T3 FOSTERING THE CO-CREATION OF LOCAL ENERGY COOPERATIVES AND IMPLEMENTATION OF CITIZEN BASED PILOT ACTIONS

# D.T3.14.1 – Mid-term evaluation report on 9 2021 pilot project implementation

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# 1. Introduction

The Mid-term evaluation report is made providing horizontal analysis of all pilot projects with a focus on toolbox testing in real case scenario. The questionnaire has been developed and sent to all partners. The questions comprised of several topics.

First, they were asked to describe in short, their pilot investment. Secondly, the information on establishing of citizen energy group in their region was given; how are the roles of members distributed and did they use Tool 1 (Co-design workshop methods for engaging participants into local energy planning) in establishing process and to what extent. In this part partners were also asked their opinion on the necessity of updating Tool 1.

Planning of pilot investment and evaluation of parameters taken into account in the process, is a topic that was investigated in the third part. Partners were asked to rate the parameters from 1 to 5 and to give an explanation on the rating itself. They were also asked to elaborate how they used Tool 2 (Community energy investment guidelines – technical, business and legal aspects) while planning the pilot investment in their region as well as if they consider the tool should be updated and in what manner.

Finally, it was inquired what is the current status of the pilot project implementation. Linked to this topic, usage of Tool 3 (Communication methods for local energy plans and creating an atmosphere of acceptance) was inquired upon among participating partners.

Results of this questionnaire is presented in following chapters, for each country individually. At the end of the document the information received is evaluated and delivered as integrated evaluation as well as recommendation for toolbox refinement.

# 2. Pilot project implementation

## 2.1. Germany

A battery swarm pilot project (PP08) is intended to generate technical, regulatory, legal and economic experience for planners, installers and operators at several locations and in the municipal electricity grid. This pilot project and the associated investments therefore address a number of objectives. With this initial investment and hands on experience, then the strategy will be further developed together the citizens and all relevant stakeholders in order to do a further larger step, afterwards. From today's perspective, a very attractive goal is to supply 10-100 additional locations with battery storage systems and then use them as a larger swarm storage system in the electricity grid.


*Image 1 CO2 Apocalypse Clock in Pfaffenhofen*

A publicity-effective CO2 clock (PP09) is intended to demonstrate the urgency of networked action, where individual citizens can "experience with their hands" which measures have which effects, how dramatic these are; and what they can do themselves. However, this illustration also shows what is necessary on a national, European and international level, i.e., a societal level, to counteract the threat of very dangerous global warming.

The CO2 clock is also a possible bracket for the other pilot projects in the current EU project, in order to show that every step towards improving the energy and climate protection plans, with and through the citizens, is very valuable and purposeful.

### 2.1.1. Establishing of citizen energy groups/cooperatives

In Pfaffenhofen there are active groups of citizens' groups. Therefore, fundamental new foundations of citizen energy groups were not necessary. However, the number of members in the citizens' energy cooperative in particular could be increased by about 100 members. It is important for the motivation of the citizens that each individual project-no matter how small they are-is planned very conservatively and thus the chance for efficient operation and yield is as high as possible.

*Image 2 Moderators, organizers and speakers of the Thinkathon workshop on 17.12.2019.*

The distribution of roles in the citizen energy group arises quite organically through the contribution of personal resources to the work of the groups and their acceptance. It is important that the leadership group acts as a real team and that it is avoided that the leadership personnel do not generate undue, large personal advantages for themselves. The self-motivation of citizens is and remains one of the core success factors for cooperatives. The realization of social values is central for successful projects.

The methods for co-design workshops to involve participants in local energy planning have been developed and tested for many years in Pfaffenhofen and are an integral part of all processes and institutions. Of course, the methods are also improved by taking on board the suggestions and criticisms of the citizens and trying to implement them together in the future. This works particularly well if the citizens who have these suggestions can be actively involved in joint projects.

### 2.1.2. Planning of pilot investment

Below it is shown which parameters and in what extent were taken into account while planning pilot investment in Pfaffenhofen.

*Table 1 Rating of pilot planning parameters in Germany*

| | | | | | |
|---|---|---|---|---|---|
| Energy consumption prior to the investment | ☐ 1 | ☐ 2 | ☐ 3 | ☐ 4 | ☒ 5 |
| Real needs and goals of municipality/region | ☐ 1 | ☐ 2 | ☐ 3 | ☐ 4 | ☒ 5 |
| Total investment cost | ☐ 1 | ☐ 2 | ☐ 3 | ☒ 4 | ☐ 5 |
| Technical possibilities | ☐ 1 | ☐ 2 | ☐ 3 | ☒ 4 | ☐ 5 |
| Possible funding outside ENES-CE project | ☐ 1 | ☐ 2 | ☐ 3 | ☐ 4 | ☒ 5 |
| Sustainability of investment | ☐ 1 | ☐ 2 | ☐ 3 | ☐ 4 | ☒ 5 |
| Influence on citizens | ☐ 1 | ☐ 2 | ☐ 3 | ☐ 4 | ☒ 5 |
| Life cycle of the investment | ☐ 1 | ☐ 2 | ☐ 3 | ☒ 4 | ☐ 5 |
| Possible replication of the investment | ☐ 1 | ☐ 2 | ☐ 3 | ☐ 4 | ☒ 5 |

In the table above mark 1 means this parameter was not taken into account at all, and mark 5 means this parameter has been taken into account completely.

The following explanations for the grading were given:

- Energy consumption prior to the investment: Energy consumption and investment are coupled variables, which is why both are always considered together and reconciled.
- Real needs and goals of region: Only when there is a real need do citizens become active. These goals in the region are important, but a successful pilot project also releases new resources and higher-level goals are sometimes adjusted as a result.
- Technical possibilities: A pilot project should of course be technically feasible. However, the technical hurdles are usually much smaller than the regulatory and economic hurdles.
- Possible funding outside ENES-CE project: In fact, grants are really very important. On the one hand, projects can be tackled that perhaps would not be realized or would be realized much later, and on the other hand, broad publicity is guaranteed through funding. Both become synergetic together, which is why funding for pilot projects is enormously important.
- Sustainability of investment: The sustainability of investments is a matter of course for our citizen and stakeholders.
- Influence on citizens: Since the citizens are always part of the planning and the investment, the influence of the citizens is extraordinary.
- Life cycle of the investment: The life cycle of the investments is a matter of course for our citizen and stakeholders.
- Possible replication of the investment: Particularly with our investment pilot projects, we naturally make sure that you can initiate further and several new projects with it. However, the demonstration and publicity aspects are also very important to us.

While planning the pilot investment in Pfaffenhofen, previously developed Tool 2 has been used to calculate profitability for the battery swarm storage pilot project.

### 2.1.3. Implementation of pilot action

The pilot investment in Germany has passed planning stage, procurement has been implemented and the works and equipment has been contracted.

The citizens were interested to participate in implementation of energy projects prior to the ENES-CE project, but new impulses from the ENES-CE project were obtained. The exchange between project participants and the EU partners has also led to new insights and further commitment. The energy plans are constantly updated, especially as new energy projects are added. The citizens are very well involved in the pilot projects.

Based on the communication methods for local energy plans, the attention of the pilot project was increased again. For example, elements of Tool 3 to promote the CO2 clock even more were used. Among other things, this helped that the regional media reported very positively about the ENES-CE pilot project. Tool 3 will continue to be used for the battery swarm storage pilot project.

There still may be potentials in the social media field that could be leveraged. Detailed analysis of this is to be carried out in the latter phases.

## 2.2. Italy

In Forlì the ENES-CE Energy Group collects people interested to save energy in everyday life and is going to find some possibilities to purchase high-efficiency equipment joining their demands. The energy kit distributed as a project pilot action helped in finding sensitized people and in inviting them to cooperate and brainstorming about joint activities.

The selected modality for the implementation of the pilot actions is the distribution of 100 Energy Saving Kit to be handed at the municipal Energy Help Desk in the offices of the in-house society FMI s.r.l. The Energy Service Kit is composed by technical devices, which are intended to be helpful in measuring the use of energy in everyday domestic life. In more detail, the equipment handed out are the following:

- A thermo-hygrometer and CO2 air monitoring device;
- A power and energy plug-in measurer;
- A Luxmeter;
- A high-efficiency LED lamp.


*Image 3 Energy Service Kit*

To the Energy Saving Kit is associated a User's Manual, which displays the main features of the devices and how they can be used to improve the energy efficiency at home.

Anyone who refers to the Energy Help Desk can request the Energy Saving Kit and leave his/her e-mail address to be contacted for any further activities of the Consumer Energy Group.

Besides the distribution of such technical equipment, the Municipality of Forlì purchased 200 Solar Toys to be handed out to any parent who request it at the Energy Help Desk for his/her child, or to be

distributed during some next educational activities in schools: the energy saving subject can be taught to children through the use of renewable energy in such everyday life activity as playing.


*Image 4 Solar Toys*

### 2.2.1. Establishing of citizen energy groups/cooperatives

The established Energy Group in Forlì is mainly composed by sensitized citizens who care about the issue of energy efficiency and renewable energy.

Workshops and public events were the places where the word could be better spread. For the Municipality of Forlì, FMI raised the involvement of the participants and distributed the ENES-CE pilot action's Energy Saving kit, collecting the willing of participate in the Energy Group's activities.

The participants are now members in a mailing list and are going to be involved with each other in activities to join their demands and evaluating some collective purchase in the frame of energy efficiency devices or renewable energy plants.

Tool 1 – Co-design workshop methods for engaging citizens into local energy planning, made available by the project partners was used during the workshops and the events and lead to the decision of hiring a professional communicator to ease the relationship between the interested people.

Besides, the production of two videos with the involvement of professional video-makers and carried out through the engagement of primary school pupils in educational laboratories helped in giving visibility to the project and sensitizing the citizens.

### 2.2.2. Planning of pilot investment

Below it is shown which parameters and in what extent were taken into account while planning pilot investment in Forli.

*Table 2 Rating of pilot planning parameters in Italy*

| | | | | | |
|---|---|---|---|---|---|
| Energy consumption prior to the investment | ☐ 1 | ☐ 2 | ☐ 3 | ☒ 4 | ☐ 5 |
| Real needs and goals of municipality/region | ☐ 1 | ☐ 2 | ☐ 3 | ☒ 4 | ☐ 5 |
| Total investment cost | ☐ 1 | ☐ 2 | ☒ 3 | ☐ 4 | ☐ 5 |
| Technical possibilities | ☐ 1 | ☐ 2 | ☐ 3 | ☒ 4 | ☐ 5 |
| Possible funding outside ENES-CE project | ☐ 1 | ☐ 2 | ☒ 3 | ☐ 4 | ☐ 5 |
| Sustainability of investment | ☐ 1 | ☐ 2 | ☒ 3 | ☐ 4 | ☐ 5 |
| Influence on citizens | ☐ 1 | ☐ 2 | ☐ 3 | ☒ 4 | ☐ 5 |
| Life cycle of the investment | ☐ 1 | ☒ 2 | ☐ 3 | ☐ 4 | ☐ 5 |
| Possible replication of the investment | ☐ 1 | ☐ 2 | ☐ 3 | ☒ 4 | ☐ 5 |

In the table above mark 1 means this parameter was not taken into account at all, and mark 5 means this parameter has been taken into account completely.

The following explanations for the grading were given:

- Energy consumption prior to the investment: Since every citizen has to face energy consumptions in everyday life, the importance of being aware of losses and inefficiency is crucial.
- Real needs and goals of region: A large base of citizens aware and active in the field of energy efficiency is an important achievement to fulfil the SECAP's goals.
- Technical possibilities: The energy saving kit distributed as pilot project is a collection of technical devices useful to take a new generation of instruments into the houses of citizens and in their everyday life.
- Possible funding outside ENES-CE project: The energy group started within the ENES-CE project, may take its step forward outside the EU funding, for example joining the demand of high-efficiency devices in order to make some collective purchase and obtain significant discounts by the retailers.
- Sustainability of investment: The hand-given energy efficiency kit intends to raise a cultural awareness in terms of energy and environmental impact of everyday action and in terms of economic losses due to energy inefficiencies.
- Influence on citizens: The engagement and the sensitization of the citizens is slowly built step by step, through the work of a professional communicator, the production of professional videos with the students of the local schools, and thanks to a direct contact with the people in public events.
- Life cycle of the investment: The Energy Group is not considering any huge investment and the scale of the investment is in maximal part into cultural initiatives without any important impact on physical resources.

- Possible replication of the investment: The Energy group and the energy saving kit are replicable, and within the activities of the group other positive experiences are replicable too.

The possibility given by energy communities in Italy are available from mid-2021 and there is not a certain and definite set of rules to implement such kind of activities.

Since the interest in the sector is raising (even in the legislator's side) Tool 2 will be more and more useful and applicable in the next years and it will be at disposal for anybody will attend the Municipal Energy Help Desk in future.

*Image 5 1st workshop in Municipality of Forli*

### 2.2.3. Implementation of pilot action

All stages of the pilot investment in Italy have already been implemented.

Although the issue of the use of the energy is not so popular among the citizens, many people showed interest and curiosity and having a personal contact during public events (when it was possible to organize them in presence) lead to increase the involvement and the willing of better understand how to improve their own energy efficiency at home.

The distribution of the pilot project's energy kit gave the opportunity to tackle the citizens' interest and examine more in depth the opportunities of a Consumer Energy Group and the issues defined in the Sustainable Energy and Climate Action Plan (SECAP).

Tool 3 was very useful to define the communication strategy, to individuate the correct targets, and to define some communicative methods within the Municipality's staff and with the professional communicator hired to facilitate the workshops and the events.

## 2.3. Poland

There are plans to create an energy-saving community in the Lubelskie Voivodeship, in the Niemce Commune. The form of the establishment is an energy cluster with the possibility of transforming it into a citizen energy cooperative in the future.

In Lubelskie Voivodeship the pilot investment will not be financed from ENES-CE project but only the ecological education action.

The pilot action within the ENES-CE project will take place in the Niemce Commune in the Lubelskie Voivodeship after the creation of the energy cluster. The pilot action will consist of ecological education.

In addition, the Niemce Commune received in 2021 a co-financing for PV installations. It is one of the priority investment projects in RES in the commune with the engagement of the citizens in the planning and implementation phase. The residents of the Niemce Commune (private users, as the target group) will be direct users of the installation being the subject of the project.

This project is not financed by the ENES-CE project. It is co-financed by the funds of the European Regional Development Fund under the Regional Operational Program for the Lubelskie Voivodeship 2014-2020.

The Niemce Commune has signed a grant agreement for the co-financing of PV installations for 354 private facilities/households in the Commune with a total capacity of 1.269 MW.

It will be the realization of the fifth stage of the big project "ECO-effective Gmina Niemce" that has been implemented continuously since 2013. Activities in this fifth stage of the project should be closed to the end of 2022.

It is proposed to continue this project also in the following years until 2030, depending on the financing possibilities.

### 2.3.1. Establishing of citizen energy groups/cooperatives

The citizen energy group has not been established yet in Lubelskie Voivodeship. The expert is still working on providing well-prepared materials. Therefore, his contract was annexed, thus transferring the task of creating the group to the next stage of the project implementation.

During workshop 1 in 2021 on 20.07.2021 proposals were presented for future possible projects, measures until 2030 with a perspective until 2050. These recognized the needs and suggestions of stakeholders, potential energy cluster partners. The idea of creating an energy cluster in the Niemce Commune was also presented. The next steps in the project were discussed too.

The distribution of roles between the members of the citizen energy group was discussed, including the vision of the future cooperation and gathering the information to be included in the proposed documents, i.e., a draft of the civil law agreement for the creation of a civic energy group in the form of an energy cluster in the Niemce Commune, in the Lubelskie Voivodeship.

One of the discussion points was the proposal that in the case of implementation of "Cluster Projects", which will be financed from external funds, partners should conclude separate agreements strictly regulating the rules of making financial, material and other asset contributions.

It was resolved that the participation in the energy cluster should be open, based on the principles of voluntary willingness to cooperate on the basis of the principles of cluster functioning. At the same time, the commune declared that it would initially assume the function of a coordinator.

*Image 6 2nd workshop in the Niemce Commune in Lubelskie Voivodeship*

The potential members of the energy cluster were motivated by the benefits and possibilities of financing the RES investments in the future as members of the energy cluster, which were presented during the meetings.

There were regular workshop meetings with the stakeholders in the ENES-CE project included presentations and discussions about the commune-citizens joint activities in the ENES-CE project and next steps/activities.

Common values and goals were presented, the project idea, the engagement in the project of active politicians from the commune were shown and discussed along with the proposals of the RES investments with the citizens. Experts from a different range of areas, entrepreneurs, the energy advisor and the external Expert participated in the meetings.

Each workshop was moderated primarily by an External Expert or Niemce Commune representatives. Secondary and tertiary moderators were among the audience, their role was to bring new impulses into the discussions; these were the energy advisor or the ENES-CE project coordinator, and the representatives of the Marshal Office of the Lubelskie Voivodeship in Lublin.

The Energy Advisor and the external Expert played an important role in informing and explaining the complexities of the topic. The professional knowledge of the energy advisor or the external expert,

combined with plain/down-to-earth language provided a comprehensive and comprehensible picture of creating a citizen energy group and its activities, related to investments in renewable energy.

As moderators they passed the ball to and supported each other – they were asking questions to the participants to involve them in the interactive discussion, ensuring that the participants were active and free to ask questions, describe their goals, and expectations.

The meetings were concluded with a summary of the discussion points and the invitation to the next workshop, including the description of the following steps in the project.

Tool 1 is optimal to be used for mow, but in the future, it should be updated and adapted depending on the technical possibilities to reach the audience.

### 2.3.2. Planning of pilot investment

Below it is shown which parameters and in what extent were taken into account while planning pilot investment in Niemce Commune.

*Table 3 Rating of pilot planning parameters in Poland*

| | | | | | |
|---|---|---|---|---|---|
| Energy consumption prior to the investment | ☐ 1 | ☐ 2 | ☐ 3 | ☐ 4 | ☒ 5 |
| Real needs and goals of municipality/region | ☐ 1 | ☐ 2 | ☐ 3 | ☒ 4 | ☐ 5 |
| Total investment cost | ☐ 1 | ☐ 2 | ☐ 3 | ☐ 4 | ☒ 5 |
| Technical possibilities | ☐ 1 | ☐ 2 | ☐ 3 | ☐ 4 | ☒ 5 |
| Possible funding outside ENES-CE project | ☐ 1 | ☐ 2 | ☐ 3 | ☐ 4 | ☒ 5 |
| Sustainability of investment | ☐ 1 | ☐ 2 | ☐ 3 | ☒ 4 | ☐ 5 |
| Influence on citizens | ☐ 1 | ☐ 2 | ☐ 3 | ☒ 4 | ☐ 5 |
| Life cycle of the investment | ☐ 1 | ☐ 2 | ☒ 3 | ☐ 4 | ☐ 5 |
| Possible replication of the investment | ☐ 1 | ☐ 2 | ☐ 3 | ☒ 4 | ☐ 5 |

In the table above mark 1 means this parameter was not taken into account at all, and mark 5 means this parameter has been taken into account completely.

The following explanations for the grading were given:

- Energy consumption prior to the investment: Needs defined by residents, by specifying the annual electricity consumption.
- Real needs and goals of region: Reduction of CO2 emissions.
- Technical possibilities: Roofs/properties of the inhabitants of the Niemce Commune, signing a building lease agreement for the PV assembly.
- Possible funding outside ENES-CE project: Co-financing by the funds of the European Regional Development Fund under the Regional Operational Program for the Lubelskie Voivodeship 2014–2020.
- Sustainability of investment: Reduction of CO2 emissions through RES energy production.
- Influence on citizens: Lower energy prices, improved air quality by reduction of CO2 emissions.

- Life cycle of the investment: The Beneficiary is obliged to maintain the durability of the project for a period of 5 years from the date of the final payment to the Beneficiary.
- Possible replication of the investment: A proposal to continue the project in the future.

During workshop 2 in 2020 the external Expert presented Tool 2, the community projects assessment tool, created by the Croatian partner as part of the ENES-CE project and comments provided by the Lubelskie Voivodship developed by an expert, involved in the project.

During workshop 3 in 2020 the expert talked about the commune's priority activities and investments in renewable energy (e.g. project of PV installations) based on Tool 2 developed in the ENES-CE project.

Tool 2 should be updated or adapted considering user experience and also depending on the specific nature of projects.

### 2.3.3. Implementation of pilot action

In Lubelskie Voivodship the pilot investment will not be financed from ENES-CE project, only the ecological education action. This pilot action activity is currently in the planning phase.

During the workshops the participants agreed that it is necessary to conduct an educational campaign as part of meetings with residents and other stakeholders in order to raise awareness of the problems of low emission, present opportunities to engage in joint activities to reduce CO2 levels in the commune and improve air quality through individual actions or as part of cooperation in the citizen energy group.

The Expert proposed replacing low-power combustion sources in the municipal and household sector with coal-fuelled eco-design boilers, or gas- or biomass-fuelled boilers in 440 residential buildings in all the commune by 2030. The continuation of the projects in a longer time frame is planned until 2050.

At the same time, it was resolved that the investment projects for the replacement of combustion sources could be preceded by "an ecological education plan for the community, as part of information and promotional meetings aimed at raising awareness of the possibility of reducing low emissions in the commune, the possibility of choosing air quality notification systems in the future" as part of the ENES-CE project.

The expert also proposed to continue the activities in the following years until 2050 by conducting an "educational and information campaign to raise awareness about energy efficiency (EE) and the related possibilities of financing investment activities" by the commune, e.g. as part of the activities of the commune, energy engineer or an external expert, or as part of an energy cluster activity.

The concept of the pilot action (ecological education action/plan) will be presented to the workshop participants during workshop 2 in 2021.

One of the priority investment projects in RES is already being realized in the Niemce Commune with the engagement of the citizens, namely "Eco-Effective Niemce Commune Stage V". The subject of the project is the delivery and assembly of 354 PV installations in the Niemce Commune, but this

investment is not financed from the ENES-CE project. It is co-financed by the European Regional Development Fund under the Regional Operational Program for the Lubelskie Voivodeship 2014–2020. The residents of the Niemce Commune (private users, as the target group), will be direct users of the installation being the subject of the project.

The citizens were interested to participate in the implementation of energy projects prior to the ENES-CE project especially in the installation of photovoltaic panels in cooperation with the Niemce Commune and residents.

During the ENES-CE project the interest in the investments in PV installations and other investments in RES in cooperation with the Niemce Commune or individuals increased. The decision on energy investments depends on the possibility of receiving co-financing in the new financial perspective.

Tool 3 – Communication methods for local energy plans and creating an atmosphere of acceptance, presents communication channels for 4 key groups that need to be informed about local energy plans and initiatives. These stakeholders are children, families, the business sector and the elderly.

During workshop 3 in 2020 the revised energy plan was presented also to a wider public.

In the aspect of digital communication, there are and will be: the web homepage of the Niemce Commune and also a Facebook page of the Commune.

It is difficult to reach the business sector by Twitter, Instagram or LinkedIn because not everyone uses it. Also, the Commune does not have it.

Before and during the workshops, brochures were distributed to provide information about the project to reach workshops participants. Short case study examples were presented along with the regular presentations. The investments in RES were described using simple descriptive language.

We are considering making a video clip (e.g. with the phone) to promote the activities of the citizen energy group after its formation.

Tool 3 should be updated depending on the developed of technical communication possibilities in the future.

## 2.4. Slovenia

Pilot investment will support the public lightning as one of the main actions of the energy plan. Renovation of public lightning along public roads and public areas is going to be made in accordance with the Decree on limit values due to light pollution of environment, with amendments and supplements.

The pilot action of smart public lightning will be implemented and will include an action of maximum 15.000 EUR. Equipment for smart lightning solution with sensors that adjust the power of lightning to the actual needs in real time according to traffic load, pedestrian traffic, time of day and given weather conditions will be installed on the roads in rural area. This type of technical solution is suitable for areas where maximum lightning power is not constantly required - for roads or streets with less traffic. Energy savings and operating costs of such systems, together with LED lightning technology, will

contribute to lower lighting costs, i.e. dimming, on the other hand, will prolong the life of the lamps and further contribute to the reduction of light pollution.

### 2.4.1. Establishing of citizen energy groups/cooperatives

Within the pilot action Municipality of Koper will support the creation of a solar energy cooperative. The Community Solar Power Plant is a project where a group of individuals unites in the desire to produce electricity from a clean source - the sun. The reason for joining the cooperative can be either that as individuals they do not have enough funds for the realization of their own project, or they want to implement such a project as a community. This means that the decision-making on the concrete elements of the project and its placement is carried out in a participatory way - both within the community that invests in the project and in the environment where the project will be realized.

In the area of the Municipality of Koper there is a great potential for the use of solar energy, unfortunately its exploitation is still minimal. With our help, solar energy cooperative will be established in the rural area of the municipality, where local communities and their inhabitants will be invited to take an active part. All members of the cooperative are equal members. The cooperative is represented by the president of the cooperative.

Tool 1 was used to engage the stakeholders during the Workshops and to reach a wider public. There is no need for updating Tool 1 for the Slovenian situation.

*Image 7 Follow-up workshop on establishing the solar cooperative in Sv. Anton*

### 2.4.2. Planning of pilot investment

Below it is shown which parameters and in what extent were taken into account while planning pilot investment in Municipality of Koper.

*Table 4 Rating of pilot planning parameters in Slovenia*

| | | | | | |
|---|---|---|---|---|---|
| Energy consumption prior to the investment | ☐ 1 | ☐ 2 | ☐ 3 | ☒ 4 | ☐ 5 |
| Real needs and goals of municipality/region | ☐ 1 | ☐ 2 | ☐ 3 | ☒ 4 | ☐ 5 |
| Total investment cost | ☐ 1 | ☐ 2 | ☐ 3 | ☒ 4 | ☐ 5 |
| Technical possibilities | ☐ 1 | ☐ 2 | ☐ 3 | ☐ 4 | ☒ 5 |
| Possible funding outside ENES-CE project | ☐ 1 | ☐ 2 | ☐ 3 | ☒ 4 | ☐ 5 |
| Sustainability of investment | ☐ 1 | ☐ 2 | ☐ 3 | ☐ 4 | ☒ 5 |
| Influence on citizens | ☐ 1 | ☐ 2 | ☐ 3 | ☒ 4 | ☐ 5 |
| Life cycle of the investment | ☐ 1 | ☐ 2 | ☐ 3 | ☐ 4 | ☒ 5 |
| Possible replication of the investment | ☐ 1 | ☐ 2 | ☐ 3 | ☐ 4 | ☒ 5 |

In the table above mark 1 means this parameter was not taken into account at all, and mark 5 means this parameter has been taken into account completely.

The following explanations for the grading were given:

- Energy consumption prior to the investment: After the replacement and upgrade of electric lights, the annual electricity consumption will be reduced by at least 7,700 kWh/year. The purpose of the project is to increase the energy efficiency of public lighting, which is achieved by replacing technologically obsolete, energy-intensive lamps and installing modern, environmentally friendly and energy-saving lamps.
- Real needs and goals of region: **no explanation given*
- Technical possibilities: Various technical options were considered, then the most relevant was selected.
- Possible funding outside ENES-CE project: If there are not enough funds available for the investment, we will add the rest from the municipal budget.
- Sustainability of investment: The investment will contribute to greater sustainability of the municipality and region.
- Influence on citizens: The municipality wants to become a good example to citizens in energy use and reduction of light pollution.
- Life cycle of the investment: Life cycle of the investment is important for the citizens.
- Possible replication of the investment: If the investment proves to be effective, investments in smart lights will continue in other areas. Smart public lighting is replicable.

Tool 2 was used in the first steps of planning the pilot investment and will be used in future.

### 2.4.3. Implementation of pilot action

Prior to the ENES-CE project, citizens were involved in various energy projects. Their interest has increased during the implementation of project ENES-CE activities. The attendance of the second workshop as part of the establishment of the solar cooperative was excellent. More than half of the participants has expressed the interest in joining the cooperative. Participants were invited to the workshop with an invitation received by each household in the local community of Sv. Anton.

For pilot investment we have published a public tender and have received three offers. We will now sign the contract. After signing the contract, the contractor will start with work and the pilot investment will be finished by 30. 11. 2021.

Tool 3 was used in communication with citizens and presenting revised local energy plan. The tool will also be used in the next steps in setting up the solar energy cooperative. The Tool itself does not need to be updated as it is prepared very professionally.

## 2.5. Croatia

Town of Prelog in cooperation with Medjimurje Energy Agency Ltd. has implemented several workshops from year 2019 until the finalization of creation of citizen energy association in year 2021. These workshops combined with other relevant communication activities have triggered involvement of interested citizens in process of revision of current energy plan (SEAP), development of new energy plan (SECAP) and identification of most relevant measures to be implemented in Town of Prelog.

Three most relevant measures for implementation in Town of Prelog have been identified:

- Installation of photovoltaic powerplants on public buildings;
- Workshops for local entrepreneurs on financing energy projects;
- Bike sharing project and construction of bike lanes.

During the communication with citizens and newly established energy association, it has been determined that a photovoltaic powerplant will be installed on the roof of Kindergarten “Fijolica” in Prelog as a pilot investment.

The building of this kindergarten has been energy refurbished within last two years and is now in energy class B for the specific annual needed heat energy and A+ for the specific annual primary energy. It has flat roof and there are already installed solar collectors for hot water. The rest of the roofs free area will be used to install photovoltaics.


*Image 8 The building of Kindergarten "Fijolica" in Prelog*

It has been agreed with all involved relevant stakeholders that the new PV powerplant will have the power of 50 kW. The cost of such a plant exceeds the budget allocated in projects’ Application Form for implementation of pilot activities (15.000,00 €), so the rest of the funds will be covered from the budget of Town of Prelog. Total cost of the investment has been estimated at around 49.000,00 €.

*Image 9 Roof area of the Kindergarten "Fijolica" in Prelog*

### 2.6.3. Establishing of citizen energy groups/cooperatives

The basis of the acceptance atmosphere was established through marketing and communication activities as well as three workshops for wider audience in the first part of project implementation. The following three workshops (in late 2020 and first half 2021) were organized to determine main participants of the newly established energy group as well as legal requirements and limitations.

It has been determined that, according to the current legislation on Croatia, most suitable form of energy group to establish would be citizen energy association. The founding assembly was held between 2nd and 3rd workshop in 2021 i.e. on July 7th 2021. The president, vice-president and management board were defined, the name of the association ("Green Energy Club Prelog") was determined and members enlisted.

The association is open for anyone to join and its main goals are sustainable development, development and implementation of energy and climate projects, environmental protection and cooperation with other similar organization to satisfy its main goal.

The Town of Prelog as well as Medjimurje Energy Agency Ltd. have been supporting the establishment of the association from the beginning and will do so through the course of its actions in the future.

Tool 1 has been used in organization of workshops for citizens and other interested stakeholders in Town of Prelog.

The Tool is well developed and useful, however, it should be updated regularly in accordance to new needs of the users and target groups.

### 2.6.4. Planning of pilot investment

Below it is shown which parameters and in what extent were taken into account while planning pilot investment in Town of Prelog.

*Table 5 Rating of pilot planning parameters in Croatia*

| | | | | | |
|---|---|---|---|---|---|
| Energy consumption prior to the investment | ☐ 1 | ☐ 2 | ☐ 3 | ☐ 4 | ☒ 5 |
| Real needs and goals of municipality/region | ☐ 1 | ☐ 2 | ☐ 3 | ☐ 4 | ☒ 5 |
| Total investment cost | ☐ 1 | ☐ 2 | ☐ 3 | ☒ 4 | ☐ 5 |
| Technical possibilities | ☐ 1 | ☐ 2 | ☐ 3 | ☐ 4 | ☒ 5 |
| Possible funding outside ENES-CE project | ☐ 1 | ☐ 2 | ☐ 3 | ☐ 4 | ☒ 5 |
| Sustainability of investment | ☐ 1 | ☐ 2 | ☐ 3 | ☐ 4 | ☒ 5 |
| Influence on citizens | ☐ 1 | ☐ 2 | ☐ 3 | ☒ 4 | ☐ 5 |
| Life cycle of the investment | ☐ 1 | ☐ 2 | ☐ 3 | ☒ 4 | ☐ 5 |
| Possible replication of the investment | ☐ 1 | ☐ 2 | ☐ 3 | ☐ 4 | ☒ 5 |

In the table above mark 1 means this parameter was not taken into account at all, and mark 5 means this parameter has been taken into account completely.

The following explanations for the grading were given:

- Energy consumption prior to the investment: Since the building is owned by the Town of Prelog, the consumption is monitored within Energy Management Informational System (ISGE) on a monthly basis. Apart from data from ISGE, electric energy operator was asked to provide 15 minute curves of electric energy work loads and this too was taken into account while planning the pilot investment.
- Real needs and goals of region: It has been identified on several occasions that most potential with RES usage in Medjimurje county lies in solar power. Due to this information and inevitable raise of the electric energy prices, it has been concluded that installation of PV systems on buildings meets regional energy transition goals and leads it to become energy sufficient.
- Total investment cost: Funds that are allocated in the project budget for Prelog pilot investment, are not sufficient to fund whole investment. Town of Prelog agreed to finance the rest of the investment cost from its own budget. However, in the future alternative funding options will be searched for.
- Technical possibilities: Proximity to the electric grid, the state of the grid itself as well as the state of the building on which the PV plant will be installed, has all been taken into account while planning the investment. Technology of the PV modules has also been communicated with experts in this field.
- Possible funding outside ENES-CE project: National Energy Efficiency and Nature Protection Fund (FZOEU) publishes yearly calls to co-fund installation of RES systems in public buildings. There is an option to fund part of the investment that is above budget allocated within this project through applying to named call.
- Sustainability of investment: The calculations show that building owner will have significant decrease in the consumption of electric energy from the grid and thus also smaller energy bills. The excess energy that will be produced during summer times will be used to power electric cars that the Town of Prelog plans to buy in the near future.

- Influence on citizens: Through decrease of the cost of electricity for the kindergarten, saved funds will be invested to raise quality of service given to citizens of Prelog in pre-school education of their children. The comfort of stay in the kindergarten will also increase as will their energy sustainability and independence.
- Life cycle of the investment: The investment will reach point of the return in following several years since the planning has been well performed and calculations prior to the installation conducted.
- Possible replication of the investment: Other public buildings owners will have a chance to see benefits gained through this pilot action and be motivated to install similar systems in their buildings. Since the whole region is small and tightly connected, the replicability of the investment will surely be well represented.

Tool 2 has been used to prepare investor for the pilot investment. Also, its features were presented to the wider public including citizens, to familiar them with the investment and to show how all of the involved stakeholders will benefit from the same.

The Tool will have to be updated regularly with respect to the potential changes in the PV market.

### 2.5.3. Implementation of pilot action

The pilot investment in Croatia is in planning phase. External experts have developed technical project documentation and public procurement documents are now being developed.

Prior to the implementation of ENES-CE project, citizens were sceptic to get involved in energy and climate planning in their communities. It was hard to trigger their cooperation since general attitude was that their ideas will not be taken into account. Through implementation of workshops and communication activities within this project, awareness of the citizens and their cooperation with the Town of Prelog in developing energy and climate plans and projects has increased significantly.

The Town of Prelog in cooperation with Medjimurje Energy Agency Ltd. and interested citizens, has assisted in establishment and starting activities of “Green Energy Club Prelog”, a citizen energy cooperative. This cooperative will continue to cooperate with all relevant stakeholders in defining real needs of their community and implement future energy and climate projects. The cooperative members were participating at all workshops and are very well acquainted with pilot investment, how it will be implemented and how it will be funded.

*Image 10 Founding Assembly of the citizens' association " Green Energy Club Prelog"*

Tool 3 has been used while preparing and implementing workshops for citizens and other interested parties in Prelog. It has also been used to encourage citizens to join newly established energy cooperative in Prelog.

Taking into account new trends in communication and usage of social networks, the Tool will surely have to be updated in the future.

## 2.6 Hungary

Zugló eco-map will be an online site for the residents of the district of Zugló to support and develop a climate-friendly lifestyle. The open-source online map is therefore designed to support citizens in adopting a new, greener lifestyle.

The test phase of the site www.zugloiokoterkep.hu is also scheduled for October - this will also involve local NGOs, with whom we have multiple links in the ENES-CE project.


*Image 11 Testing phase of the site www.zugloiokoterkep.hu*

The map will be open-source, so citizens themselves can contribute to the map by adding new service points or other available infrastructure to support the circular economy. The site will offer steps and pathways towards a climate-friendly lifestyle. Following the test phase, a crowdfunding campaign will also be launched by the HelloSpring Community Foundation. The focus will be on the development of specific "green routes" in Zugló and the related $CO_2$ calculations. This would add knowledge to the map that could be used to calculate data on the values of individual/district level green lifestyle change associated with $CO_2$ emission reductions.

The energy monitoring system Measure together! has been launched in several local public institutions of the municipality of Zugló. As of this year, 25 institutions have joined the database of the Online Monitoring System and are collecting data regularly in a unified system. The data will be processed and analysed by the municipality's energy expert partner.

The main aim of the pilot project Let’s Go Green Together! is to create small local communities, that are active, responsible and supportive of each other on various green issues such as energy saving, responsible consumption, and thoughtful household management.

Thanks to the savings in the project, Energiaklub decided to support a concrete action meeting all conditions set in an open call for proposals. After the selection procedure, the implementation stared in 11.2021.

In the frame of this pilot more energy efficient community workspace and common bike storage will be ensured, i.e., the AZTA! Community Workspaces will be upgraded (insulation) and a community bike-sharing facility will be formed by March 2022 with the active involvement of at least 30 people. The term of use of the community bike storage will serve as a model for other similar initiatives. The energy renovation is estimated to result in a saving around 1500 kWh per year.

### 2.6.1. Establishing of citizen energy groups/cooperatives

The Energy Action Group, which was channeled into the pilot activities was established. The main idea is to gather and support civil initiatives that help Zugló to achieve the objectives of SECAP.

Actions focus on strengthening civic initiatives and creating small local communities that are active, responsible and supportive of each other on various green topics such as energy saving, composting, community shopping, community gardening and more. A platform for networking with SMEs, organizational development, promotional activities, workshops, challenges and the zugloiokoterkep.hu website will also be provided in order to reach as many citizens as possible.

Citizens, NGOs and SMEs where motivated through events, workshops and joint creative activities. There is a plan to launch challenges on the website offering prizes and a guerrilla video campaign. The activities on motivating them to take a part in Zuglo's SECAP actions by reducing their $CO_2$ emission exist.

An Energy Action Group is not institutionalized due to the lack of legal structure.

An expert KÖFE (Association of community developers) is responsible for the engagement process related to Tool 1. They took over activities related to the use of tool and they already used some of the available methods.

### 2.6.2. Planning of pilot investment

Below it is shown which parameters and in what extent were taken into account while planning pilot investment in Zugló.

*Table 6 Rating of pilot planning parameters in Hungary*

| | | | | | |
|---|---|---|---|---|---|
| Energy consumption prior to the investment | ☐ 1 | ☐ 2 | ☐ 3 | ☐ 4 | x 5 |
| Real needs and goals of municipality/region | ☐ 1 | ☐ 2 | ☐ 3 | ☐ 4 | x 5 |
| Total investment cost | ☐ 1 | ☐ 2 | ☐ 3 | ☐ 4 | x 5 |
| Technical possibilities | ☐ 1 | x 2 | ☐ 3 | ☐ 4 | ☐ 5 |
| Possible funding outside ENES-CE project | ☐ 1 | ☐ 2 | ☐ 3 | ☐ 4 | x 5 |
| Sustainability of investment | ☐ 1 | ☐ 2 | ☐ 3 | x 4 | ☐ 5 |
| Influence on citizens | ☐ 1 | ☐ 2 | ☐ 3 | ☐ 4 | x 5 |
| Life cycle of the investment | ☐ 1 | x 2 | ☐ 3 | ☐ 4 | ☐ 5 |
| Possible replication of the investment | ☐ 1 | ☐ 2 | ☐ 3 | ☐ 4 | x 5 |

In the table above mark 1 means this parameter was not taken into account at all, and mark 5 means this parameter has been taken into account completely.

The following explanations for the grading were given:

- Energy consumption prior to the investment: The main aim to boost citizens awareness on their everyday energy consumption and how to reduce it.
- Real needs and goals of region: By providing tools and platforms to energy related communities and collaborations community-based investments can be embed.
- Technical possibilities: The parameters were changed during the projects and the possible investments cost regulated our possibilities.
- Possible funding outside ENES-CE project: Alternative and community financing possibilities are being explored.
- Sustainability of investment: The awareness of the financial sustainability during the planning of the pilots exists.
- Influence on citizens: There is a plan to reach as many citizens as possible.
- Life cycle of the investment: Not relevant.
- Possible replication of the investment: The possibility of replication during the planning phase of the pilots is being considered.

Tool 2.2.2. was not relevant due to the different legal status of community energy cooperatives. The Tool 2.3.2. was translated and disseminated and also used by a local focus group, when the possibilities of energy communities in the future were discussed. It was also used while discussing how pilot activities in Zugló and community building work can provide a base for future community investments. Tool 2 will be used also in further development in this context.

### 2.6.3. Implementation of pilot action

The pilot action in Zugló is in the installation/implementation phase. Citizens' climate and energy related initiatives in Zugló were concentrated on the activities of local NGOs. The largest “movements“ are in favor of establishment of public parks and gardens. Only some solar energy projects that were realized by housing associations from the help of structural funds are known.

The interest has not changed yet, but there is hope that it will raise during the pilot's realization.

There exists a campaign for increasing the knowledge about the projects and the possibilities of civil participation.

Tool 2.2.3 was used during the planning of pilots communication campaigns.

# 3. Conclusion

In the following table, the status of implementation of certain activity within WPT3 per region can be seen:

*Table 7 WPT3 activities implementation status*

| Region | Activity | |
|---|---|---|
| | Establishing of citizen energy group | Implementation of the pilot activity |
| | Status of implementation | |
| **Germany, Pfaffenhofen** | Established | Works and equipment procured and contracted |
| **Italy, Forli** | Established | Al stages of pilot investment have been finalized |
| **Poland, Niemce** | Not established | Pilot in planning stage |
| **Slovenia, Koper** | Not established | Contracting of works and equipment |
| **Croatia, Prelog** | Established | Procurement of works and equipment in progress |
| **Hungary, Zuglo (Budapest)** | Established[1] | In the installation/ implementation phase |

As can be seen in the table, four partners have already established some sort of a citizen energy group while two are still in the process of establishment. While establishing citizen energy groups, all of the partners conducted several workshops with interested stakeholders. They were using developed Tool 1 - Co-design workshop methods for engaging participants into local energy planning, for engaging participants to get involved in the process of energy plans revision and join energy groups. This tool is well developed and useful, in the opinion of the partners, however, it should in the future be updated depending on the technical possibilities to reach the audience.

The implementation of the pilot investment is in different stage at each partner region. While some partners have already implemented all of the planned pilot investment activities, others are still in the planning stage. All of the partners stated that they used Tool 2 Community energy investment

[1] The Citizen Energy Group gather a civil and SME workforce but it still isn't legal institutionalized but there is a possibility to establish the Group as civil low partnership. This will be discussed among partnership.

guidelines – technical, business and legal aspects, while planning their pilot action. Also, it has been noted that they find Tool 2 very useful and will continue to use it when planning their future energy and climate projects.

All of the involved partners stated they used Tool 3 Communication methods for local energy plans and creating an atmosphere of acceptance, while organizing the workshops to motivate and engage citizens to join energy groups in their region. The Tool is referred to as useful, but there is still room for updating and improvement depending on the development of communication channels in the future.

In all participating regions it is visible that the citizens were generally interested to participate in revision of local energy plans and defining of most relevant future energy and climate projects. The organization of the workshops was a bit challenging sometimes for the partners due to the constant change in restrictions linked to the Covid-19 pandemic. However, even when organizing online events, the participation proved to be substantial and all planned activities were implemented within set deadlines.

There were some difficulties in Poland and Slovenia, but these issues are being resolved and partners plan to implement all activities by the end of the project duration.