionnaire (UEQ) (individual)(~ 10 minutes)

Functionality testing (tasks) (~ 35 minutes)

UI feedback (group discussion) (~15 minutes)

Wrap up (~5 min)

- Thank you for your inputs
- Any final comments or questions?
- We really appreciate you taking to time to participate in this research
- INCENTIVE

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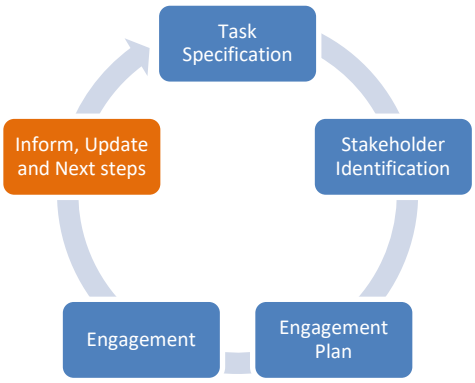
3.5 Living Labs: Inform, Update and Next Steps

The final stage in the LL process (before the cycle begins again or moves on to the next engagement task) is to discuss the outcomes of the LL engagement activities and update the necessary consortium partners through communication and SYNERGY resources (e.g. Trello, LL task force).



After engagements have taken place, the feedback and information gained from these engagements will inform the next steps of the living process on multiple levels. Including:

- Recording the details of what engagements took place and the feedback received (using the Event Participation Toolkit presented in section 3.4.2).
- Assessment of LL; were the required number of stakeholders engaged? was the necessary feedback gained?
- Are new interactions or additional stakeholders required based on the feedback received?
- How and where will the received feedback be integrated?

To ensure all relevant parties benefit from and are aware of the outcomes from the LL activities, an individual point of contact for each WP and demo site should be appointed for dispersing/receiving the information from the LL engagements (Table 9). Alongside the LL task responsible, these contacts will form a LL task force that can relay and update plans and outcomes from engagements that cover all WPs and demo sites ensuring all relevant SYNERGY parties remain informed on LL activities.

Table 9.

WP and Demo site points of contact.

Contact role	Name/Organisation
WP 1 Lead	ETRA

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WP 2 Lead	VERD
WP 3 Lead	UBI
WP 4 Lead	S5
WP 5 Lead	ICCS
WP 6 Lead	ETRA
WP 7 Lead	VTT
WP 8 Lead	HEDNO
WP 9 Lead	GECO
WP 10 Lead	ETRA
Demo Representative: Greece	TBC
Demo Representative: Spain	TBC
Demo Representative: Austria	TBC
Demo Representative: Finland	TBC
Demo Representative: Croatia	TBC
Technical project coordinator	S5
Project coordinator	ETRA

Note: Demo representatives are yet to be determined.

To ensure WPLs and demo site representatives remain up to date on LL engagements, it is beneficial to also have regular meetings so the LL task force can discuss upcoming or completed engagements. This meeting provides an opportunity for WPLs and demo site representatives to discuss their experiences of recent engagements, this is not restricted to the information or feedback gained, it can also include topics such as new potential external stakeholders identified, an evaluation on the engagement activity; what went or well what

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could be improved etc. It is suggested that LL task force meetings take place at quarterly intervals, however, meetings should also be arranged as and when they are needed to discuss any potential issues. Meetings do not have to involve representatives from all WPs or demo sites, if there are issues to be discussed at the demo sites or WP level, smaller committee meetings can be undertaken to resolve or discuss any issues.

3.6 Evaluation of LL activities

As a last stage, appropriate KPIs should be defined based on the overarching goals of the LL activities in the context of SYNERGY (c.f. Chapter 2). The details of the engagement activities will be monitored, including how many of each type of interaction took place (how many interviews, how many platform demonstrations, etc) and how many stakeholders were engaged. While these metrics are interesting, they do not provide insight towards identifying if the LL engagements have achieved their goals or allow for corrective actions to improve the LL process.

Therefore, in addition to the targets foreseen in the DoA "*at least 10 targeted living lab engagement and training workshops will be performed (2 in each demo site)*" we propose to track the following KPIs which require the entire consortium's participation to be successful and better capture the success of the LL engagements:

- KPI 1) Number of engagements that effectively took place (source: Event Participation Toolkit) / Number of engagements foreseen (source: engagement planning phase).
- KPI 2) Quantity of feedback received / Quantity of feedback integrated or considered.
- KPI 3) Number of stakeholders engaged (source: Event Participation Toolkit) / Number of stakeholders foreseen to be engaged (source: engagement planning phase).

KPI 1. During the engagement planning phase, and in particular from the pre-engagement discussion meeting, a number of engagements will be planned to address the aims of WPLs or DPs. Following the implementation of these activities, the Event Participation Toolkits that were completed during the activities can be compared to the number of planned engagements set out in the planning phase.

KPI 2. During the engagements, feedback will be generated from stakeholders. The value of this feedback and how it is integrated back into the SYNERGY process is a vital component of the LL methodology. The feedback can be recorded at each engagement activity using

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toolkits (such as those outlined in section 3.4). How this feedback is incorporated can be recorded through the activities of the LL task force. Comparing the amount of feedback successfully obtained to how much was incorporated serves as a valuable KPI in the LL process.

KPI 3. During the pre-engagement discussion meeting, WPLs and DPs will identify a specific number of stakeholders they wish to contact to generate the required feedback. Using the Event Participant Toolkit will allow for an evaluation with regards to determining if the target number of stakeholders to be engaged was reached.

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4 Current planned engagements

Tables 10-12 provides information of the current planned engagements for each WP as part of SYNERGY LL activities from all the currently received stakeholder and task identification questionnaires. This includes each task, sub task, related stakeholders, planned date of activity and potential engagements (where possible).

Currently, a number of task and stakeholder identification questionnaires are still being completed by WPLs and DPs. When all questionnaires have been completed and received by GECO, stakeholder mapping can be done that covers all WPs. This mapping process will allow for clarity on crossovers and connections between WPs with regards to targeted stakeholders. Knowledge of these connections will allow the identification of opportunities for collaboration. Subsequently, stakeholders (particularly external stakeholders) can be engaged in an optimal manner and repeat contact covering the same material can be avoided.

In addition to the stakeholder mapping, when all preliminary information is received by GECO, a complete GANTT can be created that covers all upcoming tasks related to each WP. This GANTT chart will be refined as the project progresses through information gathered from the pre-engagement discussion meetings and LL engagement activities.

It is important to note that despite not having received all the responses to the questionnaires from WPLs and DPs, the progression of engagement activities related to responses that have been received will not be delayed (c.f. section 3.3.1). Indeed, engagement activities foreseen in M5 and M6 as part of task T2.1 in WP2 are currently being organised between the WPL, TC, PC, and the LL leader.

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Table 10.

Table of planned activities for WP2

Activity to be performed and Aim of stakeholder engagement		Electricity data value chain stakeholders	Impact to the project	Timeline	Recommended Engagement
Task 1. Validation of Use Cases (UCs) and Business Requirements (BRs) deriving from Synergy's Business Scenarios. Specifically, engaged stakeholders to this activity could be presented with the description of the relevant UCs as well as preconditions and	**Business Area 1**: Launching/enhancing flexibility and ancillary markets to enhance D&T Network resilience and Investment deferral (e.g. UC_5_3, UC_5_4*) **UC ID's according to Use cases reporting in Trello*	**Internal** • DSO/Greek DSO/HEDNO/Internal (a): Mr. X (emailX), Internal (b): Targeted Profiles: Operations, planning, strategy and regulatory personnel • TSO/Greek TSO/IPTO/Internal (a): Mr. X (emailX)., Internal (b): Targeted Profiles: Operations, planning, strategy and regulatory personnel • Electricity retailer / Greek / EPA / Internal (a): Mr X (emailX), Targeted Profiles: Operations, Innovation and Business Development personnel	WP2 – Task 4, WP3-5, WP8 WP10	**Internals**: M5 (1st iteration), end of M14 (2nd iteration) **Externals**: end of M6 (1st iteration), end of M16 (2nd iteration)	Face-to-face meeting/workshops with Greek internal stakeholders. (TBC) Telco, remote workshop or phone interview with Internal Spanish and Austrian DSO & Aggregators (TBC) External stakeholders through focus groups, interviews (in person if

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postconditions of their implementation in order to provide feedback on a) the availability of necessary data b) willingness and existence of legal framework to share/purchase those data c) feasibility of reported preconditions d) overall necessity and/or feasibility of the UCs and BRs and e) market appetite f) regulatory barriers		• DSO/Spanish DSO/ CUERVA (CUE)/ Targeted Profiles: Operations, planning, strategy and regulatory personnel • Aggregator/Spanish Aggregator/URBENER (URB) Targeted Profiles: Operations, Innovation and Business Development personnel • DSO/Austrian DSO/ ENERGIE GUSSING (GUS)/ Targeted Profiles: Operations, planning, strategy and regulatory personnel • Aggregator/Austrian Aggregator/ EUROPAISCHES ZENTRUM FUR ERNEUERBARE ENERGIE GUSSING GMBH (EEE)/ Targeted Profiles: Operations, Innovation and Business Development personnel **External** • Regulators - Policy Makers / European Organizations/ CEER			possible) and surveys (TBC)

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depending on the type of stakeholder.		• Professional Associations / European-level Energy Regulatory Agency / ACER • Professional Associations/TSO European association/ENTSO-E/ Targeted Profiles: Strategy and regulatory personnel • Professional Associations/DSO European association/E.DSO/ Targeted Profiles: Strategy and regulatory personnel • Professional Associations/DSO European association Eurelectric (DSO-Entity)/ Targeted Profiles: Strategy and regulatory personnel • Policy Makers / European Commission Instrument / ETIP-SNET (e.g. Working Groups 5 and 6) • Policy Makers / European Commission Instrument / H2020 Bridge – Business Models Working Group			

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	Business Area 2: Distribution & Transmission Networks performance assessment, sizing, monitoring of status & health, preventive maintenance scheduling. (e.g. UC_5_1, UC_5_2, UC_5_7, UC_5_8)	All the DSO, TSO internal (specific contact points) and external stakeholders of Business Area 1 with the following targeted profiles: Operations, planning, strategy and regulatory personnel Plus **External** • Policy Makers / European Commission Instrument / ETIP-SNET (e.g. Working Groups 5 and 6) • Policy Makers / European Commission Instrument / H2020 Bridge – Business Models Working Group	WP2 – Task 4, WP3-5, WP8, WP10	**Internals**: M5 (1st iteration), end of M14 (2nd iteration) **Externals**: end of M6 (1st iteration), end of M16 (2nd iteration)	
	Business Area 3: PV plants performance and health monitoring, O&M, optimized monetization	**Internal** • RES Operators/Spanish/COBRA/Targeted Profiles: Operations, Asset Management • RES Operators/Spanish/CUERVA/Targeted Profiles: Operations, Asset Management	WP2 – Task 4, WP3-5, WP8, WP10	**Internals**: M5 (1st iteration), end of M14 (2nd iteration)	

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	approach (UC_5_5, UC_5_6, UC_5_9).	• Energy Trading/Austrian/ENES: Targeted Profiles: Traders, PPA facilitators **External** • Professional Associations/Solar power European Association/ SolarPower Europe • Professional Associations/Solar power International Association: International Solar Energy Society (ISES) • Policy Makers / European Commission Instrument / ETIP-SNET (e.g. Working Groups 5 and 6) • Policy Makers / European Commission Instrument / H2020 Bridge – Business Models Working Group		**Externals**: end of M6 (1st iteration), end of M16 (2nd iteration)	
	Business Area 4: Retailers' and Aggregators' portfolio	All the Retailer and Aggregator internal stakeholders of Business Area 1 with the following targeted profiles: Operations, Innovation and Business Development personnel	WP2 – Task 4,	**Internals**: M5 (1st iteration), end of M14	

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	management and flexibility asset exploitation: advanced analytics, demand forecasting, DSM strategies, alternative (dynamic) billing strategies, VPP configuration, flexibility contracts and settlement (All WP6 related UCs)	**External** • Professional Associations/ European Retailers Association/ European Energy Retailers • Policy Makers / European Commission Instrument / H2020 Bridge – Business Models Working Group • Policy Makers / European Commission Instrument / ETIP-SNET (e.g. Working Groups 5 and 6)	WP6, WP8, WP10	(2nd iteration) **Externals**: end of M6 (1st iteration), end of M16 (2nd iteration)	
	Business Area 5: Building-level energy real-time monitoring and visualization, performance simulation and optimization, predictive	**Internal** • Urban planners and Innovations Centers/Technical Research Center of Finland – VTT/ Internal (a): Mr. X (emailX), • City authorities/Smart City strategies implementation Unit for the City of Helsinki/ FVH / Internal (a): X (emailX)	WP2 – Task 4, WP7, WP8, WP10	**Internals**: M5 (1st iteration), end of M14 (2nd iteration) **Externals**: end of M6	

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	maintenance scheduling, energy performance certifications (All WP7 UCs).	• Commercial/European-level Industrial Facility Managers – Headquarters in Helsinki, Finland/ CAVERION (CAV)/ Internal (a): X (emailX) • ESCOs/Croatian ESCO – Microgrid Operator/ KRK • ESCOs/Greek ESCO – Aggregator/ ELIN VERD (VERD)/ Internal (a): X (emailX), Internal (b): Business Development personnel: X (emailX) • Aggregators/ URB, EEE (see Business Area 1) **External** • Professional Association / European Association of Energy Services Companies / eu.ESCO • Professional Association / European Building Automation and Controls Association / eu.BAC • Consumer Association / European Consumer Organization / BEUC		(1st iteration), end of M16 (2nd iteration)	

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		• Policy Makers / European Commission Initiative / Covenant of Mayors for Climate & Energy • Professional Association / European Council of Spatial - Urban Planners / ECTP-CEU • Policy Makers / European Commission Instrument / Urban Development Network • Policy Makers / European Commission Instrument / ETIP-SNET (e.g. Working Groups 5 and 6) • Policy Makers / European Commission Instrument / H2020 Bridge – Business Models Working Group			
Task 2: Feedback on the analysis on socio-economic, organizational and regulatory obstacles to Synergy Innovation deriving from the state-of-the-art analysis on relevant topics in a European level, in-depth literature		**External** • Regulators - Policy Makers / European Organizations/ CEER	WP2, WP10	**Externals**: end of M6 (1st iteration), end of M16	

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review and outcomes of the relevant questionnaires circulated among Synergy Consortium Partners.	• Professional Associations / European-level Energy Regulatory Agency / ACER • Policy Makers / European Commission Instrument / ETIP-SNET (e.g. Working Groups 5 and 6) • Policy Makers / European Commission Instrument / H2020 Bridge - Regulations Working Group		(2nd iteration)	

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Task 3 Investigation on data IPR policies	**Internal:** within group b • Data Management Personnel (management, interoperability, sharing, protection, security) • Legal Department / Data Protection Officers **External**: within group c • EU-wide umbrella initiatives: BRIDGE, OPEN-DEI, BDVA. Relevant working groups yet to be identified.	In synergy with T2.2 Other relevant tasks: T1.3, T1.4 WP3, WP4	M6 to M8	
Task 4: Feedback on the SYNERGY platform's architecture design, components specifications and features.	**Internal** • Experts from the Energy domain from UBITECH's affiliated company UBITECH ENERGY (UBE): o Dr X (emailX) – Director of Research and Innovation of UBE			

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	o Dr X (emailX) – Director of Technology of UBE o X (emailX) - Research Associate of UBE **External** • Big data platforms, service-based distributed and heterogeneous systems, software engineering and data management expert: o Department of Digital Systems in University of Piraeus, Associate professor Dr. X (emailX)			

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Table 11.

Table of planned activities for WP4

Activity to be performed and Aim of stakeholder engagement	Electricity data value chain stakeholders	Impact to the project	Timeline	Recommended Engagement
Task 1: Requirements extraction and validation for big data analytics functionalities	**Internal:** Data analysts & data management personnel from all demo partners **External:** Data analysts & data management personnel from 5 organisations in the Energy domain Regarding the category of the aforementioned organisations, at this stage the following are considered: network operators, electricity retailers, RES operators, aggregators and facility managers/ ESCOs. The list will be refined as WP4 activities progress. This applies across all references to external stakeholder engagement in WP4 activities in the current table	WP3	M10-M11	

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Task 4: Requirements extraction and validation for data sharing workflow, contractual aspects and relevant services to be developed	**Internal**: Legal department, data management personnel & business development and strategy department from all demo partners **External**: Legal department, data management personnel & business development and strategy department from 5 organisations in the Energy domain	WP3	M10-M11	
Task 5: Requirements extraction and validation for data discovery, suggestion services and dataset exploration	**Internal:** Data analysts & data management personnel from all demo partners **External:** Data analysts & data management personnel from 5 organisations in the Energy domain	WP3	M10-M11	
Task 2: Requirements extraction and validation for baseline algorithms' expected usage	**Internal**: Data analysts & operations personnel from all demo partners **External**: Data analysts & operations personnel from 5 organisations in the Energy domain	WP5-WP7	M14-M15	

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Task 3: Requirements extraction and validation for multi-party computation needs	**Internal**: Data analysts & data management personnel from all demo partners **External**: Data analysts & data management personnel from 5 organisations in the Energy domain	WP3	M14-M15	
T4.1, T4.2, T4.3 mainly, also T4.4, T4.5: Feedback (and additional requirements extraction) for big data analytics, baseline analytics services, multi-party computation functionalities and data exploration and sharing from a technical perspective	**Internal**: Data analysts & data management personnel from all demo partners **External**: Data analysts & data management personnel from 5 organisations in the Energy domain	WP3, WP5-WP7	M23-M25, M35-36	
T4.2, T4.4, T4.5 mainly, also T4.1, T4.3: Feedback and additional requirements extraction for data exploration,	Internal: Operations personnel from all demo partners	n/a	M23-M25	

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matchmaking and sharing workflows, usage of big data analytics functionalities and pretrained baseline algorithms from operations perspective (e.g. ease of integration of SYNERGY tools and services in actual operations environment	Operations personnel from 5 organizations in the Energy domain			
T4.2, T4.4, T4.5 mainly, also T4.1, T4.3: Validation of the developed data exploration, matchmaking and sharing workflows, the provided big data analytics functionalities and the pretrained baseline algorithms from business perspective	Business development and strategy department from 5 organizations in the Energy domain	n/a	M35-M36	

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Table 12.

Table of planned activities for WP10

Activity to be performed and Aim of stakeholder engagement		Electricity data value chain stakeholders	Impact to the project	Timeline	Recommended Engagement
Task T10.1: Definition of new data-sharing based business models:	- Input from energy market stakeholders to understand advanced energy services to be created	Stakeholder category 1a / Demo partners Stakeholder category 1b / Demo partners: data scientist, business development	WP2, T2.1 T2.2	M9 to M18	
	Input from stakeholders about creation of data sharing economies	Stakeholder category 2c / umbrella organizations: OPEN DEI, BDVA → Relevant working groups Stakeholder category 2d / sister projects in DT-ICT-11-2019, other relevant topics	WP9, T9.4	M9 to M18	
	New actors to understand emerging energy stakeholder ecosystems	Stakeholder category 1b / Demo partners: business development	WP2, T2.1 T2.2 WP9, T9.4	M9 to M18	

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	Stakeholder category 2c / umbrella organizations: BRIDGE → Relevant working groups Stakeholder category 2d / other projects to be identified			
Task T10.2: Data-driven and Data-sharing Business Model Evaluation	Stakeholder category 1b / DSO / HEDNO / Business Development, Data Scientists	n/a	M22	Interview, Questionnaire
	Stakeholder category 1b / TSO / IPTO / Business Development, Data Scientists			
	Stakeholder category 1b / Aggregator / VERD / Business Development, Data Scientists			
	Stakeholder category 1b / Retailer / EPA / Business Development, Data Scientists			
	Stakeholder category 1b / RES Operator / COBRA / Business Development, Data Scientists			
	Stakeholder category 1b / DSO / CUE / Business Development, Data Scientists			

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	Stakeholder category 1b / Aggregator / URB / Business Development, Data Scientists			
	Stakeholder category 1b / DSO / GUS / Business Development, Data Scientists			
	Stakeholder category 1b / Aggregator / EEE / Business Development, Data Scientists			
	Stakeholder category 1b / RES Operator / ENES / Business Development, Data Scientists			
	Stakeholder category 1b / City Authorities / FVH / Business Development, Data Scientists			
	Stakeholder category 1b / ESCO / CAV / Business Development, Data Scientists			
	Stakeholder category 1b / RES Operator / KRK / Business Development, Data Scientists			
	Stakeholder category 2b / DSO / EAC / Business Development, Data Scientists			

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5 References

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6 Appendices

6.1 Appendix A: Task identification questionnaire (sent to WPLs)

Context

Stakeholder engagement and market actor validation of our project activities and findings are important aspects of Synergy. Our role as GECO is to facilitate interaction and feedback loops via the Living Lab (LL) activities. We are currently working on the deliverable 9.1 which will present a methodology for the LL process and the engagement of stakeholders throughout the project.

What is key to this methodology is understanding the work and activities that would potentially require stakeholders' input and feedback. As work package leaders (perhaps in coordination with the task leaders), you are best placed to provide this information. Therefore, we would like you to answer a few questions about current and planned activities (it might seem early for some of the work packages, but please provide answers as best you can).

Providing this information will allow GECO to co-ordinate engagements throughout the project, across work packages, ensuring you collect the feedback you need for your work in an optimal and timely manner. Furthermore, providing knowledge of the type of information and feedback work package leaders are interested in and who they could get it from, will allow GECO to suggest appropriate engagement activities, as well as guidelines and materials to carry out activities.

Need

What we need to know is for which aspects of your work package would you like to involve stakeholders (e.g. to discuss potential data exchanges, to share or validate the data analytics results, to discuss new business models, the features of the interfaces, market appetite for the services you are testing, to understand drivers and barriers to their adoption, etc.), who the stakeholders are you want to collaborate with and obtain feedback from, when would these engagement activities take place, and what you hope to gain from engagements.

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Before proceeding to the Stakeholder Consultation Plan table on the last page, please read the following section on stakeholder categorisation below to assist you in filling out the plan.

Stakeholder Categorisation

Table 13 displays high-level categorisations of stakeholders to guide your thoughts and follow a consistent approach across work packages.

Table 13. Stakeholder Categories

1) Internal stakeholders	a- Expert from project partner organisation working on the project
	b- Other relevant departments / experts at partner organisations (e.g. sales, CRM, businesspeople, IT people, data scientists, data protection officer, etc.) not directly involved in the project
2) External stakeholders	a- Partner country stakeholders (contextualising the stakeholder exchanges to your local circumstances and needs are important)
	b- Other EU country stakeholders (e.g. DSO from another EU country not represented in the consortium, etc.)
	c- EU level stakeholders (e.g. umbrella organisations such as ACER, eu.ESCO, Bridge, BDVA)
	d- Other EU-funded projects

Figure 10 and Figure 11 display potential stakeholders as listed in the DoA and identified as part of early project activities which can assist in specifying the electricity data value chain stakeholder. These lists are not exhaustive and thus feel free to add any that you feel relevant in your consultation plan.

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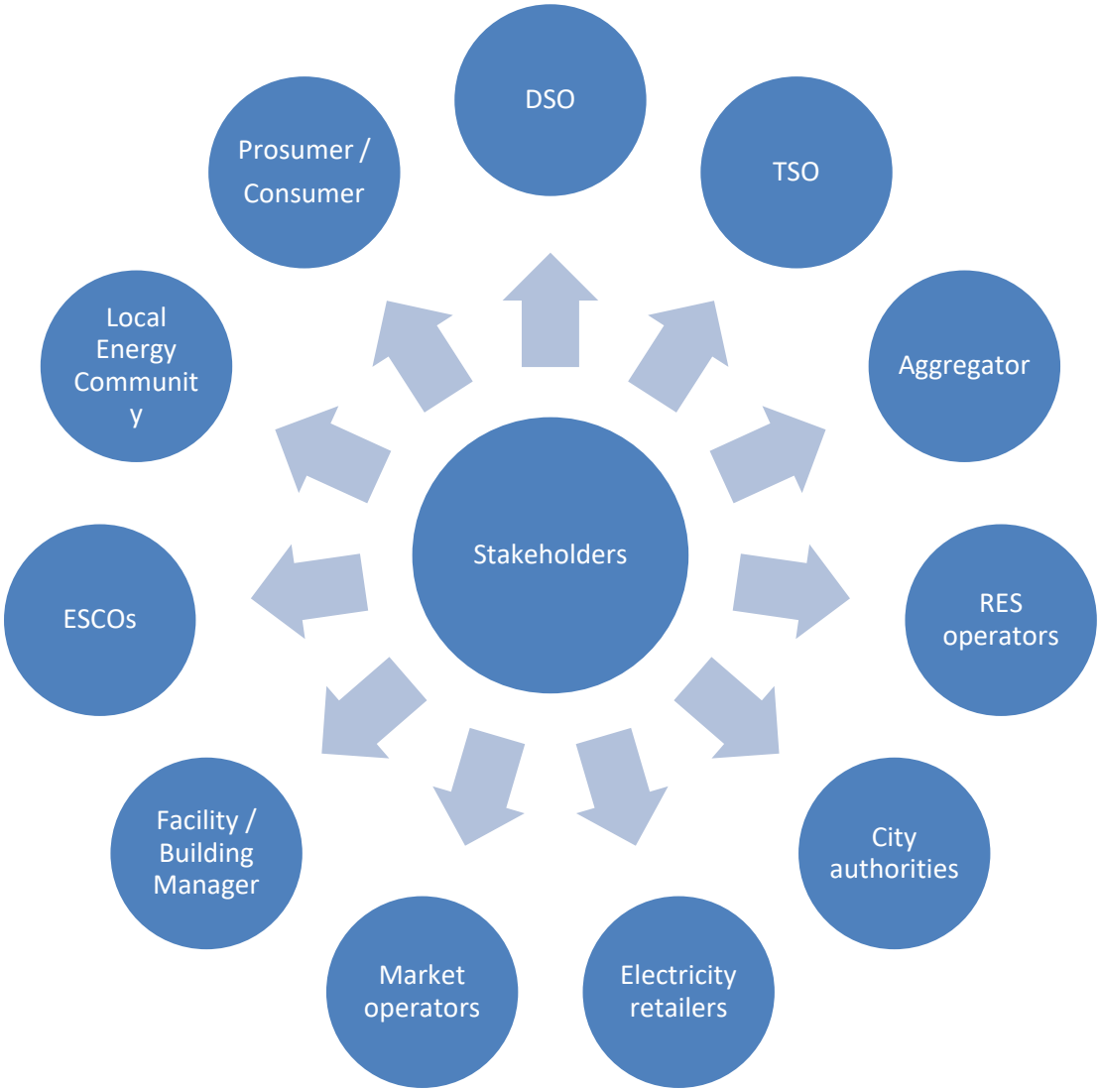

Figure 10. "Vertical" Electricity Data Value Chain Stakeholders (non-exhaustive)

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Figure 11. "Horizontal" Electricity Data Value Chain Stakeholders (non-exhaustive)

The table below lists the potential employee profile we should try to engage. The list is not exhaustive and thus feel free to add any that you feel relevant in your consultation plan.

Table 14. Targeted profile categories within Electricity Data Value Chain Stakeholders organisations (non-exhaustive)

Targeted Profile Functions
• Operations Personnel (to be further defined based on targeted business functions) • Data Management Personnel (management, interoperability, sharing, protection, security)

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- Data scientists / analysts
- Legal Department / Data Protection Officers
- Marketing Department
- Business development and strategy department

Stakeholder consultation plan

Please fill out the **Stakeholder Consultation Plan** table below and include as much detail and information as possible. If you do not have concrete plans at the moment, then please provide any provisional plans that you have. Please also coordinate with the task leaders if you think it necessary.

When completing the stakeholder consultation plan:

- Consider all the categories listed above
- Be as precise as possible as to the purpose of the stakeholder engagement e.g. (a) to collect feedback on the SYNERGY platform and data-sharing, (b) to co-design and validate use cases, requirements and market needs, (c) to maximise the platform exploitation following the project completion
- Whenever possible name the stakeholder organisations and if possible, even the persons you wish to engage with in addition to choosing stakeholder groups e.g. Stakeholder category 2a / DSO / Helsinki's DSO / HELEN / Business development / Ms xyz.

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Activity to be performed and Aim of stakeholder engagement	Electricity data value chain stakeholders and category	Impact to the project	Timeline
Please describe as precisely as possible the activity to be performed and link it to a specific task/ work package. Moreover, describe the aim of engaging each stakeholder in this activity and what you expect to achieve	***Please list the different stakeholders you would need to engage (c.f. Figure 1 and 2), the profile function (c.f. Table 2) and which category they belong to (c.f. Table 1). Possibly organisation / contact names should be mentioned.***	***Will the output of the engagement be used in other parts of the project (other tasks and work packages)? Our goal is to avoid unnecessary engagements by combining them across tasks or WPs if and when possible***	***Project month the engagement is supposed to happen***
Ex: WP2 task 3 Validate business model x's requirements	Ex: Stakeholder category 2a / DSO / Helsinki's DSO / HELEN / Business development / Ms xyz.	Ex: WP 8	Ex: M14

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6.2 Appendix B: Stakeholder identification questionnaire (sent to DPs)

The following questions are designed to help us understand what you, either as the pilot country demo leader or pilot country demo partner, wants to achieve with this project and who are the parties we need to involve in the discussion to establish a co-creation framework and validate the services that the SYNERGY platform intends to provide and the services that you are developing and testing as part of the different demo cases (Please refer to the description of task 9.1. in the Annex). Your answers don't have to be long (bullet points are welcome).

If your answers differ per use case, please specify which use case you are referring to in your responses in ALL questions or you can send back multiple questionnaires if you feel it is clearer

Context and needs

1. **What are your primary goals for your pilot? What do you want to achieve? What would you consider a successful outcome?**

2. **In which aspects of your pilot would you like to involve external stakeholders that are not part of the consortium (e.g. to discuss potential data exchanges, to share or validate the data analytics results, to discuss new business models, the features of the interfaces, market appetite for the services you are testing, to understand drivers and barriers to their adoption, etc.)**

Stakeholder identification

Below is an attempt at a high-level categorisation of potential stakeholders to guide your thoughts and follow a consistent approach across pilot sites. When answering the following questions, please try to think of all the categories below and be as precise as possible as the purpose of the stakeholder engagement shall be multi-fold: (a) to collect feedback and additional requirements for the overall SYNERGY platform, (b) to co-design and validate the piloting activities, (c) to contribute to the pilot results exploitation. For instance, it will not be enough to say "Customers" as stakeholders, but try to

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explain who is the customer, is it a household, an office building, a solar plant, a power plant, a DSO? An even better answer would be to name a contact in the organisation.

Internal stakeholders	Project partners
	Other relevant departments / experts at partner organisations (e.g. sales, CRM, businesspeople, IT people, data scientists, etc.)
External stakeholders (for instance but not limited to: DSOs, TSOs, Aggregators, RES Operators, ESCOs and City Authorities, Electricity Retailers, Prosumers (including facility managers, Communities, regulator, policy makers, etc.)	Pilot area stakeholders (contextualising the stakeholder exchanges to your local circumstances and needs are important)
	Pilot national stakeholders
	EU level stakeholders (e.g. ACER, eu.ESCO)
	3rd EU country stakeholders

Platform design and development phase

3. **During the SYNERGY platform requirements elicitation, with which external stakeholders in the electricity data value chain can you bring us in contact with (in order to discuss their requirements and needs regarding data sharing and data analytics)? Please try to suggest at least 3 contacts per demo partner.**

Stakeholder Organization Name	Stakeholder Type [DSO, TSO, Aggregator, RES Operator, Electricity Retailer, Prosumer (including facility manager, ESCOs and City Authorities, Communities, Regulator, Policy maker, etc.]	Stakeholder Category [Pilot Area Stakeholder, Pilot National Stakeholder, 3rd EU Country Stakeholder]	Experts Profiles [Business Experts, IT Experts, Data Scientists, etc.]

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Piloting phase

4. **Thinking of the required data exchanges in your pilot (as initially reflected in the Data Collection activities), who are your data "suppliers"? Which ones are <u>not</u> also SYNERGY project partners?**

5. **What types of external stakeholders need to be involved in your pilot site (e.g. residential, industrial, DSOs, municipality, etc.)? Which internal stakeholders (in terms of being also SYNERGY project partners) should be involved?**

Pilot exploitation phase

6. **Who would be affected positively and/or negatively if the services developed in your pilot were taken to the market phase? Which ones are also SYNERGY project partners? Does this differ depending on the synergy product/use case in the pilot?**

7. **What other types of customers (other than the ones serviced in your pilot) would be serviced <u>if taken to the market phase</u>?**

8. **Any other stakeholders you would like to consider in our living lab activities (see description of T9.1 in Annex I below)?**

The benefits of identifying the right stakeholders and properly analysing them is that:

- You'll improve the quality of the project, as external stakeholders can give the SYNERGY consortium vital information and ensure that we don't miss anything important (both for the platform and the demo cases).

- We can avoid delays by making stakeholders supporters rather than obstacles to getting approval both in the pilots and in real market conditions going forward.

- Supporters could provide you extra resources for the project (e.g. their time).

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6.3 Appendix C: Stakeholder categorisation questionnaire

(Note: the contents of this questionnaire are **subject to change dependent upon responses obtained in the stakeholder identification questionnaire)**

Stakeholder categorisation towards tailored engagement activities

Thank you for replying to the previous questionnaire. As a final step we ask you to score the different stakeholders you have identified in order to place them into a matrix (e.g. Influence/Interest) to give a representation of how important they are for the successful implementation of your pilot and the project in general and also towards proposing tailored engagement strategies via the Living Lab activities.

The following questions are aimed at identifying each stakeholders level of interest and influence (both at pilot stage and in real market conditions) which can be considered in terms of:

- **Interest** – To what extent is the stakeholder motivated to participate? For instance, who may be affected by the project or the services developed in your pilot if taken to the market phase?
- **Influence** – To what extent is the stakeholder able to direct/control factors related to the pilot or the services developed in your pilot if taken to the market phase. For instance, who is in charge of assigning or procuring resources or facilities at your pilot participant organisations especially if they are not pilot partners? Who has the expertise which is crucial to the pilot project? Who could solve potential problems with the pilot project especially if they are not pilot partners? Who has influence over other stakeholders?

This is a list of stakeholders identified in the 'Stakeholder identification questionnaire'

1. DSO/TSO
2. Consumer (homeowner)

Please highlight the score (from 1 to 5 with 5 being the highest) you feel best reflects the interest and influence of each stakeholder

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DSO

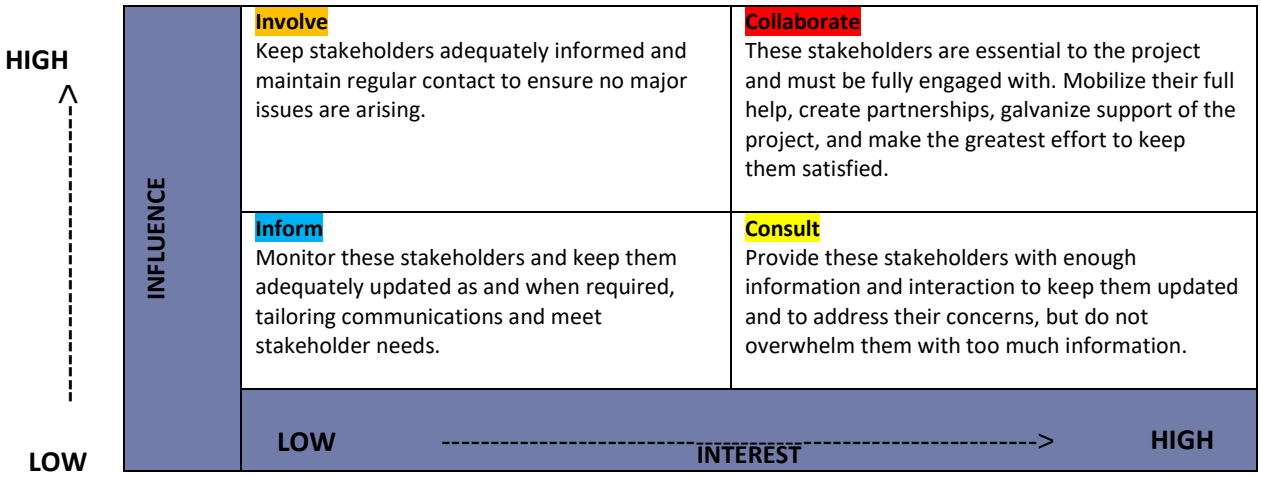
Interest	1	2	3	4	5
Influence	1	2	3	4	5

Consumer (homeowner)

Interest	1	2	3	4	5
Influence	1	2	3	4	5

Depending on the score you assign to each stakeholder, the stakeholder will be placed in 1 of 4 categories that will determine the "right" level and type of engagement. For instance, we should not communicate in the same way and as much with pilot participants and with energy regulators. Of course, the categorisation will not be rigid in the sense that you can decide to move 1 stakeholder from 1 place to another and where they are placed may change over the course of the project, in fact probably should.

The figure below explains at a high level how stakeholders will be engaged based on whether they have a high/low interest in and high/low influence on the project. Each of the four boxes represent a 'level' of engagement, ranging from the lowest level ('inform'), through the middle levels ('consult' and 'involve') to the highest level ('collaborate').



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6.4 Appendix D: Barriers to innovation questionnaire

Regulatory barriers

1. Select the regulation/legislation categories that are linked to your demo use case
2. Rank the importance of this regulation/legislation in regards to its application on your demonstrator use case (with 1 - Not Important and 5 - Very Important)
3. Could the use case be implemented considering the current legislations and regulations in your country?
4. Provide a list of URLs to related regulation/legislation that applies in your country. Please point out where is the relevant information in the links you will provide (articles, paragraphs of the regulations in question)
5. Provide a list of URLs to related regulation/legislation that applies in your country and is a potential barrier. Please point out where is the relevant information in the links you will provide (articles, paragraphs of the regulations in question)
6. Explain in short the reasons that the regulations you provide are hindering the realization of this demo case
7. Select the regulation/legislation categories that are linked to your demo use case and are currently missing.
8. Ways you overcame the missing legislation/regulation barriers
9. Are you aware of forthcoming regulations/legislation that may effect your demo case?
10. (If your previous reply was yes) What is the expected time frame until such regulations are put in force
11. (If your previous reply was yes) How these will facilitate their realization of your demo case?

Socio-economic barriers

Please rate the impact of the following issues as potential barriers for innovation with regards to its application to your demo use case (1 - Not Important and 5 - Very Important).

1. Upfront costs (CapEx) for implementing innovative energy services (e.g. smart meters, smart appliances, etc.)
2. Lack of financial support/business sponsorship to deal with CapEx
3. Neglection of the value of distributed, time-specific and location-based flexibility for system optimization, favouring centrally offered flexibility, even in cases where local-specific constraints need to be resolved
4. Increased risks and lack of hedging strategies for the viability of Energy Performance Contracting
5. Lack of holistic regulatory framework that fosters innovation providing whole system benefits (e.g. no mechanisms for trading and remunerating flexibility)
6. Lack of equal opportunities for all parties with regards to investing and the benefits of generated wealth
7. Concerns for the process of moving innovative energy services into “business as usual”
8. Lack of a true participation from ALL actors in the energy chain (e.g. is there a clear pathway for consumer/prosumer representation through aggregation and are there viable business cases for aggregation in existence)

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9. Lack of belief from consumers/prosumers in the narrative of empowerment described in the SYNERGY project, i.e. instead they believe 'empowerment' is not a consumer/prosumer focussed initiative and is in fact merely a tool to promote business agendas
10. Insufficient understanding of the risks versus potential of financial benefits of innovate energy services in contrast to commodity sales
11. Lack of robust auditing procedures and/or lack of penalties of non-compliance with energy efficiency obligations resulting in reluctance to switch to innovative energy services
12. Lack of sustained commitment due to innovative energy services being introduced in stages over a long period
13. Lack of trust between local users/consumers and professional stakeholders (e.g. DSO/TSO)
14. Perceived lack of democratic legitimacy within the energy system (e.g. lack of; a clear cost of infrastructure and operations framework, stakeholder engagement, communication between utilities and consumers)
15. Lack of clarity with regards to profit and losses from innovative energy services (e.g. lack of regulatory and national planning, lack of clear pathways to innovation adoption)
16. Lack of consideration towards diversity of interests from various stakeholders in new innovative energy services
17. Lack of awareness from consumers towards flexibility, opportunity, cost saving and revenue generation
18. Exclusion of societal groups (e.g. vulnerable groups such as elderly) due to lack of knowledge, capability or access to innovative energy services
19. Perception that the energy system is vulnerable to cyber-attack or data security issues
20. Are there any other socio-economic boundaries that may hinder the realisation of this demo case? Y/N – If yes, please explain

Organisational barriers

Please rate the impact of the following issues as potential barriers for innovation with regards to its application to your demo use case (1 - Not Important and 5 - Very Important).

1. Lack of agency in the business (e.g. Lack of ownership of building and/or supply equipment)
2. Lack of appropriate systems or professionals to recognise data value
3. Lack of energy management personnel/management systems
4. Lack of skilled professionals for combining energy data
5. Lack of knowledge and familiarity with renewable energy systems
6. I.T. infrastructure insufficient for data processing and storage
7. Lack of appropriate data governance in place to be able to identify valuable data from the vast quantities of data generated
8. Lack of compatibility of multi-source data
9. Data synergy being overly complex due to the variety of models, scales, parameters and outputs of data
10. Reluctance to adopt new business models (inertia) in favour of current model
11. Focus placed on daily operations leading to neglection of value of external data
12. Data Interoperability not being perceived as an important issue
13. Reluctance to abandon closed ICT systems
14. Perception that sharing data means data leaving premises

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15. Concerns over GDPR and associated penalties
16. Lack of knowledge with regards to new secure data sharing technologies
17. Are there any other organisational boundaries that may hinder the realisation of this demo case? Y/N - If yes, please explain below

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