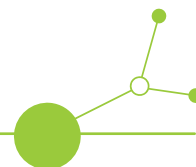


HERCULES-CE PROJECT

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HERCULES STRATEGY



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EXECUTIVE SUMMARY

Deliverable 1.3.1 is the HERCULES strategy on the establishment of renewable energy communities (RECs) in the Central European region.

The strategy has been built along the five following areas:

1. Design of business idea – a renewable energy community should primarily be considered as a business opportunity, although it is usually a non-profit initiative that aims to benefit the wider community. Within HERCULES we are proposing an innovative approach that increases the engagement of the users,
2. Identification of necessary resources and skills – when establishing a REC, the members should be able to determine what type of skills they are lacking. E.g. financial resources for the technology, technical/financial expertise, real estate, management capacity, technical skills for installing and operating the REC technology.
3. Calculation of costs and benefits – the establishment and operation of a REC cannot solely focus on investment and operational costs and sales of electricity, but the costs and benefits need to be taken to a higher level, e.g. what are the (indirect) costs and benefits to the community where the REC is located.
4. Actions to be undertaken to reduce environmental impact – as RECs are based on renewable production of electricity and heat, they bring environmental benefits in the form of CO₂ reduction. In case of heat generation, reduction of other pollutants is also expected, but it is necessary to determine the baseline (current situation) with the new situation.
5. Contribute to energy poverty reduction – as RECs are expected to reduce the price of electricity and heat consumption to their members (compared to purchase from incumbent energy suppliers), they are expected to lead to price reduction, including to those people that are struggling with paying their energy bills. This may relate to disadvantaged persons and families with low access to energy services, but also to public facilities such as schools with lack of energy equipment (proper heating and/or air conditioning). Although RECs may contribute to energy poverty reduction in general, the full picture is far more complex.

ABBREVIATIONS

Abbreviation	Definition
CEC	Citizen energy community
EC	Energy community
REC	Renewable energy community
LED	Light emitting diode
HVAC	Heating, ventilation and air conditioning systems
RES	Renewable energy sources
SME	Small and medium enterprises
SWOT	Strengths, weaknesses, opportunities, threats

1. INTRODUCTION AND OBJECTIVES

The HERCULES strategy elaborates the project's overall approach to local public and private stakeholders for their engagement in renewable energy communities (REC) and to monitor with data-base criteria the RECs contribution to energy transition, their business model, environmental impact and the contribution to energy poverty.

1.1. Structure

With this strategy and the support of an online tool, new or existing RECs will be supported in the following five areas:

1. Design of business idea – a renewable energy community should primarily be considered as a business opportunity. Although it is not a “standard” business model that strives towards maximization of profit, it still needs to “break-even” at the end of the day (costs for operating the REC should be optimally lower than its revenues). The difference with standard business models is that in HERCULES we are proposing an innovative approach that increases the engagement of the users,
2. Identification of necessary resources and skills – the members of the REC may have some necessary resources and skills in establishing a REC, but they should clarify from the beginning what they are lacking, e.g. financial resources for the technology, technical/financial expertise, real estate, management capacity, technical skills for installing and operating the REC technology.
3. Calculation of costs and benefits – the establishment and operation of a REC cannot solely focus on investment and operational costs and sales of electricity, but the costs and benefits need to be taken to a higher level, e.g. what are the (indirect) costs and benefits to the community where the REC is located
4. Actions to be undertaken to reduce environmental impact – as RECs are based on renewable production of electricity and heat, they bring environmental benefits in the form of CO₂ reduction
5. Contribute to energy poverty reduction – this is a relatively new topic. As RECs are expected to generate electricity (and heat) at lower costs to their members (compared to purchasing from incumbent energy suppliers), they are expected to lead to price reduction, including to those people that are struggling with paying their energy bills. This may relate to disadvantaged persons and families with low access

to energy services, but also to public facilities such as schools with lack of energy equipment (proper heating and/or air conditioning). Although RECs may contribute to energy poverty reduction in general, the full picture is far more complex.

This strategy ends with a general step-by-step approach in establishing a renewable energy community from the first steps like planning into operating RES plants.

2. DESIGN OF THE BUSINESS IDEA

The business idea will be proposed along an innovative approach with a sustainable business model. For that, the business model will be proposed with the GENO Canvas model.

2.1. Development of business model with the GENO Canvas Model

The GENO Canvas model proposes an **innovative approach** to increase the engagement of the users, to increase energy savings with a **sustainable business model**.

1. What is the goal? establishment of REC based on x kW of rooftop PV			2. Who should participate Co-owners of the project will be the local municipality and SMEs
7. How do you achieve the goal? the most important activities are the procurement of the technology, selection of technical assistance	8. What are the resources to achieve the goal? Financial resources for the technology, expertise, real estate, management capacity, technical skills	9. How is the service communicated? Sales and communication channels towards potential members	3. What is the target group? Customers will be the co-owners, but also local citizens willing to join the REC as member
6. What are the expected profits? Earnings for the co-owners, payments by the members			4. What other stakeholders are needed? stakeholders to be involved are RES technology suppliers, consultants, grid operators, incumbent energy suppliers
			5. What are the expected costs? Expenditures exist of investment costs for the technology, connection to the network, costs for RES project developers

When developing the business strategy, we recommend starting with the GENO Canvas model as shown above. This enables us to determine all key elements to take into account before considering establishing a REC.

To systematically cover all Canvas windows, it is recommended to start from the top left (with block 1), move right, down and up again. This enables us to answer all the nine questions from each of the nine building blocks.

1. What is the goal?

The first question to be answered is what should be the main goal of the REC? What energy resources does the REC want to invest in and what would be the approximate size. E.g. it could be rooftop PV, but also other forms of RES, or heating sources. Other questions that have to be answered are related to the size of the REC in terms of its members. And is there any broader goal of the REC? Is it about providing cheaper

electricity to its members, contributing to the energy transition or increases energy autonomy?

2. Who should participate?

Here details should be given about the type of members, but mainly the co-owners of the RES plants. It could be that the REC is aiming at having only a few members (e.g. a few neighbouring farms), but they may also have the aspiration to grow to a few hundreds of members. Then the question is who will be the members, are they single households, SMEs, farms, or also public organisations?

3. What is the target group?

Here we should distinguish between the operators / owners of the RES plants (identified under 2) and any additional consumers. These are e.g. households, public organisations, SMEs, but also energy companies they would like to sell their surplus energy to. But it can also be the case, especially in smaller RECs, that co-owners and consumers are the same entities. This is also the time to map the approximate electricity demand (profiles) of the potential customers.

4. What other stakeholders are needed?

Here we should identify other stakeholders that are of importance for the successful operation of the REC. Among them are grid operators that will have to connect the newly constructed capacity from the REC to the power network. In addition, this can be network regulators that are responsible for new grid regulations. Other stakeholders could be financial institutions where the REC would like to apply for a bank loan.

5. What are the expected costs?

The expected costs for the REC include capital costs for equipment (e.g. PV panels and associated hardware) and operational costs including maintenance costs. Depending on the power / heat source there could also be fuel costs, e.g. cost for wood pellets in case of a biomass boiler.

6. What are the expected profits?

The main revenues (and possible profits) are coming from the sale of surplus electricity and heat to the outside world. But a REC may also decide to invest in battery systems, being able to offer storage services to third parties.

7. How do you achieve the goal?

What are the most important activities to undertake before a REC can be established? Several activities need to be distinguished here. Important are permits for construction and operating a power production unit (which may be different for a small rooftop PV installation compared to a wind turbine) and access to the power distribution network.

8. What are the resources to achieve the goal?

Here a no. of resources needs to be distinguished. It's about ensuring financial resources for the investment (which can be own resources, grants or loans), ensuring the real estate for placing the RES plant, and then necessary skills (technical skills and management skills related to the construction and operation of the installation).

9. How is the service communicated?

This is mainly related to informing stakeholders and anyone who could be influenced by the REC. Here a communication strategy should be developed.

3. Identification of necessary resources and skills

The potential members of the REC may have some necessary resources and skills in establishing a REC, but they should clarify from the beginning what they are lacking. This could be anything from financial resources for the purchase of the technology, technical/financial expertise, availability of real estate, management capacity, technical skills for installing and operating the renewable energy technology.

3.1. Needs assessment of RECs

In order to set up a suitable strategy, it will be necessary to identify the main weaknesses in each of the countries. From the SWOT analysis carried out earlier in the project, it shows that these are the main weaknesses identified:

- **Regulatory and Legal Challenges:** this includes regulatory uncertainty, complex administrative procedures, and unclear legal frameworks, which hinder the development and operation of RECs.
- **Financial Barriers:** High upfront costs, financial burdens, and lack of sufficient financial support or incentives are significant obstacles for RECs.
- **Technical and Organizational Issues:** There is a lack of technical expertise, organizational complexity, and insufficient technical capacity, which pose challenges to the effective functioning of RECs.
- **Grid and Infrastructure Limitations:** Grid infrastructure challenges, restrictions on distribution networks, and insufficient grid capacity are common issues that affect the integration and efficiency of RECs.
- **Awareness and Engagement:** Low public awareness, limited community engagement, and lack of education about RECs contribute to the slow adoption and success of these communities.

These points encapsulate the primary weaknesses that RECs face across our 7 countries. The strategy defined in HERCULES cannot give an answer to all weaknesses, for the simple reason that some of them are out of scope of a strategy for RECs (such as change of administrative procedures), but it can help in taking them into account when developing the strategy:

- **Regulatory and Legal Challenges** – when setting up a REC, sufficient time should be allocated to rather the necessary permits. When needed, the parties involved in setting up a REC should consider legal advice.

- Financial barriers – there is a need to map the potential financial resources available in the country. RECs should not limit themselves to national sources. Support could also be available through different EU initiatives¹.
- Technical and Organizational Issues: This means attention should be paid to mapping all necessary skills and deciding on what skills the members should learn themselves and what activities need to be outsourced to external experts.
- Grid and Infrastructure Limitations: this cannot be addressed in the strategy. But the parties setting up the REC should be aware that in some regions this may be a severe barrier. When identifying the location of the generation capacity, grid limitations should be one of the key selection criteria.
- Awareness and Engagement: Low public awareness (locally) can be addressed by creating an information campaign that is an integral part of establishing the REC. This is one of the weaknesses that the members of the REC can address locally.

To conclude this chapter on necessary resources and skills, the members of the (to be formed) renewable energy community should compare the skills that they have internally with those required for setting up the REC.

Apart from the known resources like financed and real estate (land, available roofs on own property), a large set of skills will be necessary. Based on the steps identified in the Geno Canvas model, the following skills should be necessary:

- Energy auditor / energy expert being able to determine the dimensions of the renewable energy capacity (potentially available area, grid connection issues]
- Economic / financial expert – being able to carry out a feasibility study, economic / financial analysis and a business plan
- Legal expert – being able to identify legal and regulatory challenges and how to overcome them. In addition, the legal expert should be able to have an overview of all permits requested for starting up the REC.
- Engineering skills for designing renewable energy systems, including the selection of technology and equipment.
- Environmental expert, being able to assess the impact on the environment of the project. This is mostly needed when larger projects like wind turbines are concerned. Such projects usually require (in addition to construction and spatial permits) an environmental impact assessment.

¹ A short overview of available support will be addressed in chapter 7.

- A technical and/or procurement specialist for selecting the technology / construction company putting the generation technology in place. Usually, such services are requested in larger projects (e.g. MW size plants), but less in smaller ones.
- Communication expert/expertise – as it will be important to communicate on a regular basis with all potential stakeholders (both potential members of the REC as well as other stakeholders impacted by the project) communication skills will be needed from the moment that the RES projects / establishment of the REC is starting.

4. Calculation of costs and benefits

When calculating or estimating costs and benefits of operating a renewable energy community, it is important to start with the development of a cost model.

4.1. Cost model of the REC

The cost model for a renewable energy community can vary widely depending on several factors, including the type of renewable energy source (e.g., solar PV, wind power, small-hydro power, biomass), the scale of the project, location, technology used, and the specific goals of the community. However, there are some common elements that are typically included in the cost model for all communities.

1. Costs for project preparation

Every project starts with a planning phase. This means that there will be costs related to:

- planning, feasibility studies, project preparation and the application of the necessary permits,
- establishment of the community, legal services, member administration, member meetings, communication,

2. Initial Capital Costs, consisting of

- Equipment Costs: This includes the cost of renewable energy technologies such as solar PV panels, wind turbines, inverters, and batteries for storage. If we are talking about heat generation, investment costs include biomass boilers or heat pumps.
- Installation Costs: Labor and other costs associated with installing the equipment.
- Connection costs: there will be a need to connect the power sources to the distribution grid. Depending on the distance of the grid and local connection fees, they may differ significantly case by case
- Land or real estate acquisition: Costs for purchasing or leasing land, if necessary. In case of solar PV placed on roofs of third parties, there will be rent to be paid to the owners.
- Permitting and Fees: there are always costs associated with obtaining necessary permits and paying regulatory fees.

3. Operating and Maintenance Costs

- Regular maintenance of equipment to ensure optimal performance. The extent of the maintenance costs strongly depends on the technology (e.g. different for Solar PV, wind turbines, heat pumps, biomass boilers)
- Insurance costs and any necessary repairs during the lifetime of the technology.
- Costs for monitoring systems and software. E.g. in the case of solar PV or wind power, software may be needed for prediction of power output and how to optimise power generation for own consumption.
- Any other maintenance costs, such as:
 - o Processing of data on sharing, invoicing, monitoring of financial performance,
 - o Accounting and tax services,
 - o Offices, IT and telecommunication
 - o Overall coordination and day-to-day management of the community.
- In case we are talking of heat production, fuel costs need to be included among the operational costs. For biomass boilers there is the costs of wood pellets or wood chips and in case of heat pumps electricity needs to be purchased (if it cannot be generated locally from own generation plants)

4. Financing Costs:

In case the REC will need to request a bank loan for the investment, there will be certain financing costs, such as:

- Interest on loans or other financing mechanisms used to fund the project.
- Costs associated with securing financing, such as legal and consulting fees.

In case the REC is considering on using any national / regional funds for establishing RECs or for technology then they need to count with additional time for grant application and possibly with some external support (and costs) for preparing the application.

5. Other costs.

Then some other costs can be identified, not falling under the previous categories, mainly consisting of:

- Costs associated with Community Engagement and Education. These costs include education and outreach programs to ensure community buy-in and participation.

- Contingency Costs – the REC should keep a certain buffer for unexpected expenses or cost overruns.
- Decommissioning Costs – these are costs associated with decommissioning equipment at the end of its useful life. E.g. in cost calculations for solar PV, usually a small amount is reserved for recycling the PV panels at the end of their lifetime

4.2. Revenues of the REC

Among the expected benefits (revenue streams) we can distinguish the following

6. Revenue Streams:

The main revenues are coming from the sales of electricity back to the grid. In detail, we can distinguish the following

- Electricity Sales: Revenue from selling excess electricity back to the grid (based on a contract with an electricity supplier).
- Energy Savings: Indirect revenue are the savings on electricity bills for community members (based on the self-consumed electricity)
- Any additional network services, such as providing storage services to other producers (e.g. when operating a battery electric storage system (BESS))

7. Incentives and grants

- Many authorities offer grants (or tax rebates) for renewable energy projects, which can offset some of the costs. Sometimes there are also incentives for developing feasibility studies or business plans. Although these incentives are relatively minor, a well-developed feasibility study may save money in later stages of project preparation.

The revenue streams are also depending on the way the energy community calculates costs to individual members.

The cost model of an energy community involves calculating and allocating costs to individual members based on their energy consumption and participation in the community. This can be achieved through various methods, including fixed pricing, time-of-use pricing, and dynamic pricing. The goal is to ensure a fair and equitable distribution of costs while incentivizing energy efficiency and participation.

- **Fixed Pricing:**

Members pay a consistent rate per kWh consumed, regardless of time of day or grid conditions.

- **Time-of-Use Pricing:**

Prices fluctuate based on the time of day, encouraging consumption during off-peak hours when prices are lower.

- **Dynamic Pricing:**

Prices adjust in real-time based on factors like demand-to-supply ratios and grid conditions.

4.3. Summary

Each renewable energy community project is unique, so the cost model will need to be tailored to the specific circumstances and goals of the community. It's also important to conduct a thorough feasibility study and financial analysis to understand the potential costs and benefits. It is especially recommended to carry out a detailed financial analysis after it will be known at what conditions the REC can take a bank loan (e.g. at what interest rate) as this will influence the profitability of the project to a large extend.

5. Reducing environmental impact

Renewable energy projects implemented as part of RECs have the potential to reduce the environmental in three ways:

1. Reducing CO₂ emissions from electricity production
2. Reducing CO₂ and other emissions from heat production
3. Reducing energy use (and CO₂ emissions) from energy efficiency measures

5.1. Reducing CO₂ emissions from electricity production

Renewable energy projects are free of CO₂ emissions, they will therefore reduce CO₂ emissions when compared to fossil fuel-based electricity production. To determine and/or measure the potential reduction, the first step should be to create a baseline.

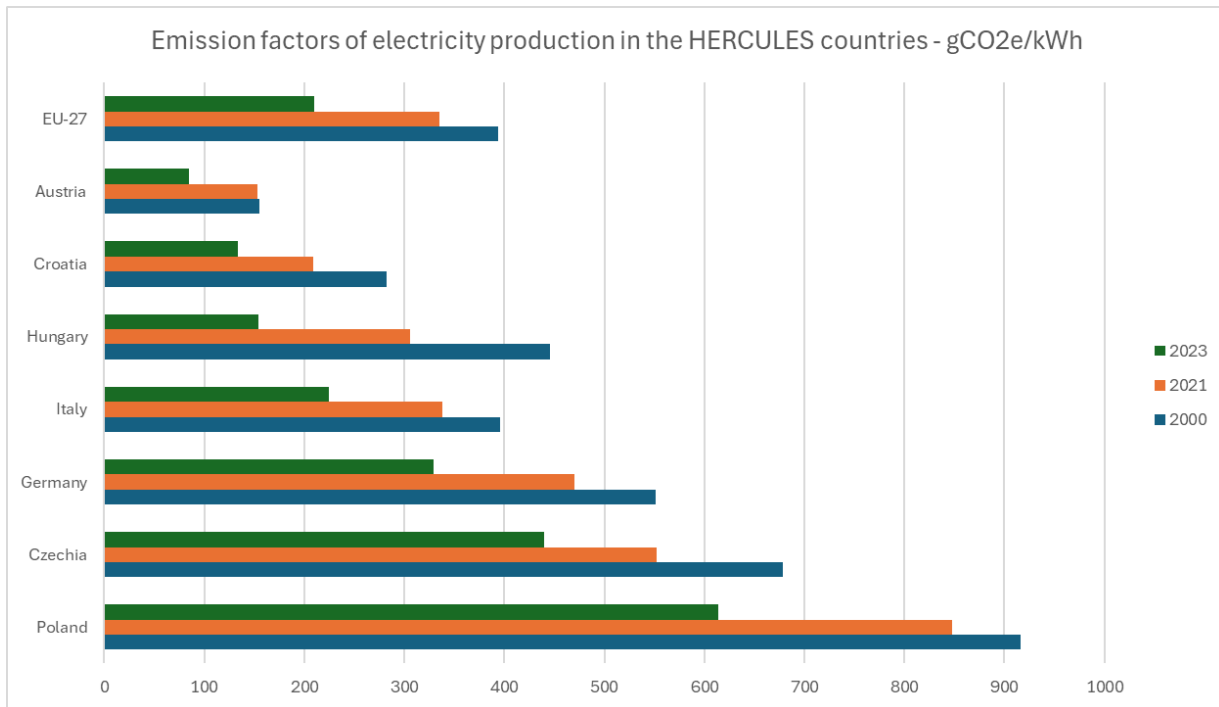
What are the current CO₂ emissions of the current electricity and heat production and what part do we want to replace:

- If we want to install x kW / MW of PV panels, we can calculate the expected electricity production
- Then determine how the electricity generation would be supplied in absence of the installed PV plants, and with what CO₂ emission factor.
- Depending on the electricity mix (e.g. the share of fossil fuels) each country has an emission factor for electricity generation, based on which you can calculate the CO₂ emissions (and emissions avoided). There are multiple sources for EU countries² that are updated every year based on how the electricity mix changes.

For example, data from the European Environmental Agency shows the following trends for the HERCULES countries. The figure shows that emission factors have been decreasing in all countries during the last decades. As of 2023, the emission factors of electricity among the HERCULES countries remain the highest in Poland, Czechia and Germany. In all three countries, the emission factors are higher than the EU average. The environmental impact in terms of CO₂ emission reduction in these countries will therefore be the highest. An interesting development is that the emission factors of electricity production has been steadily decreasing during the last decades, mainly due to efficiency gains and a general

² The JRC publishes these data each year <https://data.jrc.ec.europa.eu/dataset/919df040-0252-4e4e-ad82-c054896e1641>

transition towards cleaner and CO₂-free electricity production. This is certainly a positive trend, but the impact in terms of CO₂ emission reduction for each single REC project is now lower than it has been let say 20 years ago.



Source: <https://www.eea.europa.eu/en/analysis/indicators/greenhouse-gas-emission-intensity-of-1>

5.2. Reducing CO₂ and other emissions from heat production

A similar exercise can be done for heat generation, in case the REC considers including heat generation with biomass boilers or heat pumps.

In that case, the environmental impact can also be calculated based on available emission factors. In this case, it is suggested to look for national emission factors. Some English language sources are available from e.g. the German Umwelt Bundesamt³

Also here, the baseline is important:

- What is the current form of heat production. E.g. is heating based on natural gas, heating oil, coal? Different fossil fuels have different carbon contents and emission factors. For example, coal has a higher carbon content and thus a higher emission factor than natural gas.

³ <https://www.umweltbundesamt.de/publikationen/co2-emission-factors-for-fossil-fuels-0>

- What is the new form of heat production. Based on biomass (and what form of biomass), or heat pumps? Biomass is CO₂ neutral, heat pumps consume some electricity, so the CO₂ emissions depend again on the national emission factor.
- Emissions before and after need to be compared to calculate the total impact

Apart from CO₂ emissions, there are more emissions that need to be taken into account when replacing a fossil fuel-based heat boiler by a biomass boiler or heat pump, which is the most common replacement of natural gas or coal boiler.

Emissions from modern biomass boilers, gas boilers, coal boilers vary significantly due to differences in fuel properties and combustion technologies. And heat pumps, that need electricity for them to function are different cases.

Overall, modern biomass boilers offer a more environmentally friendly alternative to coal boilers and can be comparable to gas boilers in terms of certain emissions, especially when advanced technologies and proper maintenance are employed.

Below is a table comparing the emissions from natural gas boilers, hard coal boilers, biomass pellet boilers, and heat pumps. Apart from comparing emissions of CO₂, it also compares other typical emissions from heat generation, like particulate matter, nitrogen oxides, sulphur dioxide, carbon monoxide and volatile organic compounds.

Emission type	Natural gas boiler	Hard coal boiler	Biomass (pellet) boiler	Heat pump
Carbon dioxide (CO ₂)	Moderate	High	Considered carbon neutral	Low to none (depending on electricity source)
Particulate matter (PM)	Low	High	Low to moderate	None
Nitrogen Oxides (NO _x)	Low to moderate	High	Low to moderate	None (indirectly depending on electricity source)
Sulphur Dioxide (SO ₂)	Very low	High	Low	None (indirectly depending on electricity source)
Carbon Monoxide (CO)	Low	Moderate to high	Low (if properly maintained)	None
Volatile Organic Compounds (VOCs)	Low	Moderate to high	Low (if properly maintained)	None

This table provides a general comparison of emissions from these heating technologies. The actual emissions can vary based on specific technologies, maintenance, and operational conditions.

Overall, heat pumps tend to have lower emissions across most categories, particularly when powered by renewable energy. However, the environmental impact of heat pumps can vary based on the source of electricity. Biomass boilers, while considered carbon-neutral, still cause emissions of some pollutants that need to be managed through advanced technologies and proper maintenance.

5.3. Reducing CO₂ emissions from energy efficiency measures

Although it's not the first activity that comes to mind when talking about renewable energy communities, some RECs over time aim to reduce their internal energy use as well. Reasons are twofold, first there is usually an internal motivation to efficiently use an electricity (or heat) source when being responsible for its operation. Secondly, especially in case of renewable electricity production, there is more electricity available for sale to third parties, creating more revenue, when reducing own consumption.

There are examples of mainly larger energy communities that have created a fund with the revenues for electricity sales that is then reinvested into energy efficiency measures.

Typical energy efficiency measures in (residential / public / commercial) buildings can be split into 1) electricity saving measures and 2) saving measures related to space and water heating. In the field of electricity savings, the most common measures are:

- **Energy efficient lighting** in the form of LED lighting. LED bulbs consume less electricity and last longer than both traditional incandescent bulbs and the newer incandescent bulbs.
- **Energy-Efficient Appliances**, replacement of older appliances by new ones having a better energy efficiency class than

In the field of energy savings from heat consumption, we are talking about measures like:

- **Sealing Leaks**: usually the measures with the lowest costs that are taken first. Using weather stripping and caulking to seal leaks around doors, windows, and other openings can prevent drafts and heat loss.

- **Insulation:** Proper insulation of walls, attics, and floors can significantly reduce heating and cooling costs.
- **Energy-Efficient Windows:** Double or triple-glazed windows with low-emissivity (low-E) coatings can reduce heat transfer.
- Indirectly **water savings** can also lead to savings in warming of domestic hot water. When using a water saving shower head, less energy is needed for heating of water when showering.

Depending on the climate conditions, where the REC is located, different measures are usually considered. In colder climates, there will be more focus on insulation, double or triple glazing, while in warmer climates, the focus could be on more efficient air conditioning systems and solar heating systems for warming domestic hot water.

In order to get a complete overview of the possibilities for electricity and heat savings, gaining independent energy advice could be a first step before starting investing in concrete measures.

When investing in energy efficiency in public buildings, similar measures as in households could be possible. The difference usually is that public buildings like schools have more complex systems for heating, ventilation and air conditioning and specific measures like occupancy sensors (e.g. switching of the lights when a room is not occupied) make more sense in larger buildings. Such sensors control lighting and HVAC systems based on occupancy can reduce energy waste in unoccupied areas.

Gaining independent advice in the form of an energy audit will be even more useful in such cases because of the more complex energy systems in public buildings.

6. Contribute to energy poverty reduction

One of the objectives of the HERCULES project is to address the possible contribution of RECs to energy poverty reduction and this strategy should address some options in that direction. This should be aimed at disadvantaged persons and families with low access to energy services and public buildings such as schools with lack of energy equipment. RECs may contribute to the reduction of utility bills for their members, either due to lower generation costs of electricity from own sources or as a result of energy efficiency measures.

During the transnational peer-to-peer activity organised in January 2025 in Warsaw, the energy poverty issue was briefly addressed. At the event, Barbara Alexander from the Austrian Energy Agency addressed the critical issue of energy poverty in Europe. She discussed how energy communities can play a transformative role in alleviating this problem and presented Austria's "klimaaktiv" program, along with its various initiatives.

The following could be concluded:

- Figures show that power generation by RECs can in some cases lead to lower electricity costs for the final consumer. This can partly be caused by lower generation costs, but also by lower or even zero tax rates when selling electricity between REC members.
- Energy poverty is also about heat generation (and not being able to heat your home to a comfortable temperature), which requires other solutions.
- Energy poverty solutions need to include supportive measures like free energy efficiency advice, which could be an additional role for RECs.

6.1. What is energy poverty?

In a recent publication, the Joint Research Centre (JRC) summarized results from multiple research projects, addressing the potential role of energy communities in reducing energy poverty⁴. This report discusses the pivotal role of energy communities in addressing energy poverty, shedding light on their transformative potential in creating pathways towards equitable energy access.

⁴ JRC report: Energy Communities and Energy Poverty - <https://publications.jrc.ec.europa.eu/repository/handle/JRC134832>

The term “energy poverty”, defined as *the inability of households to access essential energy services*, has far-reaching implications for human wellbeing, societal development, and environmental sustainability. A lack of access to reliable energy sources affects not only basic comfort but also impacts health, education, and economic opportunities.

As the report mentions, energy communities, characterised by collective efforts to generate, distribute, and manage energy resources, emerge as a promising solution to combat energy poverty. These grassroots initiatives bring together citizens and institutions to co-create sustainable energy systems tailored to the specific needs of the community.

Policy context

The urgency of addressing energy poverty has been acknowledged through strategic policy initiatives by the EU that emphasize social inclusion, environmental sustainability, and innovation. Through directives such as the Clean Energy for All Europeans Package, the EU sets the legal framework for renewable energy communities that encourages Member States to prioritise the role of energy communities as essential partners in achieving energy access and reducing inequalities as part of the energy transition.

Main findings

Energy communities that prioritise inclusivity can facilitate equitable access to clean, affordable energy solutions, thus breaking down barriers to development and to social progress. They can create local job opportunities, fostering economic resilience and skills development, thereby stimulating economic development within underserved areas, while collaborative energy projects strengthen social ties fostering a sense of ownership, pride, and shared responsibility.

By collectively generating, managing, and sharing energy resources, energy communities can provide their members with access to reliable and affordable energy, a common space to acquire knowledge about the energy transition and opportunities to collaborate on issues of climate and energy justice. Nevertheless, while there is wide recognition of this potential it seems that the number of energy communities actively addressing the issue of energy poverty remains rather limited, while more research is needed to assess their actual social impact. At all policy levels, from European to local, dedicated policies should address the barriers preventing vulnerable and low-income households from participating in energy communities and for energy communities to become more inclusive of vulnerable and low-income households.

Potential benefits of RECs in addressing energy poverty:

When we look at the potential economic benefits, it is found that participation in energy communities generate additional income from selling electricity (and heat). Related to that is the motivation to reduce the cost of energy consumption and energy efficient behaviour as energy that is not self-consumed can be potentially sold.

On a community level, energy communities are associated with local job creation and community development through the reinvestment of revenues in the local community, thereby avoiding outflow of financial resources from the region.

In addition, some other “intangible” benefits exist, such as creating a sense of community, being more independent in energy supply.

Energy poverty, at least in EU countries, is usually caused by three main factors:

- a. low incomes,
- b. poor energy performance of buildings, and
- c. high energy costs.

This means that poor energy efficiency in residential buildings, low income and high energy bills can combine to form a vicious cycle in which energy poverty occurs and it is reinforced. The potential role of RECs in tackling energy poverty is therefore threefold:

- RECs can generate electricity at lower costs for their members than when purchasing it from an incumbent energy supplier, creating automatically a cost reduction
- When being a member of a REC, there is additional motivation to save energy as surplus energy can be sold at a revenue. So, part of the upfront investments is returned to the members.
- Any surplus financial means can be reinvested back into the community and spent on energy efficient technologies, decreasing the energy costs even more.

Barriers to overcome

This is the theory, but in practice there are multiple barriers to especially low-income people becoming part of an energy community.

A first issue is that especially in countries where all kinds of barriers remain to the establishment of (renewable) energy communities, setting up a REC is usually the work of “enthusiasts” who are willing to spend free time and volunteer for their cause. This is usually

the work of people who have average to above average income. And even if these early barriers have been overcome, studies have reported that participation in RECs is higher for high income people. A reason could be that high income people were the first category initiating energy communities from the beginning.

Another barrier may be the need for any upfront capital. Usually, a fee is required from potential members when joining an energy community, which forms a financial barrier for low-income people. Or a bank loan has to be requested, and the loan conditions depend on the client rating of the bank, making it more complex for lower income people to apply.

Some solutions could be proposed to overcome these barriers:

- Especially larger energy communities could lower the upfront membership fee that can later be compensated / repaid through revenues gained from selling electricity
- Instead of applying for a commercial bank loan, energy communities can try to collect finance through crowd funding initiatives.

Although it has become clear that RECs can in theory play a role in overcoming energy poverty. Strong policy support will be needed.

7. STRATEGY IN ESTABLISHING RENEWABLE ENERGY COMMUNITIES

After analysing the different topics related to the cost and benefits of RECs, below a step-by-step strategy in developing a REC is presented. This deliverable was developed in parallel with the so-called “data-driven tool” to support interested parties in simulating the technical / financial impact of a REC in their area. In this strategy we will aim at describing the concrete steps of establishing an energy community.

In chapter 2, the Geno Canvas model helped in identifying all crucial steps in establishing a REC. Before planning to set up an energy community, for all questions mentioned in these building blocks an answer should be given. The Geno Canvas model does not give a “step-by-step” approach, the building blocks could be addressed in different order. That’s why in this chapter a step-by-step approach is presented.

7.1. Steps in setting up a REC

Establishing a Renewable Energy Community (REC) involves several key steps. Here's a general outline of the process in a logical order.

1. Initial Planning and Feasibility Study

The process of any larger project or initiative starts with identification of the main goals and objectives, and this is not different in the case of the establishment of a REC:

- What type of renewable energy sources are available in the wider area and which of them would we like to include in our REC. Are we talking about solar PV and rooftop based or a larger solar PV plant located on a “brownfield”. Or do we want to include other technologies like wind power or small hydro?
- Will the REC be focused on electricity only, or also renewable heat production.
- After the choice has been made, there is a need to make a detailed assessment of the renewable energy potential available for the community (e.g., m² of land or roof area available for wind turbines or solar PV panels).
- After these first choices have been made → **conduct a feasibility study** of the selected resources to evaluate the technical and economic viability of the project.

2. Community Engagement and Formation

The “Initiator” of the REC should engage with the local community to create interest and gather support. This first engagement should also be used as a first search for interested actors in the creation of a REC. Then a core group could be formed to lead the initiative.

At this point it would also be beneficial to already define the legal structure and governance model for the REC. This of course depends on the possibilities in the countries concerned. As we have seen in D1.1.1 different legal and organizational models exist in each of the HERCULES countries. All these models have certain advantages and disadvantages. Three standard organizational models usually exist:

- Cooperative, having some rules regarding profit sharing among members
- Association, usually having simpler administration
- or other legal entities, such as a limited liability company. No need of profit sharing

Then most countries distinguish between at least two energy community types:

- Citizen’s energy community (CEC) – relatively flexible, can include a wide range of members and not necessarily based on RES only
- Renewable energy community (REC) – focuses on RES only, may include RES based heat generation as well. Often having tighter territorial restrictions.

3. Business Planning and Financial Modeling

The next step is developing a business plan outlining in detail the project's scope, timeline, and budget. Here we should estimate costs, revenues and potential savings. With that the Data-Driven Tool from HERCULES can help us.

It is expected that financial means from external sources will be needed. Therefore, it’s important to start identifying potential funding sources in this stage. These could be grants, loans, or community investments (e.g. crowdfunding initiatives). Each financial source has its specifics:

- **Grants** - Grant conditions often vary per grant programme and after certain periods, so it’s necessary to study the actual conditions for each programme.
- **Loans** – usually to be gained from private financial institutions. If the REC is considering applying for a loan, it will be important to inform in time on what

conditions (e.g. interest rate, maturity of the loan) the financial institution is willing to lend.

- **Crowdfunding** – this could be useful when a REC with a large number of members is to be set up. The success of a crowdfunding initiative often depends on the number of people providing funding.

4. Legal and Regulatory Compliance

During this step it will be necessary to obtain the necessary permits and approvals. It's necessary to research the local, regional, and national regulations related to renewable energy and community energy projects and check if our project will comply.

Each type of project requires different permits:

- For smaller projects, at least a construction permit and connection permit or fee to the power grid is required.
- Usually, a permit from the energy regulator to operate a power generation unit is necessary as well. But in some countries, this is only required from a certain minimum installed capacity.
- For larger projects, larger PV plants or wind turbines, usually spatial permits are needed, and some form of environmental impact assessment may also be needed.

5. Technical Design and Implementation

As soon as it is clear what type of technology we are investing in, it's time to:

- Design the renewable energy system, including the selection of technology and equipment as well as the dimensions in terms of capacity installed (e.g. x kW of installed solar PV).
- Hire contractors or partner with organizations for installation and maintenance of the proposed RES plants.
- Develop a plan for energy distribution and management within the community.

Hiring project developers, contractors etc. may require a public tender procedure. Especially when it includes relatively large projects of a few MWs in capacity

6. Funding and Financing

While step 3 was aimed at identifying the funding sources, in this phase the funding should be secured.

- Financing can be secured through a combination of community investments (e.g. crowdfunding), grants, loans, and other funding sources.
- Establish a financial management system to handle revenues, expenses, and member contributions. This will usually require hiring a person taking care of financial management after the operation of the RES plants has started.

Financial support for RECs differs from country to country. According to the mapping and benchmarking exercise carried out during the first months of the HERCULES project, financial support for renewable energy communities is available in five of the seven HERCULES countries. This support is available in two forms:

- Technical support for setting up renewable energy communities
- Financial support for RECs when investing in RES technologies

Apart from support at national level, several EU wide initiatives exist that provide technical support to RECs, e.g. in the form of small grants for the development of business plans, such as the ENERCOM facility⁵.

As financial support may change year by year, it is important to check the latest conditions for receiving financial support.

7. Launch and Operation

After the completion of the construction and final approval / inspection, the REC can be officially launched and electricity and/or heat generation can begin. Just before fully launching the system, two other steps will be important:

- Implement a system for monitoring and maintaining the energy infrastructure. This could mean having a maintenance contract with the technology provider

⁵ For more information, see: <https://energycommunitiesfacility.eu/>

- Develop protocols for energy sharing, billing, and member communication. This should probably be implemented by an internal (financial) manager

8. Education and Outreach:

The first steps of community engagement have already taken place during phase 2, but at the time of the launch of the REC, education and outreach activities should be intensified:

- Educate community members about the benefits and operations of the REC in more detail.
- Promote energy efficiency and sustainable practices within the community and with other nearby stakeholders
- Engage in outreach activities to share the success of the REC and inspire other communities.

9. Evaluation and Continuous Improvement:

- Regularly evaluate the performance of the REC against its goals and objectives.
- Gather feedback from members and stakeholders.
- Make necessary adjustments and improvements to ensure the long-term success and sustainability of the REC.

Each step may involve collaboration with various stakeholders, including community members, local governments, energy experts, legal advisors, and financial institutions. The specific details and requirements can vary depending on the location, size, and scope of the REC.

ANNEX - status of RECs in the participating countries

8. Status of RECs in the participating countries

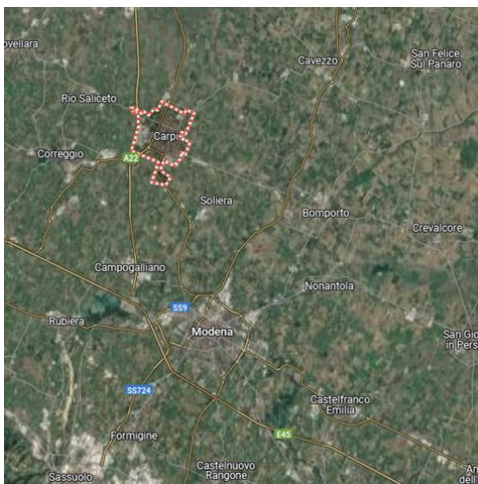
Here a short summary of the REC preparations from the project partners in the participating countries of HERCULES are presented.

8.1. Italy

8.1.1. Emilia Romagna Region

Goal set: Creation of a REC and a regional working table involving operators and stakeholders in the supply chain.

The proposed energy community will be established within the Unione delle Terre d'Argine, an autonomous local authority that encompasses four municipalities: Carpi, Soliera, Campogalliano, and Novi di Modena. These towns are located north of Modena and collectively have a population of approximately 100,000 residents, with Carpi alone accounting for 70,000.



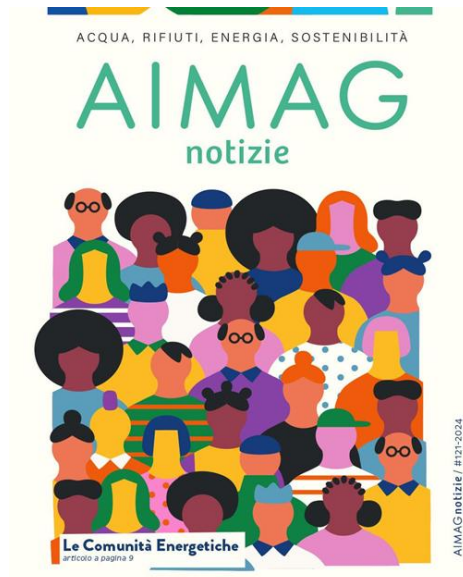
The area is known as a textile district dotted with SMEs. However, its prosperity has diminished compared to the past. The REC could offer a valuable opportunity to revitalize both the local economy and the region's energy sustainability.

Key stakeholders: at the moment the main stakeholder is AIMAG, a multi-utility company managing water, environmental, energy, technology, and public lighting services across 28 municipalities in the area. AIMAG is currently working on a REC project

for the Terre d'Argine district and may potentially assume the role of REC coordinator in the future. Other stakeholders include the municipalities, SMEs within the district, and local citizens. While no formal agreements have been signed yet, there is an option to involve an SME that is already undergoing a transformation of its production and energy assets. Feedback from AIMAG and the municipalities is currently awaited to assess whether other SMEs have already been involved.

Readiness level: The memorandum of understanding with AIMAG is expected to be finalized. Following that, a meeting should be planned between AIMAG, the municipalities, and RER. Activities in the field are anticipated to begin during the 4th quarter of 2025.

State of the art: AIMAG has already carried out informational activities in Carpi and collected expressions of interest through a campaign directed at local citizens.



Expected engagement activity: The planned engagement activities currently depend on the interest gathered by AIMAG. If there is a positive response from citizens, the focus will shift to determining which kind of activities can be carried out. Otherwise, additional efforts will be required to actively engage the community.

In any case, AIMAG will serve as a key partner, working closely throughout the process.

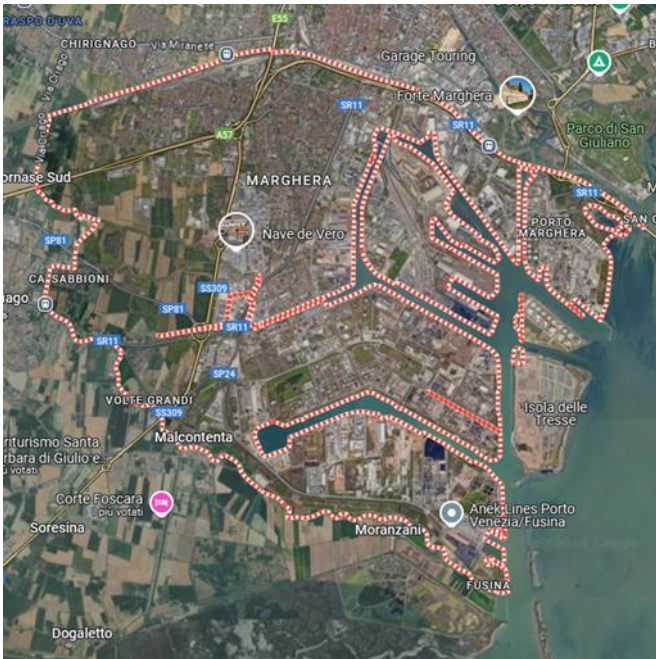
8.1.2. Veneto Region

Goal set: Simulation of a REC creation in Veneto



The pilot REC will take place in the Marghera industrial district, which includes the port area facing the Venice lagoon, as well as the surrounding industrial and residential zones. This is a predominantly industrial area, densely populated by service companies. Both office spaces and residential areas, which have historically been working-class, will be

involved. While the neighbourhood has undergone some revitalization in recent years, there remains potential to develop a REC, particularly by addressing energy poverty issues.



Key stakeholders: Citizens and the offices in the industrial area, Venezia municipality, the port authority, the Venezia Church, LegaCoop, CNA and the artisan SMEs.

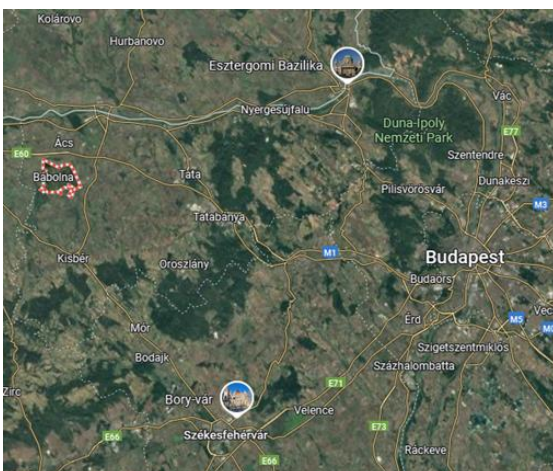
Readiness level/State of the art: An operational plan for the REC is yet to be defined. ECIPA plans to complete the software to be tested in this REC (and all others) by mid-2025. In any case, their pilot involves a REC simulation, so it is expected that the administrative and legislative processes will be quick.

Expected engagement activity: Still to be defined

8.2. Hungary

Goal set: Pilot Action Report to improve energy savings and the business model in one REC in Hungary.

Geographical information: The specific community where the pilot action will take place has not yet been finalized. **Pilot Action A** focuses on a REC in Erzsébetváros, the VII district of Budapest, located in the city centre. **Pilot Action B** is planned in the municipality of Bábólna, a rural town with approximately 4,000 inhabitants in northern Hungary.



As a partner, the first preference would be Budapest. However, due to some legislative barriers, it may become necessary to proceed with Plan B where solid contacts are already in place and the communities are established and fully operative.

The community in Budapest is not legally registered and not yet operational due to the absence of an amendment to the Act on

Electricity. This amendment, which is expected to enable all RECs to become operational, is anticipated to be passed in the forthcoming month.

Readiness level: By around January 2025, there was a legislative and political change. During the coming months, the situation should be resolved to legally establish the community in District VII. If not, the plan will shift to Plan B.

State of the art: Working to overcome legal barriers. In any cases there are active connections with all the RECs involved.

Key stakeholders: It is still too early to clearly identify the key stakeholders.

Expected engagement activity: Still to be defined according to the REC that will be selected for the Pilot, and the engagement typology required.

With the amendment of the law in force from the 1st of January 2025, the regulatory environment has been significantly improved, but the detailed regulation still needs to be improved. The law allows the creation of energy communities, regulates the main steps and conditions of the process, but further partial regulation is needed. Currently, it is legally possible to set up an energy community within a regulated framework.

With this it was confirmed that the energy community will be registered in the Budapest District VII by the end of 2025.

From the beginning of 2026, an important task will be to strengthen the newly created organisation through community building activities, awareness raising, information transfer and recruitment of new members. Main development of the Pilot will be an implementation of an operational system and through this give a good practice to municipalities to create new energy communities, to improve energy savings and build a business model.

Parties involved: The energy community will be set up by a consortium of the local government and the municipal operator companies. In the future, the number of members will be increased by involving condominiums and companies.

Engagement activities: As mentioned above from the beginning of 2026, after the legal registration process the energy community can start to operate. In this part of the process an important task will be to strengthen the newly created organisation through community building activities, awareness raising, information transfer and recruitment of new members. These activities might can be supported by the Hercules project in Period 4 since in this Period the awareness-raising tasks are planned to implement too.

8.3. Germany



Goal set: Develop 5 feasibility studies for 5 municipalities and then prepare a contract with the most promising one to develop a heating district (pilot action).

Geographical information: At present, the most advanced pilot project is Wipperoda. It is a small village in Thuringia, where the population is quite young and oriented toward energy sustainability issues. It is a predominantly rural area and surrounded by forests. Hence the desire to adopt energy derived from biomass as well as PV plants. A large PV plot already exists about 1km from Wipperoda, but it is difficult to integrate into the project due to legal and administrative barriers. Other feasibility studies are being carried out in other villages, providing viable alternatives in piloting in Wipperoda.

Readiness level/state of the art: Contacts with the municipality are already underway, a feasibility plan has been carried out to replace the outdated heating systems in the some of the houses. The feasibility plan provided an overview of the situation but did not have the level of detail required that it could be used to apply for a subsidy. The municipality prepared a tender (supported by ThEGA) to develop a feasibility plan which detailed calculations that would be sufficient to apply for an investment subsidy. Once these funds are obtained, the citizens will be further informed, and the project can be started. Expected time frame there is about 6 months.

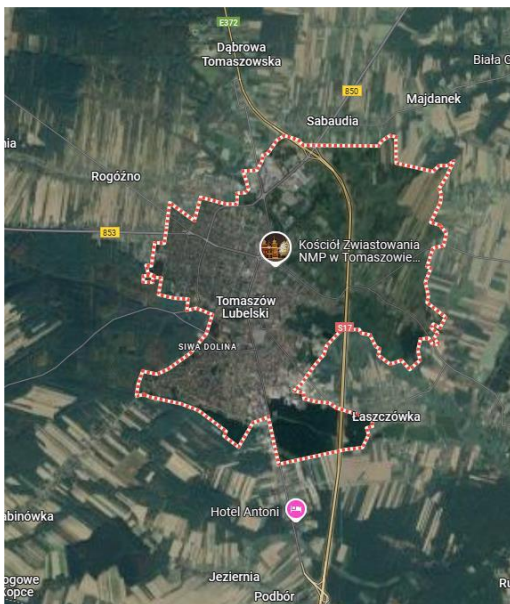
Key stakeholders: The municipality (mayor and city administration) and citizens with whom an initial informative event of the initiative has already been done. Others are the biomass supplier, the bank or financial support, but for which we are waiting to involve them to have a more structured feasibility plan.

Engagement activities are: Still to be defined

8.4. Poland

8.4.1. 1st Pilot - Tomaszowski Energy Cluster

Goal set: Pilot project about improving energy saving business model and energy performance and its sustainability



Geographical information: located in the Lubelskie voivodeship is comprises a large, mostly rural area in which there are 13 communities. The population is moderately poor and entrepreneurial activities in the area are small to medium.

Readiness level: At the moment the Tomaszowsky Energy Cluster is operative, but as energy cluster is not legally recognized yet. The goal is to transform it into an energy cooperative, fulfilling all the laws and regulations required. Next steps are to collect detailed information about the members of the cluster and pick up some of these members to the

new energy community. Beginning of February for more detailed information.

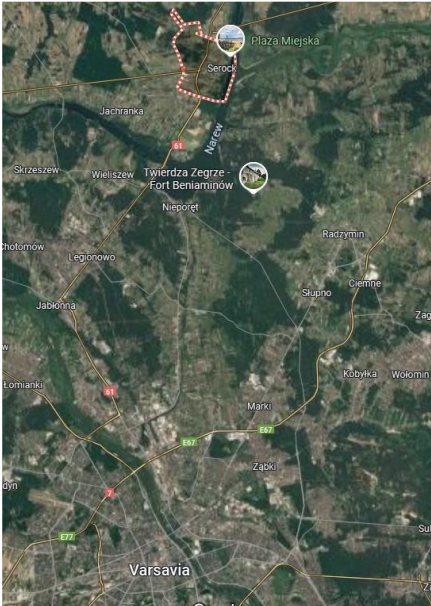
State of the art: It's operating, but the activity of each member is very different and now the main scope is on the generating energy from PV generators located in Tomaszowski region.

Key stakeholders: One of the main stakeholders is the cluster coordinator thermo-system with whom meetings were held. Other important stakeholders are the municipalities, the SMEs and the citizens in the area.

Expected engagement activity: Still to be defined

8.4.2. 2nd Pilot - Serock

Goal set: Development of new REC in Serock municipality (based on PV installation and biogas) from establishment until full operational work so the EC will become active actor in energy market. The composition of the EC will include city units and residents.



Geographical information: Serock is part of the Warsaw metropolitan area, which serves as the central hub. The town is renowned for the forests and agricultural lands surrounding it but also for its proximity to an artificial lake. Many residents commute to Warsaw for work. Locally, the economy thrives on these two key sectors: agriculture and tourism.

State of the art: The municipality previously tried to establish one energy community where the citizens and the companies were included, but there were many problems of communication with the citizens, the companies and decision-making issues. They had different goals so the municipality decide to make two different communities. There is also a lack in the trustability in these communities due to raising bill costs. The focus will be the community for citizens

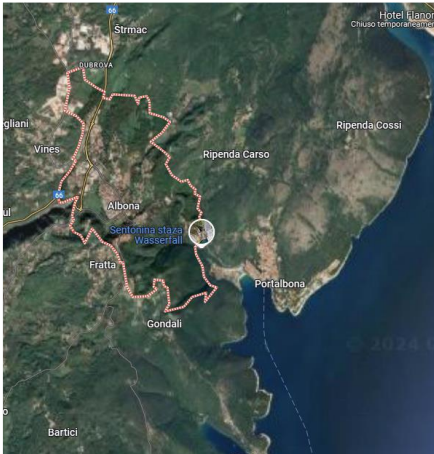
Readiness level: By mid-2025 it's planned to hold a town hall meeting and discuss the next steps about the stakeholders to be involved and collect comments and opinions why the first community failed.

Key stakeholders: The municipality and citizens as well as the various agencies at the national level and the distribution system operator. The citizenship would like to target *biogas*-based procurements, it might be useful to involve farmers.

Expected engagement activity: Still to be defined, but will be crucial work on communication between members, on the decision-making process, and on trustability in the project.

8.5. Croatia

Goal set: establishment of the "Heritage Energy Community" in Labin which will focus on inclusion into the EC of buildings listed as protected heritage ones along with their inhabitants.



Geographical information: Labin is a historic town in eastern Istria, Croatia, overlooking the Adriatic Sea. It consists of the Old Town, a medieval hilltop settlement, and Pod Labin, a 20th-century development. Surrounded by forests, hills, and the Učka mountain, it also offers Adriatic coastal tourism. With around 10,000 residents, Labin features a multicultural blend of Istrian, Italian, Croatian, and Slovenian traditions.

State of the art: Key point of the project will be the creation of an energy community in the city's old town, where historic buildings cannot be affected. Efforts to initiate engagement activities were started but had to be paused due to insufficient information, particularly regarding locations. While there is a plan to involve stakeholders and citizens broadly, the initiative is currently on hold. It's planned to create workshops, presentations and activity to disseminate and create awareness about the topic.

Readiness level: Before beginning the engagement process, it is required to define some aspects with the municipality that are expected to be discussed during the course of 2025. Next step will require to identify the appropriate business model for the context and start with the citizens engagement.

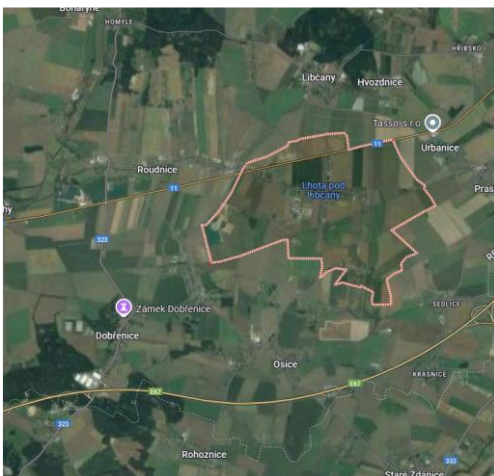
Key stakeholders: Stakeholders of the project will be the residents in the old town (more or less 200 people), the citizens of the entire city, SMEs like restaurants and small craftsmanship, the county, the municipality and the mayor. Among the key stakeholders is also Labin2000, a public company in charge of providing a public place for the PV installation.

Expected engagement activity: Still to be defined

8.6. Czech Republic

HRADECKÝ VENKOV COMMUNITY

Goal set: The new REC will be officially established (legal entity set up and statutes approved). The Action Plan will be developed identifying potential measures and RES projects to be implemented in next years including their energy, climate and economic benefits, financing and time schedule.



Geographical information: The region is predominantly rural, with small municipalities, agricultural landscapes, and scattered development. There is potential for renewable energy, primarily solar and biomass. Active measures are in place in some villages and municipalities, with five municipalities (Lhota pod Libčany, Dobřenice, Roudnice, Libčany, Praskačka, Stěžery) close to each other utilizing public buildings equipped with photovoltaics and designated spaces for additional solar installations. One or more of these municipalities will provide the location of the REC.

Key stakeholders: Citizens, the mayor and the municipality, as well as biomass suppliers and technical stakeholders. Hradecký Venkov will have a facilitator role and will be responsible for reaching out and engaging people on the ground together with the municipality

Readiness level/state of the art: Contact has been made with mayors and some municipalities who have shown interest. The population has not yet been involved.

Expected engagement activity: Still to be defined

8.7. Main findings so far

8.7.1. Main stakeholders involved

According to the information provided by the project partners, the main stakeholders involved in the establishment of Renewable Energy Communities (RECs) across the various pilot projects include:

1. **Municipalities and Local Authorities** – In almost all pilots, local municipalities or city administrations are central actors in initiating or supporting REC development (e.g., Serock, Labin, Wipperfodda, Hradecký Venkov).
2. **Citizens** – Residents are a key group whose participation and engagement are critical for the success of RECs. Their involvement is noted in multiple pilots, often through awareness campaigns or direct engagement activities.
3. **SMEs and Local Businesses** – Especially in industrial or economically active areas (e.g., Emilia-Romagna's textile district, Marghera industrial district, Tomaszowski energy cluster), small and medium enterprises play a vital role.
4. **Utility and Energy Service Providers** – Entities like AIMAG (in Emilia-Romagna) and other technical or energy service companies are mentioned as potential or actual coordinators or facilitators for RECs.
5. **Community Coordinators or Cluster Managers** – For instance, Thermosystem in the Tomaszowski Energy Cluster plays a pivotal role in coordination.
6. **Religious and Civic Organizations** – Such as the Venezia Church in the Marghera district.
7. **Public and Private Infrastructure Managers** – Including port authorities and companies managing public infrastructure (e.g., Labin2000 in the Heritage Energy Community).
8. **Financial Institutions** – Banks or funding bodies are considered future stakeholders especially where feasibility studies or infrastructure investments are required (e.g., Wipperfodda).
9. **National Agencies and Regulatory Bodies** – Particularly relevant where legal or regulatory barriers exist (e.g., Budapest's REC hindered by legislation).
10. **Technical Stakeholders and Biomass Suppliers** – Especially relevant in rural settings relying on specific renewable sources like biomass (e.g., Wipperfodda, Hradecký Venkov).

Each REC pilot tailors its stakeholder involvement based on the local context, technical feasibility, and legal frameworks.

8.7.2. Predominant renewable energy source

The predominant renewable energy sources planned or currently used in the pilot Renewable Energy Communities (RECs) are:

1. Photovoltaic (PV) Solar Energy – This is by far the most commonly mentioned renewable energy source across nearly all pilots:
 - Tomaszowski Energy Cluster: Focused on energy generation from PV generators.
 - Wipperoda: A large PV plot exists near the village.
 - Serock: PV installations are part of the energy mix.
 - Hradecky Venkov: Public buildings are already equipped with PV panels.
 - Heritage Energy Community (Labin): Plans include PV installations, especially on public and heritage buildings.
2. Biomass – Particularly in rural areas where biomass is locally available:
 - Wipperoda: Emphasis on energy from biomass.
 - Hradecky Venkov: Biomass is mentioned alongside PV as a viable energy source.
3. Biogas – Noted as a complementary or alternative renewable source:
 - Serock: Biogas is mentioned alongside PV as part of the planned energy mix.

While other renewable sources might be considered in some pilot areas, solar PV is clearly the most prevalent renewable source across the pilot RECs, followed by biomass and biogas where local conditions support their use.