PROJECT ENES-CE

D.T.3.1.1 Pilot project implementation framework

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A. Summary

Central European countries need support in the development of local and regional energy strategies and action plans, since they are lagging in their implementation and thereby threatening regional competitiveness. Local authorities face many challenges in implementing the plans including lack of financing, being understaffed and lacking local acceptance. This undermines the pledge that signatories made to support the EU action in reducing GHG emissions by 40% until 2030.

Creating a functional Low Carbon Economy Plan (like SEAP/SECAP) requires tapping into the human and financial potential of citizens. ENES-CE is addressing this challenge and beyond through improving the adoption and quality of energy plans with a bottom-up quadruple helix approach, where citizens play a pivotal role. This document seeks to bring citizens' access closer in terms of determining energy pilot investments, the obstacles that may arise, and the factors and guidelines for selecting such investments.

A.1. Introduction

This document presents a framework for a pilot investment, a way to involve citizens and form energy groups and is dedicated to the implementation of pilot projects to be selected by citizens, and technically defined by the partners in the ENES-CE project. The pilots will be implemented in the form of small investments (up to EUR 15,000) and will result from redefined SEAPs / SECAPs. Tools developed in other work packages will be continuously used to determine relevant pilot projects in each region as well as to motivate citizen participation.

The document contains summaries of revised energy planning documents in partner regions, possible ways of financing and the main factors that need to be taken into account in order to achieve the objectives of the pilot project described as evaluation and implementation criteria.

B. Evaluation

B.1 Brief summary of revised energy plans and identified relevant measures

Documents developed in the municipalities and regions of the ENES-CE project partners, which were revised in accordance with the change in energy needs, are presented in the following table. Apart from the documents and the revision process of the same, most important identified measures have also been mentioned.

Table 1 List of revised energy plans and identified measures

Italy (Municipality of Forli)	
	The document that has been revised within the project is the Sustainable Energy Action Plan (SEAP) developed in 2011, which deals, at a municipal level, with the issues related to energy consumption and carbon dioxide emissions in all relevant sectors - buildings, traffic and public lighting. Following this document, new Sustainable Energy and Climate Action Plan (SECAP) will be developed in 2021 to meet CoM targets until 2030. The document will be approved at the end of the participatory path and will thus raise the commitment in CO2 emission decrease through the themes connected to energy and environment. The process of redefinition of the Municipality's actions for the sustainable energy and the climate has started with the identification and involvement of the local stakeholders (environmental associations, trade associations, banks, public and private organizations, etc.). Their engagement is the most important key to fulfil the goals set by the Municipality with the Covenant of Mayors. A strong effort is put in involving the several organizations, societies and associations (communication, invitations, videos recorded by professional experts, workshops, etc.), because gathering the reflections of the actors of the territory at the beginning of the path for the adoption of the SECAP, will presumably help in the implementation of the actions during the everyday life of anybody. The goals to the 2030 EU objectives will be updated and new adaptation initiatives to face the climate changes at a local level will be taken into account.

Slovenia (Municipality of Koper)

In 2008 the first Local energy concept (LEK) was elaborated and updated in year 2013. On the basis of LEK a Baseline Emission Inventory for Sustainable energy action plan (SEAP) has been elaborated, which includes upgraded LEK measures. The elaboration of SEAP was in line with the Covenant of Mayors initiative and its guidelines.

The SEAP document was further elaborated in 2019. It contains several measures in key sectors and activities: public sector, residential sector, tertiary sector and transport sector, as well as municipal activities for support and information spread oriented toward citizens and local stakeholders. Key activities are referred toward the improvement of the structure of fuel use, transition from fossil fuels to biomass use and use of other renewable energy sources and efficient energy use through investments and active involvement of citizens and local stakeholders/partners.

The analysis of the existing 2019 SEAP of the City of Koper as part of the ENES-CE project included the individual analysis of all the proposed measures to reduce CO_2 emissions defined in the SEAP.

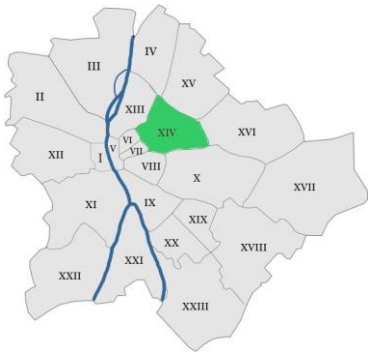
The analysis has shown that the majority of measures which could significantly contribute to CO_2 emissions are not sufficiently being implemented yet and that the efforts of city administrations are representative and could become an example of best practice to citizens. It is important to strengthen the public awareness and training activities toward stakeholders within the residential and tertiary sector as well as to enhance the assistance in obtaining the financial sources of measure implementation.

In cooperation with citizens following measures were identified as most relevant ones: Business model for an energy cooperative in the City of Koper, Business model for an energy cooperative in the countryside of MOK and Smart lighting - modernisation of public lighting in MOK.

Hungary (Budapest - district Zugló)

Municipality of Zugló (Budapest, XIV. district) joined to the Covenant of Mayors in 2015 and adopted its Sustainable Energy and Climate Action Plan in 2019, following the core methodology developed by the Covenant. The lead sector in CO2 emission is the residential building sector with 42% followed by the transport (24%) and services (21%). The municipality sector is responsible for 7% of the local CO2 emissions.

During the ENES-CE project start, the Zugló Sustainable Energy and Climate Action Plan was assessed, and interviews were taken with



local stakeholders, to gather information about the progress of the local mitigation and adaptation actions.

According to the input from the stakeholders an Energy Roadmap has been developed. The main aim of the roadmap is to boost the realization of SECAP by involving stakeholders and their sources and describe the top 3 projects that can be considered for the pilots in ENES-CE project: Facilitating condominium community solar investments with information and support, Community operated lockable bicycle storages in housing estates and Promoting cycling and pedestrian traffic: congested streets, better traffic safety.

By identifying concrete pilot schemes with efficient reduction measures, together with time frames and assigned responsibilities, Zugló translates the long-term strategy into effective actions. The initiatives are founded by local funds and the ENES-CE project, however the financial sustainability of the interventions is ensured by the appropriate composition of project partners.

Croatia (Town of Prelog)

The Town of Prelog has developed its Sustainable Energy Action Plan (SEAP) in 2014, and this was the document that has been revised within ENES-CE project. Besides the SEAP, data for development of Sustainable Energy and Climate Action Plan (SECAP) have been taken from Development Strategy of the Town of Prelog from 2018 to 2028, participation in the ENES-CE project and the Climate Change Adaptation Strategy in the Republic Croatia for the period up to 2040 with a view to 2070 NN 46/2020.

The analysis of the existing 2014 SEAP of the Town of Prelog as part of the ENES-CE project included the individual analysis of all the proposed measures to reduce CO2 emissions defined in the SEAP. In cooperation with the representatives of the city of Prelog, measures were individually analysed and the progress of each of the envisaged measures was assessed and presented in a separate document. The final SECAP has thus identified 18 measures that are relevant to be implemented in order to satisfy targets set by CoM.

As part of the ENES-CE project, interviews were conducted with local entrepreneurs and representatives of local authorities, who also contributed to the understanding of the situation in the Town of Prelog.

Based on the initial consultations with citizens, interviews with local stakeholders and expert analysis, the following three projects have been chosen as top candidates to be implemented in the second phase of the project: Workshops for local entrepreneurs on financing energy projects, Bike sharing project and construction of bike lanes and Crowdfunding project for solar panels

Poland (Lubelskie Voivodeship)

During the participation in the ENES-CE project, the Low Carbon Economy Plan (LCEP) applicable in the Niemce Commune was revised. This Low Carbon Economy Plan (LCEP) was updated until 2025 and passed on 4 February 2020 by the Resolution of the Niemce Commune Council no. XIV/138/2020. The process of upgrading to SECAP will take place in the next stage of the project in 2021, after the Base Emission Inventory (BEI) update.

The updated document contains the diagnosis of the level of pollutant emissions taking into account individual sectors, such as industry, transport, and the residential sector. The aim of the developed document is to reduce air pollutant emissions, improve energy efficiency, increase the use of renewable energy sources, as well as reduce final energy consumption.

The achievement of the intended goals is possible through the implementation of investment activities specified in the document (e.g. construction of renewable energy micro-installations) and non-investment activities (e.g. environmental education, creating a citizen energy group in the form of an energy cluster or citizen energy cooperative). Summarizing the current process of revising the Low Carbon Economy Plan for Niemce Commune (LCEP), we can say that its updating and upgrading to SECAP at a later stage of the project will allow the continuation of the pursuit of the assumed goals. Moreover, it will be possible through the creation of an energy cluster, with the possibility of transformation into a citizen energy cooperative.

The created energy cluster, taking into account the principles of bottom-up planning, will be a new solution in the Niemce Commune, which will allow to increase the effectiveness of the implementation of measures to protect air quality, as well as supporting the commune in planning and implementing energy strategies based on citizens' needs, supporting members of the energy cluster in implementing bottom-up activities in the commune, producing energy using local infrastructure to ensure the existing and future fuel and energy supply of local members of the energy cluster and its partners, creating a set of additional products, e.g. in the form of intangible services such as educational campaigns, consulting, etc.

Germany (Municipality of Pfaffenhofen)

The goal of the Municipality of Pfaffenhofen is to halve CO_2 emissions per capita by 2030. An interim CO_2 balance sheet was drawn up in year 2020 where it has shown that greenhouse gas emissions in the city of Pfaffenhofen have fallen since 2010. From 2010 to 2018, the city's per capita emissions of the greenhouse gas CO_2 fell by almost a third. Pfaffenhofen is thus well on the way to achieving the goal of the integrated climate protection concept, which envisages halving CO2 emissions per inhabitant by 2030.

The calculated CO2 emission in Pfaffenhofen in 2010 was still 7,2 tonnes per capita, in 2018 it was only 5,1 tonnes.

The total consumption of final energy decreased by 4 percent while the number of inhabitants increased by 9 percent. Most energy is consumed in private households with about 40 %, followed by trade, commerce and services with 27 %. Transport in Pfaffenhofen consumes 24 % of the total energy and industry 10 %.

The greenhouse gas balance of the city of Pfaffenhofen was prepared by the Institute for Energy and Environmental Research in Heidelberg. The analysis is an essential basis for the new climate protection concept and for the development of new, further climate protection measures.

B.2. Selection procedure of measures to increase energy efficiency and promote RES

Definition of measures to enhance energy efficiency and encourage the use of renewable energy sources is approached by first analysing the current state of energy consumption, the costs of maintenance and analysis to determine the savings potential through the implementation of measures. The potential of incorporating a measure or project is determined by a number of factors. In addition to the financing options, it is necessary to consider the factors that affect the possibility of implementing measures. Some of the aspects we observe to determine the possibility of implementing measures are described in the following chapters.

B.2.1. Climate characteristics of the region

The climate conditions of a certain area are primarily important when the production of energy from renewable sources is observed. Data that are crucial for choosing the technology of energy production usually are insolation, wind frequency and speed, geothermal potential and precipitation level. One of the most universal sources of energy is the Sun. As shown in Figure 1, almost all of Europe has potential for solar energy production. A certain disadvantage of this production is that it is not constant all the time and largely depends on the weather conditions in the atmosphere.

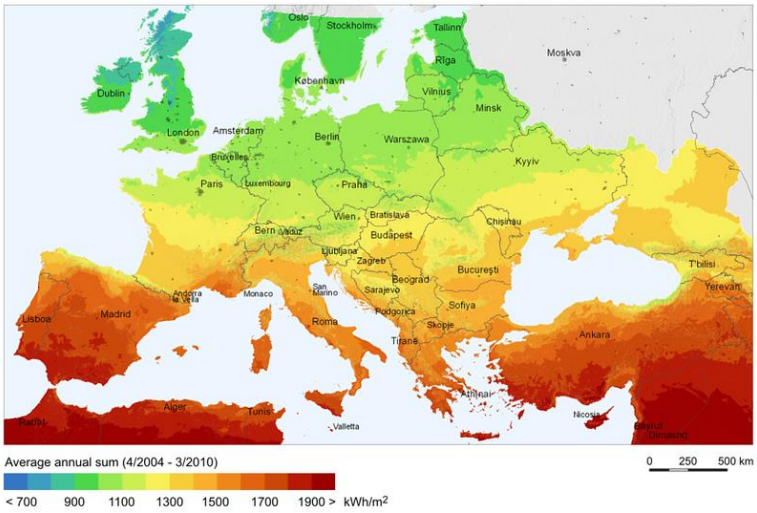


Figure 1 Global horizontal irradiation in Europe (https://solargis.com/)

In addition to solar radiation, an important source of energy related to climate conditions is wind. The production of electricity from wind energy is playing an increasing role in the total production of electrical energy in the EU. The cost-effectiveness of installing such a system depends on the potential of the macro location, which needs to be examined in advance. Regardless, wind turbines are being built in almost all EU member states, both on and off shore. In recent years, the cost of building onshore and offshore wind farms has been declining, so the use of this energy source is growing.

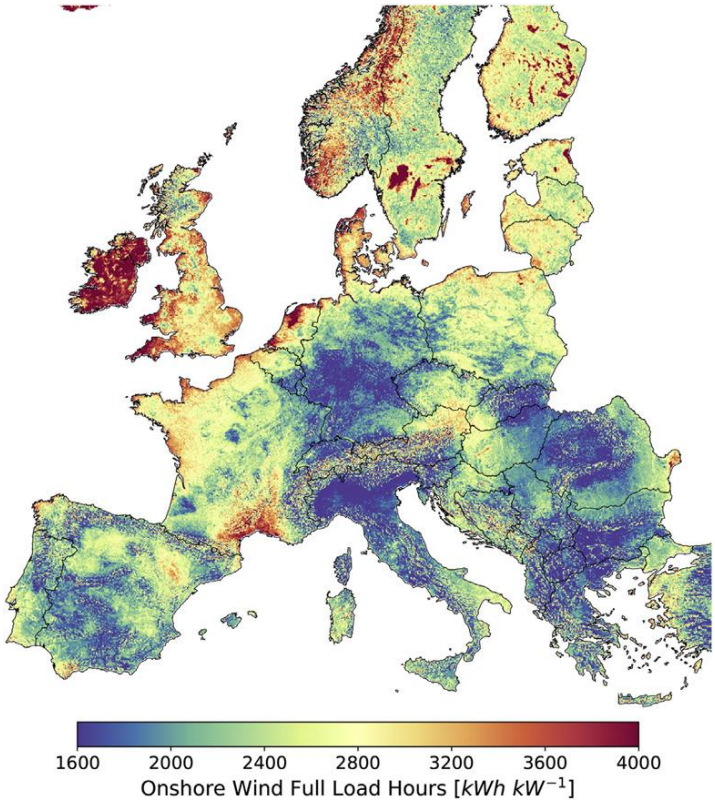


Figure 2 Average annual wind capacity factor mapped across Europe, not including any consideration of how suitable land is for windfarms. (Ryberg et al., 2019) (https://www.carbonbrief.org/europe-could-get-10-times-its-electricity-needs-from-onshore-wind-study-says)

B.2.2. Current energy consumption

The energy consumption of a particular region plays an important role in determining the measures that need to be implemented to use energy more efficiently and replace conventional with renewable energy sources. Usually, in developed areas, buildings and industry are the largest consumers of energy. Measures related to reducing energy use in buildings include better insulation, energy efficient boiler rooms or central heating systems, reduction of losses in the piping system, etc. This also applies to industrial plants, but what is specific is that they consume energy for production and their goal is to produce large quantities and consequently to consume as much propulsion energy as possible. In such systems, the goal for companies is to consume energy produced from renewable energy sources, locally or through power plants and thus make their productions process more efficient. Typically, large production plants have large roof areas on which it is possible to place a photovoltaic power plant. Additionally, depending on the production process, they can use waste heat to produce heat or electricity.

In addition to these sectors, the transport sector also has a significant impact on total consumption. To reduce emissions coming from this sector, it is necessary to involve a wider range of participants, including the automotive industry and multilevel decision makers. Giving subsidies for the purchase of hybrid and electric vehicles is one of the most successful measures that is being implemented for making this sector more efficient. In addition, it is possible to reduce CO2 emissions to a lesser extent by driving more economically, implementing car sharing systems or using rail instead of road transport, if the infrastructure supports this.

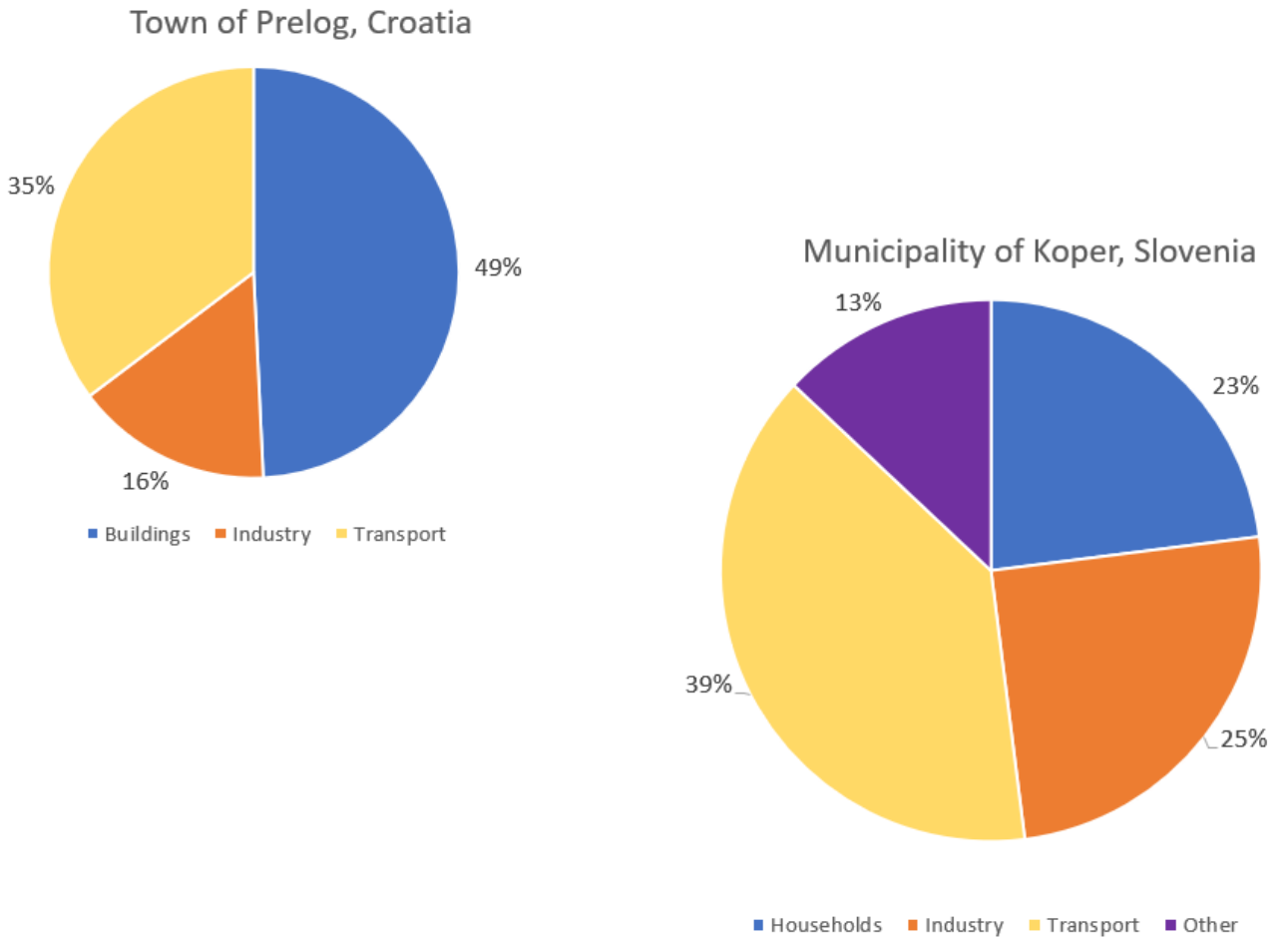


Figure 3 Overview of direct energy consumption by sectors

B.2.3. Technical possibilities

In addition to the climate conditions that enable the installation of RES systems, it is important to examine potential projects from a technical point of view. Technical capabilities tend to limit the possibilities to install any kind of technologies, especially the ones that are marked as state-of-the-art. This often refers to the existing electricity infrastructure in the case of installing different commercial RES power plants or mini power plants for own consumption. It is necessary to align the potential of power plants with the technical possibilities of electric networks. Likewise, the planning of, for example, solar power plants should take into account the routing and types of roofs prevalent in a particular region or if there is free land for non-integrated plants. In solar power plants, the angle at which the panels are placed is important, and this cannot be regulated if sloping roofs prevail.

When installing charging stations for electric vehicles, an important piece of information is the leased power of the billing metering point.

In case of district heating systems, it is important to consider the distance of the consumer, i.e. the losses that occur in the pipe network during transport. Additionally, due to other infrastructure, it is not possible to lay a pipe network in some area.

In addition to the production of energy from renewable sources, optimising technical solutions will lead to achieving significant savings in energy or water consumption.

There is usually the possibility of improving the electricity and water distribution network. With today's technology, there are smart measurement methods where losses can be easily identified and minimised.

With regards to the technology planned to be installed, technical conditions need to be analysed, such as space constraints, energy source capabilities, system maintenance, propulsion system safety systems and management.

B.2.4 Sustainability of measures

When implementing chosen measures, it is necessary to take care of the sustainability of the project. Sustainable development is a framework for creating policies and strategies for continuous economic and social growth, without any detrimental impact on the environment and natural resources significant for the future human activities.

The main goal is to ensure sustainable use of natural resources at regional and national level. The same reasoning should apply to all aspects of daily life through the formulation of plans that will closely analyse the impacts on the environment, resources, and consequently the impact on other people, the possibility to meet their requirements, and, naturally, the interests of the future generations.

Natural resources are limited, and the negative impacts on the environment caused by their consumption require improvements of the existing and discovering new models for their sustainable use.

One of the main goals of the European Union, by means of numerous financial instruments and strategies, is to promote the improvement of the economy in the sense of more efficient use of resources and energy.

B.2.5 Acceptability and involvement by citizens

The proposed measures must not greatly affect the daily habits of citizens in terms of reducing comfort. In this regard, it is important to encourage citizens to contribute to the implementation of energy efficiency measures.

When designing and implementing measures, it is important to take care of the acceptance of energy efficiency measures by the public. If the goal is to change the habits of citizens, it is necessary to get information in advance about people's awareness of the identified problem, their willingness to change everyday habits, financial savings, etc. In order to influence general awareness, it is important to use media, organize workshops, round tables and campaign to all age structures of the population.

When announcing the construction of energy facilities, there is often resistance from citizens due to lack of information. It is desirable, if the measures apply to citizens, that they can copy pilot projects to their households (eg. bicycle use, shared boiler rooms, installation of solar panels, biomass collection).

B.2.6 Identification of measures implementation criteria

Based on the above criteria and possible restrictions, it is necessary to select measures for a specific region or unique local government. Having in mind the needs and goals of the local government, in cooperation with citizens and administration according to the specific criteria, it is recommended to select several measures in the shortlist, which are then valorised and prioritized when selecting final measures.

Polls and public consultation or referendum can contribute to the selection of relevant measures. The financial resources available for the pilot project as well as the possibility of financing the continuation of

the project, play a very important role in the selection of project measures. It is necessary to take into account the resources of the local government while preparing implementation of the measure.

Additional criteria and guidelines for the selection of measures can be found in the planning documents of the city / municipality, as well as development strategies, energy strategies, consumption analysis, etc.

Legislation in the field of renewable energy and energy efficiency should also be a guideline for identifying measures. Figure 3 shows the areas that need to be addressed in order to achieve energy savings.

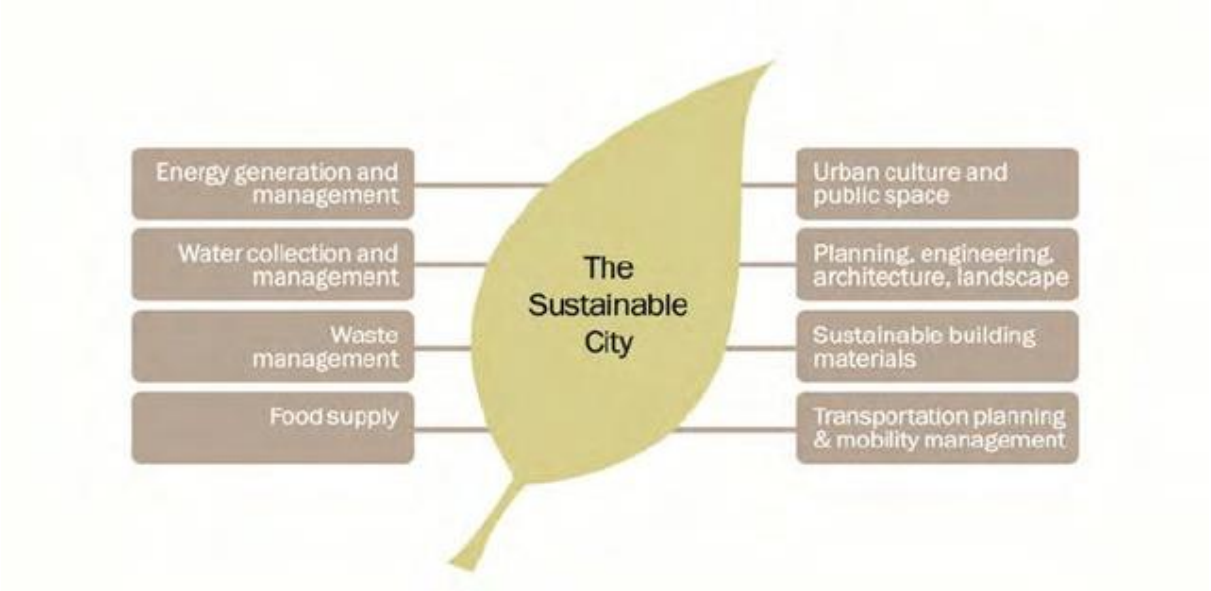


Figure 4 The Sustainable City (www.researchgate.net)

B.2.7 Assessment Tool for Community Energy Projects

Within ENES-CE project, a tool has been developed to facilitate the communities to identify projects that fit their needs and requirements the best. This tool is designed to be as generic as possible in order to be able to provide quantitative financial and qualitative impact-oriented assessment of the community projects of any kind. It can provide indication about potential profitability, size of the investment and financial return of the project as well as visual positioning of the project in regard with multiple qualitative social aspects.

The mentioned tool can be used as a support to lead informed discussion about the energy projects, both within community and project developers as well as with representatives of (local) public authorities. However generic it is, the tool is focused on the energy projects that are generating their revenues by the production of the electricity and its current version does not support projects that are generating revenues from the generated heat.

The tool can be accessed using this LINK, and is free to be used by all interested parties.

B.3. Citizen energy group members and their roles

Citizen energy groups are groups of citizens interested in increasing energy efficiency and the use of RES in their communities. Basically, any interested natural or legal person can become a member of this kind of group, although this largely depends on the existing national law. Participation in such a group has to be open and voluntary. In the revised Renewable Energy Directive, it is written that participation in renewable energy projects should be open to all potential local members based on non-discriminatory criteria. The revised Electricity Market Directive states that membership should be open to all categories of entities.

Members of the groups share financial and material resources to make investments in energy projects, usually oriented towards renewable energy sources. Such groups represent a bridge between the local administration with the public, and includes public interest in decision-making process. In addition, group members through the functioning of the group can propose new decisions, awareness-raising campaign investments, adoption of strategic documents, etc. to the local government.

The projects that are being implemented by such citizen energy groups do not focus only to the financial aspect but also to resolve certain societal and ecological problems of the community (like unemployment, better air quality etc.).

B.3.1. Definition of energy group members

Various citizen energy groups' models can be established with regard to the needs of the local community as seen in Table 2. Such legal entities can be fully owned by the community or can be established in cooperation with public or commercial actors.

Table 2 Possible legal structures for energy communities (Source: JRC based on (Roberts, Bodman, and Rybski, 2014; Hanna, 2017; REN21, 2016))

Legal structure	Description
Energy cooperatives	This is the most common and fast-growing form of energy communities. This type of ownership primarily benefits its members. It is popular in countries where renewables and community energy are relatively advanced.
Limited partnerships	A partnership may allow individuals to distribute responsibilities and generate profits by participating in community energy. Governance is usually based on the value of each partner's share, meaning they do not always provide for a one member – one vote.
Community trusts and foundations	Their objective is to generate social value and local development rather than benefits for individual members. Profits are used for the community as a whole, even when citizens do not have the means to invest in projects (for-the-public-good companies).
Housing associations	Non-profit associations that can offer benefits to tenants in social housing, although they may not be directly involved in decision-making. These forms are ideal for addressing energy poverty.

Non-profit customer-owned enterprises	Legal structures used by communities that deal with the management of independent grid networks. Ideal for community district heating networks common in countries like Denmark.
Public-private partnerships	Local authorities can decide to enter into agreements with citizen groups and businesses in order to ensure energy provision and other benefits for a community.
Public utility company	Public utility companies are run by municipalities, who invest in and manage the utility on behalf of taxpayers and citizens. These forms are less common, but are particularly suited for rural or isolated areas.

Citizen energy groups consist mainly of citizens who are interested in tackling certain energy insufficiency in their local community such as setting up a RES system. Furthermore, members of citizen energy groups have the motivation to encourage other citizens to join or perform similar actions for energy transition.

In order to have a citizen energy group which is well managed and operational certain roles are essential to be included in its organisation:

- The founder of the group
- The manager of the group
- Accounting expert
- Communication manager

These roles can be combined and sometimes one person can carry several tasks within the citizen energy group. Carrying one role by a single person or combining several roles within one employee is something each energy group has to decide with regards to their size and the complexity of the projects it's implementing.

B.3.2. Tasks of individual members

As described above, one or more citizen energy group member can be appended one or more important roles. This is usually done with regards to the persons education, expertise or experience in certain sector.

The founder of the citizen energy group can be single person, but it can also be several people, legal person or a public entity (town or municipality…). The role of the founder is to decide how the newly established citizen energy group will be defined, to start the founding process as well as assist and supervise other crucial members in preparing the legal documents and perform procedures.

Depending on the nature of the founder, manager of such a grouping can be set from internal capacity of legal private or public entity or can be chosen by or between natural persons. Usually, the manager should have good understanding of legal processes and procedures on national, regional and local level regarding energy sector. They should also have experience in financial sector with regards to funding possibilities and preparation of legal documentation. The manager should, finally, have good social and communication skills. This is crucial to be able to cooperate, motivate and resolve any kind of misunderstandings between members of energy group and wider.

Due to the fact that the citizen energy group is established to identify and implement energy projects relevant for local community, having an accounting expert within the team is quite beneficial. The funding of an energy project can be achieved with fully private funds or it can be a combination of private and public funds. The accounting expert has to keep track of all income payments as well as payments towards external service and work providers. Should there be any revenues from the implemented project,

accounting expert has to know how to keep record of the same and redistribute it between the investors. This person can be a member of the energy group, but it can also be an outside hired accounting service provider. Each citizen energy group will choose for their specific example what is more beneficial for them.

The importance of communication manager lies with the necessity to be open and share information on the group and the implemented projects towards the whole community. The communication manager has to have good relations with local and regional media and good knowledge on working with social networks, updating energy groups' web page, developing printed communication materials etc. This role can be given to a member of an energy group, but could also be outsourced should the management of the group find it necessary.

All of the involved key persons need to work closely with external service and work providers who will be in charge to develop needed technical documentation and also perform works related to installation of chosen technology.

Depending on the activities of the energy group, it is desirable that key persons in the citizen energy group are active members of different professions who can contribute their knowledge to the planned activities, whether by preparing feasibility studies, project documentation, financial analysis, administration, media promotion, etc. Possible organigram of such a citizen energy group is shown below as figure 5.

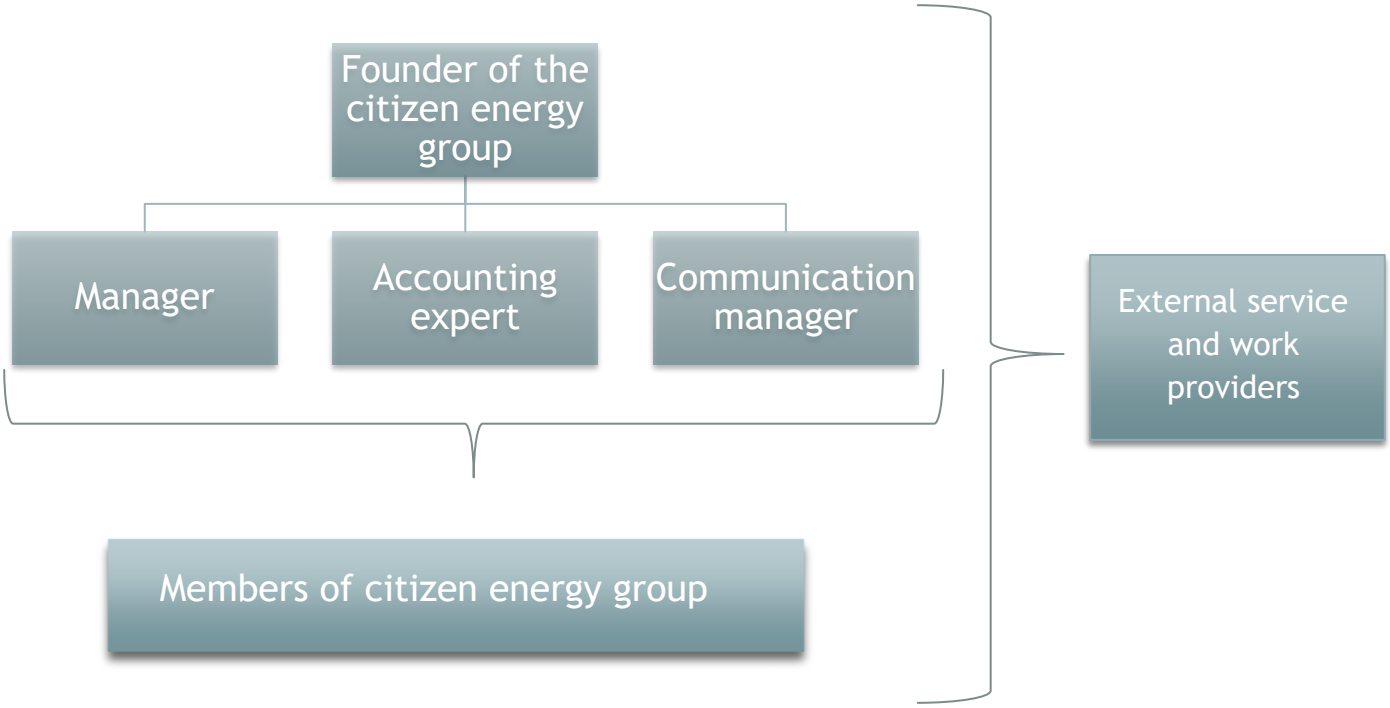


Figure 5 Organigram of potential citizen energy group

C. Implementation

C.1. Implementation of chosen measure (pilot project)

Once the process of selecting relevant energy project is finished, the next step is implementation of the same. This phase includes developing relevant technical documentation, finding funding options, engaging external service and work providers, construction works, communication activities and monitoring of the project for certain period of time. In this step it is important to involve citizens and external service and works providers to ensure sustainability of the project. Pupils and students can be involved in the implementation of the measure in terms of education.

C.1.1. Funding possibilities

Funding option that has been most widely used for this kind of projects have been various EU programmes and funds. This option provides different types of funding opportunities such as grants, loans, guarantees, subsidies and prizes. Depending on the type of investment, there are several possible sources of financing in the period from 2021 to 2027. The European regional development fund (ERDF) is one part of the European Structural and Investment Funds (ESIF) and is available in all EU countries.

The European Commission has published a Renovation Wave Strategy aimed at improving the energy performance of buildings, in what is expected to cut emissions, increase the reuse and recycling of materials, boost post-COVID recovery, reduce energy poverty, and help the European Union (EU) achieve its goal to become climate-neutral by 2050. The Renovation Wave Strategy aims to at least double renovation rates over the next ten years, seeking to ensure that 35 million buildings are renovated and up to 160,000 additional green jobs created in the construction sector by 2030, according to a press release from the commission.

In September, the European Parliament approved a report on maximizing the energy efficiency potential of the EU's building stock, calling for a faster and deeper renovation of buildings and supporting the launch of an EU-wide rooftop solar program.

The Recovery and Resilience Facility is another new funding option that will make €672.5 billion in loans and grants available to support reforms and investments undertaken by Member States. The aim is to mitigate the economic and social impact of the coronavirus pandemic and make European economies and societies more sustainable, resilient and better prepared for the challenges and opportunities of the green and digital transitions. Each recovery and resilience plan will have to include a minimum of 37% of expenditure related to climate. Progress towards other environmental objectives is also important, in line with the European Green Deal.

As for the funding options on national, regional and local level, each country usually has its own options and rules. In the table below, specific funding opportunities in 5 central European countries are listed.

Apart from public funding options, it is also possible to use commercial bank loans, energy performance contracting (EPCs), ESCOs, crowdfunding/crowdinvesting, public-private partnerships (PPPs) and other similar non-conventional and innovative mechanisms.

Table 3 Country specific funding options

Country	Specific funding options
Italy	In Italy there are several funding initiatives, mainly at a national level and addressed to different actors and for different type of investment. For the Administrations the main incentives come from Kyoto rotative funds, European Funds managed by the Regions, Ministerial funding calls, Conto Termico. These options finance approved projects. For the citizens the main incentives are given after refurbishments in the form of tax deductions of a certain percentage (36%, 50%, 65%, 85%, 110%) of the expenses depending on the type of investment.
Slovenia	At the national level, there is the possibility of funding from Slovenian Environmental Public Fund (Eco Fund) – state resources through the climate fund. Every year, the Eco Fund announces a call for loans for citizens, companies and municipalities for investments in RES. Local and regional sources of funding are not available. The pilot project will be co-financed with contributions from cooperatives.
Hungary	A national "Pilot project promoting the establishment and operation of energy communities" (2020-3.1.4-ZFR-EKM) was announced in 2020: • Project duration: max. 24 months • Funds available per project: HUF 100 M-1 Bn • Beneficiary groups: Institution of higher education, Enterprise-based research organisation, Enterprise (non-research type), Other non-profit organisation (outside research) • 7 applications have been funded • Form of support: non-refundable support The social consultation of the draft call entitled "Energy modernization of municipal buildings, energy communities" (code number VMOP-2.1.1-21) has started in 2020 December: • Project period: 2021-27 • Implementation of the project within 36 months • Support for 950 local governments • Non-refundable support
Croatia	In addition to operational, cross-border, and transnational financing programs, in Croatia in the field of energy efficiency and renewable energy sources, there is a Fund for Environmental Protection and Energy Efficiency that co-finances projects related to more efficient energy use at the national level. In addition, local self-government units may also respond to calls from the Ministry of the Economy and Sustainable Development and the Ministry of Regional Development and European Union Funds. National calls have limited freedom in creating a pilot project, i.e. specific activities and equipment are co-financed in accordance with the goal of the public call.
Poland	Pilot actions may be financed from the commune's own funds or with the support of EU funds. There are possibilities of obtaining support from national funds under the National Fund for Environmental Protection and Water Management and the Regional Operational Program of the Lubelskie Voivodeship (RPO).

C.1.2. Life cycle of the investment

Life cycle refers to the material and technical means that are usually part of the pilot. While this is not the primary goal of the project, it is important to take care to choose products that do not contribute significantly to environmental pollution, whether during production, use, reuse or final disposal.

It is important to properly dimension the technical system, and take care of the amount of energy invested in the production of the device and how much the same system will contribute to reducing consumption or emissions during its projected service life. The oversizing of the system as well as the occasional use negatively contribute to the viability of the project. The system needs to be optimally designed, placed so that it will not affect the current production, e.g. it is not convenient to install solar power plants on arable land, properly maintain it so that we have as long a service life and as little as possible to affect the environment.

In addition to energy viability, it is important to take care of the financial balance. The energy produced or saved by installing a pilot project must have a reasonable price, that is, we need to take care of the ratio of "obtained green energy" and the cost of investment.

In the figure below, the life cycle of each product is graphically shown. It is visible that various stages of use, reuse and disposal have to be taken into account while planning the project investment and purchasing goods.

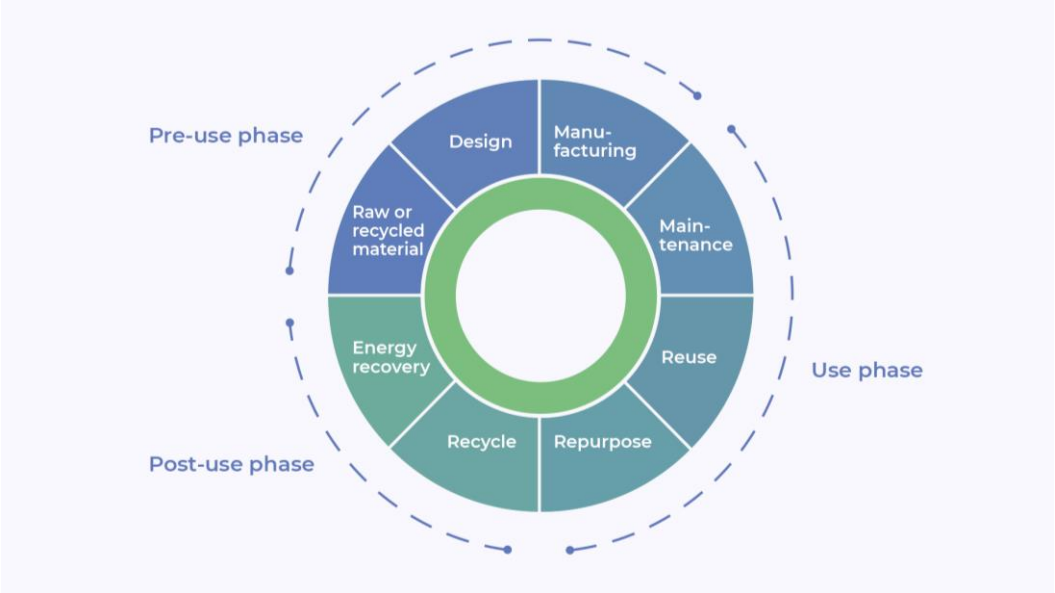


Figure 6 Products life cycle (https://baxcompany.com/insights/circularity-of-polymer-composites/life-cycle-strategy/)

C.1.3. Replication

Replication of pilot activities is very important in order to expand the idea realized by the pilot project and bring significant energy savings. Best practice on how to encourage citizens to do environmental activities is to give them a real example of good practice in their environment. It is therefore important to make efforts not only in the implementation of the pilot project but also in its replication.

All phases of design, execution and implementation of the pilot project should be as close as possible to the citizens, in terms of availability of data such as permits, costs, the problem they encounter, and the degree of utilization of a particular measure. For example, if a solar power plant is being built on one of the public buildings, it is desirable to place a panel in the lobby or application on the institution's website where the building's consumption, electricity produced, electricity bills before and after the power plant would be visible.

If we want to encourage the replication of any relevant project implemented in each local community, as much information about the pilot project as possible has to be made publicly available through different communication channels. This way interested citizens and entrepreneurs can get the necessary information, develop their ideas, upgrade to existing projects and, with the help of certain of the funding models, replicate the measure to their advantage but also to the general community needs.

D. Conclusion

The decision of an individual city or municipality to change direction in terms of energy, and turn to a green transition is linked to the activities that need to support such a decision. One of the first steps is to analyse the situation in the municipality or city, and according to the results plan steps or measures to reduce the consumption and use of renewable energy sources. Such an analysis is provided by the Sustainable Energy and Climate Action Plan (SECAP).

Given that industry and citizens spend the most energy, the task of local governments is to encourage them to change. One of the ways is through pilot projects where, in addition to energy savings, a very important goal is obtained, and that is to encourage citizens to make private investments in green energy production.

This document presents a framework for a pilot investment, a way to involve citizens and form energy groups. Examples of planning documents in partner countries, possible ways of financing and the main factors that need to be taken into account in order to achieve the objectives of the pilot project are presented. The success of the pilot project is visible only after a certain time after its start, when it is clear whether the project has been successfully expanded or whether there are similar privately owned projects and to what extent direct energy consumption has decreased.

SOURCES

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