ECOEMPOWER

ECOsystems EMPOWERing at regional and local scale supporting energy communities

February 2024

D6.2 BASELINE IN THE ECOEMPOWER PILOT SITES

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EXECUTIVE SUMMARY

This deliverable defines and describes the baseline of the pilot sites within the ECOEMPOWER project. The document also outlines the methodology followed to define the baseline and the request for information and input from the various regional ecosystems.

The document gathers all the information and data useful for defining the baseline of all the pilot sites of the project, in order to have a basis of comparison for monitoring these pilots throughout the duration of the project, with a view to achieving the set goals.

Regarding the methodology for defining the baseline, a template has been created for gathering both descriptive and numerical information and input. This template is shared with all the regional ecosystems, in which data relating to the energy communities, existing or assumed, and to all One Stop Shops (OSSs), existing or assumed, have been requested. Special emphasis is placed on the quantitative and qualitative evaluation criteria defined in D6.1, as they are crucial for an accurate assessment of the current situation.

This document serves as a descriptive basis for all pilot sites involved in the ECOEMPOWER project, both qualitatively and quantitatively. This assessment of the initial situation will then be compared to the situation after the project's implemented solutions to verify the actual success of the project in achieving the targets of the various pilot sites.

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1 Introduction

The main objective of WP6 is to test the effect of the ECOEMPOWER support mechanisms to facilitate the emergence and growth of energy community projects, by running extensive real-life evaluation tests in the 15 pilot sites (3 energy communities x 5 regions). The following objectives are identified:

- To evaluate the ecosystem impact of the project in the pilot sites;
- To measure the energy and environmental benefits and the social impacts triggered by the project;
- To analyse the social, policy and economic drivers for the success (or failure) of the measures.

These will be determined by means of qualitative and quantitative analysis. This deliverable is crucial as it allows for the evaluation of the current situation in all the project pilot sites in both qualitative and quantitative terms. Thanks to the definition of the baseline, monitoring of the sites in subsequent phases of WP6 can then be carried out to assess how effectively the project is achieving its objectives.

1.1 Objectives of the deliverable

This deliverable stems from the work carried out in T6.2 – *Baseline in the pilot sites*. In this task, a collaborative effort between WP6 and WP2 resulted in the draft of an information and data collection template, aimed at defining the baseline of the pilot sites.

This deliverable collects all information and data of the initial situation within all pilot sites and will be the basis for the comparison of parameters during the project time.

The specific objectives of this deliverable, which are related to the objectives of the reference task, are as follows:

1. To define the methodology used for the collection of information and data from the demo partners;
2. Clear assessment of the initial situation in the regions concerned, with regard to existing or already planned OSSs/energy agencies and their specific service offers, as well as existing or already planned local energy communities;
3. Evaluation of the KPIs considered in D6.1 during the initial phase of the project.

1.2 Structure of the deliverable

D.6.2 is structured in four main chapters as follows:

- **1 Introduction** – Overview of the document with objectives: description of the purpose, the structure of the deliverable, and its relationship to other ECOEMPOWER tasks.

- **2 Methodology for data collection** – Description of the method used to achieve the objective of the deliverable, i.e. the definition of the baseline in the pilot sites.

- **3 Baseline assessment in pilot sites** – Description of the identified initial situation in all the pilot sites from a qualitative and quantitative point of view.

- **4 Conclusions** - Conclusions and considerations on the deliverable.

1.3 Relation with other activities in ECOEMPOWER

This deliverable holds utmost significance for *WP6 – Testing the project mechanisms in pilot sites,* as the definition of the baseline in pilot sites serves as the reference for comparing situations in T6.3 and T6.4. Thus, this deliverable relates to every single task of WP6, from the definition of evaluation criteria (T6.1) to the analysis of the results (T6.4), via the monitoring of the pilot sites (T6.3).

This particular deliverable of WP6, besides being essential for WP6 itself considering the subsequent tasks, has some relationships outside this work package, as the baseline of the various pilot sites is also involved and used in other work packages. For example, it has relations with T2.1 of WP2, as the definition of the ICT platform requires knowledge of various types of information (data measurement, communication systems and installed assets) which is provided through the collection of information for the baseline of T6.2. In addition, it will also serve as a basis for designing and setting up the OSSs (WP5).

2 Methodology for data collection

For the definition of the baseline in the various pilot sites, the steps which are taken into considerations are as follows:

- Creation of a template for data and information collection from the different regional ecosystems;
- Collaboration between WP6 and WP2 to require in this template information also useful to task T2.1 of definition of ICT platform;
- Share the template with all the regional ecosystems (PAT, ACV, eza!, EAZK, ROCG) to require data and information about all the pilot sites within the ECOEMPOWER project;
- Evaluation of KPIs, defined in D6.1, in the initial situation for various pilot sites, as a basis for comparison within the Task 6.3 of monitoring the pilot sites during the project and the analysis of test results of pilot sites within the Task 6.4.

It follows from the Grant Agreement that no other forms of energy besides electricity are taken into account in the calculation of the project KPIs, taking into account only factors and values related to electricity. Furthermore, it is considered that in the case studies considered, energy sharing (and thus the Energy Community approach) occurs only through electricity grids. Consequently, the template focuses solely on the electricity domain, and all requests made to the pilots pertain exclusively to the electricity sector.

As for the baseline template, this consisted of several sections:

1. **General information about the Regional Ecosystem:** In this first section, a descriptive part has been requested concerning the regional ecosystem and all pilot sites considered within it, with a greater level of detail than that assessed in the Grant Agreement. Hence, it is requested to give a broad overview of everything concerning the ecosystem (geographical location of the region and the different pilots, ECs presented and their names); furthermore, it is requested to fill in a table of descriptive information that also includes technical details (such as electricity grid characteristics, sizing, metering infrastructure, etc.). This table is shown below in Table 2.1.

Table 2.1 - Data description in various pilot sites

Input data	**Description of pilot sites**
Electricity flows	1st
	2nd
	3rd
Electrical grid characteristics	1st
	2nd

	3rd
RES sizing	1st
	2nd
	3rd
Non-RES sizing	1st
	2nd
	3rd
Metering infrastructure	1st
	2nd
	3rd
Data communication protocols	1st
	2nd
	3rd

2. **Data acquisition:** This section is of paramount importance for defining the baseline for monitoring pilot sites, as it requires input on technical and non-technical parameters from the different pilot sites. This data will be monitored during T6.3 to compare the project results with the baseline without project. The required data are related to different areas, in line with the areas of the project KPIs defined in D6.1 (social, energy, economic, environmental), and are shown in the tables below (Table 2.2,Table 2.3, Table 2.4, Table 2.5). Note that in the following list, most of the KPIs are evaluated directly through measurements at the pilot site, while some, including "Primary energy savings," "Final energy savings," and “Ratio of investment”, are evaluated indirectly through formulas defined in D6.1. The tables below also include the data needed for the calculation of the indirect KPIs. A summary table of parameters for all pilot sites can be found within Annex A section.

Table 2.2 - Input request for evaluation of social parameters

Social data	**Value**	**Unit of measure**
Number of citizen-led initiatives supported and/or created		[#]
Number of citizens taking part in energy communities		[#]

Number of actors with increased skills in the area of community energy		[#]
Number of jobs created		[FTE]
Number of people participating workshops		[#]
Diversity in the distribution of people involved in the EC (% of women and % of people under 40 years)		[%]

Table 2.3 - Input request for evaluation of energy parameters

Energy data	**Value**	**Unit of measure**
Primary energy demand		[GWh/year]
Final energy demand		[GWh/year]
Renewable energy generation		[GWh/year]
RES electricity self-consumption		[%]
Flexibility – Storage size and capacity		[kW and kWh]

Table 2.4 - Input request for evaluation of Economic parameters

Economic data	**Value**	**Unit of measure**
Investments in sustainable energy		[M€]
Development of local community energy investment pipelines		[M€]
Public investment		[€]
Private investment		[€]
Average cost of electricity (from electricity bill)		[€/kWh]

Table 2.5 - Input request for evaluation of environmental parameters

Environmental data	Value	Unit of measure
Reduction of GHG emissions		[tonCO2/year]

3. **OSS evaluation:** This section is necessary for assessing the OSS (primary objective of ECOEMPOWER) during the lifetime of the project. It is important to define this part at this early stage of the baseline description in order to compare the outputs of ECOEMPOWER with the initial situation in the various regional ecosystems. Considering the steps of the development of Energy Communities from the Grant Agreement, it is requested to provide information on the stage of development in which the various pilot sites/energy communities are in the initial situation to understand the actions and support that the regional OSS can provide, among the following:

   - **Emerging phase:** the OSS raises citizens' awareness about potentials and benefits of energy communities and provides detailed information to citizens and stakeholders.

   - **Pre-development phase:** the OSS assists citizens and stakeholders involved in the energy community in analysing the underlying motivations and expectations, in establishing the project technical feasibility and viability (in terms of energy balances and assets, costs, regulation and community participation), and in providing information about funding opportunities and legal aspects.

   - **Development phase:** the OSS provides assistance in developing a business model, supports capacity building and provides technical assistance (e.g. providing orientation about technologies available on the market, including the use of simulation tools; supporting community engagement and the development of collaborative networks among the local actors involved).

   - **Operational phase**: the OSS supports the continuous evaluation of the results achieved, growth in the number of citizens involved, increase in the RES production capacity and self-consumption, updating of digital tools, compliance with evolving regulatory and policy aspects.

   A summary table for the phases of all energy communities participating in the project can be found in Annex A. Furthermore, Regional ecosystems were asked to answer a series of questions about the services offered by the OSS, the number of users of these services, and the skills and characteristics that may be significant in the context of the OSS.

4. **EC evaluation:** This last section asks for a qualitative, and no longer numerical, assessment of the energy communities in the project. The information requested assesses the degree of maturity of an energy community, providing purpose, goals and stability, as seen in Table 2.6.

Table 2.6 - Energy Community scope and objectives

No. EC	
Legally established (*yes/no*) If not, please give some details	
Operational (*yes/no*) With explanation	
Scope	
Objectives / focus	The objectives of the energy communities will be to:

In addition, other information is requested on the general context of how the energy community was formed. It is therefore required to:

- Describe how the 3 Energy Communities started. Who took the initiative? Which stakeholders were involved from the start?

- Discuss the Regulatory framework and identify if there are any regulatory incentives for energy communities within the regional ecosystem.

- Describe the governance structure of the 3 Energy Communities (how are they organised, what is the legal entity (if relevant), who mandates?). Please include a description of the division of votes/control etc.

- Provide a short description of the issue(s) that you would like to solve as Energy Communities (e.g., congestion, balancing, high energy prices, lack of community engagement).

For this part of requesting qualitative information on EC evaluation in the various pilot sites, the DECIDE[1] project was taken as inspiration, with the aim of creating a strong link with relevant EU projects to ensure efficient dissemination of project results at the European level.

Hence, the one above is the template for collecting data and information from regional ecosystems for all pilot sites associated with the project. In an effort to harmonize and to clarify the feedback provided by the regional ecosystems; these templates were discussed and improved during WP6 monthly meetings.

Once all the information was obtained from the demo partners, all feedback were evaluated, compared, and incorporated into the Deliverable D6.2 for the definition of the baseline in the ECOEMPOWER pilot sites.

[1] DECIDE (H2020 Project - Energy Community Development through Information and Collective Action) – website (https://decide4energy.eu/)

3 Baseline assessment in pilot sites

It is important to note that, while the baseline evaluation for four regional ecosystems (PAT, ACV, eza!, ROCG) was carried out based on the reference year 2023, the evaluation for the regional ecosystem of the Zlín region was conducted for 2024, due to the amendment within the project which replaced the original regional ecosystem with the Zlín region. For this reason, the figures and information presented in paragraph 3.4 refer to the reference year 2024, and the data collection for this ecosystem took place after the others.

3.1 Regional Ecosystem #1 (RE1): Autonomous Province of Trento (ITALY)

3.1.1 Description of Regional Ecosystem

With a population of 533,000 inhabitants and a robust economic foundation, Trentino currently boasts one of the highest levels of well-being and quality of life in Italy and Europe. Empowered by its unique Statute of Autonomy, in effect since 1948, the Autonomous Province of Trento exercises direct legislative, administrative, and financial control over critical sectors such as education, health, industrial policy, transport and tourism. This autonomy extends to the management of 90% of both direct and indirect income collected within the Province.

The Agency for Water Resources and Energy (APRIE)[2] stands as the regional authority entrusted with formulating energy policy and planning, utilizing various actions and instruments. Within the framework of the recently introduced Provincial Energy and Environmental Plan 2021-2030, particular emphasis has been placed on the pivotal role of energy communities in facilitating the energy transition. This stems from the increasing focus on decentralized production from renewable sources and local self-consumption.

In 2021, significant strides were made, including the establishment of a List of Energy Communities in Trentino through Provincial Law. This list, maintained by APRIE, marks a crucial step in integrating Energy Communities (ECs) into the provincial energy board, fostering collaboration with public structures, consortiums, cooperative movements, research institutions, and other entities. Approximately 20 energy community projects are currently underway, primarily engaged in initial feasibility analyses, 5 legal entity was founded in cooperative forms and other 3 initiatives were founded in other forms (e.g. Association).

Despite the absence of a dedicated office, plans are underway to establish the Trentino One Stop Shop, acting as a comprehensive help desk utilizing human and computer resources to guide the creation and management of energy communities. Simultaneously, the ECOEMPOWER project aims to support the development of three pilot sites in Trentino, serving as testing grounds for the practical implementation of the OSS.

From a regulatory point of view, there was a big delay in Italy. The implementing decree that was supposed to define the rules and incentives of the new Renewable Energy Communities (RECs) - which should have come out in June 2022 - was only published on 23 January 2024 and came into force the following day. However, there are still some important issues to be clarified, e.g. the date from which installations are considered new, which will be contained in the 'technical rules' due at the end of February. In addition, one must wait for the activation of

[2] APRIE website link: http://www.energia.provincia.tn.it/

the financing portal, which will take place 45 days after the decrees. The absence of specific deadlines and uncertainties surrounding the compatibility of renewable source plants with REC regulations has slowed project development in the three pilot territories. Moreover, the role of local authorities in the Energy Community (EC) training process is yet to be well-defined.

In the pilot sites of "Val di Fassa", "Levico Terme", and the "Valle dei Laghi" territory, challenges persist in delineating the community's perimeter, identifying additional participants beyond initial promoters, and formulating production and consumption profiles. As the baseline of the project is theoretical and indicative, numerous aspects require further investigation during construction. The absence of prior experience with energy communities operating under the new legislation adds an additional layer of complexity, necessitating ongoing investigations to determine the optimal legal entity for application. In the coming months, a direct accompanying action is anticipated to be implemented in the territories, addressing these uncertainties and contributing to the overall success of the energy community initiatives.

3.1.2 OSS evaluation

In the described region, the existing framework for energy community development involves the presence of a provincial energy agency, APRIE, which is actively monitoring the evolution of RECs at the national level. However, as of now, there is no dedicated OSS in place for the specific objectives outlined in the ECOEMPOWER project.

The pre-existing initiatives include the provincial energy agency's efforts in disseminating information and organizing public meetings to raise awareness about the potentials and benefits of energy communities. APRIE is also involved in technical research, exemplified by the simulation of REC scenarios and the calculation of solar irradiance on various surfaces within the province[3]. In the webpage dedicated to energy of the Autonomous province of Trento a section for Energy communities was created[4]. In this section there are some orientational information and all the technical documents and work published by APRIE.

As part of its role, APRIE is engaged in providing light orientation to potential energy communities, predominantly municipalities, and coordinates a provincial table involving agreements between the Provincial Administration (PAT), provincial federation of cooperatives, municipality consortium, and artisans lobby. In this frame, a digital portal was activated by Provincial federation of cooperatives, to give some information about RECs in cooperatives form[5].

An important in-depth study that APRIE has been carrying out since 2021, also with the collaboration of the "Consorzio dei Comuni Trentini", is the role that a local authority can take on within an Energy Community. this is an issue of national importance in Italy, with respect to which there are still no certain answers and the first

[3] Detailed in technical reports available on http://www.energia.provincia.tn.it/pubblicazioni ([1], [2])
[4] Webpage link (www.infoenergia.provincia.tn.it)
[5] https://energia.incooperazione.it/

experiences, which are heterogeneous, have given conflicting results. The system of constraints for the use of public resources, the administrative rules and the complexity of the topic, especially for small and poorly structured municipalities, make the feasibility of a direct contribution of municipalities as partners in RECs particularly complex. APRIE in 2022 published guidelines for municipalities on the topic.

With the integration of the ECOEMPOWER project, APRIE aims to bring more structure to the existing initiatives and institutionalize the OSS. The envisioned OSS includes the development of an informative website that serves as a comprehensive resource for initiating REC projects. This platform will not only provide detailed information but will also showcase operational REC models. Additionally, there are plans to establish a set of tools to assist in building a complete business plan, activating specific expertise as needed.

Currently, the services offered by the OSS are in the early stages, focusing on information dissemination and technical groundwork. The evolution of the OSS is anticipated to play a crucial role in supporting the different phases of REC development, aligning with the objectives outlined in the ECOEMPOWER project. Moving forward, the OSS aims to facilitate the growth of REC initiatives, increase renewable energy production and self-consumption, and ensure compliance with evolving regulatory and policy aspects. As the OSS progresses, user feedback and experiences will be vital in refining and expanding its services to meet the evolving needs of the regional energy ecosystem.

3.1.3 EC data acquisition and qualitative assessment

In the evaluated territories, there is a lack of operational Renewable Energy Communities (RECs) with no current energy exchange.

The first pilot site, in Val di Fassa area, in the territory managed by CEP[6] ("Consorzio Elettrico di Pozza") consortium reports total electricity consumption of 4,872 MWh/year in the domestic sector, 8,364 MWh/year in industrial sector and 16,661 MWh/year in the commercial and the third sector. The production of CEP is yet completely by RES sources, mainly hydroelectric and photovoltaics. The planned photovoltaic plant is sized between 130 and 240 kW (130-240 MWh/y of annual production). The electrical grid in the CEP area comprises 25 medium/low voltage substations managed by the local cooperative consortium CEP. The metering infrastructure uses the latest electronic meters with quarter-hour measurements (Second Generation 2G meters) for every POD (Point of Delivery), because in Italy it is mandatory for DSOs to upgrade their metering system until 2025.[7]

6 CEP website

7 CEP - Detailed plan of massive replacement of electricity supply meters

The second pilot site in Levico Terme municipality records a total electricity consumption of 3,745 MWh/year in the industrial sector, 5,744 MWh/year in commercial and the third sector, and 6,768 MWh/year in the domestic sector. The planned photovoltaic plant is sized between 80 and 140 kW (80-140 MWh/y of annual production). The electrical grid consists of 11 medium/low voltage substations managed by SET [8], and the metering infrastructure mirrors the first pilot site (2G for every POD until 2025)[9].

The third pilot site in the Valle dei Laghi territory encompasses multiple municipalities with a total electricity industrial consumption of 10,893 MWh/year, commercial and the third sector consumption of 4,009 MWh/year, and a total domestic consumption of 10,295 MWh/year. The planned renewable energy plant is not yet defined in size, assumed to be approximately 200 kW of photovoltaic capacity (about 200 MWh/y of annual production). The electrical grid includes 45 substations under Madruzzo, 19 under Dro, and one each under Nembia, Mezzocorona, and P.S. Giorgio, all managed by SET. Similar to the first two pilot sites, the metering infrastructure utilizes the latest electronic meters with quarter-hour measurements for all PODs.

Data reporting protocols provide for direct data collection from Energy Communities for the ECOEMPOWER project. The Point of Delivery (POD) of the metering system transmits data to the GSE, the national energy management structure responsible for incentive payments. Despite the existence of a legal entity (REC Vallelaghi) in Valle dei Laghi, founded in June 2023, REC operations are not currently possible in Italy due to laws that have not yet been implemented at the national level. The overall goals of these energy communities include increasing renewable energy production, particularly through photovoltaic and hydroelectric sources, promoting local experiences, and leveraging the energy transition to empower mountain territories. The strategic direction includes directing consumption toward widespread electrification (promoting the diffusion of heat pumps and electric vehicles) and supporting the local grid system.

This section defines all the data for the composition and evaluation of the baseline at the different pilot sites, both from a numerical point of view for the comparison of values with subsequent project steps to define the added value, and from a more qualitative point of view to assess the maturity of an energy community. Individual pilot sites in the corresponding region will be presented below.

[8] SET website: https://www.setdistribuzione.it/

[9] https://www.setdistribuzione.it/attivita/smartecometer.html

3.1.3.1 RE1.1 – Val di Fassa

Figure 3.1 – Area of Val di Fassa pilot site

The first pilot site is being developed in Val di Fassa, in the municipality of San Giovanni di Fassa (3500 inhabitants), located in Trentino. San Giovanni di Fassa is situated in the Fassa Valley and has a population of approximately 10,000 residents across 6 municipalities. The area is served by a historical electric cooperative called CEP, founded in 1914, which manages the local electric grid covering a vast region in the valley.

The Val di Fassa, located in the Fassa Valley, is embarking on an inspiring energy community project rooted in educational collaboration. Initiated by local students who took part in an inter-school "Lego League" competition, this pilot site has evolved into a vision for a Renewable Energy Community (REC) centered around the Fassa Ladin School and local preschool. A unique feature of this initiative is its focus group, composed of students, teachers, and representatives from a local electrical cooperative, which is a historic partner and key supporter in bringing this project to life. Although the REC is not yet legally established and cannot be operational under current Italian regulations, the groundwork is being laid for a community-driven energy solution that could serve as a model for similar endeavors.

The primary objective of this project is to create an energy community with a local and educational focus. A photovoltaic (PV) system of 130 kW (130 MWh/year of annual production) will be installed on the kindergarten's roof (or on the Church roof), with funding provided by the local electric cooperative. The participants in the REC will include students, their families, faculty, and school staff, embodying a true community-led initiative. Notably, any income generated from the PV system's energy production will be funneled back into the schools, directed towards purchasing educational materials to benefit all involved. This approach emphasizes social impact over financial gain for individuals, fostering a sense of shared purpose and investment in sustainable energy.

The Val di Fassa REC stands as an example of integrating renewable energy with educational objectives, where the benefits extend beyond environmental gains to include social and community development. While currently limited in its operational capacity, the initiative is poised to serve as a pilot for future energy communities in the region, supported by the local electric cooperative's commitment and the enthusiastic participation of students and faculty.

In this case, there is a lack of data in the considered pilot site because there is neither an operational energy community nor applicable baseline scenarios with good reliability. That is why it is important to monitor the performance of this pilot site in the subsequent stages of WP6 for the creation and monitoring of energy community data.

3.1.3.2 RE1.2 – Levico Terme

Figure 3.2 - Area of Levico Terme pilot site

Levico Terme (8,112 inhabitants), situated in the Valsugana Valley, is thinking about an innovative energy community initiative. This small town boasts a rich historical center and a compact industrial/commercial district nestled close to the residential zones. The driving force behind this endeavor is the Municipality of Levico Terme.

The focal point of this initiative is the repurposing of an unused school building, where an 80 kW photovoltaic (PV) plant is planned for installation. This solar power facility is anticipated to generate an annual output of 102 MWh, contributing significantly to the community's energy needs. Additionally, attention is directed towards the small industrial/commercial district. Here, a 60 kW PV system is slated for implementation, with an expected annual production of 76 MWh/y. This diversification of energy sources ensures a balanced and sustainable approach to power generation within the municipality. Extending the reach of renewable energy, residential areas on the outskirts will feature smaller PV installations. These decentralized systems, totaling 20 kW and producing 25 MWh/y annually, aim to provide clean energy to suburban homes, fostering a widespread adoption of sustainable practices. The Municipality of Levico Terme is also thinking about the possibility to integrate the system with a micro hydroelectric plant but there is not yet a real plan about this and it is not clear if this is easy in terms of concession for the use of public water.

A pivotal player in this initiative is a local Energy Service Company (ESCO), collaborating closely with the community. The ESCO's role is integral, particularly in realizing the ambitious 80 kW PV plant atop the disused school building. This collaboration underscores the cooperative spirit driving the project forward. Notably, the overarching objective of this energy community is not merely environmental sustainability but also social impact.

The creation of an energy income stream is envisioned as a proactive measure to combat energy poverty within Levico Terme. This forward-thinking approach aligns economic benefits with ecological responsibility, demonstrating a commitment to holistic community development.

One intriguing aspect of this energy community is its conscientious effort to mitigate the visual impact of renewable energy installations on the landscape. By strategically choosing large public and industrial/commercial roofs for solar installations, the project aims to strike a balance between meeting energy needs and preserving the aesthetic integrity of historical buildings. This innovative configuration reflects a commitment to sustainable development that is considerate of both environmental and cultural sensitivities.

One of the critical points of this energy community project is that there are already several other energy community projects under the same primary cabin. Limiting the area to just the Municipality of Levico Terme is probably counterproductive because there is a risk of not having enough consumers/prosumers/producers and members to make the initiative economically sustainable. Secondly, having other similar initiatives at very close distances (less than 10 km) could compromise the success of the REC. Finally, the Municipality initially thought of joining the Energy Community directly as a partner. Through the ECOEMPOWER project, the Municipality is being helped to assess the best situation and to foster dialogue with neighboring territories and nascent Energy Communities.

In this case, there is a lack of data in the considered pilot site because there is neither an operational energy community nor applicable baseline scenarios with good reliability. That is why it is important to monitor the performance of these pilot sites in the subsequent stages of WP6 for the creation and monitoring of energy community data.

3.1.3.3 RE1.3 – Valle dei Laghi

Figure 3.3 – Area of "Valle dei Laghi" pilot site

The Valle dei Laghi Energy Community is a visionary project, currently supported by 20 members (citizens, small enterprises, associations), situated in the heart of Trentino, Italy. Covering the municipalities of Cavedine, Madruzzo, and Vallelaghi, this initiative aims to unite approximately 11,000 inhabitants in a collective effort towards energy sustainability and independence.

The valley, renowned for its natural beauty, hosts a variety of lakes, biotopes, and Sites of Community Importance, along with the impressive Paganella-Gazza mountain range and Mount Bondone.

Initially, the three administrations of the Valle dei Laghi municipalities (Valle dai Laghi, Cavedine and Madruzzo) were involved in the ECOEMPOWER project. It was they, with the support of the Valley Community (a supra-municipal body that unites all the municipalities in an area), who promoted the creation of a Renewable Energy Community. However, recently, a group of entrepreneurs and citizens started an initiative to establish a REC in the Valle dei Laghi. Through ECOEMPOWER, an attempt is being made to govern the relationship between municipal administrations and this spontaneous initiative. Municipalities do not wish to officially participate as members in the Energy Community, preferring to directly activate other initiatives to valorize their energy assets (a new modality similar to Energy Communities called 'self-consumption elsewhere') because it is easier to set up (each municipality its own) and does not affect the rules of the REC, which can then act as a private entity. Their role thus becomes that of external actors promoting and supporting the development of private RECs. ECOEMPOWER will try to hold these two parts together, addressing the issue of shared renewable energy in the Valle dei Laghi as a whole.

The core objective of the Energy Community is social in nature, with a primary focus on achieving energy independence through sustainable development principles. The plan involves integrating new photovoltaic (PV)

plants on public buildings, schools, and industrial structures. Furthermore, the project envisions the creation of biogas plants to generate electricity from agricultural and livestock waste. In this moment there is not yet individuate an area to install a PV plant, but the REC is working for reaching almost 200 kW of PV (with an estimated production of 200 MWh/year). At this time there is not a concrete project about biogas, or other sources and it could be difficult to create this type of plant within ECOEMPOWER project.

Through collaborative efforts involving local municipalities, enterprises, and citizens, the Energy Community endeavors to create a self-sustaining ecosystem that reduces reliance on external energy sources. This comprehensive strategy aligns with global sustainability goals and sets a noteworthy example for other regions seeking to combine environmental conservation with community development.

In this case, there is a lack of data in the considered pilot site because there is neither an operational energy community nor applicable baseline scenarios with good reliability. That is why it is important to monitor the performance of these pilot sites in the subsequent stages of WP6 for the creation and monitoring of energy community data.

3.2 Regional Ecosystem #2 (RE2): Auvergne-Rhone-Alpes and Grand Est (FRANCE)

3.2.1 Description of Regional Ecosystem

The focus of the ECOEMPOWER project is the Centrales Villageoises' network[10] in France, a nationwide initiative with significant implementation in the Auvergne-Rhône-Alpes region (about 8 million inhabitants in the region, of which about 1.9 million residents reside in the areas covered by the local companies of Centrales Villageoises) and Grand Est region (about 5.5 million inhabitants in the region, of which about 200,000 inhabitants live in the areas covered by the local companies of Centrales Villageoises), specifically chosen as focus regions. Centrales Villageoises are local companies formed by citizens, municipalities, and local businesses, aiming to develop renewable energy and energy efficiency projects at a territorial scale, considering local factors such as landscape integration and social and economic development. The concept originated from an experimental phase (2010-2014) led by the regional energy agency of Auvergne-Rhône-Alpes, involving eight pilot sites. This initiative evolved into the establishment of local citizen-owned companies financing photovoltaic projects. The success led to the consolidation of technical and legal frameworks, facilitating the replication of the Centrales Villageoises model on other sites. In 2018, the Association Centrales Villageoises (ACV) was created to further develop the network, now comprising 68 local companies. These entities have successfully developed more than 475 photovoltaic power plants on roofs (10 MWp installed power, 12.0 GWh/y produced in 2023), with ongoing studies for other types of renewable energy projects such as micro hydroelectricity and wind energy. Historically, the regional agency AURA-EE (Auvergne-Rhône-Alpes Énergie Environnement) has been supporting the creation and development of the model of Centrales Villageoises. Since 2018, with the creation of the Association Centrrales Villageoises, the regional authority is not anymore involved in the project. However, AURA-EE is still supporting the association through a parternship in which an employee from their organization is working part time for the association. This regional program, initiated in 2010, has resulted in the creation of 68 local energy communities across multiple French regions, involving more than 7,000 shareholders. To support the expansion of the program, ACV serves as an OSS, coordinating the efforts of local energy communities implementing the Centrales Villageoises model. ACV receives support from regional public authorities, including Grand Est, Provence-Alpes-Côte d'Azur and Bretagne (in addition to Auvergne-Rhône-Alpes), as well as organizations like Foundation Terre Solidaire, Fondation Crédit Mutuel Alliance Fédérale and Energie Partagée.

In ECOEMPOWER, three pilot sites from the Centrales Villageoises' network were identified. These sites, with varying degrees of maturity, are working on innovative renewable energy projects, complementing the development of rooftop photovoltaic projects.

The roles within ECOEMPOWER include AURA-EE focusing on sharing its experience, leading specific work packages, and supporting replication activities, while ACV coordinates further development of the "One Stop Shop CV model" accompanies pilot sites, and facilitates replication in other French regions and beyond. The

[10] Centrales Villageoises website (https://www.centralesvillageoises.fr/centrales-villageoises-local-citizen-owned-energy-communities)

objective is to expand services in areas such as financing, local employment, social engagement, and the development of new renewable energy projects.

3.2.2 OSS evaluation

The Association Centrales Villageoises (ACV) plays a crucial role as the OSS in the French regional ecosystem (focused on Auvergne-Rhône-Alpes and Grand Est regions within ECOEMPOWER but acting nationally). Established with the aim of supporting the development of local energy communities, ACV serves as a vital resource, facilitating the creation of citizen-owned Renewable Energy Sources (RES) projects. This framework has enabled the successful replication of the concept across various sites. ACV is currently actively providing a comprehensive set of tools and services to its members. These include legal and business model support, technical assistance, communication tools, and various databases. ACV's toolkit[11] comprises approximately 150 tools tailored to guide local energy communities through different project phases. The services extend to virtual platforms, such as personalized websites, forums for experience sharing, and virtual storage spaces. Additionally, ACV conducts training sessions on legal, financial, and technical aspects, reinforcing the capabilities of local companies.

As of now (January 2024), ACV boasts a membership of 68 energy communities, totaling around 500 direct users, so people actively involved in the ECs. The OSS services are actively utilized, evident in the 7,900 website visits from 5,070 users within a year (2023)[12]. The number of direct users is complemented by an additional 135 participants in training sessions and 650 information requests handled by ACV staff in 2023. Several citizen groups, embodying the Centrales Villageoises model, have successfully navigated the process of creating energy communities with ACV's support. A notable example is the Centrales Villageoises Energies Coeur de Corrèze, which initiated its journey with ACV in 2020, officially joining the network, establishing a legal entity, and commissioning a PV plant by June 2023. ACV envisions a proactive approach to enhance communication and volunteer mobilization within the network. This involves developing tools and training programs to boost the visibility of local companies, facilitate volunteer governance, and support the creation of employment opportunities within local companies. Additionally, ACV aims to refine tools for business plan analysis and further develop services for different types of RES projects. ACV recognizes the value in empowering local companies through enhanced communication and volunteer engagement. The organization aims to facilitate the transition from volunteer management to paid employment, fostering sustainability and growth. The emphasis is not only on technical aspects but also on governance, citizen engagement, and participatory decision-making processes. In essence, the OSS, represented by ACV in the Centrales Villageoises' network, stands as a dynamic and multifaceted resource, actively contributing to the development and sustainability of local energy communities in the French regions. The ongoing efforts focus on adaptability and continuous improvement to meet the evolving needs of its diverse membership.

[11] Website page where some tools can be found among the public ones (https://centralesvillageoises.fr/emergence)

[12] ACV website link: https://www.centralesvillageoises.fr/

3.2.3 EC data acquisition and qualitative assessment

The ECOEMPOWER project consolidates and promotes the deployment of these innovative initiatives, which are a credible alternative to traditional renewable energy projects. Three remarkable pilot sites—Centrales Villageoises Eau et Soleil du Lac, Centrales Villageoises VercorSoleiL, and Centrales Villageoises de Vezouze en Piémont—stand as beacons of change, embodying a commitment to sustainable practices, community engagement, and environmental stewardship.

All local companies within the Centrales Villageoises network share a cooperative governance model. The General Assembly, where each individual holds one vote, consists mainly of citizens, ensuring their majority representation. The General Assembly is responsible for electing the Management Board, which, in turn, elects the President responsible for the company's legal aspects. As regard to the regulatory framework, the Centrales Villageoises model falls under the definition of Renewable Energy Communities (decree from December 26th 2023). No specific incentives exist yet for energy communities within the regional ecosystem, as the regulatory framework is very recent. The pilot sites contribute to the broader goal of becoming key players in their respective territories, actively participating in the fight against climate change. Each site showcases unique technical specifications, objectives, and challenges, reflecting the diverse approaches and contexts of the Centrales Villageoises network.

In essence, these pilot sites exemplify the transformative power of community-driven initiatives, propelling France toward a future powered by renewable energy, economic resilience, and environmental sustainability. The diverse goals of each pilot site collectively contribute to the overarching mission of the ECOEMPOWER project, marking a paradigm shift in the nation's energy narrative.

This section defines all the data for the composition and evaluation of the baseline at the different pilot sites, both from a numerical point of view for the comparison of values with subsequent project steps to define the added value, and from a more qualitative point of view to assess the maturity of an energy community. Individual pilot sites in the corresponding region will be presented below.

3.2.3.1 RE2.1 - Centrales Villageoises Eau et Soleil du Lac

Figure 3.4 – Area of Centrales Villageoises Eau et Soleil du Lac pilot site

Centrales Villageoises Eau et Soleil du Lac is a legally established energy community, adopting the SAS ("Sociétés par Actions Simplifiées" – joint-stock companies) structure since 2022. The community is operational, marked by the successful commencement of its first PV plant, with an installed capacity of 24.6 kWp (annual production: 30 MWh/y), in March 2023. Ongoing projects include the development of two additional rooftop PV plants (35.7 kWp and 102 kWp, total annual production expected: 150 MWh/y), and a hydropower project with an estimated capacity of 200 kW (annual production expected: 600 MWh/y). The primary scope of this energy community is to undertake initiatives favoring the energy transition within the territory of the "Grand Lac" community of communes (64 000 inhabitants). With a commitment to uniting citizens and local authorities, Eau et Soleil du Lac aims to boost the energy transition in the region. Looking forward, Eau et Soleil du Lac aims to broaden its membership to encompass citizens, local municipalities, and SMEs.

Below in Table 3.1, Table 3.2, Table 3.3 and Table 3.4 are entered all the parameters from the social, energy, economic and environmental point of view within the pilot site, respectively.

Table 3.1 – Input request for evaluation of social parameters - Centrales Villageoises Eau et Soleil du Lac

Social data	Value	Unit of measure
Number of citizen-led initiatives supported and/or created	1	[#]
Number of citizens taking part in energy communities	41	[#]
Number of actors with increased skills in the area of community energy	0	[#]
Number of jobs created	0 direct job 0.2 indirect job	[FTE]
Number of people participating workshops	0	[#]
Diversity in the distribution of people involved in the EC	30% of women 17 % of people under 40	[%]

Table 3.2 – Input request for evaluation of energy parameters - Centrales Villageoises Eau et Soleil du Lac

Energy data	Value	Unit of measure
Primary energy demand	0.17	[GWh/year]
Final energy demand	0.12	[GWh/year]
Renewable energy generation	0.023	[GWh/year]
RES electricity self-consumption	0	[%]
Flexibility – Storage size and capacity	0	[kW and kWh]

Table 3.3 – Input request for evaluation of Economic parameters - Centrales Villageoises Eau et Soleil du Lac

Economic data	Value	Unit of measure
Investments in sustainable energy	0.03	[M€]
Development of local community energy investment pipelines	0.03	[M€]
Public investment	1,740	[€]
Private investment	28,260	[€]
Average cost of electricity (from electricity bill)	0.1907	[€/kWh]

Table 3.4 – Input request for evaluation of environmental parameters - Centrales Villageoises Eau et Soleil du Lac

Environmental data	Value	Unit of measure
Reduction of GHG emissions	1.18	[tonCO2/year]

3.2.3.2 RE2.2 – Centrales Villageoises VercorSoleiL

Figure 3.5 – Area of Centrales Villageoises VercorSoleiL pilot site

Centrales Villageoises VercorSoleiL, established as a SAS (“Sociétés par Actions Simplifiées” – joint-stock companies) since 2015, is an operational energy community currently managing 29 PV plants. This cooperative involves 137 local citizens, municipalities, and SMEs. The community's primary focus lies in promoting the energy transition within the "Vercors Drômois" territory (2,382 inhabitants). VercorSoleiL has set ambitious goals, including surpassing the 1 MWp (1.2 GWh/year of annual production) installed threshold for photovoltaic production. In addition to its core energy activities, VercorSoleiL has ventured into innovative initiatives such as a local e-mobility service, offering a shared electric vehicle to village residents. Future projects include a new 150 kW PV project (annual production expected: 200 MWh/y), a collective self-consumption endeavor (28 kW of PV plant without storage, connected to e-mobility), and exploration into hydropower and wind projects. For example, they aim to develop collective self-consumption, and explore the incorporation of a potential hydroelectric project of 250 kW (annual production expected: 700 MWh/y). However, challenges have been encountered in launching a pre-established wind energy project of 2.4 MWp (annual production of about 5 GWh/year), attributed to funding issues and difficulties with local authorities.

The current RES annual production for this site is 510.7 MWh/y, with an RES sizing of 469 kWp. The community places a strong emphasis on citizen engagement, social aspects, shared governance, and effective communication, embodying a holistic approach to sustainable energy practices.

Below in Table 3.5, Table 3.6, Table 3.7 and Table 3.8 are entered all the parameters from the social, energy, economic and environmental point of view within the pilot site, respectively.

Table 3.5 – Input request for evaluation of social parameters - Centrales Villageoises VercorSoleiL

Social data	Value	Unit of measure
Number of citizen-led initiatives supported and/or created	1	[#]
Number of citizens taking part in energy communities	139 citizens (and 8 municipalities, and 2 SMEs)	[#]
Number of actors with increased skills in the area of community energy	0	[#]
Number of jobs created	0.4 directly 5.6 indirectly	[FTE]
Number of people participating workshops	15	[#]
Diversity in the distribution of people involved in the EC	47% of women 33% of people under 40	[%]

Table 3.6 – Input request for evaluation of energy parameters - Centrales Villageoises VercorSoleiL

Energy data	Value	Unit of measure
Primary energy demand	0.60	[GWh/year]
Final energy demand	0.44	[GWh/year]
Renewable energy generation	0.51	[GWh/year]
RES electricity self-consumption	0	[%]
Flexibility – Storage size and capacity	0	[kW and kWh]

Table 3.7 – Input request for evaluation of Economic parameters - Centrales Villageoises VercorSoleiL

Economic data	Value	Unit of measure
Investments in sustainable energy	0.8	[M€]
Development of local community energy investment pipelines	0.8	[M€]
Public investment	128,580	[€]
Private investment	671,420	[€]
Average cost of electricity (from electricity bill)	0.1907	[€/kWh]

Table 3.8 – Input request for evaluation of environmental parameters - Centrales Villageoises VercorSoleiL

Environmental data	Value	Unit of measure
Reduction of GHG emissions	26.1	[tonCO2/year]

3.2.3.3 RE2.3 - Centrales Villageoises de Vezouze-en-Piemont

Figure 3.6 – Area of Centrales Villageoises de Vezouze-en-Piemont pilot site

Centrales Villageoises de Vezouze en Piémont, established as a SAS ("Sociétés par Actions Simplifiées" – joint-stock companies) in 2019 across the grouping of municipalities of Vezouze-en-Piémont in Grand Est region (11,947 inhabitants), stands as an operational energy community with 10 PV plants with a cumulative installed RES capacity of 410 kWp, with an annual RES production of 446.2 MWh/year. Future objectives include the installation of new photovoltaic plants in 2024, promoting local electricity harnessing through collective self-consumption. Collaborative efforts with a local partner are underway for the co-development of a ground-based photovoltaic park (5 MWp, annual expected production: 5 GWh/year), part of a more extensive, longer-term project. Envisioning the future, the community delves into collective self-consumption initiatives through collaborations with local distribution system operators (DSOs), municipalities, companies, and citizens. Central to its mission are citizen involvement, social engagement, shared governance, and participatory decision-making processes. The community is dedicated to sustainable practices, fostering collaboration for a resilient and eco-friendly future.

Below in Table 3.9, Table 3.10, Table 3.11 and Table 3.12 are entered all the parameters from the social, energy, economic and environmental point of view within the pilot site, respectively.

Table 3.9 – Input request for evaluation of social parameters - Centrales Villageoises de Vezouze-en-Piemont

Social data	Value	Unit of measure
Number of citizen-led initiatives supported and/or created	1	[#]
Number of citizens taking part in energy communities	67	[#]
Number of actors with increased skills in the area of community energy	0	[#]
Number of jobs created	0 directly 3.85 indirectly	[FTE]
Number of people participating workshops	0	[#]
Diversity in the distribution of people involved in the EC	31% of people under 40 34% of women	[%]

Table 3.10 – Input request for evaluation of energy parameters - Centrales Villageoises de Vezouze-en-Piemont

Energy data	Value	Unit of measure
Primary energy demand	0.23	[GWh/year]
Final energy demand	0.17	[GWh/year]
Renewable energy generation	0.45	[GWh/year]
RES electricity self-consumption	0	[%]
Flexibility – Storage size and capacity	0	[kW and kWh]

Table 3.11 – Input request for evaluation of Economic parameters - Centrales Villageoises de Vezouze-en-Piemont

Economic data	Value	Unit of measure
Investments in sustainable energy	0.55	[M€]
Development of local community energy investment pipelines	0.55	[M€]
Public investment	120,780	[€]
Private investment	429,220	[€]
Average cost of electricity (from electricity bill)	0.1907	[€/kWh]

Table 3.12 – Input request for evaluation of environmental parameters - Centrales Villageoises de Vezouze-en-Piemont

Environmental data	Value	Unit of measure
Reduction of GHG emissions	22.8	[tonCO2/year]

3.3 Regional Ecosystem #3 (RE3): Allgau (GERMANY)

3.3.1 Description of Regional Ecosystem

Situated in Southern Germany, the expansive Allgäu region spans the districts of Oberallgäu, Ostallgäu, Unterallgäu, and Lindau, covering an extensive 4,600 square kilometers. Home to a population of 650,000 residents, Allgäu distinguishes itself not only for its geographical significance but also for its noteworthy advancements in sustainable living.

The region has positioned itself at the forefront of the energy transition movement, exemplified by the internationally acclaimed energy village of Wildpoldsried. Allgäu's dedication to environmental stewardship is evident in its pristine landscapes, attracting both national and international visitors seeking refuge in nature.

Beyond its aesthetic appeal, Allgäu boasts a thriving economy and hosts a sophisticated high-tech industry, particularly in the realm of renewable facilities and infrastructure. The energy landscape is diverse, encompassing major entities such as LEW (affiliated with E.ON) alongside numerous small, municipality-owned utilities. Even modest "Energiegenossenschaften" (energy cooperatives) have established successful operations in the region, underscoring the depth of community engagement.

Renewable energy sources constitute the backbone of Allgäu's energy profile. Solar energy takes precedence, adorning rooftops and fields, while wind power, biogas, and hydropower play integral roles in the region's sustainable energy framework. This commitment to renewables is deeply ingrained in the region's history, with Allgäu being the birthplace of pioneering energy community initiatives, such as Hindelang.

Driving Allgäu's sustainable initiatives is eza! (Energy and Environmental Centre Allgäu)[13], the regional energy agency. Comprising a team of approximately 40 experts across various disciplines related to sustainable energy management, eza! serves as a pivotal force, offering support to local authorities, municipalities, and energy utilities. The agency actively engages with educational institutions, instilling the principles of the energy transition in schools and spearheading initiatives like Bündnis Klimaneutrales Allgäu 2030 (Allgäu Climate-Neutral Alliance).

In a collaborative effort with B.A.U.M., eza! envisions the establishment of a regional OSS. This comprehensive institution aims to facilitate a seamless transition for municipalities, enterprises, and other regional stakeholders looking to embrace energy cooperatives and citizen-led renewable energy communities. The OSS will amalgamate expertise in motivation, capacity building, initiation, energy management, financing, legal affairs, and social dynamics, consolidating these services into a singular, comprehensive hub.

In essence, Allgäu transcends its geographical boundaries, standing as a testament to the harmonious fusion of tradition, innovation, and an unwavering commitment to a sustainable future. With its breathtaking landscapes, robust economy, and a community-oriented approach to the energy transition, Allgäu emerges as an exemplar of successful integration of renewable living principles.

[13] eza! Website: https://www.eza-allgaeu.de/

3.3.2 OSS evaluation

In the dynamic landscape of southern Germany's Allgäu region, a transformative initiative is taking shape with the inception of a groundbreaking OSS. Spearheaded by the Energy and Environment Centre Allgäu (eza!) in Kempten Allgäu, the OSS is a pivotal outcome of the ambitious ECOEMPOWER project. Currently the OSS is in the process of being created and aims to redefine the local energy narrative, offering a comprehensive suite of services tailored to the unique needs of energy communities. Unlike the existing energy agency model at eza!, the OSS is a dedicated effort geared specifically towards advising and supporting energy communities. At this juncture, the OSS remains a planned entity, with its development unfolding in tandem with the progression of the ECOEMPOWER project.

The envisioned OSS is poised to fill a critical void in the region's energy ecosystem. Prior to the ECOEMPOWER initiative, there were no concrete plans for such an institution. The project has provided the impetus for not only planning but also implementing an OSS, marking a significant shift in the region's approach to sustainable energy practices.

As the OSS evolves, it is expected to offer a spectrum of services. These span from raising awareness about the potentials and benefits of energy communities to providing detailed information to citizens and stakeholders. Moreover, the OSS will play a crucial role in assisting stakeholders in analyzing motivations and expectations, establishing technical feasibility and viability, and offering insights into funding opportunities and legal aspects.

The development of the OSS is a testament to the region's commitment to community-driven renewable energy initiatives. While specific services are yet to be fully outlined, the OSS is anticipated to provide support in developing business models, aiding capacity building, and offering technical guidance. This includes orientation on market-available technologies, supporting community engagement, and fostering collaborative networks among local actors.

As the OSS progresses towards full operation, it will become a central hub for the continuous evaluation of results achieved by energy communities. Monitoring the growth in the number of citizens involved, the increase in renewable energy production capacity, and adaptation to evolving regulatory aspects will be integral to its function.

Currently, there are no users utilizing OSS services, as it is still in the planning stage. However, the envisioned OSS at eza! is poised to become a focal point for citizens, stakeholders, and local authorities seeking guidance on energy community initiatives. As the OSS develops, opportunities may arise for users to share experiences and insights, contributing to the refinement and enhancement of services.

In conclusion, the emergence of the OSS in Allgäu reflects a strategic response to the region's commitment to sustainable energy practices and community engagement. The collaboration with ECOEMPOWER is set to bring about transformative changes, providing a centralized hub for expertise, support, and collaboration in the pursuit of renewable and community-driven energy initiatives.

3.3.3 EC data acquisition and qualitative assessment

In the region the focus of ECOEMPOWER project will be on three different pilot sites: Elektrizitätswerke Hindelang eG, Elektrizitätswerke Reutte, Dorfenergie eG Eppishausen.

In the regulatory realm, Germany's regulatory framework, as outlined by REScoop, reveals both progress and challenges. Amendments to the EEG (‘Erneuerbare Energien Gesetz’) in 2022 exhibit positive strides, reintroducing exemptions for 'citizen energy companies' from tender requirements. Strengthening definitions for renewable energy projects owned by these citizen-driven entities present a significant leap forward. However, gaps persist, necessitating further developments in creating an enabling framework and facilitating energy sharing among ECs.

As we delve deeper into the governance structures of these energy communities, Elektrizitätswerke Hindelang eG boasts a robust framework with a dedicated Management Board and Supervisory Board. Elektrizitätswerke Reutte is currently in the organizational phase, while Dorfenergie eG Eppishausen operates with an honorary board, supervisory board, and a substantial membership base.

This section defines all the data for the composition and evaluation of the baseline at the different pilot sites, both from a numerical point of view for the comparison of values with subsequent project steps to define the added value, and from a more qualitative point of view to assess the maturity of an energy community. Individual pilot sites in the corresponding region will be presented below.

3.3.3.1 RE3.1 - Elektrizitätswerke Hindelang eG

Figure 3.7 – Area of "Elektrizitätswerke Hindelang eG" pilot site

Established in the 1920s by 48 visionary citizens in the Ostrachtal valley (5,000 inhabitants), Elektrizitätswerke Hindelang eG is a cooperative at the forefront of community-driven sustainable energy initiatives in Germany's Oberallgäu region. Despite economic challenges, the cooperative's founders embarked on a mission to provide electricity to the local community, resulting in the construction of the Auele hydroelectric power plant in 1926 and the development of an electricity distribution network. Operating under a cooperative legal structure, Elektrizitätswerke Hindelang enjoys unwavering support from the municipality of Bad Hindelang (5,000 inhabitants). The cooperative's energy portfolio encompasses hydroelectric and solar power, electricity import and trade, as well as active involvement in the local power grid. Notable power capacities include the 1,100 kW hydro plant at Auele (annual production of 4 GWh/y), a 95 kW hydro plant at Gernbach (annual production of 300 MWh/y) and various photovoltaic installations totaling 193 kW on rooftops (annual production of 160 MWh/y). Elektrizitätswerke Hindelang is also a prominent player in the energy transition, holding a leading role in motivating other energy providers and municipalities in the region. Additionally, the cooperative contributes to sustainable mobility with five electric vehicle charging structures (each of 22 kW). Beyond energy, Elektrizitätswerke Hindelang is a key employer in the region (with 16 employees), contributing significantly to the local economy and actively participating in regional projects like the DECIDE[14] project initiative with BAUM, underscoring its commitment to driving sustainable energy transitions.

[14] DECIDE project website: https://decide4energy.eu/

Below in Table 3.13, Table 3.14, Table 3.15 and Table 3.16 are entered all the parameters from the social, energy, economic and environmental point of view within the pilot site, respectively.

Table 3.13 – Input request for evaluation of social parameters - Elektrizitätswerke Hindelang eG

Social data	Value	Unit of measure
Number of citizen-led initiatives supported and/or created	1	[#]
Number of citizens taking part in energy communities	330 citizens and 20 SMEs are members of the cooperative	[#]
Number of actors with increased skills in the area of community energy	0	[#]
Number of jobs created	16	[FTE]
Number of people participating workshops	0	[#]
Diversity in the distribution of people involved in the EC	30% women, 5% under 40y	[%]

Table 3.14 – Input request for evaluation of energy parameters - Elektrizitätswerke Hindelang eG

Energy data	Value	Unit of measure
Primary energy demand	N/A	[GWh/year]
Final energy demand	17.9	[GWh/year]
Renewable energy generation	4.46	[GWh/year]
RES electricity self-consumption	0	[%]
Flexibility – Storage size and capacity	500,000 (dam "Schrecksee")	[kWh]

Table 3.15 – Input request for evaluation of Economic parameters - Elektrizitätswerke Hindelang eG

Economic data	Value	Unit of measure
Investments in sustainable energy	N/A	[M€]
Development of local community energy investment pipelines	N/A	[M€]
Public investment	N/A	[€]
Private investment	N/A	[€]
Average cost of electricity (from electricity bill)	0.34	[€/kWh]

Table 3.16 – Input request for evaluation of environmental parameters - Elektrizitätswerke Hindelang eG

Environmental data	Value	Unit of measure
Reduction of GHG emissions	1,387	[tonCO2/year]

3.3.3.2 RE3.2 - Elektrizitätswerke Reutte

Figure 3.8 – Area of "Elektrizitätswerke Reutte" pilot site

The region encompassing Altlandkreis Füssen, Seeg, and the city of Füssen, along with other municipalities (50,000 inhabitants) in the Ostallgäu county, is poised for a transformative initiative in sustainable energy development. At the heart of this endeavor is Elektrizitätswerke Reutte (EWR), an energy supply company with a century-long legacy, legally established as Elektrizitätswerke Reutte GmbH & Co. KG and owned by the Austrian municipality of Reutte. Currently operational, EWR is now venturing into a groundbreaking project – the formation of an energy community. This collaborative effort involves municipalities, farmers, hotels, and private initiatives, all keenly interested in establishing an energy community to redefine the energy landscape of the region. About 100 citizens are currently supporting the birth of the new energy community.

In terms of technical specifications, the Seeg municipality (3,000 inhabitants) emerges as a key player, with its primary renewable energy source being photovoltaic (PV) installations generating 15 MWh/year (about 20 kW of capacity). These PV systems are strategically positioned on rooftops and open rural spaces, showcasing the region's commitment to harnessing solar power.

EWR, as the main energy distributor, relies predominantly on hydroelectricity sourced from the Lech River (28,000 kW of capacity and 161,000 MWh/y of annual production). This underscores a commitment to clean and sustainable energy generation, aligning with the broader goals of the community.

Socially, the collaborative efforts are evident through entities such as the Seeg Working Group Energy (Arbeitskreis Energie) and the Tourism Association of Füssen, particularly its subgroup – the Climate Network of

Hotels (Tourismusverein Füssen im Allgäu e.V./Klimaverbund Hotels). This coalition represents a diverse range of stakeholders, including five hotels, a sporting arena, and two farms. They are at the forefront of initiating an energy cooperative aimed at facilitating the exchange of electricity.

The vision extends beyond the initial group, with the potential for this energy cooperative to expand its reach to encompass all 20 hotel members in the association. The community-driven aspect of this initiative is evident in the cooperative's collaborative structure, involving not only major players but also smaller entities, fostering a sense of shared responsibility and commitment to sustainable energy practices.

As part of the overarching objectives, the region aims to kickstart a new energy community primarily focused on electricity generation, with a predominant emphasis on PV plants and potential integration of wind energy. The comprehensive approach, blending technical advancements with community involvement, positions this region as a pioneer in sustainable energy initiatives.

In this case, there is a lack of data in the considered pilot site because there is neither an operational energy community nor applicable baseline scenarios with good reliability. That is why it is important to monitor the performance of these pilot sites in the subsequent stages of WP6 for the creation and monitoring of energy community data.

3.3.3.3 RE3.3 - Dorfenergie eG

Figure 3.9 – Area of "Dorfenergie eG" pilot site

Eppishausen (2,000 inhabitants) and Kirchheim (2,500 inhabitants), nestled in the county of Unterallgäu, epitomize the essence of proactive and sustainable energy initiatives through their active participation in the energy cooperative, Dorfenergie eG (www.dorfenergie-eg.de) (RE3.2). The cooperative's primary goal is energy generation and self-supply for its members, emphasizing economic benefits within a framework of communal engagement.

Founded in 2010 and legally established, Dorfenergie eG operates as a beacon of renewable energy advancement, particularly in solar power. The cooperative operates with a robust focus on purchasing, installing, and maintaining facilities for renewable energy generation. Notably, the cooperative's portfolio includes solar systems, biomass extraction and processing, and the sale of generated energy in the form of electricity and/or heat. This multifaceted approach aligns with its commitment to both economic prosperity and environmental preservation.

Noteworthy solar installations include a 131 kWp PV rooftop in the Municipality of Eppishausen, a 17 kWp installation at the Haselbach community and club center, a 23 kWp system at the Kirchheim school gymnasium, and a substantial 426 kWp open space PV installation at the landfill Derndorf. In total, these installations contribute to an annual energy production of 653,000 kWh, utilized for both power and heating. Beyond the technical achievements, the cooperative actively engages citizens in the energy transition. Through comprehensive information campaigns and community involvement, the cooperative ensures that residents are well-informed about the economic yields and environmental benefits of self-organization within an energy cooperative framework. This grassroots approach has fostered a sense of community and collective responsibility among the citizens, creating a vibrant and sustainable ecosystem.

Dorfenergie eG extends its influence beyond its immediate members by providing consultation and support on renewable power supply issues to both members and third parties. Public relations efforts further amplify awareness on energy-related topics, reinforcing the cooperative's commitment to education and advocacy.

As the cooperative evolves, its objectives include ensuring self-supply and direct marketing after the 20 years of state feed-in remuneration (from 19 to 39 c€/kWh depending on size), adapting to legal developments. The cooperative's journey underscores the transformative power of community-led sustainable energy initiatives. With each solar panel and biomass facility, Eppishausen and Kirchheim set a precedent for a future where renewable energy and communal cooperation harmoniously coexist, paving the way for a more sustainable and resilient community. Below in Table 3.17, Table 3.18, Table 3.19 and Table 3.20 are entered all the parameters from the social, energy, economic and environmental point of view within the pilot site, respectively.

Table 3.17 – Input request for evaluation of social parameters - Dorfenergie eG

Social data	Value	Unit of measure
Number of citizen-led initiatives supported and/or created	1	[#]
Number of citizens taking part in energy communities	142	[#]
Number of actors with increased skills in the area of community energy	0	[#]
Number of jobs created	0	[FTE]
Number of people participating workshops	4	[#]
Diversity in the distribution of people involved in the EC	Women 31% Under 40y 20%	[%]

Table 3.18 – Input request for evaluation of energy parameters - Dorfenergie eG

Energy data	Value	Unit of measure
Primary energy demand	0.409	[GWh/year]
Final energy demand	0.1704	[GWh/year]
Renewable energy generation	0.7	[GWh/year]
RES electricity self-consumption	0	[%]
Flexibility – Storage size and capacity	0	[kW and kWh]

Table 3.19 – Input request for evaluation of Economic parameters - Dorfenergie eG

Economic data	Value	Unit of measure
Investments in sustainable energy	1.2	[M€]
Development of local community energy investment pipelines	1.2	[M€]
Public investment	0	[€]
Private investment	1,200,000	[€]
Average cost of electricity (from electricity bill)	0.40	[€/kWh]

Table 3.20 – Input request for evaluation of environmental parameters – Dorfenergie eG

Environmental data	Value	Unit of measure
Reduction of GHG emissions	217.7	[tonCO2/year]

3.4 Regional Ecosystem #4 (RE4): Zlín Region (CZECH REPUBLIC)

3.4.1 Description of Regional Ecosystem

Located in the eastern part of the Czech Republic, the Zlín Region shares its border with Slovakia and covers 3,964 square kilometers, making it the fourth smallest of the country's regions. Despite its compact size, Zlín is home to a rich cultural heritage and a dynamic industrial landscape, with a population of 580,119 residents spread across 307 municipalities. Known for its industrial exploit, Zlín houses nearly 200 enterprises with over 100 employees each, ranking fifth among the 13 Czech regions. These enterprises reflect the region's legacy in sectors such as shoemaking, aviation, engineering, showcasing a blend of tradition and innovation.

In the middle of a varied landscape, the Zlín Region has embraced energy transformation with notable dedication, driven by its regional energy agency (EAZK). The region's territory, though limited in mineral resources, has valuable deposits of brick-clay, gravel sands, and building stone, as well as some modest discoveries of crude oil and natural gas. However, its high reliance on imported fossil fuels is evident: 93% of Zlín's municipalities are connected to the natural gas grid, underscoring the need for energy independence and local resiliency. To counter this dependence, the region is prioritizing local energy sharing models and community-based initiatives to shift toward renewables.

A keystone of Zlín's energy strategy is the rapid development of energy communities, part of a nationwide movement within the Czech Republic. Leading this transition is the Energy Data Center (EDC), which launched in August 2024 to support data-driven energy management and optimization across the country. The EDC serves as a critical infrastructure component for energy communities, facilitating transparency and efficiency in energy use, and fostering collaboration among municipalities, residents, and industries.

Currently, EAZK is planning three energy communities within the Zlín Region, focusing on creating a resilient and decentralized energy model. By establishing local networks that allow energy sharing among nearby consumers, these communities aim to significantly reduce dependency on imported energy sources. The agency is working closely with stakeholders across sectors to support this initiative, addressing not only technical and financial needs but also building capacity and promoting community engagement in sustainable practices.

The establishment of energy communities aligns with Zlín's commitment to sustainable growth and local empowerment. EAZK also collaborates with educational institutions, spreading awareness of energy transformation goals and providing expertise in areas such as energy management, legal frameworks, and financing options.

The Zlín Region exemplifies a balanced integration of industrial legacy and forward-thinking sustainability. Its concerted efforts toward energy self-sufficiency and community-driven renewable initiatives highlight the region's potential as a model for sustainable energy practices in Eastern Europe.

3.4.2 OSS evaluation

The One Stop Shop (OSS) in the region, currently operated by EAZK, primarily provides physical services for building refurbishment of public buildings, assistance with energy suppliers, and the development of renewable energy sources (RES).

While OSS has been active in offering consultations, approximately 150 per year for building refurbishment, 100 for grants and subsidies, and 200 for RES development, it is primarily focused on municipalities seeking to reduce energy demand through refurbishment and adopt RES, spurred by EU subsidies popularized over the last five years. The service is evenly split between physical (in-person) and virtual (email or phone) consultations, with municipalities expressing high satisfaction due to the comprehensive support provided, particularly with navigating subsidies and addressing bureaucratic challenges. However, the creation of an OSS specifically dedicated to energy communities was not previously planned and remains absent, placing the region in the pre-development phase for energy community-related OSS services.

While current users value the complex information and support offered, there is a clear gap in services tailored to energy communities, which is why the ECOEMPOWER project is critical to developing this capacity. Stakeholders recognize the potential value in expanding OSS functionalities, although they note that the concept of OSS is still relatively new and evolving, presenting challenges in implementing innovative features and capabilities. The development of an energy community OSS would significantly enhance the regional ecosystem, addressing unmet needs and aligning with the growing interest in sustainable energy solutions.

3.4.3 EC data acquisition and qualitative assessment

The Zlín Region, located in the eastern part of the Czech Republic, covers an area of 3,964 km² and is home to 580,119 inhabitants (2021) spread across 307 local authorities. The limited availability of natural resources and the ongoing energy crisis underline the urgency of transitioning to local renewable energy sources and energy-sharing models. To address this, the regional energy agency (EAZK) has initiated the development of three pilot Energy Communities as part of a broader strategy to enhance energy resilience and sustainability.

The three pilot sites—Vlčnov, Slavičín, and Zlín—exemplify diverse approaches to community energy. In Vlčnov, the municipality manages a PV system with an installed capacity of 221.4 kW, supplying approximately 222 MWh annually. These systems, located on municipal buildings such as the local swimming pool, operate on a low-voltage grid (400V) but currently lack battery storage. Slavičín integrates a 139.5 kW PV installation with a 129.75 kWh battery and an established District Heating Network (DHN) powered by wood chips, cogeneration units, and heat pumps. The municipality's progressive approach has earned national recognition, and plans include the integration of additional renewable technologies, such as bladeless wind turbines. In Zlín, the regional capital with 74,835 inhabitants, a municipally owned company, "Teplo Zlín," is leading the development of a robust EC. Initial PV installations of 100 kW are planned, with a long-term goal of over 2 MW. Zlín's initiative aims to foster collaboration among eight city entities and other stakeholders to ensure affordable energy for the community.

Governance across these ECs reflects a strong municipal foundation, with local authorities or municipally owned companies overseeing operations. In Vlčnov, the municipality acts as the "active consumer." In Slavičín, the company BTH Slavičín manages EC development, while in Zlín, Teplo Zlín drives the project. These governance structures provide stability but require enhanced public engagement and professional expertise to maximize their potential.

Central to these pilots is the role of the Energy Data Center (EDC), operational since 2024, which facilitates real-time data collection and electricity sharing within registered consumption and production groups. EDC enables quarter-hourly data granularity, essential for monitoring and optimizing energy flows across all three sites. However, metering infrastructure remains inconsistent, with only partial coverage of smart meters, particularly on the consumption side in Slavičín and Zlín.

Regulatory advancements, particularly the amendment to the Energy Act known as Lex OZE II (effective January 2024), have provided a framework for energy communities in the Czech Republic. The amendment allows electricity sharing across distribution networks, with mandatory registration of consumption points and production facilities in the EDC. While this regulatory progress is promising, challenges remain, including low public engagement, insufficient stakeholder commitment, a lack of skilled energy professionals, and limited support from regulatory bodies like the Energy Regulatory Office and EDC.

Addressing these barriers will be critical to unlocking the full potential of ECs in the Zlín Region. By fostering local renewable energy production, reducing dependency on imported fossil fuels, and promoting community participation, these initiatives aim to contribute significantly to the region's energy transition and long-term resilience.

3.4.3.1 RE4.1 – Vlčnov

Figure 3.10 – Area of Vlčnov pilot site

Vlčnov, a village of 2,969 inhabitants, is in the initial stages of forming an Energy Community (EC), currently operating as an "active customer." The municipality manages photovoltaic (PV) systems on several public buildings, including the municipal office, cultural center, elementary school, and swimming pool, which hosts a 20 kW PV plant. These installations are key to Vlčnov's efforts to generate renewable energy locally, helping the village take a step toward greater energy independence.

However, the development of the EC faces social and operational challenges. Citizen engagement remains limited, with no active participation or workshops organized thus far, and energy skills development is still in its infancy. Despite these barriers, the municipality is supported by the regional energy agency, EAZK, which plays a crucial role in formalizing the EC and planning its future.

The primary objective of the EC is to align local energy production with consumption to maximize efficiency and sustainability. This ongoing transition reflects Vlčnov's commitment to fostering renewable energy adoption, reducing environmental impact, and paving the way for stronger community involvement in the energy transition.

Below in Table 3.21, Table 3.22, Table 3.23 and Table 3.24 are entered all the parameters from the social, energy, economic and environmental point of view within the pilot site, respectively.

Table 3.21 – Input request for evaluation of social parameters - Vlčnov

Social data	Value	Unit of measure
Number of citizen-led initiatives supported and/or created	0	[#]
Number of citizens taking part in energy communities	0	[#]
Number of actors with increased skills in the area of community energy	1	[#]
Number of jobs created	0	[FTE]
Number of people participating workshops	0	[#]
Diversity in the distribution of people involved in the EC	0	[%]

Table 3.22 – Input request for evaluation of energy parameters - Vlčnov

Energy data	Value	Unit of measure
Primary energy demand	0.648	[GWh/year]
Final energy demand	0.341	[GWh/year]
Renewable energy generation	0.222	[GWh/year]
RES electricity self-consumption	29	[%]
Flexibility – Storage size and capacity	0	[kW and kWh]

Table 3.23 – Input request for evaluation of Economic parameters - Vlčnov

Economic data	Value	Unit of measure
Investments in sustainable energy	0.275	[M€]

Development of local community energy investment pipelines	0.275	[M€]
Public investment	275,000	[€]
Private investment	0	[€]
Average cost of electricity (from electricity bill)	0.36	[€/kWh]

Table 3.24 – Input request for evaluation of environmental parameters – Vlčnov

Environmental data	**Value**	**Unit of measure**
Reduction of GHG emissions	97	[tonCO2/year]

3.4.3.2 RE4.2 – Slavičín

Figure 3.11 – Area of Slavičín pilot site

Slavičín, a municipality of 6,513 residents, stands out for its progressive energy initiatives and dedication to sustainability. The town operates a well-developed system of community energy measures, supplying heat to a significant share of households through local resources. Renewable energy production is driven by photovoltaic systems installed on municipal facilities, primarily at the boiler room and administrative building of BTH Slavičín[15], a company fully owned by the city. These PV systems generate approximately 140 MWh annually, with efficient energy use supported by a battery storage system of 129.75 kWh capacity.

The development of an Energy Community (EC) in Slavičín is underway, with plans to enhance renewable energy integration and community participation. While citizen involvement and workshops have yet to be initiated, the town's focus is on improving energy self-sufficiency and laying the groundwork for future collaboration. Long-term goals include the installation of a bladeless wind power plant, which would further diversify energy sources and reduce environmental impact.

Slavičín's renewable energy efforts have already received national recognition, reflecting the municipality's commitment to innovation and sustainability. The emerging EC aims to maximize the potential of its RES production and battery storage, strengthening local energy independence and supporting the broader energy transition.

Below in Table 3.25, Table 3.26, Table 3.27 and Table 3.28 are entered all the parameters from the social, energy, economic and environmental point of view within the pilot site, respectively.

[15] Website: https://www.bth-slavicin.cz/

Table 3.25 – Input request for evaluation of social parameters - Slavičín

Social data	Value	Unit of measure
Number of citizen-led initiatives supported and/or created	0	[#]
Number of citizens taking part in energy communities	0	[#]
Number of actors with increased skills in the area of community energy	0	[#]
Number of jobs created	0	[FTE]
Number of people participating workshops	0	[#]
Diversity in the distribution of people involved in the EC	0	[%]

Table 3.26 – Input request for evaluation of energy parameters - Slavičín

Energy data	Value	Unit of measure
Primary energy demand	N.A	[GWh/year]
Final energy demand	N.A	[GWh/year]
Renewable energy generation	0.14	[GWh/year]
RES electricity self-consumption	>50	[%]
Flexibility – Storage size and capacity	129.75 kWh	[kW and kWh]

Table 3.27 – Input request for evaluation of Economic parameters - Slavičín

Economic data	Value	Unit of measure
Investments in sustainable energy	0.335	[M€]

Development of local community energy investment pipelines	0.335	[M€]
Public investment	335,000	[€]
Private investment	0	[€]
Average cost of electricity (from electricity bill)	0.28	[€/kWh]

Table 3.28 – Input request for evaluation of environmental parameters – Slavičín

Environmental data	**Value**	**Unit of measure**
Reduction of GHG emissions	61	[tonCO2/year]

3.4.3.3 RE4.3 – Zlín City

Figure 3.12 – Area of Zlín City pilot site

Zlín, the regional capital of the Zlín region with 74,835 inhabitants, is in the initial stages of establishing its Energy Community. The city has demonstrated a clear commitment to fostering collaboration by forming a partnership agreement between the municipality and eight city entities to create a community association. This initiative aims to provide its members with favorable electricity prices while gradually expanding participation and enhancing the community's impact. The current focus is on identifying renewable energy sources, with plans to install photovoltaic systems on schools and other municipal buildings.

Despite no renewable energy generation or storage currently being operational, the groundwork is being laid for a future-oriented energy transition. The development strategy aligns with Zlín's broader goals of sustainability and cooperation, supported by entities such as Teplo Zlín. While no investments have been made yet, the city's plans to connect additional sources to the community association hold promise for significant progress in renewable energy integration and cost reduction for participants.

In this case, there is a lack of data in the considered pilot site because there is neither an operational energy community nor applicable baseline scenario with good reliability. That is why it is important to monitor the performance of these pilot sites in the subsequent stages of WP6 for the creation and monitoring of energy community data.

3.5 Regional Ecosystem #5 (RE5): Central Greece (GREECE)

3.5.1 Description of Regional Ecosystem

The Central Greece region (about 500,000 inhabitants) blend of diverse topography encompassing coastal vistas and mountainous landscapes, stands as a testament to the convergence of rich cultural heritage and a burgeoning focus on renewable energy initiatives. At the forefront of this transformative journey is the ECOEMPOWER project, a beacon for sustainable practices within the region's electricity sector.

The project is developed in three key pilot sites-Domokos, Kamena Vourla, and Amfikleia-each of which offers a distinctive picture of geographic features and socioeconomic dynamics. Delving into the complexities of the electricity sector, the region hosts a mix of low-voltage (LV) and medium-voltage (MV) grids, which are essential for the efficient distribution of power generated by the emerging ECs.

Importantly, the import/export dynamic looms as a potential shift from reliance on national grids to export of excess energy, particularly from solar plants, thus contributing to the national grid. To counter the intermittency of renewables, energy storage solutions, including battery systems, become indispensable to ensure a steady and reliable energy supply.

The power generation landscape is diverse and aligns with the unique characteristics of each pilot site. Domokos and Kamena Vourla lead the way with solar PV systems, while Amfikleia follows a particular path, focusing on a biogas plant. Consumption patterns are evolving, with a notable shift toward integrating heat pumps for climate control and supporting electric vehicle (EV) infrastructure. Pilot sites are set to significantly reshape local consumption patterns.

Within innovative practices, the possibility of incorporating Power-to-Gas (P2G) technologies looms large, particularly in areas such as Amfikleia, where agricultural waste is transformed into a valuable resource for energy generation.

Beyond the technical dimensions, Greek Law 4513/2018 provides a legal framework for the establishment and operation of ECs, serving as a catalyst for community-driven energy initiatives. Financial incentives and support measures, including incorporation into the Development Law (Law no. 4513/2018) and exemptions from certain obligations, provide an enabling environment for ECs to thrive[16].

In particular, the Central Greece region is home to 114 existing ECs involving more than 2,000 stakeholders. While there is support from entities such as HEDNO (Hellenic Distribution Network Operator), RAE (Regulatory Authority of Energy) and CRES (Center of Renewable Energy Sources), a dedicated regional office, that will be designed under the ECOEMPOWER project, aims to streamline services and support emerging ECs.

This includes the development of an OSS, both virtual and physical, to serve as a comprehensive resource center for regulatory information, network capacity data, incentives, and technical guidance. This ambitious initiative

[16] Funds for RECs, CECs or and Energy Communities under Law no. 4513/2018 in Greece: https://thegreentank.gr/en/community-energy-watch-en/funds/

aims to empower communities by combining human and technological resources for the successful establishment and operation of ECs.

In essence, the Central Greece region, through the ECOEMPOWER project, is in the middle of a revolutionary transformation: a model for sustainable energy practices that seamlessly blends technical innovation with community.

3.5.2 OSS evaluation

As of the information shared, there is no established physical or OSS dedicated to the energy communities in the Region of Central Greece. The region appears to be in the early stages of developing an OSS, starting from the support of the pilot projects in Domokos, Kamena Vourla, and Amfikleia.

This implies the need for developing both the physical and digital infrastructure necessary for an OSS that can support the emerging energy communities, empowering citizens and stakeholders to make informed decisions about participating.

Given this scenario, the next steps for the Region of Central Greece would likely involve moving from this preliminary stage, characterized by studies and initial planning, towards the actual establishment of an OSS. This OSS would ideally function both as a physical center for in-person consultations and support, as well as a virtual platform offering accessible information and resources online. This dual approach would ensure comprehensive support for the various stakeholders involved in the energy community projects.

Established procedures applicable in Greece, cooperation of the involved parties, and consideration of all legal documents will be crucial in the planning process of an EC and will be supported by the new OSS.

The envisioned OSS, with features like a comprehensive resource database, job creation support, collaborative networking, communication tools, skill development resources, legal guidance, monitoring tools, a digital marketplace, and community engagement features, aims to empower local businesses, facilitate job creation, and contribute to the overall development of the communities within the region.

3.5.3 EC data acquisition and qualitative assessment

In the target region, which includes the regional ecosystem in Central Greece, three ECs are currently being established. The legal status of each EC is pending, with no operational activity launched at this stage.

The primary objectives of the Domokos, Kamena Vourla and Amfikleia pilot sites include reducing energy costs for members and reducing the overall CO2 footprint.

The start-up of these ECs has been driven by citizens from every region who seek to reduce energy consumption costs. Support and guidance was provided by the Central Greece Region and the Ministry of Energy.

The legal basis for these Energy Communities is provided by Greek legislation, in particular Law No. 4513/2018 and Law No. 5037/2023 on the transposition of the European directives 2018/2001 and 2019/944. These laws outline the principles of cooperation that govern the EC, emphasizing values such as solidarity, justice, equality, democracy, self-sufficiency and self-responsibility. The financial management and distribution of surpluses shall be regulated according to the type of energy community.

In all types of energy communities, at least 10 % of each year's surplus must be maintained to create the regular reserve.

At least seventy per cent (70%) of the surplus for each financial year shall be retained by the RECs as special reserve and shall be allocated, by decision of the general meeting, in accordance with the activities and as provided for in the statutes. RECs may distribute financial surpluses to members, less any previous reserves, where such provision is provided for in the Statutes.

This section defines all the data for the composition and evaluation of the baseline at the different pilot sites, both from a numerical point of view for the comparison of values with subsequent project steps to define the added value, and from a more qualitative point of view to assess the maturity of an energy community. Individual pilot sites in the corresponding region will be presented below.

3.5.3.1 RE5.1 – Domokos

Figure 3.13 – Area of Domokos pilot site

Domokos is a town and municipality in Central Greece, comprising 34 villages with a total population of about 5,000. An energy community with 1.5 MW (annual production of 1.5 GWh/year) photovoltaic systems is planned to virtually share energy among public buildings, schools, water pumps, city lighting, and electric vehicle charging points. In addition, the community can choose to donate energy to vulnerable citizens in poverty.

The Domokos Energy Community (EC) will be legally established and is still in the planning stage. Although it is not yet operational, it aims to strengthen environmental and economic goals by sharing energy generated between public infrastructure points. Goals include reducing members' energy costs and minimizing CO2 footprint (the reduction in GHG emissions could be about 720 tonCO2eq/year) through virtual net metering and heat pump integration.

In this case, there is a lack of data in the considered pilot site because there is neither an operational energy community nor applicable baseline scenarios with good reliability. That is why it is important to monitor the performance of these pilot sites in the subsequent stages of WP6 for the creation and monitoring of energy community data.

3.5.3.2 RE5.2 - Kamena Vourla

Figure 3.14 – Area of Kamena Vourla pilot site

Kamena Vourla, located in the Region of Central Greece, is a town and municipality in Phthiotis. Positioned on the south coast of the Malian Gulf, it lies 4 km west of Cape Knimis, separating the Malian Gulf from the North Euboean Gulf. The municipality covers a total area of 200 km2, incorporating three small towns and 20 villages. With a town population of 2,800 and an overall municipality population of approximately 4800, Kamena Vourla is a community nestled in a coastal setting.

In a forward-thinking initiative, Kamena Vourla is planning to establish an EC that focuses on renewable energy sources (RESs). The proposed EC aims to install photovoltaic systems (PVs) with a capacity of 0.5 MW (annual production of 0.5 GWh/year) in urban areas. This infrastructure is strategically designed to inject the generated energy directly into the local distribution network, promoting sustainability and reducing reliance on traditional energy sources.

Furthermore, the RESs owned by the EC will play a crucial role in offsetting multiple energy bills through virtual net metering. This innovative approach allows the energy generated by the PVs to be distributed among community members, contributing to a collective reduction in energy costs. The emphasis on virtual net metering aligns with the broader objectives of the energy community, which include not only economic benefits but also a commitment to reducing the carbon footprint (the reduction in GHG emissions could be about 240 tonCO2eq/year).

As Kamena Vourla moves toward the establishment of this energy community, it reflects a proactive stance in harnessing clean energy, fostering environmental sustainability, and enhancing the resilience of the local energy infrastructure. The integration of renewable energy sources and virtual net metering underscores the community's dedication to both economic and ecological goals.

In this case, there is a lack of data in the considered pilot site because there is neither an operational energy community nor applicable baseline scenarios with good reliability. That is why it is important to monitor the performance of these pilot sites in the subsequent stages of WP6 for the creation and monitoring of energy community data.

3.5.3.3 RE5.3 - Amfikleia

Figure 3.15 – Area of Amfikleia pilot site

Amfikleia is a town and municipality nestled at the northern foot of Mount Parnassus in the Phthiotis region of Central Greece. Covering a vast area of 500 km^2, the municipality comprises the town and 15 surrounding villages, boasting a combined population of around 11,000 inhabitants.

The town itself houses approximately 4,000 residents and serves as the focal point for this ambitious energy community (EC) initiative. The EC, not yet legally established, aims to integrate various components to enhance sustainability and promote local development.

One key aspect of the proposed EC is the establishment of a 500 kW biogas plant for electricity and heat production, waste management and fertilizer production. This facility will play a dual role, generating both electricity and heat. The electricity produced can be channeled back into the grid, contributing to the overall energy supply or utilized for local consumption. Additionally, the generated heat will serve a crucial role in supporting the agricultural activities within the community.

Waste management is a priority within the EC framework. The implementation of effective waste management practices will not only address environmental concerns but also contribute to the overall efficiency of the community. Furthermore, the waste generated in the process will be harnessed for fertilizer production, fostering a closed-loop system that benefits local agriculture.

Members of the energy community will include farmers, breeders, and the Municipality of Amfikleia itself. This diverse group of stakeholders reflects a collaborative effort to ensure the success and sustainability of the EC.

The involvement of local farmers and breeders is particularly noteworthy, as they stand to benefit from the electricity generated through a virtual net metering system, either by selling surplus energy to the grid or offsetting their own electricity bills.

The symbiotic relationship extends to the utilization of heat and fertilizer produced by the biogas plant. These valuable resources will find purpose in the community's greenhouses, enhancing agricultural productivity and creating a more self-sufficient and resilient local economy.

In summary, the envisioned energy community in Amfikleia presents a comprehensive and integrated approach to sustainable development. Through the establishment of a biogas plant, waste management initiatives, and collaboration among diverse stakeholders, the community aims to achieve energy self-sufficiency, support local agriculture, and contribute to a more environmentally conscious future.

In this case, there is a lack of data in the considered pilot site because there is neither an operational energy community nor applicable baseline scenarios with good reliability. That is why it is important to monitor the performance of these pilot sites in the subsequent stages of WP6 for the creation and monitoring of energy community data.

4 Conclusions

In conclusion, the completion of Deliverable 6.2 marks a significant milestone in the ECOEMPOWER project (i.e. Milestone No. 11), providing a comprehensive definition of the baseline in the various pilot sites. The baseline was meticulously established through an introductory overview for each of the 5 Regional Ecosystems, along with the evaluation of the Regional OSS (in the current configuration if already operational or in the envisioned features if in the planning stage), and a quantitative and qualitative analysis of the 15 energy communities operating or developing. In addition, KPIs were evaluated for the operational energy communities, as indicated in Deliverable D6.1, where data was accessible. Annex A displays the full set of information for the various pilot sites for the parameters and OSS. This document is of key importance as it outlines the current status of all Regional Ecosystems, OSSs and pilot sites, serving as a basis for the project's progress on this issue which will be closely monitored in Tasks T6.3 and T6.4. In fact, during the monitoring period of the pilot sites within Task T6.3 of WP6, this will be carried out through a data and parameter collection of the energy communities from the social point of view, and OSS development, every six months to evaluate the effectiveness of the ECOEMPOWER project in achieving the objectives. As for the energy data of the pilot sites for monitoring the associated KPIs, these will be monitored annually throughout the life of the project. The in-depth knowledge gained from this document lays the foundation for informed decision-making and strategic planning in the later stages of the ECOEMPOWER project.

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List of Abbreviations

DoA	Description of Actions
DSO	Distribution System Operator
ESCO	Energy Service Company
GHG	GreenHouse Gas
ICT	Information and Communication Technology
KPI	Key Performance Indicator
OSS	One Stop Shop
PU	Public
POD	Point of Delivery
EC	Energy Community
RES	Renewable Energy Source
ToC	Table of Contents
WP	Work Package

A. Annex A

	PAT			ACV			eza!		
	Val di Fassa	Levico Term	Valle Laghi	*Eau et Sol*	*VercorSol*	*de Vezouz*	*Hindelang*	*Reutte*	*Dorfenerg*
Number of citizen-led initiatives supported and/or created [#]	1	-	-	1	1	1	1		1
Number of citizens taking part in energy communities [#]	0	-	-	41	139 (and 8 municipalities and 2	67	330 citizens and 20 SMEs		142
Number of actors with increased skills in the area of community energy [#]	1	-	-	0	0	0	0		0
Number of jobs created [FTE]	0	-	-	0	0.4	0	16		0
Number of people participating workshops [#]	0	-	-	0	15	0	0		4
Diversity in the distribution of people involved in the EC [%]	N/A	-	-	30% women, 17% under 40y	47% women, 33% under 40y	34% women, 31% under 40y	30% women, 5% under 40y		31% women, 20% under 40y
Primary energy demand [GWh/year]	N/A	-	-	0.17	0.6	0.23	N/A		0.409
Final energy demand [GWh/year]	N/A	-	-	0.12	0.44	0.17	17.9		0.1704
Renewable energy generation [GWh/year]	0.14	-	-	0.023	0.51	0.45	4.46		0.7
RES electricity self-consumption [%]	N/A	-	-	0	0	0	0		0
Flexibility – Storage size and capacity [kW and kWh]	N/A	-	-	0	0	0	500,000 kWh		0
Investments in sustainable energy [M€/year]	0.06	-	-	0.03	0.8	0.55	N/A		1.2
Development of local community energy investment pipelines [M€/year]	0.06	-	-	0.03	0.8	0.55	N/A		1.2
Public investment [€]	0	-	-	1,740	128,580	120,780	N/A		0
Private investment [€]	60,000	-	-	28,260	671,420	429,220	N/A		1,200,000
Average cost of electricity (from electricity bill) [€/kWh]	N/A	-	-	0.1907	0.1907	0.1907	0.34		0.4
Reduction of GHG emissions [tonCO2eq/year]	29.9	-	-	1.18	26.1	22.8	1,387		217.7

	EAZK			ROCG		
	Vlcnvov	*Slavicin*	*Zlin*	*DOMOKOS*	*KAMENA V*	*AMFIKLEIA*
Number of citizen-led initiatives supported and/or created [#]	0	0	-	-	-	-
Number of citizens taking part in energy communities [#]	0	0	-	-	-	-
Number of actors with increased skills in the area of community energy [#]	1	0	-	-	-	-
Number of jobs created [FTE]	0	0	-	-	-	-
Number of people participating workshops [#]	0	0	-	-	-	-
Diversity in the distribution of people involved in the EC [%]	0	0	-	-	-	-
Primary energy demand [GWh/year]	0.648	N.A	-	-	-	-
Final energy demand [GWh/year]	0.341	N.A	-	-	-	-
Renewable energy generation [GWh/year]	0.222	0.14	-	-	-	-
RES electricity self-consumption [%]	29	>50	-	-	-	-
Flexibility – Storage size and capacity [kW and kWh]	0	129.75 kWh	-	-	-	-
Investments in sustainable energy [M€/year]	0.275	0.335	-	-	-	-
Development of local community energy investment pipelines [M€/year]	0.275	0.335	-	-	-	-
Public investment [€]	275,000	335,000	-	-	-	-
Private investment [€]	0	0	-	-	-	-
Average cost of electricity (from electricity bill) [€/kWh]	0.36	0.28	-	-	-	-
Reduction of GHG emissions [tonCO2eq/year]	97	61	-	-	-	-

Figure 0.1 - Comparison between pilot sites in terms of project KPIs

		EC phase			
		Emerging	Pre-development	Development	Operational
PAT	Val di Fassa		X		
	Levico Terme	X			
	Valle dei Laghi	X			
ACV	Eau et Soleil du Lac				X
	VercorSoleiL				X
	de Vezouze-en-Piemont				X
eza!	Hindelang eG		X		
	Reutte	X			
	Dorfenergie eG		X		
EAZK	Vlcnov	X			
	Slavicìn	X			
	Zlìn	X			
ROCG	Domokos	X			
	Kamena Vourla	X			
	Amfikleia	X			

Figure 0.2 – Comparison between pilot sites in terms of development phases of EC and support of OSS

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FEBBRAIO 2024

D6.2 BASELINE DEI SITI PILOTA DI ECOEMPOWER

The project ECOEMPOWER - ECOsystems EMPOWERing at regional and local scale supporting energy communities receives funding from the European Climate, Infrastructure and Environment Executive Agency (CINEA) under Grant Agreement n°101120775.

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EXECUTIVE SUMMARY

Questo documento definisce e descrive la baseline dei siti pilota nell'ambito del progetto ECOEMPOWER. Il documento illustra anche la metodologia seguita per definire la baseline nonchè la richiesta di informazioni e contributi da parte dei vari ecosistemi regionali.

Il documento raccoglie tutte le informazioni e i dati utili a definire la baseline di tutti i siti pilota del progetto, al fine di avere una base di confronto per il monitoraggio di tali siti per tutta la durata del progetto, in vista del raggiungimento degli obiettivi prefissati.

Per quanto riguarda la metodologia di definizione della baseline, è stato creato un modello per la raccolta di informazioni e input sia descrittivi che numerici. Questo modello è stato condiviso con tutti gli ecosistemi regionali, in cui sono stati richiesti i dati relativi alle comunità energetiche, esistenti o presunte, e a tutti gli One Stop Shop (OSS), esistenti o presunti. Particolare enfasi è posta sui criteri di valutazione quantitativi e qualitativi definiti in D6.1, in quanto fondamentali per una valutazione accurata della situazione attuale.

Questo documento serve come base descrittiva per tutti i siti pilota coinvolti nel progetto ECOEMPOWER, sia dal punto di vista qualitativo che quantitativo. Questa valutazione della situazione iniziale sarà poi confrontata con la situazione successiva alle soluzioni implementate dal progetto per verificare l'effettivo successo del progetto nel raggiungimento degli obiettivi dei vari siti pilota.

Ecosistema regionale #1 (RE1): Provincia Autonoma di Trento (ITALIA)

Descrizione dell'ecosistema regionale

Con una popolazione di 533,000 abitanti e una solida base economica, il Trentino vanta attualmente uno dei più alti livelli di benessere e qualità della vita in Italia e in Europa. Forte del suo Statuto di Autonomia, in vigore dal 1948, la Provincia Autonoma di Trento esercita un controllo legislativo, amministrativo e finanziario diretto su settori critici come l'istruzione, la sanità, la politica industriale, i trasporti e il turismo. Questa autonomia si estende alla gestione del 90% del reddito, sia diretto che indiretto, raccolto all'interno della Provincia.

L'Agenzia provinciale per le risorse idriche e l'energia (APRIE)[17] è l'autorità regionale incaricata di formulare la politica e la pianificazione energetica, attraverso diverse azioni e strumenti. Nel quadro del recente Piano Energetico e Ambientale provinciale 2021-2030, è stata posta particolare enfasi sul ruolo cruciale delle comunità energetiche nel facilitare la transizione energetica. Ciò deriva dalla crescente attenzione alla produzione decentralizzata da fonti rinnovabili e all'autoconsumo locale.

Nel 2021, sono stati fatti passi da gigante, tra cui l'istituzione di un Elenco delle Comunità Energetiche in Trentino tramite Legge Provinciale. Questo elenco, gestito da APRIE, segna un passo cruciale per integrare le Comunità Energetiche (CE) nel consiglio energetico provinciale, favorendo la collaborazione con strutture pubbliche, consorzi, movimenti cooperativi, istituti di ricerca e altre entità. Attualmente sono in corso circa 20 progetti di comunità energetiche, che si occupano principalmente di analisi di fattibilità iniziali; 5 entità giuridiche sono state fondate in forma cooperativa e altre 3 iniziative sono state fondate in altre forme (ad esempio Associazione).

Nonostante l'assenza di un ufficio dedicato, sono in corso piani per istituire lo Sportello Unico del Trentino (Trentino One Stop Shop), che fungerà da help desk completo, utilizzando risorse umane e informatiche per guidare la creazione e la gestione delle comunità energetiche. Allo stesso tempo, il progetto ECOEMPOWER mira a sostenere lo sviluppo di tre siti pilota in Trentino, che fungeranno da campi di prova per l'implementazione pratica dell'OSS.

Da un punto di vista normativo, c'è stato un grande ritardo in Italia. Il decreto attuativo che avrebbe dovuto definire le regole e gli incentivi delle nuove Comunità Energetiche Rinnovabili (CER), previsto per giugno 2022, è stato pubblicato solo il 23 gennaio 2024 ed è entrato in vigore il giorno successivo. Tuttavia, ci sono ancora alcune questioni importanti da chiarire, ad esempio la data a partire dalla quale gli impianti sono considerati nuovi, che sarà contenuta nelle 'regole tecniche' previste per la fine di febbraio. Inoltre, si deve attendere l'attivazione del portale di finanziamento, che avverrà 45 giorni dopo i decreti.

L'assenza di scadenze specifiche e le incertezze relative alla compatibilità degli impianti a fonti rinnovabili con le normative delle CER hanno rallentato lo sviluppo dei progetti nei tre territori pilota. Inoltre, il ruolo delle autorità locali nel processo di formazione delle Comunità Energetiche (CE) deve ancora essere ben definito.

Nei siti pilota della Val di Fassa, di Levico Terme e del territorio della Valle dei Laghi, le sfide persistono nel delineare il perimetro della comunità, nell'identificare partecipanti aggiuntivi oltre ai promotori iniziali e nel formulare profili di produzione e consumo. Poiché la base di partenza del progetto è teorica e indicativa, numerosi aspetti richiedono un'ulteriore indagine durante la costruzione. L'assenza di esperienze pregresse con

[17] Link al sito web di APRIE: http://www.energia.provincia.tn.it/

le comunità energetiche che operano secondo la nuova legislazione aggiunge un ulteriore livello di complessità, rendendo necessarie indagini continue per determinare la migliore entità giuridica per l'applicazione. Nei prossimi mesi si prevede l'implementazione di un'azione di accompagnamento diretto nei territori, per affrontare queste incertezze e contribuire al successo complessivo delle iniziative delle comunità energetiche.

Valutazione dell'OSS

Nella regione descritta, il quadro esistente per lo sviluppo delle comunità energetiche prevede la presenza di un'agenzia energetica provinciale, APRIE, che monitora attivamente l'evoluzione delle CER a livello nazionale. Tuttavia, al momento non esiste uno Sportello Unico (OSS) dedicato agli obiettivi specifici delineati nel progetto ECOEMPOWER.

Le iniziative preesistenti includono gli sforzi dell'agenzia energetica provinciale nella diffusione di informazioni e nell'organizzazione di incontri pubblici per sensibilizzare sul potenziale e sui benefici delle comunità energetiche. APRIE è anche coinvolta nella ricerca tecnica, come dimostrato dalla simulazione di scenari REC e dal calcolo dell'irraggiamento solare su varie superfici all'interno della provincia[18]. Nella pagina web dedicata all'energia della Provincia Autonoma di Trento è stata creata una sezione per le Comunità Energetiche[19]. In questa sezione sono presenti alcune informazioni orientative e tutti i documenti tecnici e i lavori pubblicati da APRIE.

Nell'ambito del suo ruolo, APRIE è impegnata a fornire un orientamento di base alle potenziali comunità energetiche, in prevalenza comuni, e coordina un tavolo provinciale che coinvolge accordi tra l'Amministrazione Provinciale (PAT), la federazione provinciale delle cooperative, il consorzio dei comuni e l'associazione degli artigiani. In questo contesto, la federazione provinciale delle cooperative ha attivato un portale digitale per fornire alcune informazioni sulle CER in forma cooperativa[20].

Un importante approfondimento che APRIE sta portando avanti dal 2021, anche con la collaborazione del Consorzio dei Comuni Trentini, riguarda il ruolo che un'autorità locale può assumere all'interno di una Comunità Energetica. Questo è un tema di importanza nazionale in Italia, per il quale non ci sono ancora risposte certe e le prime esperienze, eterogenee, hanno dato risultati contrastanti. Il sistema di vincoli per l'utilizzo delle risorse pubbliche, le regole amministrative e la complessità dell'argomento, specialmente per i comuni piccoli e poco strutturati, rendono particolarmente complessa la fattibilità di un contributo diretto dei comuni come partner nelle CER. APRIE nel 2022 ha pubblicato delle linee guida per i comuni sull'argomento.

Con l'integrazione del progetto ECOEMPOWER, APRIE mira a dare maggiore struttura alle iniziative esistenti e a istituzionalizzare l'OSS. L'OSS che si intende realizzare prevede lo sviluppo di un sito web informativo che funga da risorsa completa per l'avvio di progetti CER. Questa piattaforma non solo fornirà informazioni dettagliate, ma mostrerà anche modelli CER operativi. Inoltre, ci sono piani per istituire una serie di strumenti per assistere nella costruzione di un piano aziendale completo, attivando competenze specifiche secondo necessità.

[18] Dettagliati nei rapporti tecnici disponibili su http://www.energia.provincia.tn.it/pubblicazioni
19 Link alla pagina web (www.infoenergia.provincia.tn.it)
20 https://energia.incooperazione.it/

Attualmente, i servizi offerti dall'OSS sono nelle fasi iniziali, concentrati sulla diffusione delle informazioni e sul lavoro tecnico di base. Si prevede che l'evoluzione dell'OSS svolgerà un ruolo cruciale nel supportare le diverse fasi di sviluppo delle CER, allineandosi agli obiettivi delineati nel progetto ECOEMPOWER. L'OSS mira a facilitare la crescita delle iniziative CER, aumentare la produzione di energia rinnovabile e l'autoconsumo, e garantire la conformità agli aspetti normativi e politici in evoluzione. Con il progredire dell'OSS, il feedback e le esperienze degli utenti saranno vitali per perfezionare ed espandere i suoi servizi per soddisfare le esigenze in evoluzione dell'ecosistema energetico regionale.

Acquisizione dei dati e valutazione qualitativa delle comunità energetiche

Nei territori valutati, mancano comunità energetiche rinnovabili (CER) operative e non c'è un'attuale condivisione di energia.

Il primo sito pilota, nella zona della Val di Fassa, nel territorio gestito dal consorzio CEP[21] ("Consorzio Elettrico di Pozza"), registra un consumo totale di elettricità di 4,872 MWh/anno nel settore domestico, 8,364 MWh/anno nel settore industriale e 16,661 MWh/anno nel settore commerciale e terziario. La produzione del CEP è già completamente da fonti rinnovabili, principalmente idroelettrica e fotovoltaica. L'impianto fotovoltaico previsto ha una dimensione compresa tra 130 e 240 kW (130-240 MWh/anno di produzione annuale). La rete elettrica nell'area del CEP comprende 25 sottostazioni di media/bassa tensione gestite dal consorzio cooperativo locale CEP. L'infrastruttura di misurazione utilizza i più recenti contatori elettronici con misurazioni a quarti d'ora (contatori di seconda generazione 2G) per ogni POD (Point of Delivery), poiché in Italia è obbligatorio per i DSOs (Distributori) aggiornare il loro sistema di misurazione entro il 2025[22].

Il secondo sito pilota nel comune di Levico Terme registra un consumo totale di elettricità di 3,745 MWh/anno nel settore industriale, 5,744 MWh/anno nel settore commerciale e terziario, e 6,768 MWh/anno nel settore domestico. L'impianto fotovoltaico previsto ha una dimensione compresa tra 80 e 140 kW (80-140 MWh/anno di produzione annuale). La rete elettrica è composta da 11 sottostazioni di media/bassa tensione gestite da SET[23], e l'infrastruttura di misurazione rispecchia il primo sito pilota (2G per ogni POD entro il 2025)[24].

Il terzo sito pilota nel territorio della Valle dei Laghi comprende diversi comuni con un consumo totale di elettricità industriale di 10,893 MWh/anno, un consumo del settore commerciale e terziario di 4,009 MWh/anno e un consumo domestico totale di 10,295 MWh/anno. L'impianto a energia rinnovabile previsto non è ancora definito in termini di dimensioni, si presume una capacità fotovoltaica di circa 200 kW (circa 200 MWh/anno di produzione annuale). La rete elettrica include 45 sottostazioni sotto Madruzzo, 19 sotto Dro, e una ciascuna sotto Nembia, Mezzocorona e P.S. Giorgio, tutte gestite da SET. Similmente ai primi due siti pilota, l'infrastruttura di misurazione utilizza i più recenti contatori elettronici con misurazioni a quarti d'ora per tutti i POD.

I protocolli di segnalazione dei dati prevedono la raccolta diretta dei dati dalle Comunità Energetiche per il progetto ECOEMPOWER. Il Punto di Prelievo (POD) del sistema di misurazione trasmette i dati al GSE, la struttura

21 https://consorzioelettrico.com/
22 CEP - Piano di dettaglio sostituzione massiva dei contatori di fornitura di energia elettrica
23 Sito web di SET: https://www.setdistribuzione.it/
24 https://www.setdistribuzione.it/attivita/smartecometer.html

nazionale di gestione dell'energia responsabile dei pagamenti degli incentivi. Nonostante l'esistenza di un'entità legale (REC Vallelaghi) in Valle dei Laghi, fondata a giugno 2023, le operazioni delle CER non sono attualmente possibili in Italia a causa di leggi che non sono ancora state attuate a livello nazionale. Gli obiettivi generali di queste comunità energetiche includono l'aumento della produzione di energia rinnovabile, in particolare attraverso fonti fotovoltaiche e idroelettriche, la promozione di esperienze locali e lo sfruttamento della transizione energetica per dare più potere ai territori di montagna. La direzione strategica include l'orientamento del consumo verso un'elettrificazione diffusa (promuovendo la diffusione di pompe di calore e veicoli elettrici) e il supporto al sistema di rete locale.

Questa sezione definisce tutti i dati per la composizione e la valutazione della linea di base nei diversi siti pilota, sia dal punto di vista numerico per il confronto dei valori con i successivi passaggi del progetto per definire il valore aggiunto, sia da un punto di vista più qualitativo per valutare la maturità di una comunità energetica. I singoli siti pilota nella regione corrispondente saranno presentati di seguito.

RE1.1 – Val di Fassa

Figure 0.1 – Area del sito pilota della Val di Fassa

Il primo sito pilota si sta sviluppando in Val di Fassa, nel comune di San Giovanni di Fassa (3,500 abitanti), situato in Trentino. San Giovanni di Fassa si trova nella Val di Fassa e ha una popolazione di circa 10,000 residenti in 6 comuni. L'area è servita da una storica cooperativa elettrica chiamata CEP, fondata nel 1914, che gestisce la rete elettrica locale coprendo una vasta regione della valle.

La Val di Fassa si sta imbarcando in un entusiasmante progetto di comunità energetica radicato nella collaborazione educativa. Avviato da studenti locali che hanno partecipato a una competizione interscolastica "Lego League", questo sito pilota si è evoluto in una visione per una Comunità Energetica Rinnovabile (CER) incentrata sulla Scuola Ladina di Fassa e sulla scuola dell'infanzia locale. Una caratteristica unica di questa iniziativa è il suo gruppo di lavoro, composto da studenti, insegnanti e rappresentanti di una cooperativa elettrica locale, che è un partner storico e un sostenitore chiave nel dare vita a questo progetto. Sebbene la CER non sia ancora legalmente costituita e non possa essere operativa secondo le attuali normative italiane, si stanno ponendo le basi per una soluzione energetica guidata dalla comunità che potrebbe servire da modello per iniziative simili.

L'obiettivo primario di questo progetto è creare una comunità energetica con un focus locale ed educativo. Un sistema fotovoltaico (PV) di 130 kW (130 MWh/anno di produzione annuale) sarà installato sul tetto della scuola dell'infanzia (o sul tetto della Chiesa), con finanziamenti forniti dalla cooperativa elettrica locale. I partecipanti alla CER includeranno studenti, le loro famiglie, docenti e personale scolastico, incarnando una vera iniziativa guidata dalla comunità. In particolare, qualsiasi reddito generato dalla produzione di energia dell'impianto fotovoltaico sarà reindirizzato alle scuole, destinato all'acquisto di materiali didattici a beneficio di tutti i soggetti coinvolti. Questo approccio enfatizza l'impatto sociale rispetto al guadagno finanziario per gli individui, favorendo un senso di scopo condiviso e di investimento nell'energia sostenibile.

La CER della Val di Fassa si pone come esempio di integrazione dell'energia rinnovabile con gli obiettivi educativi, dove i benefici si estendono oltre i guadagni ambientali per includere lo sviluppo sociale e comunitario. Pur essendo attualmente limitata nella sua capacità operativa, l'iniziativa è pronta a fungere da pilota per le future comunità energetiche nella regione, sostenuta dall'impegno della cooperativa elettrica locale e dall'entusiastica partecipazione di studenti e docenti.

In questo caso, c'è una mancanza di dati nel sito pilota considerato perché non c'è né una comunità energetica operativa né scenari di base applicabili con buona affidabilità. Per questo motivo è importante monitorare le prestazioni di questo sito pilota nelle fasi successive del WP6 per la creazione e il monitoraggio dei dati della comunità energetica.

RE1.2 – Levico Terme

Figure 0.2 - Area del sito ilota di Levico Terme

Levico Terme (8,112 abitanti), situata nella Valsugana, sta pensando a un'iniziativa innovativa di comunità energetica. Questa piccola città vanta un ricco centro storico e un compatto quartiere industriale/commerciale annidato vicino alle zone residenziali. La forza motrice dietro questa iniziativa è il Comune di Levico Terme.

Il punto focale di questa iniziativa è il riutilizzo di un edificio scolastico inutilizzato, dove è prevista l'installazione di un impianto fotovoltaico (PV) da 80 kW. Si prevede che questo impianto solare genererà una produzione annuale di 102 MWh, contribuendo in modo significativo al fabbisogno energetico della comunità. Inoltre, l'attenzione è rivolta al piccolo quartiere industriale/commerciale. Qui, è prevista l'implementazione di un sistema fotovoltaico da 60 kW, con una produzione annuale prevista di 76 MWh/anno. Questa diversificazione delle fonti energetiche garantisce un approccio equilibrato e sostenibile alla produzione di energia all'interno del comune. Estendendo la portata dell'energia rinnovabile, le aree residenziali alla periferia presenteranno installazioni fotovoltaiche più piccole. Questi sistemi decentralizzati, per un totale di 20 kW e una produzione di 25 MWh/anno, mirano a fornire energia pulita alle case suburbane, favorendo un'adozione diffusa di pratiche sostenibili. Il Comune di Levico Terme sta anche pensando alla possibilità di integrare il sistema con un micro impianto idroelettrico, ma non esiste ancora un piano reale in merito e non è chiaro se questo sia facile in termini di concessione per l'uso di acqua pubblica.

Un attore fondamentale in questa iniziativa è una locale Energy Service Company (ESCO), che collabora a stretto contatto con la comunità. Il ruolo dell'ESCO è fondamentale, in particolare nella realizzazione dell'ambizioso impianto fotovoltaico da 80 kW in cima all'edificio scolastico in disuso. Questa collaborazione sottolinea lo spirito cooperativo che guida il progetto. In particolare, l'obiettivo generale di questa comunità energetica non è solo la sostenibilità ambientale ma anche l'impatto sociale. La creazione di un flusso di reddito energetico è concepita

come una misura proattiva per combattere la povertà energetica all'interno di Levico Terme. Questo approccio lungimirante allinea i benefici economici con la responsabilità ecologica, dimostrando un impegno per lo sviluppo olistico della comunità.

Un aspetto intrigante di questa comunità energetica è il suo sforzo coscienzioso per mitigare l'impatto visivo degli impianti di energia rinnovabile sul paesaggio. Scegliendo strategicamente grandi tetti pubblici e industriali/commerciali per le installazioni solari, il progetto mira a trovare un equilibrio tra la soddisfazione del fabbisogno energetico e la conservazione dell'integrità estetica degli edifici storici. Questa configurazione innovativa riflette un impegno per lo sviluppo sostenibile che tiene conto sia delle sensibilità ambientali che culturali.

Uno dei punti critici di questo progetto di comunità energetica è che ci sono già diversi altri progetti di comunità energetiche sotto la stessa cabina primaria. Limitare l'area al solo Comune di Levico Terme è probabilmente controproducente perché si rischia di non avere abbastanza consumatori/prosumer/produttori e membri per rendere l'iniziativa economicamente sostenibile. In secondo luogo, avere altre iniziative simili a distanze molto ravvicinate (meno di 10 km) potrebbe compromettere il successo della CER. Infine, il Comune ha inizialmente pensato di aderire alla Comunità Energetica direttamente come partner. Attraverso il progetto ECOEMPOWER, il Comune viene aiutato a valutare la situazione migliore e a favorire il dialogo con i territori limitrofi e le nascenti Comunità Energetiche.

In questo caso, c'è una mancanza di dati nel sito pilota considerato perché non c'è né una comunità energetica operativa né scenari di base applicabili con buona affidabilità. Per questo motivo è importante monitorare le prestazioni di questi siti pilota nelle fasi successive del WP6 per la creazione e il monitoraggio dei dati della comunità energetica.

RE1.3 – Valle dei Laghi

Figure 0.3 – Area del sito pilota della Valle dei Laghi

La Comunità Energetica della Valle dei Laghi è un progetto visionario, attualmente supportato da 20 membri (cittadini, piccole imprese, associazioni), situato nel cuore del Trentino, Italia. Coprendo i comuni di Cavedine, Madruzzo e Vallelaghi, questa iniziativa mira a unire circa 11,000 abitanti in uno sforzo collettivo verso la sostenibilità e l'indipendenza energetica.

La valle, rinomata per la sua bellezza naturale, ospita una varietà di laghi, biotopi e Siti di Importanza Comunitaria, insieme all'imponente catena montuosa Paganella-Gazza e al Monte Bondone.

Inizialmente, le tre amministrazioni dei comuni della Valle dei Laghi (Valle dei Laghi, Cavedine e Madruzzo) sono state coinvolte nel progetto ECOEMPOWER. Sono stati loro, con il supporto della Comunità di Valle (un ente sovra-comunale che unisce tutti i comuni di un'area), a promuovere la creazione di una Comunità Energetica Rinnovabile. Tuttavia, recentemente, un gruppo di imprenditori e cittadini ha avviato un'iniziativa per costituire una CER nella Valle dei Laghi. Attraverso ECOEMPOWER, si sta cercando di gestire il rapporto tra le amministrazioni comunali e questa iniziativa spontanea. I comuni non desiderano partecipare ufficialmente come membri alla Comunità Energetica, preferendo attivare direttamente altre iniziative per valorizzare i loro beni energetici (una nuova modalità simile alle Comunità Energetiche chiamata 'autoconsumo altrove') perché è più facile da avviare (ogni comune la propria) e non influisce sulle regole della CER, che può quindi agire come un'entità privata. Il loro ruolo diventa così quello di attori esterni che promuovono e sostengono lo sviluppo di CER private. ECOEMPOWER cercherà di tenere insieme queste due parti, affrontando la questione dell'energia rinnovabile condivisa nella Valle dei Laghi nel suo complesso.

L'obiettivo principale della Comunità Energetica è di natura sociale, con un focus primario sul raggiungimento dell'indipendenza energetica attraverso i principi dello sviluppo sostenibile. Il piano prevede l'integrazione di nuovi impianti fotovoltaici (PV) su edifici pubblici, scuole e strutture industriali. Inoltre, il progetto prevede la creazione di impianti a biogas per generare elettricità da rifiuti agricoli e zootecnici. In questo momento non è

ancora stata individuata un'area per installare un impianto fotovoltaico, ma la CER sta lavorando per raggiungere almeno 200 kW di fotovoltaico (con una produzione stimata di 200 MWh/anno). Al momento non esiste un progetto concreto sul biogas, o altre fonti, e potrebbe essere difficile creare questo tipo di impianto all'interno del progetto ECOEMPOWER.

Attraverso gli sforzi di collaborazione che coinvolgono comuni, imprese e cittadini locali, la Comunità Energetica si impegna a creare un ecosistema autosufficiente che riduca la dipendenza da fonti energetiche esterne. Questa strategia globale si allinea con gli obiettivi di sostenibilità globali e costituisce un esempio degno di nota per altre regioni che cercano di combinare la conservazione ambientale con lo sviluppo comunitario.

In questo caso, c'è una mancanza di dati nel sito pilota considerato perché non c'è né una comunità energetica operativa né scenari di base applicabili con buona affidabilità. Per questo motivo è importante monitorare le prestazioni di questi siti pilota nelle fasi successive del WP6 per la creazione e il monitoraggio dei dati della comunità energetica.

Conclusioni

In conclusione, il completamento del Deliverable 6.2 segna una tappa significativa del progetto ECOEMPOWER, ovvero la Milestone n. 11, fornendo una definizione completa della linea di base nei vari siti pilota. La linea di base è stata meticolosamente stabilita attraverso una panoramica introduttiva per ciascuno dei cinque Ecosistemi Regionali, insieme alla valutazione dell'OSS Regionale, sia nella sua configurazione attuale se già operativo, sia nelle funzionalità previste se ancora in fase di pianificazione. È stata inoltre condotta un'analisi quantitativa e qualitativa delle quindici comunità energetiche operative o in via di sviluppo. Inoltre, sono stati valutati i KPI per le comunità energetiche operative, come indicato nel Deliverable D6.1, laddove i dati erano accessibili. L'Annex A mostra l'intero set di informazioni per i vari siti pilota, relative ai parametri e all'OSS. Questo documento riveste un'importanza fondamentale in quanto delinea lo stato attuale di tutti gli Ecosistemi Regionali, degli OSS e dei siti pilota, fungendo da base per i progressi del progetto, che saranno attentamente monitorati nei Task T6.3 e T6.4. Infatti, durante il periodo di monitoraggio dei siti pilota all'interno del Task T6.3 del WP6, verranno raccolti dati e parametri delle comunità energetiche dal punto di vista sociale e dello sviluppo dell'OSS ogni sei mesi, al fine di valutare l'efficacia del progetto ECOEMPOWER nel raggiungimento degli obiettivi. Per quanto riguarda i dati energetici dei siti pilota, necessari per il monitoraggio dei relativi KPI, questi saranno monitorati annualmente per tutta la durata del progetto. L'approfondita conoscenza acquisita da questo documento pone le basi per un processo decisionale informato e una pianificazione strategica nelle fasi successive del progetto ECOEMPOWER.

ECOEMPOWER

ECOsystems EMPOWERing at regional and local scale supporting energy communities

Février 2024

D6.2 BASE DE RÉFÉRENCE DANS LES SITES PILOTES ECOEMPOWER

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EXECUTIVE SUMMARY

Ce livrable définit et décrit la base de référence des sites pilotes dans le cadre du projet ECOEMPOWER. Le présent document décrit également la méthodologie suivie pour définir la base de référence, avec les données nécessaires à remplir par chaque écosystème régional.

Le document rassemble les informations et données essentielles pour définir la base de référence de tous les sites pilotes du projet, afin d'avoir une base de comparaison pour suivre les sites pilotes tout au long du projet, dans le but d'atteindre les objectifs fixés.

En ce qui concerne la méthodologie pour définir la base de référence, un modèle a été créé pour récolter des données à la fois descriptives et numériques. Ce modèle a été partagé avec tous les écosystèmes régionaux, qui ont ensuite renseigné des informations (existantes ou présumées) sur les communautés d'énergie et les guichets uniques. Une attention particulière a été portée sur les critères d'évaluation quantitatifs et qualitatifs définis au point D6.1, car ils sont essentiels pour évaluer la situation actuelle de manière précise.

Ce document sert de base descriptive pour tous les sites pilotes impliqués dans le projet ECOEMPOWER, tant sur le plan qualitatif que quantitatif. Cette évaluation de la situation initiale sera ensuite comparée à la situation finale, quand les activités du projet auront été réalisées, afin de s'assurer du succès du projet dans la réalisation des objectifs des différents sites pilotes.

Écosystème Régional #2 (RE2): Auvergne-Rhône-Alpes et Grand Est (FRANCE)

Description de l'écosystème régional

Le projet ECOEMPOWER se concentre sur le réseau des Centrales Villageoises [25] en France, une initiative nationale fortement implantée dans les régions Auvergne-Rhône-Alpes (environ 8 millions d'habitants dans la région, dont environ 1.9 million dans les zones couvertes par les entreprises locales de Centrales Villageoises) et Grand Est (environ 5.5 millions d'habitants dans la région, dont environ 200,000 habitants dans les zones couvertes par les entreprises locales de Centrales Villageoises), qui ont été choisies comme régions cibles.

Les Centrales Villageoises sont des entreprises locales fondées par des citoyens, des municipalités et des entreprises locales, dans le but de développer des projets d'énergie renouvelable et d'efficacité énergétique à l'échelle territoriale, en tenant compte de facteurs locaux tels que l'intégration paysagère et le développement socio-économique. Le concept est né d'une phase expérimentale (2010-2014) menée par l'agence régionale Auvergne-Rhône-Alpes Energie Environnement (AURA-EE), impliquant huit sites pilotes. Cette initiative a abouti à la création d'entreprises locales détenues par les citoyens, finançant des projets photovoltaïques. Le succès a conduit à la consolidation de cadres techniques et juridiques, facilitant la réplication du modèle des Centrales Villageoises sur d'autres sites.

En 2018, l'Association Centrales Villageoises (ACV) a été créée pour développer le réseau, qui compte aujourd'hui 68 entreprises locales. Ces entités ont développé avec succès plus de 475 centrales photovoltaïques sur toits (10 MWc de puissance installée, 12.0 GWh/an produits en 2023), et des études sont en cours pour d'autres types de projets d'énergie renouvelable comme la micro-hydroélectricité et l'énergie éolienne. Historiquement, l'agence régionale AURA-EE (Auvergne-Rhône-Alpes Énergie Environnement) a soutenu la création et le développement du modèle des Centrales Villageoises. Depuis 2018, avec la création de l'Association Centrales Villageoises, l'autorité régionale n'est plus directement impliquée dans le projet. Cependant, AURA-EE soutient toujours l'association via un partenariat où un de ses employés travaille à temps partiel pour l'association. Ce programme régional, initié en 2010, a abouti à la création de 68 communautés énergétiques locales dans plusieurs régions françaises, impliquant plus de 7,000 actionnaires.

Pour soutenir l'expansion du programme, l'ACV sert de guichet unique (OSS), coordonnant les efforts des communautés énergétiques locales qui mettent en œuvre le modèle des Centrales Villageoises. L'ACV reçoit le soutien des autorités publiques régionales, notamment du Grand Est, de Provence-Alpes-Côte d'Azur et de Bretagne (en plus d'Auvergne-Rhône-Alpes), ainsi que d'organisations comme la Fondation Terre Solidaire, la Fondation Crédit Mutuel Alliance Fédérale et Énergie Partagée.

Dans le cadre d'ECOEMPOWER, trois sites pilotes du réseau Centrales Villageoises ont été identifiés. Ces sites, à des degrés de maturité variables, travaillent sur des projets d'énergie renouvelable innovants, complétant le développement des projets photovoltaïques sur toits.

Les rôles au sein d'ECOEMPOWER incluent AURA-EE, qui se concentre sur le partage de son expérience, la direction de groupes de travail spécifiques et le soutien aux activités de réplication, tandis que l'ACV coordonne le développement du « modèle de guichet unique CV », accompagne les sites pilotes et facilite la réplication dans

25 Centrales Villageoises site (https://www.centralesvillageoises.fr/centrales-villageoises-local-citizen-owned-energy-communities)

d'autres régions françaises et au-delà. L'objectif est d'étendre les services dans des domaines tels que le financement, l'emploi local, l'engagement social et le développement de nouveaux projets d'énergie renouvelable.

Évaluation de l'OSS

L'Association Centrales Villageoises (ACV) joue un rôle crucial en tant que guichet unique (OSS) dans l'écosystème régional français (centré sur les régions Auvergne-Rhône-Alpes et Grand Est dans le cadre d'ECOEMPOWER, mais agissant à l'échelle nationale). Créée dans le but de soutenir le développement des communautés énergétiques locales, l'ACV propose des ressources structurantes, facilitant la création de projets d'énergies renouvelables (EnR) détenus par les citoyens. Ce cadre a permis la réplication réussie du concept sur divers sites. L'ACV fournit[26] activement une gamme complète d'outils et de services à ses membres, incluant un soutien juridique et pour le modèle économique, une assistance technique, des outils de communication et diverses bases de données. La boîte à outils de l'ACV comprend environ 150 outils conçus pour guider les communautés énergétiques locales à travers les différentes phases de leurs projets. Les services s'étendent aux plateformes virtuelles, telles que des sites web personnalisés, des forums pour le partage d'expériences et des espaces de stockage virtuels. De plus, l'ACV organise des sessions de formation sur les aspects juridiques, financiers et techniques, renforçant les capacités des entreprises locales.

À ce jour (janvier 2024), l'ACV compte 68 communautés énergétiques membres, pour un total d'environ 500 utilisateurs directs, soit des personnes activement impliquées dans les CE. Les services du guichet unique sont largement utilisés, comme en témoignent les 7,900 visites de sites web par 5,070 utilisateurs au cours de l'année 2023[27]. Le nombre d'utilisateurs directs est complété par 135 participants supplémentaires aux sessions de formation et 650 demandes d'information traitées par le personnel de l'ACV en 2023. Plusieurs groupes de citoyens, incarnant le modèle Centrales Villageoises, ont réussi à créer des communautés énergétiques avec le soutien de l'ACV. Un exemple notable est celui de Centrales Villageoises Énergies Coeur de Corrèze, qui a commencé son parcours avec l'ACV en 2020, rejoignant officiellement le réseau, créant une entité juridique et mettant en service une centrale photovoltaïque en juin 2023.

L'ACV envisage une approche proactive pour améliorer la communication et la mobilisation des bénévoles au sein du réseau. Cela implique le développement d'outils et de programmes de formation pour augmenter la visibilité des entreprises locales, faciliter la gouvernance des bénévoles et soutenir la création d'opportunités d'emploi au sein des entreprises locales. De plus, l'ACV vise à affiner les outils d'analyse de plans d'affaires et à développer davantage de services pour différents types de projets EnR. L'ACV reconnaît l'importance de renforcer les capacités des communautés d'énergies locales grâce à une meilleure communication et à l'engagement des bénévoles. L'organisation a pour objectif de faciliter la transition d'une gestion bénévole à des emplois rémunérés, favorisant ainsi la pérenité et la croissance des structures. L'accent est mis non seulement sur les aspects techniques, mais aussi sur la gouvernance, l'engagement citoyen et les processus de prise de décision participative. Essentiellement, le guichet unique, représenté par l'ACV au sein du réseau des Centrales Villageoises, se présente comme une ressource dynamique et multifacette, contribuant activement au développement et à la durabilité des communautés énergétiques locales dans les régions françaises. Les efforts en cours se concentrent sur l'adaptabilité et l'amélioration continue pour répondre aux besoins évolutifs de ses divers membres.

26 Page web où certains outils peuvent être trouvés parmi ceux qui sont accessibles au public (https://centralesvillageoises.fr/emergence)
27 Lien vers le site web de l'ACV : https://www.centralesvillageoises.fr/

Acquisition de données des communautés énergétiques et évaluation qualitative

Le projet ECOEMPOWER consolide et promeut le déploiement de ces initiatives innovantes, qui constituent une alternative crédible aux projets d'énergie renouvelable traditionnels. Trois sites pilotes remarquables — Centrales Villageoises Eau et Soleil du Lac, Centrales Villageoises VercorSoleiL et Centrales Villageoises de Vezouze en Piémont — se dressent comme des phares du changement, incarnant un engagement envers les pratiques durables, l'engagement communautaire et le respect de l'environnement.

Toutes les entreprises locales du réseau Centrales Villageoises partagent un modèle de gouvernance coopérative. L'Assemblée Générale, où chaque individu a une voix, est composée principalement de citoyens, assurant leur représentation majoritaire. L'Assemblée Générale est responsable de l'élection du Conseil de Gestion, qui à son tour élit le Président responsable des aspects juridiques de l'entreprise. En ce qui concerne le cadre réglementaire, le modèle Centrales Villageoises relève de la définition des Communautés d'Énergies Renouvelables (décret du 26 décembre 2023). Aucun dispositif incitatif spécifique n'existe encore pour les communautés énergétiques en France, car le cadre réglementaire est très récent.

Les sites pilotes contribuent à l'objectif plus large de devenir des acteurs clés dans leurs territoires respectifs, participant activement à la lutte contre le changement climatique. Chaque site présente des spécifications techniques, des objectifs et des défis uniques, reflétant les approches et les contextes diversifiés du réseau Centrales Villageoises.

Essentiellement, ces sites pilotes promeuvent le pouvoir transformateur des initiatives collectives, à travers des projets axés sur le développement des énergies renouvelables, dans un soucis de résilience économique et de durabilité environnementale. Les divers objectifs de chaque site pilote contribuent collectivement à la mission globale du projet ECOEMPOWER, marquant un changement de paradigme dans le récit énergétique national.

Cette section définit toutes les données pour la composition et l'évaluation de la situation de référence dans les différents sites pilotes, tant d'un point de vue numérique pour la comparaison des valeurs avec les étapes ultérieures du projet afin de définir la valeur ajoutée, que d'un point de vue plus qualitatif pour évaluer la maturité d'une communauté énergétique. Les sites pilotes individuels dans la région correspondante seront présentés ci-dessous.

RE2.1 - Centrales Villageoises Eau et Soleil du Lac

Figure 0.4 – Zone du site pilote Centrales Villageoises Eau et Soleil du Lac

Centrales Villageoises Eau et Soleil du Lac est une communauté énergétique légalement établie, adoptant la structure de SAS (Sociétés par Actions Simplifiées) depuis 2022. La communauté est opérationnelle, marquée par le démarrage réussi de sa première centrale photovoltaïque, d'une capacité installée de 24.6 kWc (production annuelle : 30 MWh/an), en mars 2023. Les projets en cours incluent le développement de deux centrales photovoltaïques supplémentaires sur toits (35.7 kWc et 102 kWc, production annuelle totale attendue : 150 MWh/an) et un projet hydroélectrique d'une capacité estimée à 200 kW (production annuelle attendue : 600 MWh/an). L'objectif principal de cette communauté énergétique est d'entreprendre des initiatives favorisant la transition énergétique sur le territoire de la communauté de communes du "Grand Lac" (64 000 habitants). Avec l'engagement d'unir citoyens et autorités locales, Eau et Soleil du Lac vise à stimuler la transition énergétique dans la région. À l'avenir, Eau et Soleil du Lac a pour but d'élargir ses membres pour inclure citoyens, municipalités locales et PME.

Ci-dessous dans le Tableau 0.1, Tableau 0.2, Tableau 0.3 et Tableau 0.4 sont entrés respectivement tous les paramètres du point de vue social, énergétique, économique et environnemental au sein du site pilote.

Table 0.1 – Données de référence pour l'évaluation des paramètres sociaux - Centrales Villageoises Eau et Soleil du Lac

Données sociales	Valeur	Unité de mesure
Nombre d'initiatives citoyennes soutenues et/ou créées	1	[#]
Nombre de citoyens participant aux communautés énergétiques	41	[#]
Nombre d'acteurs dont les compétences ont été améliorées dans le domaine des communautés d'énergie	0	[#]
Nombre d'emplois créés	0 emploi direct 0.2 emploi indirect	[FTE]
Nombre de personnes participant aux ateliers	0	[#]
Diversité dans la répartition des personnes impliquées dans la CE	30% de femmes 17 % de personnes de moins de 40 ans	[%]

Table 0.2 – Données de référence pour l'évaluation des paramètres énergétiques - Centrales Villageoises Eau et Soleil du Lac

Données énergétiques	Valeur	Unité de mesure
Demande en énergie primaire	0.17	[GWh/year]
Demande en énergie finale	0.12	[GWh/year]
Production d'énergie renouvelable	0.023	[GWh/year]
Autoconsommation d'électricité renouvelable	0	[%]
Flexibilité – Taille et capacité de stockage	0	[kW and kWh]

Table 0.3 – Données de référence pour l'évaluation des paramètres économiques - Centrales Villageoises Eau et Soleil du Lac

Données économiques	Valeur	Unité de mesure
Investissements dans l'énergie durable	0.03	[M€]
Investissements totaux, incluant les infrastructures réseaux, stockage, bornes de recharges, etc.	0.03	[M€]
Investissement public	1,740	[€]
Investissement privé	28,260	[€]
Coût moyen de l'électricité (d'après la facture d'électricité)	0.1907	[€/kWh]

Table 0.4 – Données de référence pour l'évaluation des paramètres environnementaux - Centrales Villageoises Eau et Soleil du Lac

Données environnementales	Valeur	Unité de mesure
Réduction des émissions de gaz à effet de serre	1.18	[tonneCO2/an]

RE2.2 – Centrales Villageoises VercorSoleiL

Figure 0.5 – Zone du site pilote Centrales Villageoises VercorSoleiL

Centrales Villageoises VercorSoleiL, établie en tant que SAS (Sociétés par Actions Simplifiées) depuis 2015, est une communauté énergétique opérationnelle gérant actuellement 29 centrales photovoltaïques. Cette coopérative implique 137 citoyens locaux, municipalités et PME. L'objectif principal de la communauté est de promouvoir la transition énergétique sur le territoire du "Vercors Drômois" (2,382 habitants). VercorSoleiL s'est fixé des objectifs ambitieux, notamment de dépasser le seuil de 1 MWc (1.2 GWh/an de production annuelle) pour la production photovoltaïque. En plus de ses activités énergétiques de base, VercorSoleiL s'est aventuré dans des initiatives innovantes comme un service de mobilité électrique local, proposant un véhicule électrique partagé aux habitants du village. Les projets futurs incluent un nouveau projet photovoltaïque de 150 kW (production annuelle attendue : 200 MWh/an), une initiative d'autoconsommation collective (28 kW de centrale photovoltaïque sans stockage, connectée à la mobilité électrique) et l'exploration de projets hydroélectriques et éoliens. Par exemple, ils visent à développer l'autoconsommation collective et à explorer l'intégration d'un potentiel projet hydroélectrique de 250 kW (production annuelle attendue : 700 MWh/an). Cependant, des défis ont été rencontrés lors du lancement d'un projet éolien d'un potentiel de 2.4 MWc (production annuelle d'environ 5 GWh/an), attribués à des problèmes d'acceptation des autorités locales.

La production annuelle actuelle d'EnR pour ce site est de 510.7 MWh/an, avec une puissance d'installationsEnR de 469 kWc. La communauté met fortement l'accent sur l'engagement citoyen, les aspects sociaux, la gouvernance partagée et une communication efficace, incarnant une approche axée sur la sensibilisation autour des pratiques énergétiques durables.

Ci-dessous dans le Tableau 0.5, Tableau 0.6, Tableau 0.7 et Tableau 0.8 sont entrés respectivement tous les paramètres du point de vue social, énergétique, économique et environnemental au sein du site pilote.

Table 0.5 – Données de référence pour l'évaluation des paramètres sociaux - Centrales Villageoises VercorSoleiL

Données sociales	Valeur	Unité de mesure
Nombre d'initiatives citoyennes soutenues et/ou créées	1	[#]
Nombre de citoyens participant aux communautés énergétiques	139 citoyens (et 8 municipalités, et 2 PME)	[#]
Nombre d'acteurs dont les compétences ont été améliorées dans le domaine des communautés d'énergies	0	[#]
Nombre d'emplois créés	0.4 emploi direct 5.6 emploi indirect	[FTE]
Nombre de personnes participant aux ateliers	15	[#]
Diversité dans la répartition des personnes impliquées dans la CE	47% de femmes 33% de personnes de moins de 40 ans	[%]

Table 0.6 – Données de référence pour l'évaluation des paramètres énergétiques - Centrales Villageoises VercorSoleiL

Données énergétiques	Valeur	Unité de mesure
Demande en énergie primaire	0.60	[GWh/year]
Demande en énergie finale	0.44	[GWh/year]
Production d'énergie renouvelable	0.51	[GWh/year]
Autoconsommation d'électricité renouvelable	0	[%]
Flexibilité – Taille et capacité de stockage	0	[kW and kWh]

Table 0.7 – Données de référence pour l'évaluation des paramètres économiques - Centrales Villageoises VercorSoleiL

Données économiques	Valeur	Unité de mesure
Investissements dans l'énergie durable	0.8	[M€]
Investissements totaux, incluant les infrastructures réseaux, stockage, bornes de recharges, etc.	0.8	[M€]
Investissement public	128,580	[€]
Investissement privé	671,420	[€]
Coût moyen de l'électricité (d'après la facture d'électricité)	0.1907	[€/kWh]

Table 0.8 – Données de référence pour l'évaluation des paramètres environnementaux - Centrales Villageoises VercorSoleiL

Données environnementales	Valeur	Unité de mesure
Réduction des émissions de gaz à effet de serre	26.1	[tonneCO2/an]

RE2.3 - Centrales Villageoises de Vezouze-en-Piémont

Figure 0.6 – Zone du site pilote Centrales Villageoises de Vezouze-en-Piémont

Centrales Villageoises de Vezouze en Piémont, établie en tant que SAS (Sociétés par Actions Simplifiées) en 2019 sur la Communauté de Communes de Vezouze-en-Piémont dans la région Grand Est (11,947 habitants), se présente comme une communauté énergétique opérationnelle avec 10 centrales photovoltaïques d'une capacité EnR installée cumulée de 410 kWc, et une production EnR annuelle de 446,2 MWh/an. Les objectifs futurs incluent l'installation de nouvelles centrales photovoltaïques en 2024, promouvant l'exploitation locale de l'électricité par le biais de l'autoconsommation collective. Des efforts de collaboration avec un partenaire local sont en cours pour le co-développement d'un parc photovoltaïque au sol (5 MWc, production annuelle attendue : 5 GWh/an), dans le cadre d'un projet plus vaste et à plus long terme.

Envisageant l'avenir, la communauté se penche sur des initiatives d'autoconsommation collective grâce à des collaborations avec le gestionnaire de réseau, les municipalités, les entreprises et les citoyens. Au cœur de sa mission se trouvent l'implication citoyenne, l'engagement social, la gouvernance partagée et les processus de prise de décision participatifs. La communauté est dédiée aux pratiques durables, favorisant la collaboration pour un avenir résilient et respectueux de l'environnement.

Ci-dessous dans le Tableau 0.9, Tableau 0.10, Tableau 0.11 et Tableau 0.12 sont entrés respectivement tous les paramètres du point de vue social, énergétique, économiques et environnementales au sein du site pilote.

Table 0.9 – Données de référence pour l'évaluation des paramètres sociaux - Centrales Villageoises de Vezouze-en-Piémont

Données sociales	Valeur	Unité de mesure
Nombre d'initiatives citoyennes soutenues et/ou créées	1	[#]
Nombre de citoyens participant aux communautés énergétiques	67	[#]
Nombre d'acteurs dont les compétences ont été améliorées dans le domaine des communautés d'énergie	0	[#]
Nombre d'emplois créés	0 emploi direct 3.85 emploi indirect	[FTE]
Nombre de personnes participant aux ateliers	0	[#]
Diversité dans la répartition des personnes impliquées dans la CE	31% de personnes de moins de 40 ans 34% de femmes	[%]

Table 0.10 – Données de référence pour l'évaluation des paramètres énergétiques - Centrales Villageoises de Vezouze-en-Piémont

Données énergétiques	Valeur	Unité de mesure
Demande en énergie primaire	0.23	[GWh/year]
Demande en énergie finale	0.17	[GWh/year]
Production d'énergie renouvelable	0.45	[GWh/year]
Autoconsommation d'électricité renouvelable	0	[%]
Flexibilité – Taille et capacité de stockage	0	[kW and kWh]

Table 0.11 – Données de référence pour l'évaluation des paramètres économiques - Centrales Villageoises de Vezouze-en-Piémont

Données économiques	Valeur	Unité de mesure
Investissements dans l'énergie durable	0.55	[M€]
Investissements totaux, incluant les infrastructures réseaux, stockage, bornes de recharges, etc.	0.55	[M€]
Investissement public	120,780	[€]
Investissement privé	429,220	[€]
Coût moyen de l'électricité (d'après la facture d'électricité)	0.1907	[€/kWh]

Table 0.12 – Données de référence pour l'évaluation des paramètres environnementales - Centrales Villageoises de Vezouze-en-Piémont

Données environnementales	Valeur	Unité de mesure
Réduction des émissions de gaz à effet de serre	22.8	[tonneCO2/an]

Conclusions

En conclusion, la finalisation du Livrable 6.2 marque une étape importante du projet ECOEMPOWER (à savoir, le Jalon n°11), en fournissant une définition complète de la situation de référencepour les divers sites pilotes. Cette situation de référence a été méticuleusement établie à travers une vue d'ensemble pour chacun des cinq écosystèmes régionaux, une évaluation du guichet unique régional (OSS) — qu'il soit déjà opérationnel ou en phase de planification — et une analyse quantitative et qualitative des 15 communautés énergétiques en activité ou en cours de développement. De plus, les indicateurs clés de performance (KPI) des communautés énergétiques opérationnelles ont été évalués, comme indiqué dans le Livrable D6.1, lorsque les données étaient disponibles. L'Annexe A présente l'ensemble complet des informations pour les divers sites pilotes concernant les paramètres et les OSS. Ce document est d'une importance capitale car il décrit l'état actuel de tous les écosystèmes régionaux, des OSS et des sites pilotes, servant de base pour l'avancement du projet sur cette question, qui sera étroitement suivi dans les Tâches T6.3 et T6.4. En effet, pendant la période de suivi des sites pilotes dans le cadre de la Tâche T6.3 du WP6, une collecte de données et de paramètres sur les communautés énergétiques sera effectuée, du point de vue social et du développement des OSS, tous les six mois afin d'évaluer l'efficacité du projet ECOEMPOWER dans l'atteinte de ses objectifs. Quant aux données énergétiques des sites pilotes pour le suivi des KPI associés, elles seront surveillées annuellement tout au long de la durée de vie du projet. La connaissance approfondie acquise grâce à ce document jette les bases d'une prise de décision éclairée et d'une planification stratégique pour les étapes ultérieures du projet ECOEMPOWER.

ECOEMPOWER

ECOsystems EMPOWERing at regional and local scale supporting energy communities

Februar 2024

D6.2 AUSGANGSLAGE IN DEN ECOEMPOWER-PILOTSTANDORTEN

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EXECUTIVE SUMMARY

Dieses Dokument definiert und beschreibt die Ausgangslage der Pilotstandorte im Rahmen des ECOEMPOWER-Projekts. Das Dokument umreißt auch die Methodik, die zur Definition der Ausgangslage angewandt wurde, sowie die Anforderung von Informationen und Beiträgen aus den verschiedenen regionalen Ökosystemen.

In dem Dokument werden alle Informationen und Daten zusammengetragen, die für die Festlegung der Ausgangslage aller Pilotstandorte des Projekts nützlich sind, um eine Vergleichsgrundlage für die Überwachung dieser Pilotstandorte während der gesamten Laufzeit des Projekts zu haben, damit die gesetzten Ziele erreicht werden können.

Für die Methodik zur Festlegung der Ausgangslage wurde eine Vorlage erstellt, mit der sowohl beschreibende als auch numerische Informationen und Eingaben erfasst werden können. Diese Vorlage wurde allen regionalen Ökosystemen zur Verfügung gestellt, in denen Daten zu den bestehenden oder angenommenen Energiegemeinschaften und zu allen bestehenden oder angenommenen One Stop Shops (OSS) angefordert wurden. Besonderes Gewicht wird auf die in D6.1 definierten quantitativen und qualitativen Bewertungskriterien gelegt, da sie für eine genaue Beurteilung der aktuellen Situation entscheidend sind.

Dieses Dokument dient als beschreibende Grundlage für alle am ECOEMPOWER-Projekt beteiligten Pilotstandorte, sowohl in qualitativer als auch in quantitativer Hinsicht. Diese Bewertung der Ausgangssituation wird dann mit der Situation nach der Umsetzung der Projektlösungen verglichen, um den tatsächlichen Erfolg des Projekts bei der Erreichung der Ziele der verschiedenen Pilotstandorte zu überprüfen.

Regionales Ökosystem #3 (RE3): Allgäu (DEUTSCHLAND)

Beschreibung des regionalen Ökosystems

Die weitläufige Region Allgäu in Süddeutschland erstreckt sich über die Landkreise Oberallgäu, Ostallgäu, Unterallgäu und Lindau und umfasst eine Fläche von 4,600 Quadratkilometern. Mit 650,000 Einwohnern zeichnet sich das Allgäu nicht nur durch seine geografische Bedeutung aus, sondern auch durch bemerkenswerte Fortschritte im Bereich des nachhaltigen Lebens. Die Region hat sich an die Spitze der Energiewendebewegung gesetzt, was durch das international anerkannte Energiedorf Wildpoldsried beispielhaft demonstriert wird. Das Engagement des Allgäus für den Umweltschutz zeigt sich in seinen unberührten Landschaften, die nationale und internationale Besucher anziehen, die Erholung in der Natur suchen.

Über seine ästhetische Anziehungskraft hinaus verfügt das Allgäu über eine florierende Wirtschaft und beherbergt eine hochentwickelte High-Tech-Industrie, insbesondere im Bereich der erneuerbaren Anlagen und Infrastrukturen. Die Energielandschaft ist vielfältig und umfasst große Unternehmen wie LEW (verbunden mit E.ON) sowie zahlreiche kleine, kommunale Versorgungsunternehmen. Selbst kleinere „Energiegenossenschaften“ haben im Allgäu erfolgreiche Betriebe aufgebaut, was die Tiefe des bürgerschaftlichen Engagements unterstreicht. Erneuerbare Energiequellen bilden das Rückgrat des Energieprofils im Allgäu. Solarenergie steht an erster Stelle, bedeckt Dächer und Felder, während Windkraft, Biogas und Wasserkraft eine wesentliche Rolle im nachhaltigen Energierahmen der Region spielen. Dieses Engagement für erneuerbare Energien ist tief in der Geschichte der Region verwurzelt, da das Allgäu die Wiege vorbildhafter Energie-Gemeinschaftsinitiativen wie Hindelang ist.

Treiber der nachhaltigen Initiativen im Allgäu ist die regionale Energieagentur eza! (Energie- und Umweltzentrum Allgäu) [28] . Mit einem Team von etwa 40 Experten aus verschiedenen Disziplinen des nachhaltigen Energiemanagements ist eza! eine entscheidende Kraft, die lokale Behörden, Gemeinden und Energieversorger unterstützt. Die Agentur engagiert sich aktiv in Bildungseinrichtungen, vermittelt die Prinzipien der Energiewende in Schulen und leitet Initiativen wie das „Bündnis Klimaneutrales Allgäu 2030“.

In einer kollaborativen Anstrengung mit B.A.U.M. plant eza! die Errichtung eines regionalen OSS (One Stop Shop). Diese umfassende Einrichtung soll den Übergang für Gemeinden, Unternehmen und andere regionale Akteure erleichtern, die Energiegenossenschaften und bürgerschaftliche Erneuerbare-Energie-Gemeinschaften gründen möchten. Der OSS wird Expertise in den Bereichen Motivation, Kapazitätsaufbau, Initiierung, Energiemanagement, Finanzierung, rechtliche Angelegenheiten und soziale Dynamik bündeln und diese Dienstleistungen in einem einzigen, umfassenden Knotenpunkt zusammenführen.

Im Wesentlichen geht das Allgäu über seine geografischen Grenzen hinaus und steht als Beweis für die harmonische Verschmelzung von Tradition, Innovation und einem unerschütterlichen Engagement für eine nachhaltige Zukunft. Mit seinen atemberaubenden Landschaften, einer robusten Wirtschaft und einem gemeinschaftsorientierten Ansatz zur Energiewende erweist sich das Allgäu als Beispiel für die erfolgreiche Integration von Prinzipien des nachhaltigen Lebens.

28 eza! Website: https://www.eza-allgaeu.de/

OSS-Bewertung

In der dynamischen Landschaft der süddeutschen Region Allgäu nimmt eine transformative Initiative Gestalt an: die Gründung eines OSS (One Stop Shop). Angeführt vom Energie- und Umweltzentrum Allgäu (eza!) in Kempten, ist der OSS ein zentrales Ergebnis des ambitionierten Projekts ECOEMPOWER. Der OSS befindet sich derzeit im Aufbau und soll die lokale Energielandschaft neu definieren, indem er eine umfassende Palette von Dienstleistungen anbietet, die auf die einzigartigen Bedürfnisse von Energie-Gemeinschaften zugeschnitten sind. Im Gegensatz zum bestehenden Modell der Energieagentur eza! ist der OSS eine gezielte Anstrengung, die speziell auf die Beratung und Unterstützung von Energiegemeinschaften ausgerichtet ist. Zum jetzigen Zeitpunkt bleibt der OSS eine geplante Einheit, deren Entwicklung sich parallel zum Fortschritt des Projekts ECOEMPOWER entfaltet.

Der geplante OSS soll eine entscheidende Lücke im Energie-Ökosystem der Region füllen. Vor der Initiative ECOEMPOWER gab es keine konkreten Pläne für eine solche Einrichtung. Das Projekt hat den Anstoß gegeben, einen OSS nicht nur zu planen, sondern auch umzusetzen, was einen bedeutenden Wandel im Ansatz der Region für nachhaltige Energiepraktiken markiert.

Mit der Weiterentwicklung des OSS wird erwartet, dass er ein breites Spektrum von Dienstleistungen anbietet. Diese reichen von der Sensibilisierung für die Potenziale und Vorteile von Energie-Gemeinschaften bis hin zur Bereitstellung detaillierter Informationen für Bürger und Akteure. Darüber hinaus wird der OSS eine entscheidende Rolle dabei spielen, Akteuren bei der Analyse von Motivationen und Erwartungen zu helfen, die technische Machbarkeit und Rentabilität zu ermitteln und Einblicke in Finanzierungsmöglichkeiten und rechtliche Aspekte zu gewähren.

Die Entwicklung des OSS ist ein Beweis für das Engagement der Region für bürgerschaftliche Erneuerbare-Energie-Initiativen. Während die spezifischen Dienstleistungen noch nicht vollständig festgelegt sind, wird erwartet, dass der OSS Unterstützung bei der Entwicklung von Geschäftsmodellen, beim Kapazitätsaufbau und bei der technischen Beratung bietet. Dies umfasst die Orientierung an am Markt verfügbaren Technologien, die Unterstützung des bürgerschaftlichen Engagements und die Förderung kollaborativer Netzwerke zwischen lokalen Akteuren. Mit dem Fortschritt des OSS in Richtung vollständiger Einsatzbereitschaft wird er zu einem zentralen Knotenpunkt für die kontinuierliche Bewertung der von den Energiegemeinschaften erzielten Ergebnisse. Die Überwachung des Wachstums der Anzahl der beteiligten Bürger, der Zunahme der Kapazität zur Erzeugung erneuerbarer Energien und der Anpassung an sich entwickelnde regulatorische Aspekte wird ein integraler Bestandteil seiner Funktion sein.

Derzeit gibt es keine Nutzer, die die OSS-Dienste in Anspruch nehmen, da sich dieser noch in der Planungsphase befindet. Der geplante OSS bei eza! ist jedoch dazu bestimmt, ein zentraler Anlaufpunkt für Bürger, Akteure und lokale Behörden zu werden, die Beratung zu Energiegemeinschafts-Initiativen suchen. Mit der Entwicklung des OSS können sich Möglichkeiten für Nutzer ergeben, Erfahrungen und Erkenntnisse auszutauschen, was zur Verfeinerung und Verbesserung der Dienstleistungen beitragen wird.

Zusammenfassend spiegelt die Entstehung des OSS im Allgäu eine strategische Antwort auf das Engagement der Region für nachhaltige Energiepraktiken und bürgerschaftliches Engagement wider. Die Zusammenarbeit mit ECOEMPOWER wird transformative Veränderungen herbeiführen, indem sie einen zentralen Knotenpunkt für Expertise, Unterstützung und Zusammenarbeit im Streben nach erneuerbaren und gemeinschaftsgesteuerten Energieinitiativen bereitstellt.

Datenerfassung und qualitative Bewertung der Energie-Gemeinschaften

In der Region konzentriert sich das Projekt ECOEMPOWER auf drei verschiedene Pilotstandorte: Elektrizitätswerke Hindelang eG, Elektrizitätswerke Reutte und Dorfenergie eG Eppishausen.

Im regulatorischen Bereich zeigt der deutsche Rechtsrahmen, wie er von REScoop beschrieben wird, sowohl Fortschritte als auch Herausforderungen. Die Änderungen am EEG (Erneuerbare-Energien-Gesetz) im Jahr 2022 weisen auf positive Schritte hin, indem sie Ausnahmen von den Ausschreibungspflichten für „Bürgerenergiegesellschaften“ wieder einführen. Die Stärkung der Definitionen für Erneuerbare-Energie-Projekte, die diesen bürgerschaftlich geführten Entitäten gehören, stellt einen bedeutenden Fortschritt dar. Dennoch bestehen weiterhin Lücken, die weitere Entwicklungen erfordern, um einen förderlichen Rahmen zu schaffen und den Energieaustausch zwischen den CE zu erleichtern.

Bei einer tieferen Betrachtung der Governance-Strukturen dieser Energiegemeinschaften verfügt die Elektrizitätswerke Hindelang eG über einen robusten Rahmen mit einem engagierten Vorstand und einem Aufsichtsrat. Die Elektrizitätswerke Reutte befinden sich derzeit in der Organisationsphase, während die Dorfenergie eG Eppishausen mit einem ehrenamtlichen Vorstand, einem Aufsichtsrat und einer beträchtlichen Mitgliederbasis arbeitet.

Dieser Abschnitt definiert alle Daten für die Zusammensetzung und Bewertung der Ausgangsbasis an den verschiedenen Pilotstandorten, sowohl aus numerischer Sicht für den Vergleich der Werte mit den nachfolgenden Projektschritten zur Definition des Mehrwerts, als auch aus einer eher qualitativen Sicht zur Bewertung der Reife einer Energiegemeinschaft. Die einzelnen Pilotstandorte in der entsprechenden Region werden nachfolgend vorgestellt.

RE3.1 - Elektrizitätswerke Hindelang eG

Figure 0.7 – Bereich des Pilotstandorts „Elektrizitätswerke Hindelang eG“

Gegründet in den 1920er Jahren von 48 visionären Bürgern im Ostrachtal (5.000 Einwohner), ist die Elektrizitätswerke Hindelang eG eine Genossenschaft, die an der Spitze der gemeinschaftsgetriebenen nachhaltigen Energieinitiativen in der deutschen Region Oberallgäu steht. Trotz wirtschaftlicher Herausforderungen begannen die Gründer der Genossenschaft mit der Mission, die lokale Gemeinschaft mit Strom zu versorgen, was 1926 zum Bau des Wasserkraftwerks Auele und zur Entwicklung eines Stromverteilungsnetzes führte. Die Elektrizitätswerke Hindelang, die unter einer genossenschaftlichen Rechtsform tätig sind, genießen die unerschütterliche Unterstützung der Gemeinde Bad Hindelang (5.000 Einwohner). Das Energieportfolio der Genossenschaft umfasst Wasserkraft und Solarenergie, Stromimport und -handel sowie eine aktive Beteiligung am lokalen Stromnetz. Zu den bemerkenswerten Kraftwerkskapazitäten gehören das 1.100 kW-Wasserkraftwerk in Auele (jährliche Produktion von 4 GWh/Jahr), ein 95 kW-Wasserkraftwerk in Gernbach (jährliche Produktion von 300 MWh/Jahr) und verschiedene Photovoltaikanlagen mit einer Gesamtleistung von 193 kW auf Dächern (jährliche Produktion von 160 MWh/Jahr). Die Elektrizitätswerke Hindelang sind auch ein prominenter Akteur in der Energiewende und spielen eine führende Rolle bei der Motivation anderer Energieversorger und Gemeinden in der Region. Darüber hinaus trägt die Genossenschaft zur nachhaltigen Mobilität mit fünf Ladestationen für Elektrofahrzeuge (jeweils 22 kW) bei. Über die Energie hinaus ist die Elektrizitätswerke Hindelang ein wichtiger Arbeitgeber in der Region (mit 16 Mitarbeitern), trägt wesentlich zur lokalen Wirtschaft bei und beteiligt sich aktiv an regionalen Projekten wie der Initiative des DECIDE-Projekts mit BAUM[29], was ihr Engagement für die Förderung nachhaltiger Energiewenden unterstreicht.

29 DECIDE-Projektwebsite: https://decide4energy.eu/

Nachfolgend in Tabelle 0.13, Tabelle 0.14, Tabelle 0.15 und Tabelle 0.16 sind alle parameter aus sozialer, energetischer, wirtschaftlicher und ökologischer Sicht innerhalb des Pilotstandorts eingegeben.

Table 0.13 – Anforderung für die Bewertung sozialer Parameter - Elektrizitätswerke Hindelang eG

Soziale Daten	Wert	Maßeinheit
Anzahl der unterstützten und/oder geschaffenen bürgerschaftlichen Initiativen	1	[#]
Anzahl der Bürger, die an Energie-Gemeinschaften teilnehmen	330 Bürger und 20 KMU sind Mitglieder der Genossenschaft	[#]
Anzahl der Akteure mit verbesserten Fähigkeiten im Bereich der Gemeinschaftsenergie	0	[#]
Anzahl der geschaffenen Arbeitsplätze	16	[FTE]
Anzahl der Personen, die an Workshops teilnehmen	0	[#]
Vielfalt in der Verteilung der beteiligten Personen in der CE	30% frauen, 5% unter 40 Jahren	[%]

Table 0.14 – Anforderung für die Bewertung energetischer Parameter - Elektrizitätswerke Hindelang eG

Energiedaten	Wert	Maßeinheit
Primärenergiebedarf	N/A	[GWh/year]
Endenergiebedarf	17.9	[GWh/year]
Erzeugung erneuerbarer Energien	4.46	[GWh/year]
Eigenverbrauch von erneuerbarem Strom	0	[%]
Flexibilität – Speichergröße und Kapazität	500,000 (Damm “Schrecksee”)	[kWh]

Table 0.15 – Anforderung für die Bewertung wirtschaftlicher Parameter - Elektrizitätswerke Hindelang eG

Wirtschaftsdaten	Wert	Maßeinheit
Investitionen in nachhaltige Energie	N/A	[M€]
Entwicklung von Investitionspipelines für lokale Gemeinschaftsenergie	N/A	[M€]
Öffentliche Investitionen	N/A	[€]
Private Investitionen	N/A	[€]
Durchschnittliche Stromkosten (aus der Stromrechnung)	0.34	[€/kWh]

Table 0.16 – Anforderung für die Bewertung ökologischer Parameter - Elektrizitätswerke Hindelang eG

Umweltdaten	Wert	Maßeinheit
Reduktion der Treibhausgasemissionen	1,387	[tCO2/Jahr]

RE3.2 - Elektrizitätswerke Reutte

Figure 0.8 – Bereich des Pilotstandorts „Elektrizitätswerke Reutte“

Die Region, die den Altlandkreis Füssen, Seeg und die Stadt Füssen sowie weitere Gemeinden (50,000 Einwohner) im Landkreis Ostallgäu umfasst, steht vor einer transformativen Initiative zur Entwicklung nachhaltiger Energie. Im Mittelpunkt dieses Unterfangens steht die Elektrizitätswerke Reutte (EWR), ein Energieversorgungsunternehmen mit einer jahrhundertelangen Geschichte, das rechtlich als Elektrizitätswerke Reutte GmbH & Co. KG gegründet wurde und sich im Besitz der österreichischen Gemeinde Reutte befindet. EWR, das derzeit in Betrieb ist, wagt sich nun an ein weiteres Projekt – die Bildung einer Energiegemeinschaft. Diese kollaborative Anstrengung beinhaltet Gemeinden, Landwirte, Hotels und private Initiativen, die alle daran interessiert sind, eine Energiegemeinschaft zu gründen, um die Energielandschaft der Region neu zu gestalten. Etwa 100 Bürger unterstützen derzeit die Gründung der neuen Energiegemeinschaft.

In Bezug auf die technischen Spezifikationen erweist sich die Gemeinde Seeg (3,000 Einwohner) als ein wichtiger Akteur, dessen primäre erneuerbare Energiequelle Photovoltaik-Anlagen (PV) sind, die 15 MWh/Jahr (etwa 20 kW Kapazität) erzeugen. Diese PV-Anlagen sind strategisch auf Dächern und offenen ländlichen Flächen positioniert und zeigen das Engagement der Region, Solarenergie zu nutzen.

EWR, als Hauptenergieversorger, stützt sich überwiegend auf Wasserkraft aus dem Lech (28,000 kW Kapazität und 161,000 MWh/Jahr Jahresproduktion). Dies unterstreicht ein Engagement für saubere und nachhaltige Energieerzeugung, das mit den breiteren Zielen der Gemeinschaft in Einklang steht.

Sozial sind die kollaborativen Anstrengungen durch Entitäten wie den Arbeitskreis Energie Seeg und den Tourismusverein Füssen, insbesondere seine Untergruppe – das Klimaverbund Hotels (Tourismusverein Füssen im Allgäu e.V./Klimaverbund Hotels), ersichtlich. Diese Koalition repräsentiert eine vielfältige Gruppe von

Interessengruppen, darunter fünf Hotels, eine Sportarena und zwei Bauernhöfe. Sie sind an vorderster Front bei der Initiierung einer Energiegenossenschaft, die den Austausch von Strom erleichtern soll.

Die Vision reicht über die ursprüngliche Gruppe hinaus, mit dem Potenzial für diese Energiegenossenschaft, ihren Wirkungsbereich auf alle 20 Hotelmitglieder des Verbandes auszudehnen. Der gemeinschaftsgetriebene Aspekt dieser Initiative zeigt sich in der kollaborativen Struktur der Genossenschaft, die nicht nur große Akteure, sondern auch kleinere Entitäten einbezieht und ein Gefühl der gemeinsamen Verantwortung und des Engagements für nachhaltige Energiepraktiken fördert.

Als Teil der übergeordneten Ziele strebt die Region die Gründung einer neuen Energiegemeinschaft an, die sich hauptsächlich auf die Stromerzeugung konzentriert, mit einem vorwiegenden Schwerpunkt auf PV-Anlagen und der potenziellen Integration von Windenergie. Der umfassende Ansatz, der technische Fortschritte mit bürgerschaftlichem Engagement verbindet, positioniert diese Region als Pionierin in Sachen nachhaltiger Energieinitiativen.

In diesem Fall fehlt es an Daten am betrachteten Pilotstandort, da weder eine betriebsbereite Energie-Gemeinschaft noch anwendbare Ausgangsszenarien mit guter Zuverlässigkeit vorhanden sind. Deshalb ist es wichtig, die Leistung dieser Pilotstandorte in den nachfolgenden Phasen des WP6 für die Erstellung und Überwachung von Daten der Energie-Gemeinschaften zu überwachen.

RE3.3 - Dorfenergie eG

Figure 0.9 – Bereich des Pilotstandorts „Dorfenergie eG“

Eppishausen (2,000 Einwohner) und Kirchheim (2,500 Einwohner), eingebettet im Landkreis Unterallgäu, verkörpern das Wesen proaktiver und nachhaltiger Energieinitiativen durch ihre aktive Teilnahme an der Energiegenossenschaft Dorfenergie eG (www.dorfenergie-eg.de) (RE3.2). Das Hauptziel der Genossenschaft ist die Energieerzeugung und Eigenversorgung ihrer Mitglieder, wobei der Schwerpunkt auf wirtschaftlichen Vorteilen im Rahmen des gemeinschaftlichen Engagements liegt.

Gegründet im Jahr 2010 und rechtlich etabliert, fungiert die Dorfenergie eG als Leuchtturm des Fortschritts erneuerbarer Energien, insbesondere im Bereich der Solarenergie. Die Genossenschaft konzentriert sich auf den Kauf, die Installation und die Wartung von Anlagen zur Erzeugung erneuerbarer Energien. Bemerkenswert ist, dass das Portfolio der Genossenschaft Solaranlagen, Biomasse-Extraktion und -Verarbeitung sowie den Verkauf der erzeugten Energie in Form von Strom und/oder Wärme umfasst. Dieser vielschichtige Ansatz steht im Einklang mit ihrem Engagement für wirtschaftlichen Wohlstand und Umweltschutz.

Zu den bemerkenswerten Solaranlagen gehören eine 131 kWp PV-Dachanlage in der Gemeinde Eppishausen, eine 17 kWp-Anlage im Gemeinde- und Vereinshaus Haselbach, ein 23 kWp-System in der Schulturnhalle Kirchheim und eine beträchtliche 426 kWp Freiflächen-PV-Anlage auf der Deponie Derndorf. Insgesamt tragen diese Anlagen zu einer jährlichen Energieproduktion von 653.000 kWh bei, die sowohl für Strom als auch für Heizung genutzt wird. Über die technischen Errungenschaften hinaus engagiert die Genossenschaft die Bürger aktiv in der Energiewende. Durch umfassende Informationskampagnen und bürgerschaftliches Engagement stellt die Genossenschaft sicher, dass die Bewohner gut über die wirtschaftlichen Erträge und die Umweltvorteile der Selbstorganisation im Rahmen einer Energiegenossenschaft informiert sind. Dieser von der Basis ausgehende Ansatz hat ein Gefühl der Gemeinschaft und der kollektiven Verantwortung unter den Bürgern gefördert und ein lebendiges und nachhaltiges Ökosystem geschaffen.

Die Dorfenergie eG dehnt ihren Einfluss über ihre unmittelbaren Mitglieder hinaus aus, indem sie Mitgliedern und Dritten Beratung und Unterstützung bei Fragen zur erneuerbaren Energieversorgung bietet. Die Öffentlichkeitsarbeit verstärkt das Bewusstsein für energiewirtschaftliche Themen weiter und bekräftigt das Engagement der Genossenschaft für Bildung und Interessenvertretung.

Mit der Weiterentwicklung der Genossenschaft gehören zu ihren Zielen die Sicherstellung der Eigenversorgung und der Direktvermarktung nach den 20 Jahren der staatlichen Einspeisevergütung (von 19 bis 39 c€/kWh je nach Größe), wobei sie sich an rechtliche Entwicklungen anpasst. Der Weg der Genossenschaft unterstreicht die transformative Kraft von gemeinschaftlich geführten, nachhaltigen Energieinitiativen. Mit jedem Solarpanel und jeder Biomasseanlage schaffen Eppishausen und Kirchheim einen Präzedenzfall für eine Zukunft, in der erneuerbare Energien und gemeinschaftliche Zusammenarbeit harmonisch koexistieren und den Weg für eine nachhaltigere und widerstandsfähigere Gemeinschaft ebnen.

Nachfolgend in Tabelle 0.17, Tabelle 0.18, Tabelle 0.19 und Tabelle 0.20 sind alle Parameter aus sozialer, energetischer, wirtschaftlicher und ökologischer Sicht innerhalb des Pilotstandorts eingegeben.

Table 0.17 – Anforderung für die Bewertung sozialer Parameter - Dorfenergie eG

Soziale Daten	Wert	Maßeinheit
Anzahl der unterstützten und/oder geschaffenen bürgerschaftlichen Initiativen	1	[#]
Anzahl der Bürger, die an Energie-Gemeinschaften teilnehmen	142	[#]
Anzahl der Akteure mit verbesserten Fähigkeiten im Bereich der Gemeinschaftsenergie	0	[#]
Anzahl der geschaffenen Arbeitsplätze	0	[FTE]
Anzahl der Personen, die an Workshops teilnehmen	4	[#]
Vielfalt in der Verteilung der beteiligten Personen in der CE	Frauen 31% Unter 40 Jahren 20%	[%]

Table 0.18 – Anforderung für die Bewertung energetischer Parameter - Dorfenergie eG

Energiedaten	Wert	Maßeinheit
Primärenergiebedarf	0.409	[GWh/year]
Endenergiebedarf	0.1704	[GWh/year]
Erzeugung erneuerbarer Energien	0.7	[GWh/year]
Eigenverbrauch von erneuerbarem Strom	0	[%]
Flexibilität – Speichergröße und Kapazität	0	[kW and kWh]

Table 0.19 – Anforderung für die Bewertung wirtschaftlicher Parameter - Dorfenergie eG

Wirtschaftsdaten	Wert	Maßeinheit
Investitionen in nachhaltige Energie	1.2	[M€]
Entwicklung von Investitionspipelines für lokale Gemeinschaftsenergie	1.2	[M€]
Öffentliche Investitionen	0	[€]
Private Investitionen	1,200,000	[€]
Durchschnittliche Stromkosten (aus der Stromrechnung)	0.40	[€/kWh]

Table 0.20 – Anforderung für die Bewertung ökologischer Parameter – Dorfenergie eG

Umweltdaten	Wert	Maßeinheit
Reduktion der Treibhausgasemissionen	217.7	[tCO2/Jahr]

Schlussfolgerungen

Abschließend lässt sich festhalten, dass die Fertigstellung von Deliverable 6.2 einen wichtigen Meilenstein im ECOEMPOWER-Projekt darstellt (d.h. Meilenstein Nr. 11), da sie eine umfassende Definition der Ausgangssituation in den verschiedenen Pilotstandorten liefert. Die Ausgangsbasis wurde sorgfältig durch eine einleitende Übersicht für jedes der fünf regionalen Ökosysteme erarbeitet, zusammen mit der Bewertung der regionalen OSS (in der aktuellen Konfiguration, sofern bereits in Betrieb, oder mit den vorgesehenen Merkmalen, sofern sich diese noch in der Planungsphase befinden), sowie durch eine quantitative und qualitative Analyse der 15 Energie-Gemeinschaften, die entweder bereits betrieben werden oder sich in Entwicklung befinden.

Darüber hinaus wurden KPIs für die operativen Energiegemeinschaften bewertet, wie im Deliverable D6.1 angegeben, sofern entsprechende Daten zugänglich waren. Anhang A zeigt den vollständigen Satz an Informationen zu den verschiedenen Pilotstandorten in Bezug auf die Parameter und die OSS. Dieses Dokument ist von entscheidender Bedeutung, da es den aktuellen Stand aller regionalen Ökosysteme, OSS und Pilotstandorte darstellt und als Grundlage für den weiteren Fortschritt des Projekts in diesem Bereich dient, welcher in den Aufgaben T6.3 und T6.4 engmaschig überwacht wird.

Im Rahmen der Überwachungsphase der Pilotstandorte innerhalb von Aufgabe T6.3 des Arbeitspakets WP6 werden halbjährlich Daten und Parameter der Energiegemeinschaften aus sozialer Sicht sowie die Entwicklung der OSS erhoben, um die Wirksamkeit des ECOEMPOWER-Projekts bei der Zielerreichung zu bewerten. Die Energiedaten der Pilotstandorte zur Überwachung der damit verbundenen KPIs werden jährlich während der gesamten Projektlaufzeit überwacht.

Das durch dieses Dokument gewonnene vertiefte Wissen bildet die Grundlage für fundierte Entscheidungen und strategische Planungen in den späteren Phasen des ECOEMPOWER-Projekts.

ECOEMPOWER

ECOsystems EMPOWERing at regional and local scale supporting energy communities

Únor 2024

D6.2 VÝCHOZÍ STAV PILOTNÍCH LOKALIT V PROJEKTU ECOEMPOWER

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EXECUTIVE SUMMARY

Tento výstup definuje a popisuje výchozí stav pilotních lokalit v rámci projektu ECOEMPOWER. Dokument také uvádí metodologii, která se používá k definování výchozího stavu a požadavků na informace a vstupy od různých regionálních ekosystémů.

Dokument shromažďuje všechny informace a údaje užitečné pro definování výchozího stavu všech pilotních lokalit projektu, aby měl základ pro srovnání a monitorování těchto pilotních projektů po celou dobu trvání projektu s cílem dosáhnout stanovených cílů.

Co se týče metodiky pro definování výchozího stavu, byla vytvořena šablona pro shromažďování jak popisných, tak numerických informací a vstupů. Tato šablona je sdílena se všemi regionálními ekosystémy, od kterých byly požadovány údaje týkající se stávajících nebo připravovaných energetických společenství a jednotných kontaktních míst (OSS). Zvláštní důraz je kladen na kvantitativní a kvalitativní hodnotící kritéria definovaná v D6.1, protože jsou klíčová pro přesné posouzení současné situace.

Tento dokument slouží jako výchozí kvalitativní a kvantitativní popis všech pilotních lokalit zapojených do projektu ECOEMPOWER. Toto hodnocení výchozího stavu bude následně porovnáno se stavem po realizaci pilotních projektů, aby se ověřila skutečná úspěšnost projektu při dosahování cílů jednotlivých pilotních lokalit.

Regionální ekosystém #4 (RE4): Zlínský kraj (ČESKÁ REPUBLIKA)

Popis regionálního ekosystému

Zlínský kraj se nachází ve východní části České republiky, sousedí se Slovenskem a rozkládá se na ploše 3 964 km², což z něj činí čtvrtý nejmenší kraj v zemi. Přestože je rozlohou kompaktní, je bohatý na kulturní dědictví a dynamické průmyslové prostředí. Žije zde 580 119 obyvatel v 307 obcích. Zlín je známý svými průmyslovými tradicemi a sídlem téměř 200 podniků s více než 100 zaměstnanci, čímž se řadí na páté místo mezi 13 kraji ČR. Tyto podniky odrážejí odkaz regionu v oborech, jako je obuvnictví, letectví či strojírenství, a současně ukazují spojení tradice s inovacemi.

Uprostřed rozmanité krajiny se Zlínský kraj pustil do energetické transformace s výrazným odhodláním, které podporuje krajská energetická agentura (EAZK). I když území kraje není bohaté na nerostné zdroje, vyskytují se zde ložiska cihlářských jílů, štěrkopísků a stavebního kamene, v menší míře také ropa a zemní plyn. Závislost na dovozu fosilních paliv je však vysoká – 93 % obcí je napojeno na plynárenskou síť, což zdůrazňuje potřebu energetické nezávislosti a místní odolnosti. Proto kraj upřednostňuje modely sdílení energie a komunitní iniciativy zaměřené na přechod k obnovitelným zdrojům.

Klíčovým prvkem energetické strategie Zlínského kraje je rychlý rozvoj energetických společenství, která jsou součástí celonárodního trendu v ČR. Lídrem této transformace je Elektroenergetické datové centrum (EDC), spuštěné v srpnu 2024, které podporuje datově řízené řízení a optimalizaci energií v celé republice. EDC představuje zásadní infrastrukturní složku pro energetická společenství, umožňuje transparentnost a efektivní využívání energie a podporuje spolupráci mezi obcemi, obyvateli a průmyslem.

V současnosti EAZK připravuje vznik tří energetických společenství ve Zlínském kraji, jejichž cílem je vytvořit odolný a decentralizovaný energetický model. Lokální sítě umožňující sdílení energie mezi spotřebiteli v blízkém okolí mají významně snížit závislost na dovozu energií. Agentura spolupracuje s různými aktéry, aby podpořila tuto iniciativu nejen po technické a finanční stránce, ale také v oblasti budování kapacit a zapojování komunity do udržitelných praktik.

Zakládání energetických společenství je v souladu s dlouhodobým závazkem Zlínského kraje k udržitelnému rozvoji a posilování místních komunit. EAZK také spolupracuje se vzdělávacími institucemi, šíří povědomí o cílech energetické transformace a poskytuje odborné znalosti v oblastech energetického managementu, legislativního rámce a možností financování.

Zlínský kraj je příkladem vyvážené integrace průmyslového dědictví a udržitelného směřování do budoucnosti. Jeho soustředěné úsilí o energetickou soběstačnost a komunitní obnovitelné iniciativy z něj činí inspirativní model pro udržitelné energetické praktiky ve východní Evropě.

Zhodnocení OSS

One Stop Shop (OSS) v regionu, v současnosti provozovaný EAZK, poskytuje především fyzické služby zaměřené na renovaci veřejných budov, asistenci při výběru dodavatelů energií a rozvoj obnovitelných zdrojů energie (OZE).

OSS je aktivní v poskytování konzultací – přibližně 150 ročně v oblasti renovací budov, 100 v oblasti grantů a dotací a 200 v oblasti rozvoje OZE. Primárními uživateli jsou obce, které usilují o snížení energetické náročnosti prostřednictvím renovací a zavádění OZE, podporovaných evropskými dotacemi, jež se v posledních pěti letech staly populárními. Služba je zhruba rovnoměrně rozdělena mezi osobní (prezenční) a virtuální (e-mail, telefon) konzultace. Obce vyjadřují vysokou spokojenost díky komplexní podpoře, zejména při orientaci v dotačních titulech a překonávání byrokratických překážek.

Nicméně vytvoření OSS zaměřeného přímo na energetická společenství dosud nebylo plánováno a zatím chybí, což řadí region do předvývojové fáze v oblasti OSS služeb pro energetická společenství.

Současní uživatelé oceňují komplexní informace a podporu, ale existuje jasná mezera ve službách cílených na energetická společenství – právě proto je projekt ECOEMPOWER zásadní pro rozvoj této kapacity. Zainteresované strany si uvědomují potenciální přínos rozšíření funkcionalit OSS, zároveň však upozorňují, že koncept OSS je stále relativně nový a vyvíjející se, což představuje výzvy při implementaci inovativních funkcí a možností. Rozvoj OSS zaměřeného na energetická společenství by výrazně posílil regionální ekosystém, odstranil dosud nenaplněné potřeby a zároveň se sladit s rostoucím zájmem o udržitelná energetická řešení.

Sběr dat o ES a kvalitativní hodnocení

Zlínský kraj, nacházející se ve východní části ČR, pokrývá plochu 3 964 km² a je domovem 580 119 obyvatel (2021), obývajících 307 obcí. Omezená dostupnost přírodních zdrojů a probíhající energetická krize podtrhují nutnost přechodu na místní obnovitelné zdroje energie a modely sdílení energie. Aby na to kraj reagoval, krajská energetická agentura (EAZK) zahájila rozvoj tří pilotních energetických společenství (ES) jako součást širší strategie posilování energetické odolnosti a udržitelnosti.

Tři pilotní lokality – Vlčnov, Slavičín a Zlín – představují různé přístupy ke komunitní energii:

- Vlčnov – obec provozuje FV systém s instalovaným výkonem 221,4 kWp, který ročně vyrobí cca 222 MWh. Systémy jsou instalovány na obecních budovách (např. bazén) a fungují v síti nn (400 V), zatím však bez akumulace.
- Slavičín – FV systém 139,5 kWp doplněný o baterii 129.75 kWh a existující systém CZT (dřevní štěpka, kogenerační jednotky, tepelná čerpadla). Město plánuje i další OZE (např. bezlopatkové větrné turbíny).
- Zlín – krajské město (74 835 obyvatel) rozvíjí EC pod vedením společnosti Teplo Zlín. První instalace FV 100 kWp, cílem je dosáhnout přes 2 MW. Zapojeno je osm městských subjektů.

Řízení ES je založeno na silné municipální bázi: ve Vlčnově je obec „aktivním zákazníkem“, ve Slavičíně ES rozvíjí městská firma BTH Slavičín a ve Zlíně stojí v čele Teplo Zlín. Tato struktura zajišťuje stabilitu, ale vyžaduje posílení zapojení veřejnosti a odborných kapacit.

Klíčovou roli hraje Elektroenergetické datové centrum (EDC), které od roku 2024 umožňuje čtvrthodinová měření, sdílení elektřiny a optimalizaci toků. Problémem zůstává neúplné pokrytí chytrými měřiči, zejména u spotřeby ve Slavičíně a Zlíně.

Regulační rámec posílila novela energetického zákona Lex OZE II (leden 2024), která umožňuje sdílení elektřiny přes distribuční síť a vyžaduje registraci odběrných i výrobních míst v EDC. Přesto přetrvávají výzvy: nízká angažovanost veřejnosti, slabý závazek stakeholderů, nedostatek odborníků a omezená podpora regulačních orgánů (ERÚ, EDC).

Odstranění těchto bariér bude klíčové pro odemknutí plného potenciálu ES ve Zlínském kraji. Podpora místní výroby z OZE, snižování závislosti na dovozu fosilních paliv a posílení komunitní participace významně přispějí k energetické transformaci a dlouhodobé odolnosti regionu.

RE4.1 – Vlčnov

Figure 0.10 – Pilotní místo Vlčnov

Vlčnov, obec s 2 969 obyvateli, je v počáteční fázi vytváření energetického společenství (ES), v současnosti funguje jako „aktivní zákazník“. Obec provozuje fotovoltaické (FV) systémy na několika veřejných budovách – na obecním úřadě, kulturním domě, základní škole a na bazénu, kde je instalována FV elektrárna o výkonu 20 kWp. Tyto instalace jsou klíčem k místní výrobě obnovitelné energie a prvním krokem k větší energetické nezávislosti obce.

Rozvoj ES však naráží na sociální a provozní výzvy. Zapojení občanů je zatím omezené – dosud neproběhly žádné workshopy ani přímá participace. Rozvoj energetických dovedností je také v počátcích. Obec má ale podporu od krajské energetické agentury (EAZK), která hraje klíčovou roli při formalizaci ES a plánování jeho budoucnosti.

Hlavním cílem ES ve Vlčnově je sladit místní výrobu a spotřebu energie, aby se dosáhlo maximální účinnosti a udržitelnosti. Tento přechod odráží závazek obce k podpoře obnovitelných zdrojů, snížení dopadů na životní prostředí a přípravě na silnější komunitní zapojení do energetické transformace.

V tabulkách 0.21, 0.22, 0.23 a 0.24 jsou uvedeny všechny parametry ze sociálního, energetického, ekonomického a environmentálního hlediska v rámci pilotního místa.

Table 0.21 – Sociální parametry – Vlčnov

Sociální data	Hodnota	Jednotka
Počet občansky vedených iniciativ	0	[#]
Počet občanů zapojených do ES	0	[#]
Počet aktérů se zvýšenými dovednostmi v oblasti komunitní energie	1	[#]
Počet nových pracovních míst	0	[FTE]
Počet účastníků workshopů	0	[#]
Diverzita zapojených aktérů	0	[%]

Table 0.22 – Energetické parametry – Vlčnov

Energetické data	Hodnota	Jednotka
Primární energetická spotřeba	0.648	[GWh/rok]
Konečná energetická spotřeba	0.341	[GWh/rok]
Výroba z OZE	0.222	[GWh/rok]
Samospotřeba elektřiny z OZE	29	[%]
Flexibilita – kapacita úložišť	0	[kW a kWh]

Table 0.23 – Ekonomické parametry – Vlčnov

Ekonomická data	Hodnota	Jednotka
Investice do udržitelné energie	0.275	[M€]
Rozvoj investičních projektů v oblasti energetiky na úrovni místních komunit	0.275	[M€]
Veřejné investice	275,000	[€]
Soukromé investice	0	[€]

Průměrná cena elektřiny	0.36	[€/kWh]

Table 0.24 – Environmentální parametry – Vlčnov

Environmentální data	**Hodnota**	**Jednotka**
Snížení emisí CO_2	97	[tun CO2/rok]

RE4.2 – Slavičín

Figure 0.11 – Pilotní oblast Slavičín

Slavičín, město s 6 513 obyvateli, vyniká svým progresivním přístupem k energetice a udržitelnosti. Město provozuje dobře rozvinutý systém komunitních energetických opatření, který zásobuje významnou část domácností teplem z lokálních zdrojů. Výroba elektřiny z OZE je založena na FV systémech instalovaných na městských objektech, především na kotelně a administrativní budově společnosti BTH Slavičín[30] (stoprocentně vlastněné městem). Tyto FV systémy vyrábějí cca 140 MWh ročně a jsou podpořeny bateriovým úložištěm o kapacitě 129,75 kWh.

Rozvoj ES ve Slavičíně je v běhu a cílem je posílení integrace OZE a zapojení komunity. Zatím nebyly zahájeny žádné workshopy ani občanské iniciativy, prioritou je zvýšení energetické soběstačnosti a příprava na budoucí spolupráci. Dlouhodobým plánem je instalace bezlopatkové větrné elektrárny, která dále diverzifikuje zdroje a sníží dopady na životní prostředí.

Energetické snahy Slavičína již získaly národní uznání a odrážejí závazek města k inovacím a udržitelnosti. ES má za cíl maximalizovat potenciál výroby z OZE a využití bateriového úložiště, posílit energetickou nezávislost a podpořit energetickou transformaci.

V tabulkách 0.25, 0.26, 0.27 a 0.28 jsou uvedeny všechny parametry ze sociálního, energetického, ekonomického a environmentálního hlediska v rámci pilotního místa.

30 Webové stránky: https://www.bth-slavicin.cz/

Table 0.25 – Sociální parametry – Slavičín

Sociální data	Hodnota	Jednotka
Počet občansky vedených iniciativ	0	[#]
Počet občanů zapojených do ES	0	[#]
Počet aktérů se zvýšenými dovednostmi v oblasti komunitní energie	0	[#]
Počet nových pracovních míst	0	[FTE]
Počet účastníků workshopů	0	[#]
Diverzita zapojených aktérů	0	[%]

Table 0.26 – Energetické parametry – Slavičín

Energetické data	Hodnota	Jednotka
Primární energetická spotřeba	N.A	[GWh/rok]
Konečná energetická spotřeba	N.A	[GWh/rok]
Výroba z OZE	0.14	[GWh/rok]
Samospotřeba elektřiny z OZE	>50	[%]
Flexibilita – kapacita úložišť	129.75 kWh	[kW a kWh]

Table 0.27 – Ekonomické parametry – Slavičín

Ekonomická data	Hodnota	Jednotka
Investice do udržitelné energie	0.335	[M€]
Rozvoj investičních projektů v oblasti energetiky na úrovni místních komunit	0.335	[M€]
Veřejné investice	335,000	[€]
Soukromé investice	0	[€]

Průměrná cena elektřiny	0.28	[€/kWh]

Table 0.28 – Environmentální parametry – Slavičín

Environmentální data	**Hodnota**	**Jednotka**
Snížení emisí CO_2	61	[tun CO2/rok]

RE4.3 – Zlín City

Figure 0.12 – Pilotní oblast města Zlín

Zlín, krajské město s 74 835 obyvateli, je v počáteční fázi budování svého energetického společenství (ES). Město uzavřelo partnerskou dohodu s osmi městskými subjekty za účelem vytvoření komunitního společenství. Cílem je poskytovat členům výhodnější ceny elektřiny, postupně rozšiřovat zapojení a zvyšovat dopad na komunitu.

Zatím není v provozu žádná výroba z OZE ani uložiště, ale město klade základy pro budoucí rozvoj. Strategií je instalace FV systémů na školách a dalších obecních budovách. Projekt je podporován společností Teplo Zlín a sladěn s dlouhodobými cíli města v oblasti udržitelnosti a spolupráce.

V současnosti chybí relevantní data, protože ES ještě není v provozu a nelze definovat spolehlivý výchozí scénář. Je proto zásadní monitorovat výkonnost pilotních lokalit v dalších fázích projektu (WP6) a sledovat data o ES.

Závěry

Závěrem lze říci, že dokončení výstupu De6.2 představuje významný milník projektu ECOEMPOWER (tj. milník č. 11), neboť poskytuje komplexní vymezení výchozího stavu v jednotlivých pilotních lokalitách. Tento výchozí stav byl pečlivě zaznamenán prostřednictvím úvodního přehledu pro každý z pěti regionálních ekosystémů, spolu s vyhodnocením regionálních OSS (v současné konfiguraci, pokud již fungují, nebo v plánovaných parametrech, pokud jsou ve fázi přípravy), a také na základě kvantitativní a kvalitativní analýzy 15 energetických společenství, která jsou v provozu nebo ve vývoji.

Kromě toho byly vyhodnoceny KPI pro fungující energetická společenství, jak je uvedeno ve výstupu D6.1, pokud byla data k dispozici. Příloha A obsahuje úplný soubor informací o jednotlivých pilotních lokalitách pro sledované parametry a OSS. Tento dokument má zásadní význam, protože shrnuje současný stav všech regionálních ekosystémů, OSS a pilotních lokalit a slouží jako základ pro další postup projektu v této oblasti, který bude pečlivě sledován v úkolech T6.3 a T6.4.

Během monitorovací fáze pilotních lokalit v rámci úkolu T6.3 pracovního balíčku WP6, bude každých šest měsíců probíhat sběr dat a parametrů energetických společenství z hlediska sociálního a dále rozvoj OSS, aby byl vyhodnocen dopad projektu ECOEMPOWER při dosahování stanovených cílů. Energetická data pilotních lokalit pro sledování souvisejících KPI budou monitorována každoročně po celou dobu trvání projektu.

Znalosti získané prostřednictvím tohoto dokumentu tvoří základ pro kvalifikované rozhodování a strategické plánování v dalších fázích projektu ECOEMPOWER.

ECOEMPOWER

ECOsystems EMPOWERing at regional and local scale supporting energy communities

Φεβρουάριος 2024

D6.2 ΓΡΑΜΜΗ ΒΑΣΗΣ ΣΤΟΥΣ ΠΙΛΟΤΟΥΣ ΤΟΥ ECOEMPOWER

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EXECUTIVE SUMMARY

Το παραδοτέο αυτό καθορίζει και περιγράφει τη γραμμή βάσης των πιλότων του έργου ECOEMPOWER. Το έγγραφο παρουσιάζει τη μεθοδολογία που ακολουθήθηκε για τον καθορισμό της γραμμής βάσης, καθώς και τη διαδικασία για τη συλλογή πληροφοριών και τη συνεισφορά από τα διάφορα περιφερειακά οικοσυστήματα.

Το παραδοτέο συγκεντρώνει όλες τις πληροφορίες και τα δεδομένα που είναι χρήσιμα για τον καθορισμό της βάσης όλων των πιλότων του έργου, προκειμένου να υπάρχει σημείο αναφοράς για την παρακολούθησή τους κατά τη διάρκεια του έργου, με σκοπό την επίτευξη των στόχων που έχουν τεθεί.

Όσον αφορά τη μεθοδολογία για τον καθορισμό της γραμμής βάσης, δημιουργήθηκε ένα πρότυπο για τη συλλογή τόσο περιγραφικών όσο και αριθμητικών πληροφοριών και στοιχείων. Το πρότυπο αυτό κοινοποιήθηκε σε όλα τα περιφερειακά οικοσυστήματα του έργου, όπου ζητήθηκαν πληροφορίες που αφορούν τις ενεργειακές κοινότητες, υφιστάμενες ή προγραμματισμένες, καθώς και στοιχεία σχετικά με τα καταστήματα μιας στάσης, υπάρχοντα ή προγραμματισμένα. Ιδιαίτερη έμφαση δίνεται ως προς τα ποσοτικά και ποιοτικά κριτήρια που έχουν καθοριστεί στα πλαίσια του παραδοτέου D6.1, καθώς είναι κρίσιμα για την ακριβή αξιολόγηση της παρούσας κατάστασης.

Αυτό το παραδοτέο λειτουργεί ως περιγραφική βάση για όλους τους πιλότους που συμμετέχουν στο έργο ECOEMPOWER, τόσο ποιοτικά όσο και ποσοτικά. Αυτή η αξιολόγηση της αρχικής κατάστασης θα συγκριθεί στη συνέχεια με τη μέλλουσα συνθήκη ύστερα από την εφαρμογή των λύσεων του έργου, ώστε να επαληθευτεί η επιτυχία του στην επίτευξη των στόχων των διαφόρων πιλότων.

Περιφερειακό Οικοσύστημα #5 (RE5): Στερεά Ελλάδα (ΕΛΛΑΔΑ)

Περιγραφή του Περιφερειακού Οικοσυστήματος

Η Περιφέρεια Στερεάς Ελλάδας (περίπου 500.000 κάτοικοι), με τον συνδυασμό παράκτιων περιοχών και ορεινών τοπίων, αποτελεί παράδειγμα σύγκλισης πλούσιας πολιτιστικής κληρονομιάς και αυξανόμενης έμφασης σε πρωτοβουλίες ανανεώσιμων πηγών ενέργειας. Στο επίκεντρο αυτής της μετασχηματιστικής πορείας βρίσκεται το έργο ECOEMPOWER, που λειτουργεί ως φάρος βιώσιμων πρακτικών στον ηλεκτρικό τομέα της περιοχής.

Το έργο αναπτύσσεται σε τρεις βασικούς πιλοτικούς χώρους – Δομοκός, Καμένα Βούρλα και Αμφίκλεια – καθένας από τους οποίους προσφέρει μια ιδιαίτερη εικόνα γεωγραφικών χαρακτηριστικών και κοινωνικοοικονομικής δυναμικής. Η περιοχή φιλοξενεί δίκτυα χαμηλής (LV) και μέσης τάσης (MV), απαραίτητα για την αποδοτική διανομή ενέργειας που παράγεται από τις υπό σύσταση ενεργειακές κοινότητες.

Σημαντικό στοιχείο αποτελεί η δυναμική εισαγωγών/εξαγωγών ενέργειας, με τη μετάβαση από την εξάρτηση από τα εθνικά δίκτυα προς την εξαγωγή πλεονάζουσας ενέργειας, κυρίως από φωτοβολταϊκά, συμβάλλοντας έτσι στο εθνικό δίκτυο. Για την αντιμετώπιση της διαλείπουσας φύσης των ΑΠΕ, οι λύσεις αποθήκευσης ενέργειας, όπως συστήματα μπαταριών, κρίνονται αναγκαίες για τη διασφάλιση σταθερού και αξιόπιστου εφοδιασμού.

Το ενεργειακό μίγμα παραγωγής είναι διαφοροποιημένο και αντανακλά τις ιδιαιτερότητες κάθε πιλοτικού χώρου: ο Δομοκός και τα Καμένα Βούρλα βασίζονται στα φωτοβολταϊκά, ενώ η Αμφίκλεια επικεντρώνεται στη λειτουργία μονάδας βιοαερίου. Παράλληλα, τα καταναλωτικά πρότυπα εξελίσσονται, με σημαντική στροφή προς την ενσωμάτωση αντλιών θερμότητας για θέρμανση/ψύξη και την ανάπτυξη υποδομών ηλεκτροκίνησης.

Στο πλαίσιο καινοτόμων πρακτικών, διαφαίνεται η δυνατότητα ενσωμάτωσης τεχνολογιών Power-to-Gas (P2G), ειδικά στην Αμφίκλεια, όπου τα αγροτικά απόβλητα μπορούν να μετατραπούν σε πολύτιμο ενεργειακό πόρο.

Πέρα από τις τεχνικές διαστάσεις, ο Νόμος 4513/2018 παρέχει το νομικό πλαίσιο για την ίδρυση και λειτουργία Ενεργειακών Κοινοτήτων (ΕΚ), λειτουργώντας ως καταλύτης για κοινοτικές ενεργειακές πρωτοβουλίες. Επιπλέον, χρηματοδοτικά κίνητρα και μέτρα στήριξης, συμπεριλαμβανομένων διατάξεων του Αναπτυξιακού Νόμου, δημιουργούν ευνοϊκό περιβάλλον για την ανάπτυξη των ΕΚ[31].

Η Στερεά Ελλάδα φιλοξενεί ήδη 114 ενεργειακές κοινότητες με τη συμμετοχή άνω των 2.000 μελών. Παρά τη στήριξη οργανισμών όπως ο ΔΕΔΔΗΕ, η ΡΑΕ και το ΚΑΠΕ, το έργο ECOEMPOWER στοχεύει στη δημιουργία περιφερειακού γραφείου που θα απλοποιήσει τις διαδικασίες και θα ενισχύσει τις νέες ΕΚ. Αυτό περιλαμβάνει την ανάπτυξη ενός OSS (One-Stop-Shop), φυσικού και ψηφιακού, ως κέντρου πληροφόρησης για κανονιστικά θέματα, δεδομένα χωρητικότητας δικτύου, κίνητρα και τεχνική καθοδήγηση.

Συνολικά, η Στερεά Ελλάδα, μέσω του ECOEMPOWER, βρίσκεται στη μέση μιας επαναστατικής μετάβασης, αποτελώντας πρότυπο βιώσιμων ενεργειακών πρακτικών που συνδυάζουν τεχνική καινοτομία και κοινοτική συμμετοχή.

31 Κονδύλια για REC, CEC ή Ενεργειακές Κοινότητες σύμφωνα με τον νόμο αριθ. 4513/2018 στην Ελλάδα: https://thegreentank.gr/en/community-energy-watch-en/funds/

Αξιολόγηση του OSS

Σύμφωνα με τις πληροφορίες που έχουν κοινοποιηθεί, δεν υπάρχει καμία φυσική ή OSS αφιερωμένη στις ενεργειακές κοινότητες στην Περιφέρεια Κεντρικής Ελλάδας. Η περιφέρεια φαίνεται να βρίσκεται στα αρχικά στάδια ανάπτυξης μιας OSS, ξεκινώντας από την υποστήριξη των πιλοτικών έργων στο Δόμοκο, την Καμένη Βούρλα και την Αμφικλεία.

Αυτό συνεπάγεται την ανάγκη ανάπτυξης τόσο της φυσικής όσο και της ψηφιακής υποδομής που απαιτείται για ένα OSS που θα μπορεί να υποστηρίξει τις αναδυόμενες ενεργειακές κοινότητες, ενδυναμώνοντας τους πολίτες και τους ενδιαφερόμενους φορείς ώστε να λαμβάνουν τεκμηριωμένες αποφάσεις σχετικά με τη συμμετοχή τους.

Δεδομένου αυτού του σεναρίου, τα επόμενα βήματα για την Περιφέρεια Κεντρικής Ελλάδας θα περιλαμβάνουν πιθανώς τη μετάβαση από αυτό το προκαταρκτικό στάδιο, που χαρακτηρίζεται από μελέτες και αρχικό σχεδιασμό, προς την πραγματική δημιουργία ενός OSS. Ιδανικά, αυτό το OSS θα λειτουργεί τόσο ως φυσικό κέντρο για προσωπικές συμβουλές και υποστήριξη, όσο και ως εικονική πλατφόρμα που προσφέρει προσβάσιμες πληροφορίες και πόρους στο διαδίκτυο. Αυτή η διττή προσέγγιση θα εξασφαλίσει ολοκληρωμένη υποστήριξη για τους διάφορους ενδιαφερόμενους φορείς που συμμετέχουν στα έργα της ενεργειακής κοινότητας.

Οι καθιερωμένες διαδικασίες που ισχύουν στην Ελλάδα, η συνεργασία των εμπλεκόμενων μερών και η εξέταση όλων των νομικών εγγράφων θα είναι καθοριστικής σημασίας για τη διαδικασία σχεδιασμού μιας ΕΚ και θα υποστηριχθούν από το νέο OSS.

Το προβλεπόμενο OSS, με χαρακτηριστικά όπως μια ολοκληρωμένη βάση δεδομένων πόρων, υποστήριξη για τη δημιουργία θέσεων εργασίας, συνεργατική δικτύωση, εργαλεία επικοινωνίας, πόροι ανάπτυξης δεξιοτήτων, νομική καθοδήγηση, εργαλεία παρακολούθησης, μια ψηφιακή αγορά και χαρακτηριστικά συμμετοχής της κοινότητας, στοχεύει στην ενδυνάμωση των τοπικών επιχειρήσεων, στη διευκόλυνση της δημιουργίας θέσεων εργασίας και στη συμβολή στη συνολική ανάπτυξη των κοινοτήτων της περιοχής.

Συλλογή δεδομένων ΕΚ και ποιοτική αξιολόγηση

Στην περιοχή-στόχο, η οποία περιλαμβάνει το περιφερειακό οικοσύστημα της Κεντρικής Ελλάδας, δημιουργούνται επί του παρόντος τρεις ΟΚ. Το νομικό καθεστώς κάθε ΟΚ είναι σε εκκρεμότητα, χωρίς να έχει ξεκινήσει καμία επιχειρησιακή δραστηριότητα σε αυτό το στάδιο.

Οι πρωταρχικοί στόχοι των πιλοτικών τοποθεσιών Δομοκός, Καμένη Βούρλα και Αμφικλέια περιλαμβάνουν τη μείωση του ενεργειακού κόστους για τα μέλη και τη μείωση του συνολικού αποτυπώματος CO2.

Η έναρξη λειτουργίας αυτών των ΕΚ προωθήθηκε από πολίτες από όλες τις περιφέρειες που επιδιώκουν τη μείωση του κόστους κατανάλωσης ενέργειας. Υποστήριξη και καθοδήγηση παρείχαν η Περιφέρεια Κεντρικής Ελλάδας και το Υπουργείο Ενέργειας.

Η νομική βάση για αυτές τις Ενεργειακές Κοινότητες παρέχεται από την ελληνική νομοθεσία, ιδίως από τον νόμο αριθ. 4513/2018 και τον νόμο αριθ. 5037/2023 για τη μεταφορά των ευρωπαϊκών οδηγιών 2018/2001 και 2019/944. Οι νόμοι αυτοί περιγράφουν τις αρχές συνεργασίας που διέπουν τις ΕΚ, δίνοντας έμφαση σε αξίες όπως η αλληλεγγύη, η δικαιοσύνη, η ισότητα, η δημοκρατία, η αυτάρκεια και η αυτοευθύνη. Η χρηματοοικονομική διαχείριση και η κατανομή των πλεονασμάτων ρυθμίζονται ανάλογα με τον τύπο της ενεργειακής κοινότητας. Σε όλους τους τύπους ενεργειακών κοινοτήτων, τουλάχιστον το 10 % του ετήσιου πλεονάσματος πρέπει να διατηρείται για τη δημιουργία τακτικού αποθεματικού.

Τουλάχιστον το εβδομήντα τοις εκατό (70 %) του πλεονάσματος για κάθε οικονομικό έτος διατηρείται από τις REC ως ειδικό αποθεματικό και κατανέμεται, με απόφαση της γενικής συνέλευσης, σύμφωνα με τις δραστηριότητες και όπως προβλέπεται στο καταστατικό. Οι REC μπορούν να διανέμουν τα οικονομικά πλεονάσματα στα μέλη, μείον τυχόν προηγούμενα αποθεματικά, όταν αυτό προβλέπεται στο καταστατικό.

Η ενότητα αυτή ορίζει όλα τα δεδομένα για τη σύνθεση και την αξιολόγηση της βάσης αναφοράς στις διάφορες πιλοτικές περιοχές, τόσο από αριθμητική άποψη για τη σύγκριση των τιμών με τα επόμενα στάδια του έργου για τον προσδιορισμό της προστιθέμενης αξίας, όσο και από πιο ποιοτική άποψη για την αξιολόγηση της ωριμότητας μιας ενεργειακής κοινότητας. Οι επιμέρους πιλοτικές περιοχές στην αντίστοιχη περιφέρεια θα παρουσιαστούν παρακάτω.

RE5.1 – Δομοκός

Figure 0.13 – Περιοχή του πιλοτικού έργου στο Δομόκο

Ο Δομόκος είναι μια πόλη και δήμος στην Κεντρική Ελλάδα, που περιλαμβάνει 34 χωριά με συνολικό πληθυσμό περίπου 5,000 κατοίκους. Προβλέπεται η δημιουργία μιας ενεργειακής κοινότητας με φωτοβολταϊκά συστήματα ισχύος 1.5 MW (ετήσια παραγωγή 1.5 GWh/έτος) για την εικονική κατανομή της ενέργειας μεταξύ δημόσιων κτιρίων, σχολείων, αντλιών νερού, φωτισμού πόλεων και σταθμών φόρτισης ηλεκτρικών οχημάτων. Επιπλέον, η κοινότητα μπορεί να επιλέξει να δωρίσει ενέργεια σε ευάλωτους πολίτες που ζουν σε συνθήκες φτώχειας.

Η Ενεργειακή Κοινότητα (ΕΚ) του Δομοκού θα συσταθεί νομικά και βρίσκεται ακόμη στο στάδιο του σχεδιασμού. Αν και δεν είναι ακόμη λειτουργική, στοχεύει στην ενίσχυση των περιβαλλοντικών και οικονομικών στόχων μέσω της κοινής χρήσης της ενέργειας που παράγεται μεταξύ των σημείων δημόσιας υποδομής. Οι στόχοι περιλαμβάνουν τη μείωση του ενεργειακού κόστους των μελών και την ελαχιστοποίηση του αποτυπώματος CO2 (η μείωση των εκπομπών αερίων του θερμοκηπίου θα μπορούσε να είναι περίπου 720 tonCO2eq/έτος) μέσω της εικονικής μέτρησης και της ενσωμάτωσης αντλιών θερμότητας.

Σε αυτή την περίπτωση, υπάρχει έλλειψη δεδομένων στον υπό εξέταση πιλοτικό χώρο, καθώς δεν υπάρχει ούτε λειτουργική ενεργειακή κοινότητα ούτε εφαρμόσιμα σενάρια αναφοράς με καλή αξιοπιστία. Γι' αυτό είναι σημαντικό να παρακολουθείται η απόδοση αυτών των πιλοτικών τοποθεσιών στα επόμενα στάδια του WP6 για τη δημιουργία και την παρακολούθηση των δεδομένων της ενεργειακής κοινότητας.

RE5.2 - Καμένη Βούρλα

Figure 0.14 – Περιοχή του πιλοτικού τόπου στην Καμένη Βούρλα

Η Καμένη Βούρλα, που βρίσκεται στην Περιφέρεια Κεντρικής Ελλάδας, είναι μια πόλη και δήμος της Φθιώτιδας. Βρίσκεται στη νότια ακτή του Μαλιακού Κόλπου, 4 χλμ. δυτικά του Ακρωτηρίου Κνίμη, που χωρίζει τον Μαλιακό Κόλπο από τον Βόρειο Ευβοϊκό Κόλπο. Ο δήμος καλύπτει συνολική έκταση 200 km2 και περιλαμβάνει τρεις μικρές πόλεις και 20 χωριά. Με πληθυσμό 2.800 κατοίκους στην πόλη και συνολικό πληθυσμό περίπου 4.800 κατοίκους στον δήμο, η Καμένη Βούρλα είναι μια κοινότητα που βρίσκεται σε παραθαλάσσια τοποθεσία.

Σε μια πρωτοποριακή πρωτοβουλία, η Καμένη Βούρλα σχεδιάζει να δημιουργήσει ένα ΕΚ που θα επικεντρώνεται στις ανανεώσιμες πηγές ενέργειας (ΑΠΕ). Το προτεινόμενο ΕΚ στοχεύει στην εγκατάσταση φωτοβολταϊκών συστημάτων (Φ/Β) ισχύος 0,5 MW (ετήσια παραγωγή 0,5 GWh/έτος) σε αστικές περιοχές. Η υποδομή αυτή έχει σχεδιαστεί στρατηγικά ώστε να διοχετεύει την παραγόμενη ενέργεια απευθείας στο τοπικό δίκτυο διανομής, προωθώντας τη βιωσιμότητα και μειώνοντας την εξάρτηση από τις παραδοσιακές πηγές ενέργειας.

Επιπλέον, οι ΑΠΕ που ανήκουν στην ΕΚ θα διαδραματίσουν καθοριστικό ρόλο στην αντιστάθμιση πολλαπλών λογαριασμών ενέργειας μέσω της εικονικής καθαρή μέτρησης. Αυτή η καινοτόμος προσέγγιση επιτρέπει την κατανομή της ενέργειας που παράγεται από τα ΦΣ μεταξύ των μελών της κοινότητας, συμβάλλοντας στη συλλογική μείωση του ενεργειακού κόστους. Η έμφαση στην εικονική μέτρηση δικτύου ευθυγραμμίζεται με τους ευρύτερους στόχους της ενεργειακής κοινότητας, οι οποίοι περιλαμβάνουν όχι μόνο οικονομικά οφέλη, αλλά και τη δέσμευση για μείωση του αποτυπώματος άνθρακα (η μείωση των εκπομπών αερίων του θερμοκηπίου θα μπορούσε να είναι περίπου 240 τόνοι CO2eq/έτος).

Καθώς η Καμένη Βούρλα προχωρά προς τη δημιουργία αυτής της ενεργειακής κοινότητας, αντανακλά μια προληπτική στάση στην αξιοποίηση της καθαρής ενέργειας, την προώθηση της περιβαλλοντικής βιωσιμότητας και την ενίσχυση της ανθεκτικότητας της τοπικής ενεργειακής υποδομής. Η ενσωμάτωση ανανεώσιμων πηγών

ενέργειας και εικονικής μέτρησης δικτύου υπογραμμίζει την αφοσίωση της κοινότητας τόσο στους οικονομικούς όσο και στους οικολογικούς στόχους.

Σε αυτή την περίπτωση, υπάρχει έλλειψη δεδομένων στον υπό εξέταση πιλοτικό χώρο, καθώς δεν υπάρχει ούτε λειτουργική ενεργειακή κοινότητα ούτε εφαρμόσιμα σενάρια αναφοράς με καλή αξιοπιστία. Για αυτόν τον λόγο, είναι σημαντικό να παρακολουθείται η απόδοση αυτών των πιλοτικών χώρων στα επόμενα στάδια του WP6 για τη δημιουργία και την παρακολούθηση των δεδομένων της ενεργειακής κοινότητας.

RE5.3 - Αμφικλεία

Figure 0.15 – Περιοχή του πιλοτικού τόπου Αμφικλεία

Η Αμφικλεία είναι μια πόλη και δήμος που βρίσκεται στους βόρειους πρόποδες του Παρνασσού, στην περιοχή της Φθιώτιδας στην Κεντρική Ελλάδα. Καλύπτοντας μια τεράστια έκταση 500 km2, ο δήμος περιλαμβάνει την πόλη και 15 γύρω χωριά, με συνολικό πληθυσμό περίπου 11.000 κατοίκους.

Η ίδια η πόλη έχει περίπου 4.000 κατοίκους και αποτελεί το επίκεντρο αυτής της φιλόδοξης πρωτοβουλίας για την ενεργειακή κοινότητα (ΕΚ). Η ΕΚ, η οποία δεν έχει ακόμη συσταθεί νομικά, έχει ως στόχο την ενσωμάτωση διαφόρων στοιχείων για την ενίσχυση της βιωσιμότητας και την προώθηση της τοπικής ανάπτυξης.

Ένα βασικό στοιχείο της προτεινόμενης ΕΚ είναι η δημιουργία μονάδας βιοαερίου 500 kW για την παραγωγή ηλεκτρικής ενέργειας και θερμότητας, τη διαχείριση αποβλήτων και την παραγωγή λιπασμάτων. Η μονάδα αυτή θα έχει διπλό ρόλο, καθώς θα παράγει τόσο ηλεκτρική ενέργεια όσο και θερμότητα. Η παραγόμενη ηλεκτρική ενέργεια μπορεί να διοχετευθεί πίσω στο δίκτυο, συμβάλλοντας στη συνολική παροχή ενέργειας, ή να χρησιμοποιηθεί για τοπική κατανάλωση. Επιπλέον, η παραγόμενη θερμότητα θα διαδραματίσει κρίσιμο ρόλο στη στήριξη των γεωργικών δραστηριοτήτων της κοινότητας. Η διαχείριση των αποβλήτων αποτελεί προτεραιότητα στο πλαίσιο της ΕΚ. Η εφαρμογή αποτελεσματικών πρακτικών διαχείρισης αποβλήτων δεν θα αντιμετωπίσει μόνο τα περιβαλλοντικά προβλήματα, αλλά θα συμβάλει και στη συνολική αποδοτικότητα της κοινότητας. Επιπλέον, τα απόβλητα που παράγονται κατά τη διαδικασία θα αξιοποιηθούν για την παραγωγή λιπασμάτων, προωθώντας ένα σύστημα κλειστού κύκλου που ωφελεί την τοπική γεωργία.

Μέλη της ενεργειακής κοινότητας θα είναι αγρότες, κτηνοτρόφοι και ο ίδιος ο Δήμος Αμφικλειάς. Αυτή η ποικιλόμορφη ομάδα ενδιαφερομένων αντανακλά μια συλλογική προσπάθεια για τη διασφάλιση της επιτυχίας και της βιωσιμότητας της ενεργειακής κοινότητας. Ιδιαίτερα αξιοσημείωτη είναι η συμμετοχή των τοπικών αγροτών και κτηνοτρόφων, καθώς θα επωφεληθούν από την ηλεκτρική ενέργεια που παράγεται μέσω ενός

συστήματος εικονικής μέτρησης, είτε με την πώληση της πλεονάζουσας ενέργειας στο δίκτυο είτε με την αντιστάθμιση των δικών τους λογαριασμών ηλεκτρικού ρεύματος.

Η συμβιωτική σχέση επεκτείνεται στη χρήση της θερμότητας και των λιπασμάτων που παράγονται από τη μονάδα βιοαερίου. Αυτοί οι πολύτιμοι πόροι θα βρουν εφαρμογή στα θερμοκήπια της κοινότητας, ενισχύοντας την αγροτική παραγωγικότητα και δημιουργώντας μια πιο αυτάρκη και ανθεκτική τοπική οικονομία.

Συνοψίζοντας, η ενεργειακή κοινότητα που οραματίζεται η Αμφικλεία παρουσιάζει μια ολοκληρωμένη και ολοκληρωμένη προσέγγιση για τη βιώσιμη ανάπτυξη. Μέσω της δημιουργίας μιας μονάδας βιοαερίου, πρωτοβουλιών διαχείρισης αποβλήτων και συνεργασίας μεταξύ διαφόρων ενδιαφερόμενων μερών, η κοινότητα στοχεύει να επιτύχει ενεργειακή αυτάρκεια, να υποστηρίξει την τοπική γεωργία και να συμβάλει σε ένα πιο περιβαλλοντικά συνειδητό μέλλον.

Στην περίπτωση αυτή, υπάρχει έλλειψη δεδομένων στον υπό εξέταση πιλοτικό χώρο, καθώς δεν υπάρχει ούτε λειτουργική ενεργειακή κοινότητα ούτε εφαρμόσιμα σενάρια αναφοράς με καλή αξιοπιστία. Για τον λόγο αυτό, είναι σημαντικό να παρακολουθείται η απόδοση αυτών των πιλοτικών χώρων στα επόμενα στάδια του WP6 για τη δημιουργία και την παρακολούθηση των δεδομένων της ενεργειακής κοινότητας.

Συμπεράσματα

Συμπερασματικά, η ολοκλήρωση του Παραδοτέου 6.2 σηματοδοτεί ένα σημαντικό ορόσημο στο έργο ECOEMPOWER (δηλ. Ορόσημο αρ. 11), παρέχοντας έναν ολοκληρωμένο ορισμό της βάσης αναφοράς στις διάφορες πιλοτικές τοποθεσίες. Η βάση αναφοράς καθορίστηκε με μεγάλη ακρίβεια μέσω μιας εισαγωγικής επισκόπησης για καθένα από τα 5 περιφερειακά οικοσυστήματα, μαζί με την αξιολόγηση των περιφερειακών OSS (στην τρέχουσα διαμόρφωση, εάν είναι ήδη σε λειτουργία, ή στα προβλεπόμενα χαρακτηριστικά, εάν βρίσκονται στο στάδιο του σχεδιασμού) και μια ποσοτική και ποιοτική ανάλυση των 15 ενεργειακών κοινοτήτων που λειτουργούν ή βρίσκονται σε φάση ανάπτυξης. Επιπλέον, αξιολογήθηκαν οι KPI για τις ενεργειακές κοινότητες που λειτουργούν, όπως αναφέρεται στο Παραδοτέο D6.1, όπου τα δεδομένα ήταν προσβάσιμα. Το παράρτημα Α παρουσιάζει το πλήρες σύνολο των πληροφοριών για τους διάφορους πιλοτικούς χώρους όσον αφορά τις παραμέτρους και τα OSS. Το έγγραφο αυτό είναι εξαιρετικά σημαντικό, καθώς περιγράφει την τρέχουσα κατάσταση όλων των περιφερειακών οικοσυστημάτων, των OSS και των πιλοτικών χώρων, και αποτελεί τη βάση για την πρόοδο του έργου σε αυτό το θέμα, η οποία θα παρακολουθείται στενά στις εργασίες T6.3 και T6.4. Στην πραγματικότητα, κατά τη διάρκεια της περιόδου παρακολούθησης των πιλοτικών τοποθεσιών στο πλαίσιο της Εργασίας T6.3 του WP6, αυτό θα πραγματοποιηθεί μέσω της συλλογής δεδομένων και παραμέτρων των ενεργειακών κοινοτήτων από κοινωνική άποψη και της ανάπτυξης OSS, κάθε έξι μήνες, προκειμένου να αξιολογηθεί η αποτελεσματικότητα του έργου ECOEMPOWER στην επίτευξη των στόχων. Όσον αφορά τα ενεργειακά δεδομένα των πιλοτικών τοποθεσιών για την παρακολούθηση των σχετικών KPI, αυτά θα παρακολουθούνται ετησίως καθ' όλη τη διάρκεια του έργου. Η σε βάθος γνώση που αποκτήθηκε από το παρόν έγγραφο θέτει τα θεμέλια για την τεκμηριωμένη λήψη αποφάσεων και τον στρατηγικό σχεδιασμό στα μεταγενέστερα στάδια του έργου ECOEMPOWER.