Activity 1.1: Stakeholder map report - SUMMARY

Created by:

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1.0 Activity 1.1 Leader (PP7) approach to stakeholders interview results

The activity is the main tool for connecting with target groups, assessing their needs and finding the best ways to cover them with Project StoreMore. This part of the output described methodology for the survey.

The Activity is implemented by the partners in their respective countries or, especially in larger countries in selected regions which represent their regional specific. In some cases it could be necessary involving external services if the capacity of the partners is insufficient. This document is a basis for **Terms of Reference (ToR)**, which could be used for selection of experts (see also conditions for public contracting under Interreg Danube programme manual).

To achieve comprehensive and reliable results, project partners use different data collection methods for accurate stakeholder mapping.

All project partners followed the methodology developed by the Activity 1.1 Leader (PP7 Innovation centre of Ústí region) of **Activity 1.1 - Mapping stakeholders**. The informations was collected from the following documented analyses, which were developed according to this methodology.

a) Desk research

This includes studying documents like regional development strategy, regional Innovation strategy (S3 - smart specialization), regional energy management plans, analysis from different NGO focused on alternative energy resources and storage, document from Chamber of commerce, industrial associations, energy management companies and alternative energy providers.

b) Field research

Stakeholders will be complete with deeper interview. Interview will be realized with most promising stakeholders able to define theirs need and findings like:

- e.g. municipalities that want to cover their own energy needs.
- private operators who want to optimize their profits or enter the market with their innovative solutions.
- industrial associations which can present wider view on needs in specific domains etc…

Number of interviews depends on fragmentation of stakeholders needs, we recommended between **25 to 30 interviews from each partner**.

The stakeholder map targets the operators of the target group in three key segments.

- Those with installed storage capacity
- Those who have identified the need for storage solutions.
- Those who are not yet aware of the need for such solutions.

This thorough categorisation will allow the project to capture a detailed overview of the current landscape and provide insight into potential growth areas for energy storage solutions.
Stakeholders map will be present in table in Appendix 2. There will be also discussed approach to visualisation of results in some graphic version.

The project also ***identifies potential investors*** in RES capacity, with a specific focus on understanding their investment tendencies, preferred investment types and expected returns.

Map include typically this type of investors:

a) Public grants

b) Soft loans provided by national development banks and agencies.
c) Private capital resources, bank loans and special energy funds like energy performance contacting etc..

Investors maps, see appendix 3 describe investors target, main focus (TRL level, industry, expected results etc.)

The stakeholder map will serve as a basis for several other project activities.

- The map will also help to identify potential sites for best practice visits (activity 1.4).
- The map will also play a crucial role in communication strategies for dissemination of project results (activity 3.3) and for recruitment of testers for the modelling tool and the RES optimisation tool (activities 2.1 and 2.2).

Stakeholder mapping is an essential first step that will provide the basis for subsequent project activities and facilitate effective engagement of target groups for successful project implementation.

c. Organizational Engagement

A diverse range of organizational types participated, including:

- Equipment suppliers
- Regulators
- Energy producers and aggregators

Adoption of energy management systems varied, with larger entities favoring advanced tools such as SCADA and DEMAS, while smaller organizations often relied on manual or physical measures.

2.0 Situation in the Danube Region.

Activity 1.1 Leader: PP7 - ICUK from **Czech republic** carried out its own questionnaire survey which verified most of the theses that are summarized in the Activity 1.2 State of play

analysis in output 1.2. The current Czech market is characterized by waiting for the new legislation called “LEX OZE Act 3” which specifies the conditions for the deployment of energy storage, flexibility rules, etc.

Lex OZE III (Renewable Energy Sources Act III)

This act is focused on the development of community energy and the integration of modern technologies in the field of renewable energy in the Czech Republic. The main goals and provisions of the law are:

Key Provisions

- **Right to Store Electricity**:
  - Introduction of a new license for electricity storage for devices with a capacity above 50 kW.
  - Exemptions from the license for batteries connected with a power plant and with a capacity up to 1.2 times the plant's output.
- **Right to Provide Flexibility**:
  - Energy communities and customers with interval metering can provide flexibility without a license.
- **Right to Aggregate Flexibility**:
  - Aggregating flexibility is possible under a trading license.
  - Customers have the right to have different electricity suppliers and aggregators.
- **Access to Near-Real-Time Data**:
  - Distribution System Operators (DSOs) are required to provide consumption data no later than 15 minutes after measurement.

Six Priority Amendments

1. **Sharing Electricity from Stand-Alone Batteries**:

- Allow sharing under the same conditions as power plants, enhancing self-sufficiency and flexibility of communities.

2. **Providing Ancillary Services by Communities**:
   - Enable communities to participate in ancillary services for the grid, creating a new source of income.
3. **Simplification of Aggregation Processes**:
   - Allow aggregation of flexibility without a trading license if it involves only community members.
4. **Dynamic and Hybrid Electricity Sharing**:
   - Introduce the option for dynamic electricity sharing starting from July 1, 2026.
5. **Participation in Multiple Sharing Groups**:
   - Permit community members to join multiple electricity-sharing groups.
6. **Free Access to Data from the EDC**:
   - Ensure free and fast access to electricity measurement data.

Timeline

- **First Reading in Parliament**: April 2024.
- **Next Steps**: Economic Committee discussions, second and third readings during summer 2024.
- **Effective Date**: January 1, 2025 (aggregation flexibility provisions from July 1, 2026).

Purpose of the Law

Lex OZE III aims to remove obstacles from previous legislative adjustments and enable the full integration of energy communities into new activities, such as storage and aggregation, in compliance with European regulations.

The advantage of the Czech market is the formation of a strong association Asociace AKU-BAT CZ[1] that lobbies for changes in the law and dissonates investment and operational

[1] https://www.akubat-asociace.cz/en/

know-how for technology diffusion. In the following, we also summarize lessons learned from other markets.

The survey reveals several key insights into energy storage technologies in **Hungary.** Lithium-ion emerged as the favorite due to its advantages as a standalone solution for the regulation of the energy market. This technology boasts a fast response with no ramp-up period, allowing for immediate participation. Additionally, it provides high availability and efficiency, minimizing energy losses. However, it requires a significant initial investment. For long-term storage needs, fuel tanks or cylinders offer a stable and efficient solution. Lead-acid batteries, while a more traditional technology, remain relevant for their ability to support flexibility within fossil fuel-based generation portfolios.

From a practical point of view, and it is typical from all Project StoreMore regions with exception of Germany there are limited experiences with battery storage.

Slovenia analyze households and Legal Entities. The analysis of legal entities revealed that many face challenges related to the complexity of subsidy programs for energy storage systems, with some organizations struggling with low funding, long approval processes, and stringent application requirements. Despite this, a number of organizations showed interest in future developments in energy storage, especially in advancements in battery technologies and the role of storage systems in integrating renewable energy sources. These systems were seen as crucial for enhancing grid stability and managing excess energy from renewable sources like solar and wind power.

Legal entities also highlighted the importance of subsidies in encouraging investments in energy storage, and many pointed out that reducing the costs of storage systems and simplifying the application process for financial aid would make these technologies more accessible and economically viable for businesses and organizations.

Household respondents expressed increasing interest in sustainable energy storage systems. Many believed these systems would play a significant role in the future, particularly

in enabling the integration of renewable energy sources and improving energy independence. However, despite this interest, there is still hesitance to invest due to the high initial costs, long payback periods, and concerns about the environmental impacts of battery technologies, such as raw material extraction and challenges with recycling.

EU candidate states like **Bosnia, Serbia and Montenegro** are only in first steps to energy storage implementation. This point is deeply discussed in 1.2. Output. From the questionnaire it is clear that there is a basic awareness of energy storage, however, lacks more detailed knowledge, for example from the implementation of pilot solutions.

The perspective from **Germany (PP9 Municipality of Fuchstal)** is particularly interesting. They emphasize the importance of launching a comprehensive awareness and image campaign, as 40% of potential investors are unaware of the benefits and possibilities offered by large-scale storage systems (LSS). Investors expect holistic or turnkey storage solutions, which are currently still too little offered.

Politically, uniform legal framework conditions and planning security must be created for investors in storage technologies. A law similar to the EEG for large-scale storage (LSS) would be optimal. Uniform building regulations must be created, and vocational and technical colleges as well as universities should take the topic of storage technology into account in their learning and training plans, as there are currently too few qualified engineers and consultants. The construction cost subsidy (BKZ) for the connection of large- scale storage systems to the public power grid should be significantly reduced, temporarily suspended or abolished.

Project partner (PP9 - Municipality of Fuchstal) from Germany recommended some strategy recommendations, technologically and market-specifically, a comprehensive education and image campaign must be launched about the advantages of large-scale storage systems. Uniform, manufacturer-independent interfaces between storage technologies, energy producers and other peripherals must be created in order to minimise the individual effort required for system integration. Investors expect holistic or turnkey storage solutions, which are currently still too little offered.

As part of the **"StoreMore"** study, it became clear that all market participants and decision-makers now see storage systems as a **key element for the energy transition.** However, higher battery capacities and stable legal and normative framework conditions are necessary for economic operation. Despite the availability of technologies, there is still room for innovation and improvements in the field of products and services that will enable the lucrative operation of storage facilities through operational management know-how and algorithms that have yet to be developed.

The current market structure leads to price distortions that make it difficult to operate storage systems profitably. Many stakeholders are not aware of the economic potential of large-scale storage systems (NSSO), and there is a lack of qualified experts with a high level of advisory competence. There is a lack of a clear legal framework, especially for the remuneration of feed-in power.

The flexibility offered by energy storage systems is not sufficiently taken into account in the current regulations and remuneration mechanisms. Building regulations are inconsistent and lead to complex approval

Although storage systems are still rather new and poorly represented in the energy portfolio of the **Republic of Croatia (PP11 - University of Zagreb, FSB),** some important conclusions can be drawn from the information obtained during the interviews. General public's awareness of the need for storage is growing but it's still slow and investors are often repelled by the complicated or non – exist legislation on energy storage. In spite of that, main institutions in the field of RES and energy management are starting to implement various storage systems, paving the way for their future easier, more financially favorable and accessible implementation. There is still a long way to go, but efforts are made towards a more efficient, sustainable and greener future in energy production and consumption.

Stakeholder analysis and engagement levels in **Romania (PP8 - Oradea Metropolitan Area Intercommunity Development Association)** bring some interesting figures which seems

applicable also in other Danube region countries. The quantitative and qualitative analysis revealed a diverse range of organizations. Industry stakeholders showed the highest engagement (48%), followed by municipalities (16%), higher education institutions (6%), renewable energy producers (6%), DSOs (3%), and other diverse organizations (19%). This analysis underscores the dominant role of the industry and significant contributions from municipalities, while highlighting the need for increased engagement from renewable energy producers and DSOs.

For stakeholders with installed energy storage solutions, key factors included power supply issues, R&D pilot projects, and the potential for faster EV charging. Lithium-ion batteries were the most common technology, with capacities varying significantly. Challenges included high CAPEX and OPEX, and operational risks.

Among those recognizing the need for storage solutions, the main drivers for investment were cost reduction, energy efficiency, and the use of energy surplus from RES. Financial challenges, such as lack of CAPEX and high solution costs, were the most significant barriers.

For those not yet aware of the need for energy storage solutions, the study highlighted an urgent need for more information and awareness. Factors deterring investment included high costs, short system lifetimes, and a lack of prioritization. This point is also stressed in our **Activity 1.2. State of play analysis output**.

Findings from the analysis: current deployment

Energy storage deployment is still in its early stages across the analyzed regions, but specific patterns emerge. Battery storage systems dominate the landscape, with lithium-ion technology being the most prevalent due to its advanced performance characteristics, scalability, and established market presence. In Hungary, Slovenia, and Croatia, only a few large-scale storage projects are in operation or under development. Household and commercial adoption rates are similarly low, though some municipalities and companies have implemented pilot projects

Lithium-Ion Systems:

Lithium-ion technology is favored for its high energy density, rapid response times, and reliability. However, stakeholders noted disadvantages such as limited lifespans, safety concerns, and high initial costs. For example, Croatian companies investing in storage systems cite challenges in balancing the cycle-dependent efficiency degradation and starting charge discrepancies of battery stacks.

Emerging Technologies:

Emerging alternatives like sodium-ion, iron-salt, and flow batteries show promise for long-duration applications and environmental sustainability. For instance, Slovenia's stakeholders have shown interest in thermal storage solutions, emphasizing cost-effectiveness and compatibility with heating systems. Meanwhile, hydrogen storage and solid-state batteries are viewed as key innovations for addressing long-term and seasonal storage needs.

Barriers to Investment

- **Financial Constraints**: High upfront costs and uncertain ROI deter investment, especially among smaller stakeholders.
- **Regulatory Hurdles**: Complex or unclear policies hinder progress.
- **Technical Challenges**: Grid integration issues and long lead times for equipment delivery present significant obstacles.

Funding and Support Programs

Support programs such as EU funds (Horizon Europe, Interreg) and national subsidies are vital but often perceived as bureaucratically cumbersome. Simplified application processes and increased funding allocations are suggested improvements.

Regulatory and Policy Challenges

- Lack of unified and storage-specific regulations.
- Lengthy permitting processes.
- Double taxation issues in some jurisdictions.
- Insufficient legislative focus on energy storage apart from RES

3.0 Conclusions and recommendation from stakeholders interview

Conclusions and recommendations from Activity 1.1 Mapping stakeholders adds outputs from 1.2. State of the play analysis. There are several factors which change energy storage utilization in different Danube region countries defined in Activity 1.2 - State of play analysis.

a) Natural conditions (wind, period of enlightenment, hydrology conditions)
b) Social conditions (population density, not in my backyard effects, energy poverty)
c) Economic conditions (level of industrialization, number of companies under ESG regulations, emission allowances, stability in energy grids).
d) Activity 1.1 Leader prepared a summary of the outcomes from each country, compared approaches in each of the above areas and recommended approaches for further project implementation taking into account the analysed evidence.
e) We can conclude that all Danube countries are striving for a balanced energy mix so that they are not dependent on only one source of energy. In more industrialized countries with lack of natural conditions (hydropower) are still important part of energy mix nuclear energy with main advantage in regular production and higher network stability. Interesting comparison is between Romania, Hungary and the Czech Republic. Germany's strategy is very different, but the issue is network stability with high usage of wind energy.
f) All partner countries recognize the importance of renewables in the energy mix in terms of long-term economic competitiveness, ESG regulations and the need to offer to industries sustainable, stable and economically viable energy sources.

g) From regional analysis it is clear that the partners work with knowledge of a relatively wide range of different technologies and their combinations. Investments in wind farms, solar power plants, and small hydroelectric plants are being prioritized to diversify the energy portfolio of all Project StoreMore participating countries.

h) Energy storage and RES utilization is so called **Regulative Innovations** which refer to changes in the rules, regulations, and policies that govern various sectors and activities. These innovations aim to improve regulatory frameworks to better accommodate new technologies, business models, and societal needs. Based on Activity 1.2 State of play analysis we stressed that without integration new legislation is widespread of new technology in some Danube countries impossible. This point will be more discussed especially in **SO 3** and must be supported by the learning process between project partners and their stakeholders.

This Activity 1.1 Outputs are formulated in some recommendations from the interview. There are some concrete points:

However, the central finding from the StoreMore project is the lack of market experience. Therefore, it is strongly recommended to carry out pilot projects, for example in Apfeldorf, Germany. The municipality has excellent infrastructure and connectivity to the power grid, which facilitates the implementation and operation of energy storage systems. The willingness of local authorities to support innovative projects creates an enabling environment for such pilot projects to be carried out. A storage facility in a regional environment or a district solution can participate here and demonstrate how these solutions can work successfully.

Germany offers excellent market connections and is well advanced compared to other regions in the Danube region. With a power coverage of 50% in the German electricity market, battery technology is urgently needed to ensure grid stability and drive the energy transition.

To enhance current funding programs and support the implementation of energy storage solutions, stakeholders suggested the following:

- Simplify procedures and reduce bureaucracy.
- Minimize paperwork for experienced applicants and offer predefined solutions.
- Provide the entire funding amount upfront, with the ineligible portion repaid from savings.
- Extend eligibility and applicability scopes.
- Enhance collaboration with project coordinators.
- Shorten program opening periods.
- Assign a dedicated contact person for inquiries.

Very significant for many Danube region countries are conclusions from **Romania** interviews.

The stakeholders having energy storage capacity demonstrated high engagement from industry stakeholders, but it faced practical implementation challenges and utilized a variety of technologies. The *Need for storage solutions* segment emphasized the economic benefits of storage, yet it encountered significant financial barriers and required supportive case studies to advance. Meanwhile, the *Unawareness of Need* segment highlighted a critical need for information dissemination. This segment faced varied deterrents based on the type of organization and had specific criteria that would need to be met to reconsider investment.

In conclusion, the study highlights the diverse needs and challenges of different stakeholder segments in Romani). It underscores the importance of tailored communication strategies, simplified funding processes, and increased engagement across all sectors to achieve sustainable energy storage solutions. This point covered all Danube region countries!

The most important conclusions of the survey from **Lead Partner (Békéscsaba, City of County Rank) from Hungary** can be summarized as follows. Also these points covered results from other Danube Region countries.

- Energy storage systems are currently not widespread on the market yet, but increased attention is directed to the topic
- In the near future, the Hungarian market will focus on battery-based energy storage
- Many actors have definite investment plans for the next 3 years, focusing primarily on the system-level services market
- The most important indicator in the investment analysis of energy storage projects is return on capital (ROI), with a maximum return expectation of 10 years
- Actors typically manage to get support for investments, RFF resources are of particular importance
- The most typical hindering factor for investments is the grid connection, but the perception of the regulatory environment of the market is rather negative - at the same time, there are many technological and/or system integration problems

Final conclusion words

The surveys confirms that the energy storage industry is still a **regulatory innovation** dependent on the legislative framework, subsidies and the overall bureaucratic setup of a given state. Process of technology diffusion must be based on wider policy discussions with stakeholders and good background analysis.

Next Project StoreMore strategy must be based on this points:

- Project StoreMore is a platform for sharing knowledge, conducting research, and offering technical assistance.[2] Good case is the pilot application in **Apfeldorf in Germany** (Part of site visit: Activity 1.4).

- StoreMore project partners must define regional roadmaps which must be prepared in deeper discussion with national and regional stakeholders**.** This type of agreement must be prepared also on a regional level (for example Hydrogen Strategy in Usti region).

[2] https://www.jstor.org/stable/25046084

- StoreMore project strategy must be in accordance with European Union (EU) effort in harmonizing regulations among member states. This regional approach ensures consistency and reduces regulatory barriers within the region.

- Project StoreMore must provide „Technical Assistance and Capacity Building" must implement new regulatory frameworks, offer best practice in preparation of strongly funded accelerating programs and also regulatory sandboxes.

- Project StoreMore will help in preparation of "Policy Networks and Forums": Various international forums and networks allow regulators to exchange ideas and experiences. These platforms help disseminate innovative regulatory practices and foster collaboration.

These ideas collectively ensure that regulatory innovations like energy storage and best practices are effectively shared and adopted across different regions and countries.