

D.1.2.1: KPIs DEFINITION AND MAPPING INVOLVED STAKEHOLDERS

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SO 1 / Title:	Reducing the peak loads by pilot actions
Activity 1.2 Pilot action implementation	<p>The activity focuses on the pilot action implementation. Therefore, the pilot partners test the pilot performance. A brief Strategic Environmental Assessment (SEA) will be conducted where and if needed. Pilot partners define, select the suitable KPIs to be monitored and presented in corresponding reports and afterwards also in evaluation reports (D.1.3.1). The KPIs will consist of qualitative (questionnaire for the interviews) and quantitative indicators.</p> <p>Additionally, mapping of key and most relevant stakeholders for the pilot actions, strategy and action plan concept (development and implementation) is foreseen. It contains the list of stakeholders on local, regional, national and transnational level by all partners. The stakeholders will be relevant for the development and implementation of the proposed actions. Categories of stakeholders are created, and these are then used to identify specific stakeholders.</p> <p>The co-working groups will be established to ensure the joint transnational cooperation where the partners will interact among each other during the online or live meetings/workshops to co-design & co-develop the pilot actions. Based on this, 8 pilot actions (described under Investment) will be jointly implemented. LP and PP10 will lead partners-to-partners transnational online interaction. The outcomes of it will be used in the strategic part of Master plan and in pilot development and implementation phase. LP and PP10 guide and direct each pilot site and technical partner in pilot development. The groups will be composed of the pilot and non-pilot partners. At least 1 joint online meeting should take place especially in the early phase of the pilot development and implementation.</p> <p>A focus group for each pilot will be established and built around the pilot's priorities and key stakeholders. The group meets at least twice during the period of pilot to learn about the progress and to advise on the implementation. Focus groups are small, moderated discussions with the stakeholders. Regularly communicate the progress of the pilot action to relevant stakeholders. Pilot partners discuss with the local stakeholders and ASP on the pilot development, inform them on the progress. Non-pilot partners also organize meetings with the stakeholders and ASPs and present the pilot action progress from other countries for later transfer into their areas.</p> <p>Nevertheless, 8 pilot actions will be implemented in the early stage of the project to collect the data to use in the later stages of the project.</p> <p>Communication activities base on the press article, at least one video per pilot site demonstrates the variety of solutions. Online interviews with LP & two selected PPs on the implementation of pilot actions are sent via livestream on the project's social media channel (YouTube, LinkedIn, Twitter). Roll-up production is expected to be used during the live events and some promotional material. Activity leader is LP.</p>
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The summary

Quantitative KPIs are metrics collected from smart meters and monitoring systems to evaluate the performance of pilot projects focused on energy efficiency and peak load reduction. These indicators measure aspects like the percentage and amount of peak load reduction on the network and the amount of internally used energy. Each pilot project also identifies specific KPIs that align with their unique goals and features. These KPIs help track progress, pinpoint areas for improvement, and support decision-making, ensuring the projects achieve their objectives and contribute to overall energy efficiency and sustainability. The collected data and calculated KPIs will provide a clear and objective basis for evaluating the success and impact of the pilot actions, facilitating strategic planning and effective replication of successful measures.

The KPIs are divided into the:

- **Mandatory KPIs** (compulsory for all pilot actions)
- **Pilot-specific KPIs** (each pilot site defines 2-3 specific KPIs based on their unique features and project goals)
- **General quantitative KPIs** (these KPIs standardize the assessment of the overall project impact, focusing on energy efficiency, carbon emissions reduction, and integration of renewable energy sources.)

Qualitative data will be also gathered through the questionnaires which will give an overview of how the stakeholders see the individual pilot activity, what is their attitude towards the pilot, what is their understanding of the project content, whether the pilot implementation has the possibility of replication, etc. As part of the project, it was prepared two questionnaires, one for pilot countries, the other for non-pilot countries. Questionnaires will be distributed at stakeholder events.

Each partner identified key stakeholders and players necessary for the implementation and future replication of pilot systems, master plans, and solutions. These stakeholders, forming Focus Groups in each country, will interface between ESINERGY and partners. They come from various levels—local, regional, national, and transnational. The stakeholders include internal and external parties, where internal stakeholders are directly involved in management and highly impacted by the company's success, while external stakeholders are indirectly affected by the company's activities.

The identified stakeholders will participate in multiple events such as Focus Groups, exploitation workshops, demonstration events, engagement sessions, policy forums, solution development collaborations, and various webinars. These activities will keep them informed and involved in the project's progress, enabling them to provide valuable insights and recommendations. The goal is to facilitate knowledge transfer, foster collaboration, and ensure the successful implementation and replication of energy solutions across different regions.

The Strategic Environmental Assessment (SEA) indicates that the establishment of energy management systems and energy communities in Austria and Hungary is environmentally benign. Other pilot activities like installing two-way charging stations in Slovenia, heat pumps in Ukraine, and battery and PV systems in Croatia, Bulgaria, and Bosnia and Herzegovina have minimal environmental impact, primarily due to their small scale and implementation within existing buildings. These installations are not located in protected areas, ensuring no harm to natural habitats, and proper waste management practices will be followed for batteries. Each pilot project aims to reduce peak loads in energy networks, with specific benefits highlighted for each country. For instance, Slovenia's solar power integration reduces emissions and promotes renewable energy, improving air quality. Croatia's battery storage system supports peak load reduction, indirectly benefiting the environment by decreasing reliance on fossil fuel power plants. Austria's and Germany's initiatives focus on utilizing local renewable resources and managing electricity use to reduce CO2 emissions. Hungary's energy awareness campaign promotes the use of renewables, aiming to decrease greenhouse gas emissions and enhance public environmental consciousness. In Ukraine, the combination of heat pumps and solar energy for hospitals aims to provide sustainable energy solutions and reduce peak electricity consumption, especially critical due to the current energy supply challenges.

Introduction

The aim of the document is to provide Key performance indicators for pilot actions, identify the stakeholders in each of the participating country and make a brief Strategic Environmental Assessment (SEA) for various pilot projects across several project countries. These pilots focus on implementing energy management systems, renewable energy installations, and energy storage solutions to reduce peak loads in energy networks.

The document will serve to record all the indicators defined by the pilot countries and to map the stakeholders. It is about documenting all the basic data, which will later be needed in other relevant documents, and based on it, data and analyses are also being prepared.

Looking from the broader perspective the document is also set against the backdrop of increasing energy demands and the need for sustainable energy solutions to mitigate environmental impacts. It highlights the importance of transitioning to renewable energy sources and improving energy efficiency to address climate change and reduce greenhouse gas emissions. The pilot projects are part of a broader initiative to test and demonstrate innovative energy solutions that can be scaled up and replicated across different regions.

The document covers the following key areas:

- **Assessment of environmental impact:** It evaluates the potential environmental impacts of various pilot projects, such as the installation of two-way charging stations, heat pumps, and energy storage systems. The assessment ensures that these projects have minimal or negligible impacts on the environment. The document emphasizes the importance of

sustainable practices, such as proper waste management for batteries and the integration of renewable energy sources.

- **Key performance indicators establishment:** It provides detailed descriptions of pilot projects in countries like Slovenia, Croatia, Austria, Germany, Hungary, Bulgaria, Bosnia and Herzegovina, and Ukraine. Each project is analysed for its specific contributions to reducing peak loads, promoting renewable energy, and enhancing energy efficiency. Thus, three main indicators have been defined (mandatory, pilot-specific and general KPIs) to check the pilot progress and achievements/success.
- **Stakeholder engagement and learning opportunities:** The document highlights the role of stakeholders in the pilot projects and in the non-pilot countries, including their involvement in data collection, focus groups, and awareness-raising. It aims to provide valuable learning opportunities and foster collaboration among stakeholders to promote the successful adoption of energy innovations in the non-pilot countries.

It should be noted that the partnership is structured in such a way that eight countries (SI, HR, AT, DE, HU, BG, BIH and UA) represent pilot countries, while the remaining four countries (SK, RS, RO and ME) are non-pilot countries, which also affects project activities. In principle, the project is designed so that the non-pilot countries transfer the pilot solutions to their environment and learn from the pilot countries.

Pilot actions in a nutshell

The objective of the pilot actions is to reduce the peak loads of the energy network. The table below shows us a list of the pilot actions to be implemented in each pilot country.

COUNTRY	Titel of the pilot action
SLOVENIA	Smart concept for solar electricity flow and use
CROATIA	Battery system in Administrative building of MED

AUSTRIA	Monitoring Equipment Campus Innovation Centre WEIZ
GERMANY	Monitoring & control of decentralized plants/assets
HUNGARY	Energy community establishment
BULGARIA	Smart battery management
BOSNIA and HERZEGOVINA	Installation of the PVPP with a battery system
UKRAINE	Heat pumps for local hospital

Quantitative KPIs

Quantitative data are collected from smart meters and specific monitoring systems installed in the pilot actions. These data will be used to calculate Key Performance Indicators (KPIs) that provide precise information about the pilot actions. This detailed information is crucial for evaluating the implementation of these actions in the third project period.

Key Performance Indicators are essential for evaluating and monitoring the effectiveness of the pilot actions. They will assess technical, efficient and environmental aspects. A comprehensive set of KPIs will be identified to provide ESINERGY Project Partners (PPs) with a robust tool for monitoring the success of the pilots and evaluating the potential impacts and benefits of replicating these actions to reduce peak loads.

The quantitative KPIs will serve multiple purposes: tracking progress, identifying areas for improvement, and ensuring that the pilot actions meet their intended goals. These indicators will offer a clear and objective basis for decision-making and strategic planning.

Each KPI must be assessed at different stages of pilot actions, following the contents and timeline outlined in document D.1.3.1. This staged evaluation approach will ensure that the data reflects the evolving dynamics of the pilot projects and provides timely insights for necessary adjustments.

By systematically collecting and analysing this quantitative data, we aim to establish a reliable framework for evaluating the effectiveness and sustainability of the pilot actions, ultimately contributing to the broader goals of energy efficiency and peak load reduction.

Thus, the pilot action partners had to identify the indicators in the frame of the three indicators' pillar:

- Mandatory KPIs
- Pilot specific KPIs
- General KPIs

Mandatory KPIs

This sub-chapter serves as a comprehensive guide defining the calculation methodology for determining the mandatory Key Performance Indicators (KPIs) associated with peak load reduction. Its fundamental objective is to establish a standardized approach, ensuring uniformity and consistency in the calculation process across all pilot actions. By adhering to a common methodology outlined herein, stakeholders can effectively gauge and compare data, facilitating seamless analysis and interpretation.

The significance of this methodology extends beyond mere computation; it lays the groundwork for coherent decision-making and strategic planning aimed at optimizing energy efficiency. With a shared understanding of the calculation framework, stakeholders can accurately assess performance metrics, identify areas for improvement, and devise targeted interventions to achieve sustainable peak load reduction objectives.

The use of a standardized methodology fosters synergy among diverse stakeholders and promotes interoperability within the energy ecosystem. Consistency in data interpretation streamlines internal processes and also enhances external communication and collaboration with regulatory bodies and other relevant entities.

This description gives us the tools we need to make our energy-saving efforts stronger and more effective.

The data that will be obtained based on the calculations below will be presented in deliverable D.1.3.1.

The LP proposed three mandatory indicators with the accompanying calculation methodology:

Calculation methodology:

1. The percentage (%) of network's peak load reduction achieved

Calculation method:

The percentage of network peak load reduction achieved is a measure of how much the peak demand on the network has been reduced compared to its maximum peak load of energy network by previous month / year. This reduction is the result of demand-side management (in case of SI, this will be the support of the battery that is in the electric car, in case of HR, BG and BA pilot it is energy battery, in UA it is storage of heated water, in DE & AT it is a smart management of other capacities (the entire system, water, etc.) and in HU it is the total indicative power of the power plant that the energy community will build in the future.

In case that the load reduction of the electricity network is displayed only for a few months, the same calculation is made for an individual month as indicated below for the annual reduction. Then all the monthly load reduction calculations are added up and the result is divided by the number of months we processed.

The data we need for the calculation is taken from the existing databases on the operation of the electricity network, as well as from the databases of the smart metering system.

The formula to calculate the percentage of peak load reduction is:

$$\text{Peak load reduction (\%)} = \frac{\text{max peak load of the system} - \text{peak load with reduction}}{\text{max peak load of the system}} \times 100$$

Measurement unit:

%

2. The amount of kilowatts (kW) of network's peak load reduction achieved

Calculation method:

To determine the amount of kilowatts (kW) of network peak load reduction achieved, we would deduct the peak load with reduction from the peak load without reduction. This data/information is already shown in the previous indicator, namely from the upper part of the formula: (max peak

load of the system – peak load with reduction). The data is important because it shows the power for which it was possible to reduce the load on the electrical network and will serve us in the future for calculations of the wider impact of the pilots in case of replication.

The formula to calculate:

Peak load reduction (kW) = Total peak load of the system by previous month/year – Peak Load with Reduction by month/year after installation of pilot

Measurement unit:

kW

3. The amount of energy (kWh) used »internally« – off-grid power

Calculation method:

To calculate the amount of energy (kWh) used internally ...

in SI: with the support of car battery,

in HR, BG and BA: with the support of energy battery,

in UA: with the support of heated water storage,

in DE & AT: with the support of smart management of other capacities (the entire system, water, etc.),

in HU: total indicative production of energy from renewable sources by the power plant that the energy community will build in the future

... (off-grid power), we would need to sum of the energy consumption of all devices/systems that operate independently of the main electric grid in building.

We need to find the difference in the amount of energy that was produced locally and stored in existing battery (or other) capacities and then used to operate devices within the local system in building. These are (renewable) energy flows that have no need and do not affect the electricity grid.

The calculation formula for the total amount of energy used "internally" or off-grid:

Total off-grid energy used = Total use of electricity - Use of electricity from the grid

Measurement unit: kWh

Pilot specific Quantitative Key performance indicators

In this chapter it is presented all pilot specific indicators that were determined by each pilot country. Each pilot site needed to define specific Quantitative Key Performance Indicators (KPIs) to meet the pilot action objectives outlined in D.1.1.1. Partners had to identify 2-3 pilot-specific KPIs based on the unique features of their pilot investments, while also aligning with the general project goals, such as reducing peak load and connecting to the energy network/system.

Partners had to also provide detailed information for each KPI, such as:

- Title of the indicator (give a clear and concise name to each KPI)
- Calculation method (explain how each KPI will be calculated).
- Measurement unit (specify the unit of measurement (e.g., kW, kWh, tCO₂/y).

Partners also needed to focus on energy values, KPIs should reflect energy-related values such as:

- Installed power (kW)
- Installed capacity (kWh)
- Energy produced/consumed (kWh)
- CO₂ reduction (tCO₂/y)

Pilot partners must ensure the values are specific to pilot site and not standardized across all pilot sites. The method recommended for data collection are the following:

- smart metering equipment installed during pilot actions to gather data.

The indicators could be also developed and determined based on the pilot project design documentation (done by the external experts if needed). Pilot partners had to first agreed on the KPIs with Lead Partner (LP) and Activity leaders (AL). Partners have still the possibility to update KPIs if needed during the Mid-term review reports (D.1.2.4).

Partners will ensure that their pilot-specific KPIs are effectively measured and aligned with both their individual objectives and the overall project goals.

Here are the pilot specific indicators divided by pilot countries:

Slovenia and Bulgaria:

The Slovenian pilot specific KPIs are the same as the mandatory indicators.

KPI #1: The percentage (%) of network's peak load reduction achieved

Calculation method:

The percentage of network peak load reduction achieved is a measure of how much the peak demand on the network has been reduced compared to its maximum peak load of energy network by previous month / year. This reduction is the result of demand-side management - in our case, the support of the battery that is in the electric car.

If the load reduction of the electricity network is displayed, the same calculation is made for an individual month as indicated below for the annual reduction. Then all the monthly load reduction calculations are added up and the result is divided by the number of months we processed.

The data we need for the calculation is taken from the existing databases on the operation of the electricity network, as well as from the databases of the newly developed application.

The formula to calculate the percentage of peak load reduction is:

$$\text{Peak load reduction (\%)} = \frac{(\text{max peak load of the system} - \text{peak load with reduction})}{\text{max peak load of the system}} \times 100$$

Measurement unit: %

KPI #2: The amount of kilowatts (kW) of network's peak load reduction achieved

Calculation method:

To determine the amount of kilowatts (kW) of network peak load reduction achieved, we would deduct the peak load with reduction from the peak load without reduction. This data/information is already shown in the previous indicator, namely from the upper part of the formula: (max peak load of the system - peak load with reduction). The data is important because it shows the power for which it was possible to reduce the load on the electrical network and will serve us in the future for calculations of the wider impact of the pilots in case of replication.

The formula to calculate:

Peak load reduction (kW) = total peak load of the system by previous month / year – Peak Load with Reduction by month / year after installation of pilot

Measurement unit: kW

KPI #3: The amount of energy (kWh) used »internally« (with support of battery in car) – off-grid power

Calculation method:

To calculate the amount of energy (kWh) used internally with the support of batteries in car (off-grid power), we would need to sum of the energy consumption of all devices / systems that operate independently of the main electric grid in building.

We need to find the difference in the amount of energy that was produced locally and stored in existing battery capacities and then used to operate devices within the local system in building. These are (renewable) energy flows that have no need and do not affect the electricity grid.

The calculation formula for the total amount of energy used "internally" or off-grid would be:

Total off-grid energy used = total use of electricity - use of electricity from the grid

Measurement unit: kWh

Croatia:

KPI #1: Battery percentage - State of charge (SoC)

Calculation method:

$$\text{State of charge (\%)} = \frac{\text{battery charge level}}{\text{maximum charge available of the battery}}$$

Measurement unit: %

KPI #1a: Current percentage of charging/discharging power

Calculation method:

$$\text{Power percentage (\%)} = \frac{\text{available charging power (current)}}{\text{max. (rated) charging power (current)}}$$

Measurement unit: %

KPI #2: Percentage of energy stored in battery system from PV and from grid (monthly, annually)

Calculation method:

$$\text{energy stored in battery system from PV} = \frac{\text{total produced energy from PV} - \text{feed electricity} - \text{currently consumed electricity from PV}}{\text{total energy stored in battery}}$$

$$\text{energy stored in battery system from grid} = \text{total energy stored in battery} - \text{energy stored in battery system from PV}$$

Measurement unit: %

Austria:

KPI #1: Energy consumption supplied by external sources

Calculation method:

- Total thermal/electrical energy consumption of the pilot system, supplied by external sources for one year $E_{c,tot}$ [kWh]
- Calculation of Key Performance Indicator:

$$KPI_1 = E_{c,tot}$$

Measurement unit: kWh

KPI #2: Energy self-sufficiency

Calculation method:

Consumed energy from self-production of local RES system in a year $E_{self-RES}$ [kWh]
Total thermal/electrical energy consumption of the pilot system for one-year $ETOT$ [kWh]
Calculation of Key Performance Indicator:

$$KPI_2 = [E_{self-RES} / ETOT] \times 100 \%$$

Measurement unit: %

Germany:

KPI #1: Number of installed hardware components - added value is the identification of the technical challenges and determination of the required hardware and measured values

Calculation method: counting components

Measurement unit: number

KPI #2: Data availability in our systems

Calculation method: counting datapoints

Measurement unit: number

KPI #3: Forecast quality

Calculation method: deviation between forecast and reality

Measurement unit: percentage

KPI #4: Installed flexible power

Calculation method: counting installed kilowatt of hardware

Measurement unit: kilowatt

Hungary:

KPI #1: Annual energy production

Calculation method: Based on the produced energy. PV power production will be obtained from the PV inverter. Energy generated by the oil generator and the mini wind turbine will be measured by a smart meter. (Or for easy-of-use, possibly also including the PV.) The 15-minute measuring periods will allow peak load analysis.

Measurement unit: kWh

KPI #2: Annual energy consumption

Calculation method: Based on the used energy. A smart energy meter will be installed in the consumption site. The 15-minute measurement intervals will allow analysis of peak load.

Measurement unit: kWh

KPI #3: Number of energy community members

Calculation method: Members who join the energy community. Initially (as written in proposal) only 2 members are planned (one producer, one consumer). However, the system is designed in a way so as to in year 2 and 3 of the project the energy community can be expanded.

Measurement unit: Number of the members (institutions / persons / SMEs)

Bosnia and Herzegovina:

KPI #1: Installed solar power

Calculation method: It will be calculated based on power of installed solar panels and inverter.

Measurement unit: kWh

KPI #2: Energy production from PVPP

Calculation method: Produce energy from solar panels will be metered by smart metering. Pilot plant will be attached to application through which will be monitored energy that solar panels produce.

Measurement unit: kWh

KPI #3: Installed power of battery system

Calculation method: Installed power of the battery system will be based on capacity of the battery and on energy that battery will give to system.

Measurement unit: kWh

KPI #4: Direct used energy from the PV System and storage

Calculation method: Through smart metering and application will be monitored how much energy in system is given by solar panels and by battery system.

Measurement unit: kWh

KPI #5: Energy used for EV charging

Calculation method: Through smart metering will be monitored energy that will be used for charging of the EVs in ownership of the JP Elektroprivreda BiH d.d. – Sarajevo. System will be connected on existing EV system for EV charging.

Measurement unit: kWh

Ukraine:

KPI #1: Annual amount of heat production by the heat pumps

Calculation method: The volume of heat energy production will be monitored by a corresponding energy meter, which will be installed and will record exclusively the production of the heat pump. The data will be recorded monthly by the city council's energy management unit.

Measurement unit: kWh

KPI #2: Amount of traditional energy consumption decreasing in hospital at all due to operating the heat pumps

Calculation method: Reduction of the average annual volume of thermal energy consumption for the heating needs of the entire hospital. It will be determined in comparison with the base indicator - average value of energy consumption for the last 3 years (2021-2023).

Measurement unit: kWh

KPI #3: Decreasing of CO2 emissions

Calculation method: Reduction of the total amount of emissions produced as a result of the hospital's energy consumption in comparison with the average emissions for the last 3 years (2021-2023). It is expected that emissions will be reduced due to less consumption of traditional energy for heating needs, as well as the use of green electricity from PV station.

Measurement unit: tCO₂/y

General Quantitative Key performance indicators

General Quantitative Key Performance Indicators (KPIs) are essential metrics that allow us to measure the success and impact of the overall project. These KPIs provide a standardized way to assess whether the project is meeting its broader goals and objectives, such as improving energy efficiency, reducing carbon emissions, and enhancing the integration of renewable energy sources. By setting and monitoring these KPIs, we can ensure that all pilot sites contribute effectively to the collective aims of the project.

The pilot partners selected 1-2 general indicators, which are presented below:

The title of the indicator	Calculation method	Measurement unit
SLOVENIA:		
KPI #1: Pilot action "Smart concept for solar electricity flow and use" implemented during the project lifetime	Submitted partner report and conducted pilot action	Number of pilot actions Implemented
KPI #2: The number of people informed about the pilot action and results	Counting people through mailing list, e-news	Number
CROATIA:		
KPI #1: Action implemented (Installed battery system)	Submitted partner report and conducted pilot action	Number of pilot actions implemented
KPI #2: Estimated number of people benefiting from the pilot action	people working in the Administrative building in the Knowledge Centre of Medjimurje County	Number
AUSTRIA:		
KPI #1: Implementation of an electrical storage system to reduce the peak load	Storage is implemented in the power grid of the Innovation Centre W.E.I.Z. and is operating	kWh stored
KPI #2: Other innovation centre or business parks benefit from the pilot action	All innovation centres in middle Europe	Estimated number
GERMANY:		
KPI #1: Stakeholders involved	Counting stakeholders	Number
KPI #2: Estimated number of people benefiting from the pilot action	Counting people	Number
HUNGARY		
KPI #1: Energy community ready to be launched as planned	Energy community which is ready to be established	Number
KPI #2: Number of energy community members benefiting from the pilot action	Counting members willing to join to the energy community	Number
BULGARIA		
KPI #1: Pilot action "Smart battery management" implemented during the project lifetime	Submitted partner report and conducted pilot action	Number of pilot actions Implemented

KPI #2: The number of people informed about the pilot action and results	Counting people through mailing list, e-news	Number
BOSNIA and HERZEGOVINA		
KPI #1: Energy produced by pilot plant	Produced energy will be monitored through system that will be established on pilot plant	Number
KPI #2: Reduction of the peak loads	It will be recorded peak loads, and it will be compared with previous periods (2023) for result of reduction of peak loads.	Number
UKRAINE:		
KPI #1: Action implemented	Documenting project milestones and completion of predefined tasks as outlined in the project plan	+/-
KPI #2: Installed heat pumps power	Information will be taken from the technical indicators of the installed equipment	kWh
KPI #3: Estimated number of people (personnel and patients) benefiting from the pilot action	Documented annual number of personnel and patients of the therapeutic and rehabilitation departments of the hospital	persons

Qualitative KPIs

Qualitative data consist of the socio-economic questionnaires/surveys. It is about to:

- gauge the public's attitude to pilot measures.
- measure the extent to which they feel part of the intervention and
- evaluate the possibility for capitalisation of the intervention: The market appraisal aspect showing where the particular pilot stands & what is the replication potential towards the neighbourhood (new pilot areas).

In addition to the quantitative data, further questionnaire for obtaining the qualitative data has been developed. The questionnaire is enclosed to this document as the annex. It has been provided by LP and PP10. The aim of the questionnaire is to gain insights of the awareness among the participants at the ESINERGY stakeholder and other engagement meetings (D.1.2.3, D.1.3.1, D.2.2.1, D.3.1.1). All results will be evaluated and presented in two deliverables:

- D.1.3.1 Quantitative and qualitative evaluation of the pilot actions: where the input from D.1.2.3 and D.1.3.1 (one) will be provided and used for the Master plan (in WP2)

and in

- D.3.1.2: Policy brief solution for the peak load reduction and energy self-sufficient prosumers: where the input from D.2.2.1 and D.3.1.1. will be integrated for aiming the improvement in downstreaming and upstreaming engagement (A.3.2).

Mapping of relevant stakeholders

Each partner identified the representatives or relevant stakeholders as well as selected players whose support will be needed for the future implementation of the pilot systems, master plan and solution development or any other replication actions/meetings. These actors compose the Focus group in each country and will be the main interface between ESINERGY and the partners, therefore each partner has to include/recruit and invite stakeholders from their country that belong to the local/regional/ national/transnational level. Also, non-pilot countries established the Focus group of stakeholders in order to engage them and transfer the pilot solutions in their environment as well.

The stakeholders will be invited to the following events:

- D.1.2.3: Focus Groups to keep stakeholders and associated partners engaged (all PPs – 2x)
- D.1.3.1: Quantitative and qualitative evaluation of the pilot actions – exploitation workshop (only pilot partners - 1x)
- D.1.4.2: Outdoor demonstration event (only pilot partners – 1x)
- D.2.2.1: Stakeholder engagement sessions (all PPs – 3x: each country organizes on the local level 1 focus group workshop, 1 SWOT analyse workshop, 1 finding measures workshops.)
- D.2.2.4: Policy forum for the adoption of the Master plans (all PPs – 1x)
- D.3.1.1: Collaboration of partnership, stakeholder and associated partners in solution development (all PPs – 1x)
- D.3.2.1: Solution rolled-out to the non-pilot countries (only non-pilot partners – 1-2x)
- D.3.2.2: Matchmaking events with the new energy prosumers (only pilot partners – 1x)
- D.3.2.3: Individual consultations and advocacy activities with the policy makers for solution taken up (all PPs – 2x)
- D.3.2.4: Follow-up meetings with the governmental bodies (all PPs – 1x)
- D.3.3.1: Transnational webinar for policy authorities (all PPs – 1x)
- D.3.3.2: Transnational webinar for energy producers (all PPs – 1x)
- D.3.3.4: Final project conference (all PPs – 1x)

The Focus group should moreover serve as a knowledge transfer vehicle for the other work packages and opinion makers and recommendation/suggestion providers for improvements.

They are often divided into two groups of internal and external stakeholders:

- **Internal Stakeholders** of a company are those parties, individuals or groups, that participate in the management of the company. They can influence and can be influenced by the success or failure of the entity because they have vested interest in the organisation. Primary stakeholders is the second name of the Internal stakeholders. Internal stakeholders provide services to the company. They are highly affected by the decisions, performance, profitability and other activities of the company. In the absence of internal stakeholders, the organisation will not be able to survive in the long run.
- **External Stakeholders** are those interested parties, who are not a part of the management, but they are indirectly affected by the work of the company. They are the outside parties which form part of the business environment. They are also known as Secondary Stakeholders. They are the users of financial information of the company, to know about its performance, profitability, and liquidity. External stakeholders do not participate in day-to-day activities of the entity, but the actions of the company influence them. They deal with the company externally. They have no idea about the internal matters of the company.

The task of the partners was to identify their national/regional/local stakeholders, who will be involved in various events to actively participate in the implementation of pilot activities, in the development of transnational strategies and in the development of solutions.

The partners arranged the stakeholders based on the categories of target groups in the application form and based on external and internal stakeholders.

Categories of stakeholders are the following:

- EUSDR
- National authorities (ministries, bodies responsible for policy development and implementation in the energy field) + different state-owned entities
- Regional authorities (bodies responsible for policy development and implementation in the energy field)
- Local authorities (municipalities')
- Energy producers (households, farmers, cities, utilities, power plants, local and regional utilities), energy distributors, energy providers (for sustainable electricity & heat energy), energy distributors, technical experts
- Sectoral agencies: local or regional development, environmental, & energy agencies
- NGOs
- Universities, research institutions, energy planning experts
- SMEs: Companies, farms and other individual investors (households) in e.g., photovoltaics or other energy-producing systems/entity
- Others

Here is the list of the stakeholders in each participating country:

Group (internal or external stakeholders)	Category of stakeholder and the name of the stakeholder	Role of stakeholder	Approach, method and tools for integration into to project of the stakeholders, communication channels (e.g.: phone, emails, invitation letter, personal acquaintance)
SLOVENIA			
External stakeholder	FOTOVOLT – Samo Vrečič	Installer photovoltaic	Invitation letter and through phone
External stakeholder	ENERTEC – Bojan Horvat	Installer photovoltaic Company Moja elektrarna brings to the market sophisticated and comprehensive energy solutions in combination with the use of solar energy.	Invitation letter and through phone, e-mail.
External stakeholder	FACULTY OF ENERGY ENGINEERING – Prof. dr. Peter Vrtič	Head of the Laboratory for Energy Conversion	Invitation letter and Through phone
External stakeholder	Seller of the electric vehicle	KIA, Hyundai	Through phone
External stakeholder	Supplier of charge station	TELEM – Goran Popović	Through phone
External stakeholder	ENERGIJA PLUS	Matjaž Vodušek, Valentina Sabol Prapotnik - Head of Marketing and PR	Invitation letter
External Stakeholder	Local energy agency Dolenjska, Posavje, Bela Krajina (LEAD)	Irena Lisac	Through phone
External Stakeholder	Goriška Local Energy Agency (GOLEA)	Rajko Leban	Through phone
External Stakeholder	Energy and Climate Agency of Podravje (ENERGAP)	Vlasta Krmelj	Through phone
External Stakeholder	Energy Agency of Savinjska, Šaleška and Koroška region (KSSENA)	Boštjan Krajnc)	Through phone
External Stakeholder	Local energy agency Spodnje Podravje (LEA Spodnje Podravje)	Roman Kekec	Through phone

External Stakeholder	Local Energy Agency of Gorenjska (LEAG)	Črtomir Kurnik	Through phone
External Stakeholder	TV AS	Simon Balažic (director and responsible editor)	Through phone
External Stakeholder	TV IDEA – kanal 10 d.o.o.	Mitja Podgajski (director and responsible editor)	Through phone
External Stakeholder	Association of Municipalities and Towns of Slovenia (SOS)	Miha Mohor (director)	Through phone
External Stakeholder	Solar cooperative, green energy	Tomaž Zver (director)	Through phone
CROATIA			
Internal/external	Local authorities (Towns – Čakovec, Mursko Središće, Prelog)	Participation in focus group and other project events, transfer of knowledge, potential/possibility to replicate pilot approach	Direct approach via e-mails, in-person contact, invitation letter; method and tools: focus group meetings, questionnaires
Internal/external	State-owned entity – national fund (Energy Efficiency and Environmental protection Fund)	Participation in focus group and other project events, providing expert knowledge, consultation and dialogue, providing guidance on the topic where applicable	Direct approach via e-mails, in-person contact, invitation letter; method and tools: focus group meetings, questionnaires
Internal/external	National DSO (HEP ODS Ltd.)	Participation in focus group and other project events, providing expert knowledge, consultation and dialogue, providing guidance on the topic where applicable	Direct approach via e-mails, in-person contact, invitation letter; method and tools: focus group meetings, questionnaires
Internal/external	Regional DSO (HEP ODS d.o.o. Elektra Čakovec)	Participation in focus group and other project events, providing expert knowledge, consultation and dialogue, providing guidance on the topic where applicable	Direct approach via e-mails, in-person contact, invitation letter; method and tools: focus group meetings, questionnaires
Internal/external	Research institution (Energy Institute Hrvoje Požar)	Participation in focus group and other project events, providing expert knowledge, consultation and dialogue, providing guidance on the topic where applicable	Direct approach via e-mails, in-person contact, invitation letter; method and tools: focus group meetings, questionnaires
Internal/external	Other – Tourism Board (Tourism Board of Medjimurje County –TZMŽ)	Participation in focus group and other project events, transfer of knowledge, potential/possibility to replicate pilot approach	Direct approach via e-mails, in-person contact, invitation letter; method and tools: focus group meetings, questionnaires

Internal/external	SME (Technology-Innovation Centre Medjimurje Ltd - TICM)	Participation in focus group and other project events, transfer of knowledge, potential/possibility to replicate pilot approach	Direct approach via e-mails, in-person contact, invitation letter; method and tools: focus group meetings, questionnaires
Internal/external	SME (Medjimurje, investment, real-estate Ltd. - MIN)	Participation in focus group and other project events, transfer of knowledge, potential/possibility to replicate pilot approach	Direct approach via e-mails, in-person contact, invitation letter; method and tools: focus group meetings, questionnaires
Internal/external	Sectoral agency (Public institution for the development of Medjimurje County REDEA)	Participation in focus group and other project events, transfer of knowledge, potential/possibility to replicate pilot approach	Direct approach via e-mails, in-person contact, invitation letter; method and tools: focus group meetings, questionnaires
Internal/external	NGO (Energy citizen association Zeleni Prelog)	Participation in focus group and other project events, transfer of knowledge, potential/possibility to replicate pilot approach	Direct approach via e-mails, in-person contact, invitation letter; method and tools: focus group meetings, questionnaires
AUSTRIA			
External stakeholder	Stephan Pessl Wirtschaftsraum Weiz-St. Ruprecht	To learn from the implementation of Energy storages in buildings and to calculate savings and economic calculations	Mailings, personal acquaintance
External stakeholder	Gerald Hutter, Varicon	Provide technical solutions, calculations e.g	Mailings, personal acquaintance
External stakeholder	Robert Pratter, 4ward energy research	Researcher and support in research issues	Mailings, personal acquaintance
External stakeholder	Rafael Bramreiter, REALLABOR Weiz	Regional coordinator of energy issues	Mailings, personal acquaintance
Internal Stakeholder	Günther Maier, W.E.I.Z.	Energy expert	Mailings, personal acquaintance
Internal Stakeholder	Andrea Dornhofer, W.E.I.Z	Project manager	Mailings, personal acquaintance
Internal Stakeholder	Johannes Gruber, W.E.I.Z	Technical expert	Mailings, personal acquaintance
GERMANY*			
Internal	Matthias Füss	Head of supervisory board EWH as representative of the owners	personal acquaintance
Internal	Rufus Walk	Contact service provider for flexibility forecasting of the power plant	personal acquaintance
Internal	Volker Wiegand	CEO AllgäuNetz upstream grid provider	personal acquaintance
Internal	Katja Zitt	Contact AÜW service provider for energy trading	personal acquaintance

Internal	Florian Fischer	Contact AÜW service provider operation charging infrastructure	personal acquaintance
Internal	Philipp Reisigl	Contact AÜW smart region LoRaWAN operator	personal acquaintance
External	Herbert Hanser	Climat manager Municipality	personal acquaintance
External	Dr. Sabine Rödel	Major Municipality	personal acquaintance
External	Sebastian Morell	Contact power plant utility Oberstdorf	personal acquaintance
External	Indra Baier-Müller	District administrator local government	personal acquaintance
External	Armin Gross	CEO Hotel Prinz Luitpold Bad, Customer and charging infrastructure owner	personal acquaintance
External	Michael Sambale	CEO eza! Local energy agency	personal acquaintance
External	Eric Beißwenger	Bavarian Minister of State for European Affairs and International Affairs	personal acquaintance
External	Reinhard Pargent	Member municipality council & Member NGO Sonnwend e.V.	personal acquaintance
External	Michael Riedlinger	CEO ski resort Oberjoch, biggest consumers	personal acquaintance

* In the first step, and if successfully applied, the investment contributes to the reduction of upstream grid costs. Since these costs are regulated, all electricity consumers in the area of the grid operator benefit from this. In addition, the requirements for the upstream network operator could be reduced and thus the network expansion could also be reduced in this area. The upstream grid operator is AllgäuNetz GmbH & Co. KG from Kempten (Allgäu).
If, however, the distribution sector should also be given access to controllability of consumption devices, it would also be possible to intervene here as needed. In turn, increasing the contribution of the intervention as a whole.

The power plant operator is the primary beneficiary related to better forecasting of power plant deployment, provided that this can be used successfully from an economic point of view. In this specific case, the project partner is the power plant operator, as well as of the operator of the involved charging infrastructure. Other power plant operators from the region, such as Energieversorgung Oberstdorf, who have comparable power plants, will also be invited to join the stakeholder group. In addition, service providers involved in forecasting (HydroGrid) and energy trading service provider or data sensor operator (Allgäuer Überlandwerk), will also be involved. To include policy makers and civil society actors, we will invite participants from the municipality (Major, climate manager, district administrator), from the region (Bavarian Minister of State for EU and International Affairs), a regional energy association (eza!), a non-profit organisation (Sonnwend e.V.) and the owners of the municipal utility (Elektrizitätswende Hindelang). Finally, as the biggest electricity consumers in the region, representatives from the ski resorts and hotels will be invited.

HUNGARY

National authorities	Közigazgatási és Területfejlesztési Minisztérium	Participation in project events. Consideration of our pilot results and	Invitation to project events
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	(Ministry of Public Administration and Regional Development)	recommendations in policy development.	
Local authorities	Lenti Város Önkormányzata / Local municipality of Lenti	As owner of the field, continuously monitors the project activities, participate in project events, contributes to dissemination tasks.	Invitation to project events
Sectoral agencies	Lenti és Vidéke Fejlesztési Ügynökség Közhasznú Nonprofit Kft. (Lenti and Countryside Development Agency Public Benefit Non-profit Ltd.)	Participate in project events, contributes to the successful implementation of pilot action and dissemination tasks.	Invitation to project events
Sectoral agencies	Lenti Városgazdálkodási Kft. (Urban-management organization of Lenti)	As organization owned by the local municipality and responsible for town-management tasks, continuously monitors and supports the project activities.	Invitation to project events
NGOs	Lenti és Térsége Vidékfejlesztési Egyesület (Lenti and Region Rural Development Association)	Participation in project events, forward the information for relevant stakeholders / other settlements, raising public awareness of energy communities.	Invitation to project events
Universities, research institutions, energy planning experts	University of Pannonia	Support the project implementation with professional activities.	Invitation to project events
Energy producers, energy distributors, and technical experts	Energy community members	As members of the energy community, participate in the pilot activity implementation.	Invitation to project events
Energy producers, energy distributors, and	Representative of the power distributor (MVM or e-on), independent technical experts	Contributes to the project results, as operator of energy grid network.	Invitation to project events

technical experts			
SLOVAKIA			
Internal University	FAD STU	Vice dean of the Faculty of Architecture and Design, Slovak University of Technology in Bratislava, which is currently preparing the project of the implementation of RES on its building in the Bratislava city centre. The building is protected as national cultural monument.	Phone, email, personal contact
External Regional authority	Bratislava self-governing region	Head of the spatial plan of the region – Bratislava self-governing region interested in the collaboration in the issue of GIS solutions, RES applications on buildings and communities	Email, invitation letters
External Local authority	Bratislava - Nové Mesto district	Municipality in the Bratislava city district which has intensive collaboration with the Faculty of Architecture and Design and is interested in on solutions for reducing the energy demands of school buildings and buildings in their ownership	Email, invitation letters
External National authority	Slovak electricity transmission system - SEPS	SEPS is an energy company fully owned by the state, which performs the activities of the transmission system operator of the Slovak Republic as required by Directive 2003/54/EC. The main tasks therefore include the operation of the Slovak Transmission System, including dispatching.	Phone, invitation letters email, personal contact
External National authority	The Slovak Innovation and Energy Agency	The Slovak Innovation and Energy Agency, abbreviated as SIEA, is a state-funded organization that provides free energy consultancy, mediates the drawing of financial aid, prepares energy audits, concepts and studies and verifies the efficiency of	Phone, invitation letters email,

		operation of heating systems.	
External Sectoral agency	Slovak Green Building Council	Slovak Green Building Council – SKGBC is the main ambassador of sustainable construction in Slovakia. It brings together companies from various sectors of the economy supporting high-quality construction and renovation of buildings according to the principles of sustainability. It organizes events focused on sustainability in the construction industry with the aim of educating both professionals and the general public.	Phone, invitation letters email,
External Sectoral association	Buildings for the Future	Since 2013, the association Buildings for the Future (B4F) has actively shaped public policies with the aim of promoting a high-quality level of construction and renovation of buildings in terms of energy efficiency, the quality of the indoor environment and along principles of building sustainability.	Phone, invitation letters email,
External Sectoral association	Local Action Group (MAS)	The Local Action Group is a partnership of representatives of the public, private and civil sectors that operates in the cohesive territory of Dolný Liptov in Slovakia. It brings together enough experienced people and institutions, prepares and subsequently implements a strategy for the development of the given territory based on the principles of the LEADER approach. The implementation of the strategy consists primarily in deciding on the support of projects of local entities, including their monitoring, and in the implementation of joint development projects and programs.	Invitation letters, email,
External	Smart Cities Klub	The Smart Cities club is an original informal platform	Invitation letters, email,

Sectoral association		for the exchange of experience and cooperation between city leaders and experts in the preparation of strategies and programs on the way to a Smart City. Its mission is to change Slovak cities not only around using Smart technologies, but especially in the area of increasing the quality of life of their residents.	
External Sectoral association	CITENERGO	CITENERGO is an interest association of cities and municipalities for sustainable energy efficiency. The founding members included the cities of Košice, Nitra, Prešov, Kremnica, Vrábľa and Gelnica. It is a member of the pan-European association Energy-Cities and a main supporter and promoter of the Convention of Mayors on Climate and Energy. It is the founder and coordinator of the activities of the National Platform of the Convention with the aim of uniting local governments, representatives of the state administration and other subjects of the public, business and professional sectors in promoting goals in the field of energy transition and building climate resilience of cities.	Invitation letters, email,
External Sectoral association	Energy Centre Bratislava	It is an independent non-profit non-governmental organization whose main mission is to promote and support the rational use of energy with the focus on increasing energy efficiency in both the public and private sectors.	Invitation letters, email,
External SME	CADexpert	As a member and co-founder of the BIM (Building Information Modelling) Association of Slovakia, they take care of	Phone, email, personal contact

		a rich overview in the field of software solution development, their availability, delivery, as well as their correct use. BIM systems include energy audits of proposed or digitized buildings.	
BULGARIA			
External	Black sea energy cluster	<p>BSEC is created with a clear vision to promote good business relationships in benefit of environment, climate and green economy!</p> <p>The cluster members are organizations which produce technologies in the areas of renewable energy use and energy efficiency, or act as suppliers on different production and service levels. NGO' members of BSEC support Bulgarian Black Sea municipalities in their efforts to ensure sustainable development and effectiveness in the area. Apart from the local and regional authorities, the cluster operates in co-operation with Bulgarian Sustainable Energy Development Agency, universities and research institution in the Black Sea region.</p> <p>THE MAIN VISION for development of BSEC is: creating organization supporting decrease in the energy consumption, organization which supports the development of the renewable energy resources and effectively managing the energy flow in the Black Sea Local Region.</p>	<p>9000, Varna, Bulgaria</p> <p>4 Preslav str., floor 3</p> <p>tel. +359 889 596 507</p> <p>e-mail: bsec@abv.bg</p>
External	ICT Cluster Burgas	Founded in 2016, ICT Cluster Burgas is one of the most established and fastest growing technology clusters in Bulgaria. The	<p>Burgas 8000</p> <p>2 Dame Gruev str., Central Park</p>

		<p>cluster represents over 30 companies from the technology sector in the southeastern part of Bulgaria. We work with technology companies in the region from startups and SMEs to large multinational companies.</p> <p>We support our members to improve their technological skills, build relationships between them in a constantly changing technology industry, as well as expand their business in the southeastern region of Bulgaria.</p>	
External	ICT Cluster - Varna	<p>ICT Cluster - Varna unites organizations and experts sharing the idea of developing Varna as a natural hub for Information Technologies and Innovations in the Black Sea region and ready to contribute with financial resources, personal time and efforts to achieve these goals.</p>	<p>ICT Cluster Varna Varna, 9000 15 Ruse Str., floor 1 +359 876 658 296 office@ictclustervarna.com</p>
External	GREEN SYNERGY cluster	<p>Green Synergy is a cluster organisation implementing sustainable solutions in the following fields:</p> <ul style="list-style-type: none"> • Sustainable Energy Planning • Renewable Energy • Energy Efficiency • Renewable Energy Communities • Smart Cities and Positive Energy Districts • Biomass to energy • Bio-based industries 	<p>Green Synergy Cluster office@greensynergycluster.eu</p> <p>+359 876 79 96 80</p> <p>+032 / 306 197</p>
External	Sustainable Energy Development Agency	<p>Sustainable Energy Development Agency (SEDA) is a legal successor of the executive Energy Efficiency Agency (EEA).</p> <p>SEDA is a legal entity at state budget support with headquarters in Sofia and has the status of an</p>	<p>1000, Sofia 37 Ekzarh Yosif Str. Tel: +359 2 915 40 10 Fax: +359 2 981 58 02 office@seea.government.bg</p>

		executive agency within the Ministry of Energy.	
ROMANIA			
	National authorities:		
External	Autoritatea Națională de Reglementare în domeniul Energiei/ Autoritatea Națională de Reglementare în domeniul Energiei National Energy Regulatory Authority	Oversees the energy market in Romania, they can influence national policies in the energy field	E-mail, phone, invitation to the project events
External	Institutul Național Român pentru Studiul Amenajării și Folosirii Surselor de Energie/ Romanian National Institute for the Study of Planning and Use of Energy Sources	Research institute in the energy field, they can provide different type of solution and can propose solution for improving the pilot projects	E-mail, phone, invitation to the project events
	Regional authorities:		
External	ADR SV Oltenia	Non-governmental organization by of public law, Management Authority for Regional Funds in Sout West of Romania, they can finance different innovative solutions in the energy field	E-mail, phone, invitation to the project events, direct contacts, consultation
External	County Council Dolj	Regional Administration at Dolj county level – they are interested to develop different solution in capacity of production and storage of energy	E-mail, phone, invitation to the project events, direct contacts, consultation
	Local authorities:		
External	Craiova, Calafat, Băilești, Filiași, Bîrca, Segarcea, Grădinile	Municipalities, beneficiary of different type of energy interested to develop different solution in capacity of production and storage of energy	E-mail, phone, invitation to the project events, direct contacts, consultation
	Energy producers, energy distributors, energy providers, technical experts:		E-mail, phone, invitation to the project events, direct contacts, consultation

External	Complexul Energetic Oltenia/ Oltenia Energy Complex	Energy producer based on coal in majority, they can be beneficiary of the solution implemented through the pilot projects	E-mail, phone, invitation to the project events, direct contacts, consultation
External	Hidroelectrica Premier Energy Furnizare-energy provider and Transelectrica - energy distributor	Energy producer based on hydropower; they can be beneficiary of the solution implemented through the pilot projects	E-mail, phone, invitation to the project events, direct contacts, consultation
	sectoral agencies:		
External	Agenția pentru Protecția Mediului/ Environmental Protection Agency	APM participation at the project events can give us feedback related with the influence of the pilot project to the environment	E-mail, phone, invitation to the project events, direct contacts, consultation
	NGOs:		
External	Asociația Prosumatorilor și Comunităților de Energie/ Association of Prosumers and Energy Communities	This NGO can influence the politics in the energy field and working already in the creation of the first energy community in Romania	E-mail, phone, invitation to the project events, direct contacts, consultation
External	ASBO - Oltenia Bloggers Association, Cluster Bio Oltenia,	They will promote the project activities and green energies consumption	E-mail, phone, invitation to the project events, direct contacts, consultation
	Universities, research institutions, energy planning experts:		E-mail, phone, invitation to the project events, direct contacts, consultation
External	Universitatea din Craiova	UCV is interested to develop partnerships with similar organization and will assure feedback about the pilot projects implementation	E-mail, phone, invitation to the project events, direct contacts, consultation
External	ICMET- National Institute for Research, Development and testing in Electrical Engineering	ICMET can provide different solution to improve the energy efficiency of the pilot projects	E-mail, phone, invitation to the project events, direct contacts, consultation
	SMEs:		E-mail, phone, invitation to the project events, direct contacts, consultation
External	Jiul SA Craiova, ALM POWER Group, HIGHTEC Marina, Hotel EUPHORIA,	Potential beneficiaries of the results of the pilot projects	E-mail, phone, invitation to the project events, direct contacts, consultation

	Ramada Plaza Craiova, Evolve Intelligence SRL, RO Software,		
SERBIA			
	National authorities:		
Internal	Ministry of Construction, Transport, and Infrastructure of Republic Serbia	National government as support in the fields of energy efficiency, renewable energy sources, and sustainable development	kabinet@mgsi.gov.rs +381 11 361 521
Internal	Ministry of Construction, Transport, and Infrastructure of Republic Serbia	Sector for housing and architectural policy, communal activities and energy efficiency	stanovanje@mgsi.gov.rs +381 11 3640697 Dusan Radonjic Assistant Minister
Internal	Ministry of Mining and Energy of Republic Serbia	National government as support in the fields of energy efficiency, renewable energy sources, and sustainable development	kabinet@mre.gov.rs +381 11 3619-833
Internal	Directorate for Financing and Encouraging Energy Efficiency	Directorate within Ministry of Mining and Energy of Republic Serbia	energetska.efikasnost@mre.gov.rs +381 11 6962143 +381 11 6962142 +381 11 6362132
Internal	Ministry of Mining and Energy of Republic Serbia	Sector for power engineering	+381 11 3604 426
Internal	Ministry of Mining and Energy of Republic Serbia -	Sector for energy efficiency and climate change and Sector for renewable energy	+381 113604 410
	Sectoral agencies:		
Internal	Energy Agency (Agencija za energetiku)	The Energy Agency was established by the Energy Law as a regulatory body with competencies in the sectors of electricity, natural gas, oil and oil derivatives, and thermal energy produced in power plants and heating plants.	edokumenti@aers.rs +38160116350130
External	Serbian Chamber of Commerce	The Association for Energy and Mining includes companies operating in the field of electric power, oil and gas industry, energy mining, communal energy, renewable energy sources and energy efficiency	Ljubinko Savić Secretary +381113304594 ljubinko.savic@pks.rs

Internal	NALED - Department for Sustainable Development	NALED - National Alliance for Local Economic Development is a non-profit organization that focuses on promoting economic development at the local level in Serbia. NALED works to improve the business environment, reduce bureaucratic obstacles, and enhance the competitiveness of Serbian municipalities.	Slobodan Krstović – Director s.krstovic@naled.rs
External	Standing Conference of Towns and Municipalities	Network of energy managers and trustees for energy efficiency - Established with the aim of providing support in the work of local energy managers and other local officials who perform tasks related to municipal energy, energy efficiency and renewable energy sources	Miodrag Gluščević Program Director for Urban Development, Environment and Communal Services +381 11 735 7908 miodrag.gluscevic@skgo.org
	Regional authorities:		
External	The Regional Chamber of Commerce Zaječar	Acquiring knowledge, exchanging experiences, as well as formulating attitudes and interests of regional stakeholders related to sustainable use of bioenergy in Eastern Serbia	rpkza@pks.rs +381 19 421 411
	Local authorities:		
Internal	The city of Zaječar	The initiator and key decision-maker for the introduction and improvement of energy efficiency in public institutions and increased utilization of renewable energy sources in the municipality of Zaječar.	ozajecar@verat.net +381 19 444 656
Internal	LER Zaječar - Office for Local Economic Development in Zaječar	Acquiring knowledge, exchanging experiences, as well as formulating attitudes and interests of regional stakeholders related to sustainable use of energy in Eastern Serbia	ler@zajecar.info +381 19 444 600
Internal	The Municipality of Sokobanja	The initiator and key decision-maker for the introduction and improvement of energy efficiency in public institutions and increased utilization of renewable	info@opstinasokobanja.com + 381 18 830 173

		energy sources in the municipality of Sokobanja.	
Internal	The Municipality of Boljevac	The initiator and key decision-maker for the introduction and improvement of energy efficiency in public institutions and increased utilization of renewable energy sources in the municipality of Boljevac.	nacelnikou@opstinaboljevac.rs +381 30 463 412
Internal	KLER Boljevac - Office for Local Economic Development in Boljevac	Acquiring knowledge, exchanging experiences, as well as formulating attitudes and interests of regional stakeholders related to sustainable use of bioenergy in Eastern Serbia	kler@opstinaboljevac.rs +381 30 463 412
Internal	The Municipality of Knjaževac	The initiator and key decision-maker for the introduction and improvement of energy efficiency in public institutions and increased utilization of renewable energy sources in the municipality of Knjaževac.	soknjazevac@mts.rs +381 19 732 730
Internal	The city of Bor	The initiator and key decision-maker for the introduction and improvement of energy efficiency in public institutions and increased utilization of renewable energy sources in the municipality of Bor.	predsednik@bor.rs +381 30 423 255
Internal	The Municipality of Majdanpek	The initiator and key decision-maker for the introduction and improvement of energy efficiency in public institutions and increased utilization of renewable energy sources in the municipality of Majdanpek.	majdanpekso@majdanpek.rs
Internal	The Municipality of Negotin	The initiator and key decision-maker for the introduction and improvement of energy efficiency in public institutions and increased utilization of renewable energy sources in the municipality of Negotin.	informatikang@yahoo.com martin.popovic@negotin.rs
Internal	The Municipality of Kladovo	The initiator and key decision-maker for the introduction and	kabinet@kladovo.org.rs

		improvement of energy efficiency in public institutions and increased utilization of renewable energy sources in the municipality of Kladovo.	
	Energy producers:		
External	EPS – Branch for Renewable sources	State-owned electric utility company in Serbia responsible for the generation, transmission, and distribution of electricity throughout the country. EPS plays a crucial role in ensuring the reliable supply of electricity to households, businesses, and industries in Serbia	EPS Obnovljivi izvori 13 Balkanska, 11000 Belgrade Telephone: e-mail: ooi@eps.rs
External	EPS Supply	A branch of EPS in charge for the distribution of energy	0800 111 202 garantovano.snabdevanje@eps.rs
External	EPS, local branch Zaječar	State-owned electric utility company in Serbia responsible for the generation, transmission, and distribution of electricity throughout the country.	+381 19 732156
	Universities, research institutions, energy planning experts:		
External	The Technical School Zaječar – professor Dejan Nikolić	Educational institution, research work on environmental protection and improvement of energy efficiency, and utilization of renewable energy sources	skola@tsz.edu.rs +381 19 422 876 +381 641450080
External	The Technical Faculty Bor	Scientific educational institution conducting research on environmental protection, enhancing energy efficiency, and utilization of renewable energy sources.	office@tfbor.bg.ac.rs +381 30 424 555
External	Nenad Jakovljević – expert in solar energy	Pioneer in projecting and implementing of photovoltaic systems in Eastern Serbia	+381606122448 nesaelektrosolar@gmail.com
	SMEs:		
External	Agromehanika Boljevac	The company is the largest manufacturer of agricultural machinery in Southeast Europe and investor in solar energy plants.	info@fpm.rs +381 30 463 531

External	Bionergy Point Boljevac	Bio Energy Point doo, a company established in 2007, is registered to operate in the field of renewable energy.	+381 30 464 295
External	SCS Plus Knjaževac	The producer of school and office furniture made of veneer, wooden toys and plastic chairs. They have implemented the project of instalation of solar power plant.	office@scsplus.co.rs http://scsplus.co.rs phone: +381 64 841 32 15
External	DOO TERMO Knjaževac	Installation of water, sewage, heating and air conditioning systems; The installation of solar collectors in the central domestic hot water system	termo_knjazevac@yahoo.com +381638142330
External	Termokonvoj Plus Beograd	Installation of insulation materials and equipment for heating and climatization.	office@termokonvoj.com +381655440022
External	Tim Elektro Knjaževac	Installation of electrical equipment	timelektro99@gmail.com +381631138283
External	DOO NJM AUTONET Knjaževac	The installation of solar panels and accompanying infrastructure for electricity production	+38163424147 http://www.njmautonet.rs
External	SOLVAN CENTRALE DOO Knjaževac	The installation of solar panels and accompanying infrastructure for electricity production	ipavlovic@hotmail.com +381656464642
External	Company ŠUKOM	Production of boilers for solid, liquid, and gaseous fuel	sukomm@gmail.com +381 62 375 025
External	PODVIS Limited Liability Company	Production of boilers	podvis@sezampro.rs
External	Company IVO TERM	Production of boilers and radiators for heating	ivoterm@ptt.rs +381 63 80 54 902
External	Alfa klima Limited Liability Company	Production of air conditioners and boilers	office@alfaklima.co.rs
External	Limited Liability Company Kran – inženjering	Cranes, boilers, structures	kraning@ptt.rs
External	Limited Liability Company Podvis KBC	Production of boilers for solid, liquid, and gaseous fuel	podvis@sezampro.rs
External	Company Eko star doo	Production of boilers for solid, liquid, and gaseous fuel	ekostardoo@hotmail.com +381 63 46 03 06
External	Company Jupet Knjaževac	Production of boilers and radiators	jupetterm@gmail.com +381 64 255 26 60
External	Company Klima mont	Production of air conditioners and boilers	klimamontkz@mts.rs +381 63 770 48 90

External	Termo – inženjering DNB	Production of air conditioners and boilers	office@termo-inzenjering.co.rs +381
External	KGH Injženjering	Manufacturer of boilers, installation of heating, cooling, and ventilation systems	vojkan.morarevic@kgh.co.rs +381 63 640 916
External	AGROMARKET Zaječar	Owner of a large land area which can be potential for installation of solar systems	+381 63 10 22 345 dragan.djorjdevic@agromarket.rs
External	Milan Vučić PR Infinity Home Systems	Security system services	Ivka Đolovića 35, 19370 Boljevac infinityhomeserbia@gmail.com
External	Bojan Bogdanović PR postavljanje elektro i termo instalacije MAJSTOR AGI Kobišnica	installation of heat pumps	+381 63 17 80 274 mareflert@gmail.com
External	Samostalna trgovinska radnja Dare Žikica Martinović preduzetnik Miroč	Installation of heat pumps	+381 63 70 72 188 Dare25martinovic@gmail.com
External	Miloš Paulesković PR Elektromehaničarska zanatska radnja Servis Paja Kladovo	Installation of heat pumps	+381 63 453 219 servispaja@yahoo.com
External	WIREN DOO Kladovo	Installation of solar panels and accompanying installations to produce electricity	+381 60 0459449 office@wiren.rs
External	SR ELEKTRO DIG GORAN NIKOLOVSKI PR NEGOTIN	Installation of solar panels and accompanying installations to produce electricity	+381 69 1947432 elektrodig@gmail.com
External	Master THE – Tk Doo Sokobanja	Installation of heat pumps	tref150@gmail.com
External	Radomir Tešanović – Project Bureau Tešanović	The owner of the project office is Tešanović from Zaječar. Performs consulting work in construction, design of construction facilities, performs expert supervision during the construction of the facility, performs technical inspection of the constructed facility and participates in the commissions for obtaining the use permit of the constructed facilities	063427766

	NGOs:		
External	Association of Engineers and Technicians DIT Zaječar	Society dedicated to supporting energy efficiency, renewable energy sources, and sustainable development.	+381 63 404 927
External	ISTOK Zaječar - Non-profit Citizens Association	Acquiring knowledge, exchanging experiences, as well as formulating attitudes and interests of regional stakeholders related to sustainable use of bioenergy in Eastern Serbia	+381 64 815 73 12 poslovnezenetk@gmail.com
External	The Timok Club Knjaževac	Acquiring knowledge, exchanging experiences, as well as formulating attitudes and interests of regional stakeholders related to sustainable use of bioenergy in Eastern Serbia	office@timok.org +381(0) 19 730 002
External	The Resource Center Bor	Acquiring knowledge, exchanging experiences, as well as formulating attitudes and interests of regional stakeholders related to sustainable use of bioenergy in Eastern Serbia	+381 30 456 130 kenicdanijela@gmail.com
External	Institute for Border Areas Bor	The Institute for Border Areas aims to reduce local, regional and cross-border socio-economic differences in border areas.	office@ipp.rs +381 (0) 19 436 988
External	Cluster of rural tourism, Magic of the East Zaječar	Assistance to association members in the field of rural tourism	+381 (0)19426376 office@carolijaistoka.rs
External	Mountaineering ski association Ljuba Nesić Zaječar	Mountaineering ski club dedicated to hiking on mountain trails in the country and abroad	psdljubanesic@gmail.com +381 63 759 85 50
External	Young Researchers Society Bor	Acquiring knowledge, exchanging experiences, as well as formulating attitudes and interests of regional stakeholders related to sustainable use of bioenergy in Eastern Serbia	kancelarija@mibor.rs
	Other:		
External	BIC Bor - Business Incubator in Bor.	Acquiring knowledge, exchanging experiences, as well as formulating attitudes and interests of regional stakeholders related to sustainable use	doobicbor@gmail.com

		of bioenergy in Eastern Serbia	
	FLER Donji Milanovac - The Foundation for Local Economic Development of the Municipality of Majdanpek.	Acquiring knowledge, exchanging experiences, as well as formulating attitudes and interests of regional stakeholders related to sustainable use of bioenergy in Eastern Serbia	+381 30 581 371 fler.mpek@gmail.com
Internal	The City of Bor - Energy manager	Establishment of energy management systems, improvement of energy efficiency, and increased utilization of renewable energy sources in Bor	sobor@ptt.rs projekti@opstinabor.rs
Internal	The City of Zaječar; Nebojša Lović – Energy manager	Establishment of energy management systems, improvement of energy efficiency, and increased utilization of renewable energy sources in Zaječar	nebojsa.lovic@hotmail.com
Internal	The Municipality of Kladovo Mirko Gavrilović (Environmental protection associate) Radoje Djurović (Head of the Urban Planning Department) - Energy managers	Establishment of energy management systems, improvement of energy efficiency, and increased utilization of renewable energy sources in Kladovo	mirko68gavrilovic@gmail.com rdjurovic@kladovonet.com
Internal	The Municipality of Knjaževac Vladan Dragičević, Mladen Radosavljević - – Energy managers	Establishment of energy management systems, improvement of energy efficiency, and increased utilization of renewable energy sources in Knjaževac	miroljub.mihajlovic@knjazevac.rs arch.vlada@gmail.com mladen.radosavljevic@razvoj.rs
Internal	The Municipality of Majdanpek Mirjana Cakić Mladenović (Assistant in the Office for Local Economic Development) - Energy manager	Establishment of energy management systems, improvement of energy efficiency, and increased utilization of renewable energy sources in Majdanpek	pomocnik.ler@majdanpek.rs
Internal	The Municipality of Sokobanja	Establishment of energy management systems, improvement of energy efficiency, and increased	ekologija@opstinasokobanja.com

	Ružica Jocić (Independent professional associate in strategic planning and environmental protection) - - Energy manager	utilization of renewable energy sources in Sokobanja	
Internal	Eco Service Negotin Dragica Mihajlović (energy manager) Jasna Milenović (energy manager)	Establishment of energy management systems, improvement of energy efficiency, and increased utilization of renewable energy sources in Negotin	ekoneg019@gmail.com ekoneg@mts.rs
External	Strahinja Glavonjić - expert	Experienced Procurement Specialist with a demonstrated history of working in the utilities industry.	0645909102
BOSNIA AND HERZEGOVINA			
Internal	SERDA	SERDA is a development agency that was founded with the aim of preparing and implementing projects in various sectors that represent the potential of the Sarajevo macro-region. Since its establishment, SERDA has implemented many projects in the fields of agriculture, support to small and medium enterprises, IT, tourism, environment, as well as energy and energy efficiency.	
Internal	JP Elektroprivreda BiH d.d. Sarajevo	Electrical industry activities performed by JP Elektroprivreda BiH d.d. - Sarajevo: Production of electricity Distribution of electricity Electricity supply Electricity trade Other activities determined by the Statute, for the purpose of obtaining profit Electricity industry activities performed by the Company as public services: Production of electricity Distribution of electricity Electricity supply JP Elektroprivreda BiH d.d. - Sarajevo is the largest	E-mails, meetings in person, on-line meetings

		electricity company in Bosnia and Herzegovina.	
External	Ministry of Economy of KS	The Ministry of Economy of Sarajevo Canton carries out administrative and professional tasks determined by the Constitution, the law and other regulations, which relate to the realization of the competence of the Canton in the fields of economy, water management, agriculture, forestry and hunting, veterinary medicine, industry and energy, crafts, use of natural resources, cantonal tourism and tourism resources, trade and tourism.	E-mails, meetings in person, on-line meetings
External	Federal Ministry of Energy, Mining and Industry	The Federal Ministry of Energy, Mining and Industry performs administrative, professional and other tasks established by law related to the realization of the Federation's competences in the fields of energy, mining, geological research and industry, except for the food industry, monitoring the economy and the economic position of economic entities and the coordination and implementation of projects from importance for the Federation in the areas for which it is responsible; creation of energy policy and geological research and other tasks established by law.	E-mails, meetings in person, on-line meetings
External	Faculty of Electrical Engineering, University of Sarajevo	In addition to activities in its basic educational activity, the Faculty of Electrical Engineering has been and remains a place of intensive scientific research and other activities related to the promotion of science, energy and technology from its foundation until today.	E-mails, meetings in person, on-line meetings

External	CETEOR (Centre for Economic, Technological and Environmental Development Sarajevo)	Since its establishment, CETEOR has been operating in the field of sustainable development, primarily in the areas of environment and energy. Through our activities, we strive to be a link between (i) Business, (ii) Academia, (iii) Government organizations and (iv) International organizations.	E-mails, meetings in person, on-line meetings
External	Association of Thermal Power Engineers in Bosnia and Herzegovina	The purpose of the association's activities is to create conditions in order to be able to fulfill the obligations assumed by BiH by signing the Energy Community Agreement, through advocacy for socially and environmentally acceptable and efficient use of energy, and with help and support in creating the necessary legal framework that will enable adequate implementation of the Energy Community Agreement.	E-mails, meetings in person, on-line meetings
MONTENEGRO			
	National authorities:		
external	Ministry of Energy and Mining	national authority in charge of development and implementation of energy policy	phone, emails, invitation letter, personal acquaintance
external	Ministry of Tourism, Ecology, Sustainable Development and Development of North	national authority in charge of environmental and climate policy	phone, emails, invitation letter, personal acquaintance
external	Energy and Water Regulatory Agency (REGAGEN)	National authority for regulation energy market	phone, emails, invitation letter, personal acquaintance
	Energy producers:		
external	Elektroprivreda Crne Gore	Energy production company	phone, emails, invitation letter, personal acquaintance
external	Crnogorski elektrodistributivni sistem (CEDIS)	Energy distribution company	emails, invitation letter, personal acquaintance

external	Crnogorski elektroprenosni sistem (CGES)	Energy transmission company	emails, invitation letter,
	Local authorities:		
external	Union of Municipalities	Institution responsible for coordination of cooperation among municipalities	phone, emails, invitation letter,
	NGOs:		
external	Eko-tim	NGO active in the field of environment, climate change and energy resources	phone, emails, invitation letter, personal acquaintance
external	Center for Climate Change University of Donja Gorica	Institution active in the climate change research and promotion	phone, emails, invitation letter, personal acquaintance
	Universities, research institutions, energy planning experts:		
external	University of Montenegro	educational and research institution	phone, emails, invitation letter, personal acquaintance
	SMEs:		
external	Ribnica komerc	SME photovoltaic or other energy-producing systems/entity	phone, emails, invitation letter, personal acquaintance
external	Ramond	SME photovoltaic or other energy-producing systems/entity	phone, emails, invitation letter, personal acquaintance
external	Ening	SME photovoltaic or other energy-producing systems/entity	phone, emails, invitation letter, personal acquaintance
external	Miličić farm	Farm photovoltaic or other energy-producing systems/entity	phone, emails, invitation letter, personal acquaintance
external	Salaš 23	SME photovoltaic or other energy-producing systems/entity	phone, emails, invitation letter, personal acquaintance
UKRAINE			
External	National authorities: State Agency of Energy Efficiency of Ukraine	SAEE is the central executive body whose activities are directed and coordinated by the Cabinet of Ministers of Ukraine through the Minister of Energy, and which implements state policy in the field of efficient use of fuel and energy resources, energy saving, renewable energy sources and alternative fuels. As an Associated Strategic	Communication will be provided through: - regular e-mail informing about the project implementation process and upcoming events: - additional communication via phone, e-mail or personal meetings will be carried out as necessary - scheduled personal participation of representatives in at least 2 stakeholder meetings

		Partner of EECU under the project, SAEI will accumulate information about the project implementation and contribute to the adoption of necessary decisions at the state level.	
External	Regional authorities: Chernivtsi Regional State Administration	The regional state administration has in its structure relevant divisions and specialists responsible, in particular, for the state energy policy. Therefore, the active involvement of these representatives in the implementation of the project will contribute to the improvement of awareness at the regional level and further multiplication of experience	
Internal	Local authorities: Khotyn City Council and Municipal non-profit organization "Khotyn Multidisciplinary Hospital"	The Khotyn City Council is a local self-government body in the city of Khotyn and is also the founder and property owner of the municipal non-commercial enterprise "Khotyn Multidisciplinary Hospital", which is the object of a pilot investment. Representatives of the city council, as well as hospital staff, will be engaged in planning of the pilot investment, ensuring the operation of the equipment and data collection for KPIs monitoring.	
External	Energy distributors: JSC Chernivtsioblenergo	Joint-stock company "Chernivtsioblenergo" is the service provider for distribution of electric energy in the city of Khotyn. The company's specialists will be involved in the planning of the pilot investment and providing the necessary technical information.	
External	Technical experts: Educational and Consulting Center	Technical partners at the stage of concept development, development of project design and provision of	

	on Energy Efficiency LLC	technical supervision of equipment installation. Additionally, will be engaged to participate in stakeholders' group.	
External	Sectoral agencies: Association "Bukovynian Communities Development Agency"	This organization connects the municipalities of Chernivtsi region, where a pilot investment is implementing. That's why it is extremely important partner for distribution the information about Khotyn case between neighbourhood communities for possible implementation of similar actions. Representatives of NGO as well as member communities will be engaged for participation in the stakeholders' group.	
External	NGOs: NGO "EcoClub"	This organization is implementing a project of installation the 140 kW PV station in the same hospital, which significantly enhances the effect of our pilot investment. So, the representatives of NGO will be engaged to participate in stakeholders' group.	
External	Universities: Ivano-Frankivsk National Technical University of Oil and Gas	Ivano-Frankivsk National Technical University of Oil and Gas it the biggest technical university in the region with energy specialization. Representatives of the university will be invited to the stakeholder' group.	
External	SMEs:	The contractors which will be chosen for providing services of heat pump installation will be engaged to the stakeholders group.	

Strategic Environmental Assessment (SEA)

It is assumed that the energy management establishment (operates based on the establishment of certain software - AT and DE pilot) and energy community (is established based on legal procedures and testing of already existing energy components - HU pilot) establishment has no impact on the environment.

In other pilot activities, such as the installation of a two-way charging station - SI, heat pumps - UA and the installation of an energy battery and PV system - HR, BG and BIH) can have negligible impact, it can be minimal, especially for small-scale residential or public/private installations. The pilots will be carried out on / in existing buildings that have already obtained a building permit, so that they do not interfere with the natural environment and do not pose any threat to natural habitats. The installations are not planned in or near protected areas. The battery will be managed properly to protect it from extraction of various chemicals and materials that could pose environmental risks. The owner will also consider the end of-life for batteries and take care of proper waste management practices which is essential.

Each pilot partner briefly prepared an assessment of the environmental impact of pilot initiatives targeting peak load reduction in energy networks.

This short assessment highlights the key elements:

- the focus on environmental impact,
- the pilot nature of the actions,
- the specific goal of reducing peak loads in energy networks.

Slovenia:

Pilot investment of project partner 2 is Smart concept for solar electricity flow and use, which aim is peak load reduction in energy networks. Strategic Environmental Assessment (SEA) of an energy network involves evaluating the environmental impacts of the network's development, operation, and potential alternatives.

Peak load reduction in energy networks can have several positive impacts on the environment:

- Reduced emissions: peak load reduction typically involves using more efficient energy sources, which means lower energy consumption and thus lower emissions.

- Promotion of renewable energy: the Slovenian pilot integrates renewable energy source such as solar power, which have minimal environmental impact compared to fossil fuels. During the project the focus group will be established and help to promote the pilot data and improvements. The impact of the pilot shows the possibilities of additional exploitation of renewable energy sources in terms of the consequence of relieving the network.
- Improved air quality: by reducing the need for additional power generation, particularly from fossil fuel sources, peak load reduction can lead to improved air quality in urban areas through the reduction of TPG emissions. This has direct benefits for public health by reducing respiratory illnesses and other health problems associated with air pollution.

Peak load reduction in energy networks can play a significant role in mitigating environmental impacts associated with energy production and consumption, contributing to a more sustainable energy system.

Pilot action will provide valuable opportunities for learning and allowing stakeholders to gather data, identify best practices and understand potential barriers. Stakeholders adjust as needed before committing to a wider implementation.

Based on the pilot and established focus group we would like to make our region greener and our pilot location energy independent. Pilot will help us to increase the efficiency energy input of PV system.

Croatia:

The pilot investment - battery storage system, which will be implemented in the Administrative building in the Knowledge centre of Medjimurje County, has no direct impact on the environment. The battery storage system does not produce noise and during its use, it is not expected to generate waste, nor does it have a negative impact on air quality since there are no emissions. Their lifespan exceeds 6,000 charge-discharge cycles, requiring minimal maintenance, and they can be recycled at the end of their lifetime. Therefore, the environmental impact of using a battery storage system is assessed as neutral.

This pilot investment will expand the existing photovoltaic power plant on the building with a battery storage system. The primary goal of the battery storage system is to reduce the peak load from the distribution grid ('peak-load reduction'). The system will have the capability to store excess energy generated by the photovoltaic power plant and store electricity during off-peak hours. Additionally, it will serve as a backup power supply for user consumption in case of a power outage from the distribution grid.

Indirect positive impact of the battery storage system on the environment stems from the fact that system in question significantly reduces the peak energy demands of buildings, and thus, the broader power grid, which are covered by the inclusion of backup - mostly gas-fired power plants, that negatively impact the environment with their emissions. For example, in 2022 in Croatia, the peak load was 2999 MW (of which 75 MW in Medjimurje County), and in the Knowledge Centre of Medjimurje County - 156 kW, while the power of the backup power plant intended to cover peak loads (Thermal power plant Jertovec, Croatia) is 76 MW, with annual energy production of 59,1 GWh. In the case of collective implementation of battery storage systems, peak loads in the power system would be reduced, thus contributing to balancing the system and reducing the negative environmental impact of peak power plants.

Austria:

The Innovation Centre W.E.I.Z. operates and owns a couple of buildings at the centre of Weiz where PV plants are already installed.

These buildings share a point of common coupling with the public grid.

There is potential for further PV-plants on the rooftops of the adjacent buildings and potential for the peak load management with the implementation of a new electrical storage system. The goal is to provide local and cheap energy for our Campus and further contribute to:

- reducing strain on the public grid by directly using the electricity within the Grid
- reducing the generation peaks caused by PV
- providing the technical set-up to allow energy supply in case of a failing of the public grid
- providing the technical set-up to include a battery storage for further increase of the own consumption and possibly islanding operation during a blackout

Germany:

At present, high electricity prices point towards times of high emissions. The purchased electricity is obtained from the upstream grid provider. The local hydropower resources can be used as a form of local renewable electricity. Additionally, controlling large loads allows to consume electricity at times of low emissions and low prices. Moreover, controlling large loads (such as EV charging stations and artificial snow machines) is expected to reduce the need for conventional fossil fuel peak generation requirements, thereby directly reducing CO₂ emissions as less fuel is used for powering the local generators.

A seasonal forecast for hydropower plant operation can increase renewable electricity generation in winter. That is, at times when electricity production is also particularly emission-intensive (e.g. due to the reduced generation from solar resources or to the increase in heating energy consumption). Hence, the implementation of forecasting technology has a direct influence in reducing CO₂ emissions.

As high prices of grid electricity are correlated to high emissions, reducing consumption from the upstream grid at times of high prices also indirectly reduces environmental impact. Moreover, purchasing electricity from the upstream grid operator leads to additional expenses related to the grid component in the electricity tariff. Reducing these expenses leads to reducing the price of electricity for the end customer. Improving the usage of local electricity generation, as well as controlling the aforementioned large loads, can help achieve a better upstream grid purchasing profile.

As a relevant element in impact assessments, societal impact is a factor which greatly influences policy. Considering the influence which costs have on customers, as well as on policy, the active management of electricity (e.g. through forecasting and improved operations) by utilities is, thus, an important consideration to properly communicate the true costs of the energy transition. Especially considering, this is an argument often used against the transition itself.

Finally, operating charging infrastructure in a grid-beneficial way reduces the requirement for grid upgrades, reducing material requirements, and improves the integration of renewable energy in the grid. The latter which also leads to increased reliability and security in electricity provision. Both the reduction of material requirements and the improved integration of renewable energy in the grid contribute to the reduction of CO₂ emissions from a systems perspective.

Hungary:

The pilot activity planned in the project is an energy awareness initiative. As Zala County has a significant potential for solar and geothermal energy, the pilot also aims to increase the use of renewable energy sources. Of particular importance is solar energy, which directly contributes to reducing daytime peak loads.

Stakeholders involved in the pilot activity include all levels of society and the pilot is in line with the environmental objectives of the European Union.

The pilot activity itself and events carried out during the project aim to increase knowledge of innovative solutions and can provide ideas for further development. In addition, awareness-raising campaigns to promote the energy community and the use of renewable energy sources will have a positive impact on environmental awareness.

Switching to renewable energy sources and participating in an energy community will lead to a reduction in greenhouse gas emissions and a more energy and environmentally conscious society. Energy communities may be able to reduce the peak loads on the electricity grid by directly connecting PV producers and consumers, and hence make renewable energy available to a wider range of consumers.

In order to reach out to younger generations, there is a need for co-operations and pilot activities that provide first-hand experience and thus help to broaden the horizons of local community members.

Bulgaria:

The UBBSLA is committed to the development of sustainable and intelligent solutions for electricity management. As part of our pilot project for smart battery management, we have conducted an environmental impact assessment focusing on initiatives aimed at reducing peak loads in electrical grids. This assessment highlights the key elements related to environmental aspects, the pilot nature of our actions, and the specific goals for optimizing energy flows.

1. Focus on Environmental Impact:

- The components of the system, including the hybrid inverter, deep cycle batteries, and charge regulator, are designed to minimize negative environmental impacts. The battery systems enable effective storage of energy from renewable sources, reducing the dependence on conventional electricity sources and, consequently, carbon emissions.
- The integrated energy management system, composed of a PLC controller and visualization software, facilitates easy monitoring and optimization of electricity consumption. This contributes to reducing adverse environmental effects.

2. Pilot Nature of Actions:

- The pilot model is designed to initiate work in a controlled environment, providing a platform for testing new technologies and innovative solutions in energy management.
- An assessment of the existing infrastructure and its environmental impacts will be conducted prior to the implementation of the system to identify potential risks and adapt project solutions accordingly.

3. Specific Goal of Reducing Peak Loads:

- The primary focus of the project is intelligent management of peak loads in electrical networks, which will optimize the efficiency of the system. By regulating consumption and integrating innovative battery solutions, the project will help reduce the need for additional electricity generation during peak load periods.
- The automation achieved through the implementation of management and monitoring software will provide new levels of efficiency, leading to significant energy cost savings and contributing to the resilience of the energy system.

Bosnia and Herzegovina:

By the end of 2023, 888 solar power plants, 70 small hydropower plants, nine wind power plants and four biogas power plants had been installed in the Federation of Bosnia and Herzegovina, according to official data. However, according to the data of the Bureau of Statistics of the Federation of Bosnia and Herzegovina in December 2023, the aforementioned nine wind power plants participated with only 3.9 percent in the total production of electricity in the Federation of Bosnia and Herzegovina, while there is no data for solar power plants and biogas power plants. The Bureau of Statistics of BiH announced that in December 2023, the total production of electricity in the Federation of BiH amounted to 714 GWh, of which hydropower plants participated in the total gross production of electricity with 38.24 %, thermal power plants with 57.84 % and wind power plants with 3.9 %. As we can see, great part of energy in Federation of Bosnia and Herzegovina comes from thermal power plants, and other places in Federation use this energy from thermal power plants, on damage of inhabitants of municipalities where thermal plant is located.

This shows that use of energy from renewable energy sources need to be in higher percentage. Also, today many investors are interested in investment in establishment of solar energy plants.

Pilot plant that is planned to be installed within the project will have capacity of 10 kW with battery system. Aim is that solar panels during the day produce energy and part of the energy to be used for purposes of the building on which will be installed pilot plant. Part of the energy will be saved in battery. Energy from battery will be used for during the night for regular work of systems of the Elektroprivreda BiH d.d. (computers system, communication system, etc.).

Impact of the pilot plant in wider grid is small having in mind that capacity of the plant is relatively small on level of the grid. On the other hand, on level off the building, pilot plant will produce energy that will result with reduction of the peak loads. This will lead to opening of the possibility to use saved energy to be used on another place.

Ukraine:

The focus on environmental impact:

The pilot investment has a significant ecological essence, as it is aimed directly at reducing the consumption of traditional carbon fuel and at the same time providing the possibility of heat supply of the building due to an alternative energy source. In addition, the electricity required for the operation of the heat pump will be provided through solar generation, which is also being

implemented in the hospital in parallel. Thus, through the implementation of the project, it is expected to achieve a direct reduction of CO2 emissions, and not just its reduction due to replacement of one heating source with a more efficient one.

The pilot nature of the actions:

Implementing a pilot investment such as heat pumps combined with photovoltaic system for public buildings in Ukraine showcases the viability and effectiveness of this technology in the region. It serves as a practical demonstration of how heat pumps can contribute to energy efficiency, sustainability, and cost savings in public infrastructure. The success of the pilot project can encourage other municipalities within the EECU network (both Covenant signatories and EECU members, in total over 200 municipalities) and other project partners to replicate similar investments. This sharing of experiences enables a faster and smoother replication process. The lessons learned from the initial pilot investment can be upscaled by leveraging the network of municipalities and existing channels of communication within the EECU.

The specific goal of reducing peak loads in energy networks:

Reducing peak loads on the network is one of the main goals of this pilot investment. This task is especially relevant in the conditions of a significant deficit of electricity in Ukraine, caused by enemy attacks on generation and distribution facilities. The presence of a heat pump in combination with a PV station makes the hospital building almost 100% autonomous and able to ensure uninterrupted operation even during blackouts. And in more favourable conditions, green generation of electricity for own needs and heat supply without using additional volumes of electricity from the network will significantly reduce consumption in peak periods and contribute to ensuring the stable operation of the energy system.

Conclusions

Quantitative KPIs are essential for monitoring and evaluating pilot projects' success in reducing peak loads and enhancing energy efficiency. These metrics provide a solid foundation for strategic planning, ensuring that projects meet their goals and deliver sustainable benefits.

The quantitative KPIs provide a comprehensive framework for evaluating the effectiveness of pilot projects, focusing on energy efficiency, peak load reduction, and sustainability. With standardized methodologies and tailoring specific KPIs to each pilot, the projects ensure accurate, consistent data for decision-making. These KPIs not only track progress but also highlight areas for improvement and offer insights into replicating successful actions across different sites. This approach supports the broader goals of reducing energy consumption, enhancing the use of renewable resources, and achieving long-term environmental benefits.

In this project, partners are tasked with identifying and involving key internal and external stakeholders from various sectors and levels (local, regional, national, transnational) in implementing pilot activities, developing master plans, and transferring solutions. These stakeholders form focus groups that will serve as primary interfaces between the project and the stakeholders, playing critical roles in knowledge transfer, solution development, and policy engagement. They will be involved in several events, workshops, demonstrations, and consultations to ensure active participation and facilitate the adoption of pilot solutions across both pilot and non-pilot countries. These stakeholders compose categories such as energy producers, sectoral agencies, local and national authorities, universities, NGOs, and SMEs. The inclusion of these diverse groups aims to enhance collaboration, enable the replication of successful approaches, and support policy development for sustainable energy practices.

Pilot activities in several countries aim to reduce energy use at peak times while reducing environmental impact. In Austria, Germany, Hungary, and Bosnia and Herzegovina, energy management systems and community initiatives use renewable energy sources like solar and hydropower, which helps to reduce emissions and make energy use more efficient. Battery storage and smart management are key to optimising energy flow and reducing reliance on conventional, emission-heavy energy sources. Ukraine's heat pump and solar projects showcase energy efficiency and resilience in public buildings. These pilot projects aim to promote sustainable practices, improve energy independence and enhance environmental awareness.

Annexes

- Annex 1 – The questionnaire for the events in the frame of the D.1.2.3 for non-pilot countries
- Annex 1 – The questionnaire for the events in the frame of the D.1.2.3 and D.1.3.1 for pilot countries
- Annex 2 – Calculation methodology for mandatory KPIs