# D3.2 Report on Community Energy Projects and Investment Campaigns in Pilot Locations

lifeloop
local ownership of power

# Contents



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# 1. Executive Summary (key findings)

This document presents the findings from the implementation of community energy projects across three pilot locations—Bistrita (Romania), Zagreb (Croatia), and Crete (Greece)—as part of the EU-funded LIFE LOOP project. These initiatives aim to accelerate the transition to renewable energy through citizen participation and the development of local energy communities. The report documents the progress, challenges, and outcomes of these activities, highlighting the distinct approaches taken in each location and providing key insights into the potential for scaling similar efforts across Europe.

The primary objective of this report is to provide information about community energy projects and activities implemented in the three pilot locations. These activities focus on fostering local energy production, citizen engagement, and the integration of renewable energy technologies within local communities. By documenting the activities in Bistrita, Zagreb, and Crete, the report seeks to provide an analysis of how different regulatory, cultural, and socio-economic contexts influence the success of community energy initiatives. It also aims to identify best practices and lessons learned that can inform the development of future energy communities in other European regions.

## Key Findings

The pilot projects showed that community energy initiatives are most successful when they are supported by clear regulatory frameworks, active citizen engagement and strong partnerships between local authorities, private entities, and energy experts. While each location presented unique challenges and opportunities, common themes emerged, including the need for improved legislation, greater citizen participation, and innovative financing models to sustain these efforts.

In Bistrita, the local energy community, RoEnergie, operates under the umbrella of the Cooperativa de Energie, a national energy cooperative. The key focus in Bistrita has been the integration of solar energy into retrofitted residential buildings. Although national legislation provides a framework for energy communities, the lack of clear regulations and the dominance of large energy companies present significant challenges. Despite this, the community has made strides in promoting local energy independence, reducing energy poverty, and increasing citizen involvement in renewable energy projects. Notable achievements include the installation of photovoltaic systems and the creation of crowdfunding initiatives to support community solar projects.

Zagreb has taken a proactive approach to the energy transition, with a strong emphasis on solarization as part of its broader Green Plan. The city has set ambitious goals to install 50 MW of solar capacity by 2025, with a focus on public buildings, residential homes, and commercial

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properties. Zagreb's efforts to promote community energy are supported by various initiatives, including the planned issuance of green bonds to fund solar projects and the establishment of energy communities. For these efforts, LIFE LOOP has provided essential support, notably by amendment of City's solarization plan which now leaves a space for development of energy communities. However, like Romania, regulatory barriers have slowed progress, particularly in terms of public procurement processes. Nevertheless, the city's success in engaging citizens through media campaigns and workshops in LIFE LOOP demonstrates the potential for widespread community involvement in renewable energy projects once the regulatory framework becomes more favourable.

Crete's Minoan Energy Community (MEC) stands out as the largest and most active energy community in Greece, with over 1,300 members, including local authorities, cooperatives, and citizens. MEC focuses on a wide range of renewable energy technologies, including photovoltaics, wind energy, and biomass. The community has implemented several large-scale projects, including three photovoltaic parks and plans for a wind park and cogeneration plants. Again, LIFE LOOP provided essential support for these initiatives. MEC's success lies in its ability to mobilise local resources and secure the participation of multiple stakeholders. However, recent regulatory changes, such as the removal of net-metering incentives, have posed challenges to the expansion of these projects. Nonetheless, MEC continues to play a critical role in driving Crete's energy transition, with a focus on energy democracy and addressing energy poverty.

The three pilot locations demonstrate varying levels of maturity in terms of community energy development, influenced by their distinct legislative, socio-economic, and technological contexts.

Romania's legislation on energy communities is relatively new and lacks the specificity needed for effective implementation. In contrast, Croatia has a more established framework but faces challenges with implementation in practice. Greece has long supported the development of energy communities, with Crete benefiting from licensing incentives for renewable energy projects. However, recent regulatory changes in Greece have introduced new obstacles, particularly in relation to net-metering.

Citizen participation varies significantly across the three locations. In Bistrita, historical legacies of centralised control have made it challenging to foster widespread engagement, though efforts to increase citizen involvement are showing positive results. In Zagreb, the city's strong media campaigns and educational initiatives have successfully raised awareness and support for energy projects. In Crete, the Minoan Energy Community has a well-established presence, with high levels of citizen participation and a strong sense of local ownership.

All three locations prioritise solar energy as a key renewable resource, but Crete stands out for its diversified approach, incorporating wind energy, biomass, and energy retrofit projects, which

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are enabled by LIFE LOOP. This diversity allows Crete to address a broader range of energy needs and economic opportunities compared to the more solar-centric models in Bistrita and Zagreb.

## Additional Insights

The report highlights the importance of local partnerships and innovative financing mechanisms in the success of community energy projects. In Bistrita, collaboration between the Cooperativa de Energie and the City Hall has enabled the development of community-funded solar projects, with residents co-financing the installation of solar panels. In Zagreb, the planned introduction of green bonds has opened up new opportunities for citizen investment in renewable energy. In Crete, MEC's partnership with local municipalities and cooperatives has been instrumental in scaling up renewable energy projects, despite the challenges posed by recent regulatory changes.

The findings from these pilot locations underscore the potential for community energy projects to drive Europe's energy transition. By empowering citizens to take an active role and ownership in energy production, these initiatives not only reduce carbon emissions but also increase resilience, energy autonomy and social equity. However, for these projects to reach their full potential, supportive regulatory frameworks, sustained citizen engagement, and accessible financing models are essential.

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# 2. Pilot location: Bistrita, Romania

## Overview of the community energy in Bistrita

The Romanian government adopted an Ordinance to transpose CECs into national legislation in 2021. For the most part, this legislation has been a copy-paste of the CEC provisions from the Electricity Directive, with some duties provided to the National Regulator, ANRE, to further articulate regulations. In response to a referral to the Court of Justice of the EU (CJEU) for failure to transpose the Renewable Energy Directive, Romania passed an Emergency Ordinance in November 2022. For the most part, it takes the same approach as the transposition of CECs. As such, it copy-pastes the text of the Renewable Energy Directive, without providing any further specificity. Again, ANRE is provided with duties to implement some aspects. Overall, therefore, ANRE shoulders much of the responsibility for the implementation of RECs and CECs at national level. Proper resources must be ensured so that ANRE can fulfil all the duties it has been given. The current EU criteria for energy communities, as transposed in Romania, lack legal clarity and detailed principles, leading to confusion and ambiguity. Specifically, Renewable Energy Communities (RECs) and Citizens' Energy Communities (CECs) have not been given clearly defined purposes and are largely copied directly from the EU directive. Consequently, the lack of specificity in the criteria can negatively impact the energy community sector.

The Public Finance Law does not clearly outline the conditions under which municipalities can contribute capital, land, etc., in association with citizens or private entities such as an energy community. It also does not specify how municipalities, as members of energy communities, can benefit from the revenues and what they can do with them. This has been a barrier to Bistrita's direct involvement in energy community projects in the city.

Even though collective self-consumption is allowed for individual households, current legislation does not effectively regulate energy sharing. Thus, an energy community billing a member is legally obliged to invoice all associated energy taxes and distribution fees, even if the energy does not transit through all grid levels, making the energy project comparable to those practised by traditional suppliers.

Generally, energy savings are achieved through the installation of green production capacities, the replacement of old appliances, and thermal rehabilitation in apartment buildings. In recent years, thermal rehabilitation has mostly been carried out by municipalities using non-refundable European funds – the National Recovery and Resilience Plan (PNRR), the Modernization Fund and other funds.

The lack of microgrid legislation is a concern, especially for new urban neighbourhoods. Housing developers want to be able to manage their microgrids and have a single point of interaction with the distribution operator. This could be achieved through through-metering at the individual user level.

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The energy community is represented by Cooperativa de Energie from Bucharest, which is an organisation owned and controlled by its members.

In Bistrița there is already an established energy community named RoEnergie, which is already part of Cooperativa de Energie, therefore we decided to facilitate the acceptance of new members to the RoEnergie community, instead of creating a new one from scratch. Currently, there are 55 members enrolled with 40 additional members in the application process.

Overall, while national legislation outlines an enabling framework, the specifics of this framework and the support for Renewable Energy Communities (RECs) still need to be developed through concrete policies and measures.

The energy market in Romania is dominated by a few large companies, limiting competition and consumer choice. Although Romania has significant potential for green energy, access remains limited, particularly for domestic consumers.

Energy prices in Romania are relatively high, putting pressure on both households and businesses. The price of active energy is variable, and it is about 0.2 EUR/kWh for households.

## Planning and preparation

The collaboration between the local energy cooperative and Bistrița City Hall aims to enlarge the existing cooperative by adhesion of new members, but most important by involving it in promoting a stronger sense of community involvement and empowerment and encouraging residents to collaborate with authorities. Moreover, the goal is to achieve energy independence by reducing its reliance on external energy providers and, in this context, reducing energy poverty for citizens. The organisational form of the new energy community is to adopt the model of a European cooperative centred around the citizen energy movement, with a primary focus on solar energy. The cooperative aims to gather members who wish to benefit from or support current and future projects.

The midpoint of the energy community's development could involve a more complex mix of investments from citizens and public funds in 50 residential blocks. This would include developing crowdfunding projects, demonstrating the benefits of the energy community to citizens. In Bistrița, calculations have been made for the number of blocks that will be retrofitted in the short term. With the implementation of LIFE LOOP, the 700 residents of these blocks will have direct involvement in the process. For instance, residents will co-finance the costs with a sum ranging between 5% and 10% of the total costs per apartment which will result in significantly lower energy bills. The City Hall will negotiate the prices as it has experience in such processes. The negotiation process will take place through a bid process, with City Hall ensuring the best quality/price ratio. They will make the investments through the National Recovery and Resilience Plan and they will negotiate the lowest price.

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The energy community will essentially function at the level of each homeowners' association, eliminating the need for a separate organisation. As awareness grows about the benefits of an energy community, homeowners' associations can propose new projects or collaborate with each other on larger initiatives.

To ensure transparency and participation, the energy community will seek feedback and ideas from the community, allowing them to actively contribute to the decision-making process. The energy community aims to promote a sense of ownership and empowerment within the citizen energy movement through active involvement of citizens in co-creation and decision-making processes.

Additionally, the energy community will explore partnerships with private entities and energy experts to leverage their expertise and resources. These collaborations will help accelerate the development and implementation of solar projects and other renewable energy initiatives in apartment buildings co-funded by their residents.

One such project is replacing light bulbs in schools, kindergartens, and private companies, following a model shared by Energy Cities in a LIFE LOOP webinar, that was successfully implemented in England. With the help of Cooperativa de Energie, this project will create energy savings for institutions and the city, serving as a best practice example for future initiatives.

Another project that Bistrita wants to implement, with the aid of RoEnergie, is to encourage the inhabitants of the newly refurbished blocks of flats that benefit from PV instalments and charging stations for electric cars, to choose RoEnergie as provider, and benefit from the quality of being a member of an energy community. The cooperative would supply the difference of power needed for the charging stations, for example if the energy produced by the PV's is not enough, and the part of revenue will be used by owners of the apartments to cover for their common expenses.

The business model is like the first scenario, with the main difference being apartment ownership. Surplus energy can be directed towards vulnerable groups - this is important as in recent times, due to rising electricity prices, many citizens face difficulties in paying for utilities. Cooperative can help them financially cope with this challenge by providing energy vouchers which can be allocated to vulnerable groups.

In this model, funding comes from the community and the municipality together. The cooperative offers citizens solar prosumer options while providing quality information and expertise gained from past projects. It facilitates collective equipment purchases at negotiated prices, benefiting from economies of scale. Surplus energy can be sold, creating new opportunities for the community.

Since there is no financial incentive for an energy cooperative to sell electricity at a reduced price, and because the greatest benefit for any consumer is self-consumption, Cooperativa de Energie, together with Bistrița City Hall, has developed a business model that benefit both

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consumers and cooperative members. The cooperative will invest in a photovoltaic installation on the roof of a municipal institution, such as a school, with the institution owning the installation from the start. This way, the institution will benefit from self-consumption and reduced electricity bills. The photovoltaic installation will be repaid to the cooperative in instalments, covering the investment and providing a small return for its members.

## Implementation, results and impact

Bistrita wants to increase the engagement of the regular citizens, inhabitants in the blocks of flats and individual houses. For such, we want to engage with citizens in a more targeted way. This means that we discuss face-to-face with: the owners of apartments in the blocks of flats already retrofitted that did not have solar PV-s installed as part of the project to explore opportunities for community funded solar; the representatives of the companies, on the location of the PV park, to explore additional opportunities such as community LED lighting projects; face-to-face meetings with individual houses that have PV's installed, to see if they consider creating a street network, where they would donate or sell their surplus power to install and use a charging station for electric cars; the private blocks of flats administrators to consider installation of paying charging stations for electric cars, using the PV's installed in the retrofitting process. In all of these we involve the local energy community and Cooperativa de Energie. At time of writing, we already have the green light from 4 schools/kindergartens to have their light bulbs changed and PV's installed. We created the connection between the schools and Cooperativa, and now they will decide the way the investment will be made.

We continue the organisation of different workshops and dedicated events that gather more people than a meeting with owners' associations representatives, approaching all citizens, no matter what background, to promote the concept of energy efficiency in the framework of a local energy community. Also, a very important aspect that needs to be shared with the citizens is that the legislation is changing, and in a couple of years they will have the possibility to benefit in their own apartments from the energy produced by the PV's installed on their block, and not just in the common spaces, as it is foreseen right now. Through this intensive outreach campaign, we expect to encourage greater public involvement in decision-making processes regarding their living spaces, whether individual or collective, and inspire citizens to take action themselves, rather than waiting for the municipality to provide solutions.

The retrofitting of the blocks is in different stages of implementation. We have a list of all inhabitants, beneficiaries of the retrofitting, and we are organising dissemination meetings, to explain the importance of energy independence, of reducing the energy bills and ultimately of creating local energy communities. We will also organise big media campaigns, to promote the installation of solar panels on industrial and other large roofs (schools, etc) and the creation of local energy communities in cooperation with Cooperativa de Energie.

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The interest of citizens to date has been somewhat limited, but we believe it will improve once there are functioning models in place. During workshops, we have already encountered attitudes like, "The municipality should give it to us" or "The municipality should do it for us." Additionally, the availability of non-repayable grants reduces citizens' interest in investing in themselves, if there is "free money." However, some apartment blocks, such as new residential buildings, are not eligible for such funds. Also, with European funding programs, there is a waiting list, and we rely on the impatience of citizens to encourage them to invest on their own.

Even though citizens are generally concerned with reducing emissions through thermal insulation of apartment blocks or the installation of solar panels on individual homes, their interest tends to be high only when their own investment is minimal, and the commitment required is the same.

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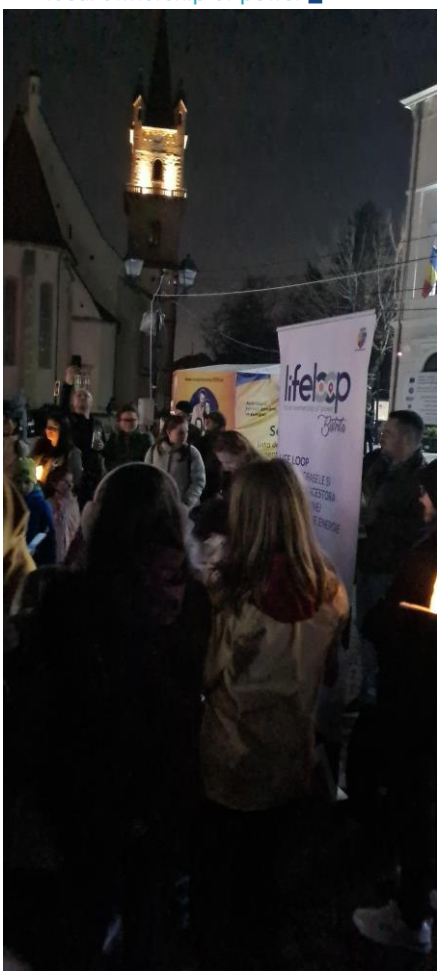

Additionally, it's important to recognize that, despite the 30 years that have passed since the fall of the communist regime, its aftermath still lingers, particularly in this sector. For instance, when the term "cooperative" is mentioned, there is a tendency to recall past oppressions and obligations imposed by the regime. During our workshops, we agreed to use the term "community" instead.

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Another instance of this historical trauma emerged when we encouraged citizens to consider using (electric) public transport or bicycles instead of personal cars. We often encountered responses like, "For so long, we couldn't own personal cars or use them, and now that we finally have them, you're telling us not to use them again?" This highlights the deep-seated attitudes that still influence public perception and behaviour today.

## Lessons learned and next steps

From our experience, we have learned several important lessons:

- Importance of Community Engagement: Direct, face-to-face interactions with citizens have proven effective in fostering interest and understanding of energy initiatives. Workshops and dissemination meetings play a crucial role in clarifying the benefits of energy independence and the formation of local energy communities.
- Overcoming Historical Context: The historical legacy of cooperatives in Romania significantly influences current perceptions. By using terms like "community" instead of "cooperative," we can mitigate negative associations and promote a more positive image of collective action.
- Focus on demonstrating success: Establishing successful models of energy communities can generate interest and motivation among citizens. Sharing initial success stories can serve as powerful motivators for broader participation, encouraging others to join and contribute to these initiatives.

The next steps involve several key actions to enhance community engagement and promote energy initiatives. First, we will conduct targeted outreach to engage citizens in retrofitted apartment blocks and individual homes, emphasising the benefits of solar energy and community initiatives. Additionally, we plan to launch large media campaigns aimed at raising awareness of solar panel installations and the advantages of local energy communities, showcasing successful projects and testimonials from early adopters.

We also aim to initiate pilot projects that demonstrate the benefits of solar energy and energy sharing, involving community members in the implementation process to foster a sense of ownership and accountability.

Furthermore, we will organise workshops and community events focused on sustainable transportation methods, such as public transit and cycling, addressing historical attitudes while promoting practical solutions. Lastly, we will strengthen partnerships with local businesses, energy experts, and educational institutions to leverage resources and expertise in developing community energy projects.

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# 3. Pilot location: Zagreb, Croatia

## Overview

The City of Zagreb has recognised the importance of the green transition as a key part of its sustainable development plan. The Green Plan aims to achieve climate goals by 2030, including reducing greenhouse gas emissions by at least 40% compared to 2008 levels. This goal is part of the broader European strategy to combat climate change. In this context, it is important to emphasise that Zagreb is one of 100 cities selected to participate in the European Union's mission for 100 climate-neutral and smart cities by 2030. Participating cities are required to develop climate contracts that will include a comprehensive plan for achieving climate neutrality across all sectors, including energy, buildings, waste management, transportation, and related investment plans. The process will involve research organisations, private sector, and citizens as key actors in this co-creation process.

A key segment of Zagreb's sustainable development strategy is investment in renewable energy, particularly solar power. The city has launched various initiatives to promote the installation of solar panels on public and private buildings through programs such as "Integrated Solar Power Plants on Public Buildings, Residential Buildings, and Family Homes, and Entrepreneurship in the City of Zagreb."

Zagreb has set an ambitious goal to install 50 MW of solar capacity by the end of 2025. This target includes installation of solar panels on public buildings such as schools, hospitals, and administrative facilities, as well as on commercial and private residential buildings. So far, over 2.3 MW of solar capacity has been installed on public buildings, and more than 5 MW is undergoing the procurement process.

Thanks to LIFE LOOP, the city is actively working to remove regulatory and administrative barriers for establishing energy communities, ensuring the necessary legal framework for implementing these initiatives. As part of the LIFE LOOP project, the city aims to establish several energy community projects by September 2025, which will be owned by citizens and local businesses. In addition to economic benefits, community energy strengthens the city's energy independence and reduces CO2 emissions. It also empowers citizens and local communities by giving them an active role in the energy transition, all in the aim of realising Zagreb's vision as a sustainable city that enhances quality of life and promotes rich urban biodiversity.

## Planning and preparation

Solarization is one of the key pillars of the City of Zagreb energy strategy. The city has an ambitious plan to install solar panels on more than 600 publicly-owned buildings, including schools, hospitals, and other institutions. The City of Zagreb aims to add 50 MW of solar

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capacity, significantly increasing the share of renewable energy in the city's total consumption. This project is part of a broader effort to increase the use of solar energy not only on public buildings but also on private homes and commercial properties, with a distribution of 10 MW on public buildings, 10 MW on private properties, and 30 MW on business facilities.

The program "Integrated Solar Power Plants on Public Buildings, Residential Buildings, and Family Homes, and Entrepreneurship in Zagreb" underwent changes to enable additional activities at locations intended for the installation of solar power plants. among other things, this also applies to projects for citizens and energy communities that are planned for implementation as part of the LIFE LOOP project. The original version of the program did not allow the City to implement additional projects at locations already included in the plans, which created limitations in flexibility when installing new solar panels. This resulted in a change in the program, which gives the mayor the opportunity to make decisions related to the expansion of activities in these locations faster. This program change is designed to speed up the city's solarization process and facilitate easier coordination between the various projects. The program now allows the mayor to respond to new opportunities for the installation of solar power plants and to adapt projects depending on the needs of local communities and market conditions. Additionally, the City of Zagreb is considering issuing green bonds to encourage citizen participation in energy transition projects. These bonds, modelled after a successful program in Vienna which was outlined in / inspired by the LIFE LOOP study tour in September 2023, allow citizens and investors to fund renewable energy projects with a financial return. By utilising this approach, Zagreb hopes to attract more private investment for solar projects, making it a promising pilot area for the LIFE LOOP project. This transparent financing method ensures the long-term sustainability of these projects, while also raising awareness on the importance of renewable energy investments.

## Implementation, Results, and Impact

The City of Zagreb is developing several models to finance its renewable energy projects. So far, the city has implemented a procurement process for the supply of electricity from renewable sources, known as the Power Purchase Agreement (PPA). This model focuses on supplying energy from eight different locations across the city and allows for long-term energy supply contracts at agreed prices, ensuring supply stability and cost predictability. The procurement process was open to all business entities, including energy communities; however, unfortunately, no energy communities applied. Despite the lack of applications from energy communities, Zagreb views the continuation of the PPA model as a key tool in achieving its climate goals. The PPA model facilitates long-term cooperation between the public sector and private investors, ensuring transparency and providing an economically sustainable way to finance energy projects.

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To implement the activities defined in the LIFE LOOP project, with the support of REGEA (Regional Energy Agency), an identification and proposal of eight locations in the City of Zagreb for the installation of photovoltaic power plants has been made. The selected locations are divided into two segments:

- Four locations are designated for self-consumption, where users will produce energy for their own needs, thereby reducing their dependence on external suppliers.
- The remaining four locations are selected for market energy production, i.e. the energy generated at these sites will be sold into the grid.

This division allows for flexibility in achieving energy goals, as it combines direct benefits for users with the economic viability of market solutions. Although the locations have been identified, they still need to be precisely determined and analysed.

A crucial partner in this process is the Green Energy Cooperative (ZEZ), one of the partners in the LIFE LOOP project, which the city actively participates with in implementing activities and removing obstacles. ZEZ will provide the final assessment of proposed locations that meet the criteria for feasibility and sustainability for energy communities. ZEZ's experience in managing energy projects is essential to ensure maximum investment efficiency. The selected locations must meet technical and financial conditions, including access to solar energy, infrastructure connectivity, and long-term profitability.

In the implementation of projects involving citizens and energy communities, one of the main challenges for the City of Zagreb is regulatory barriers. The legal framework for renewable energy is complex and requires adjustments to facilitate the easier establishment and operation of energy communities.

According to the Public Procurement Act, procedures must be transparent and cannot discriminate against business entities. However, energy communities are classified as special entities owned by citizens, which poses challenges in public procurement processes because they cannot be preferentially treated. Several meetings have been held on this topic, where experts have attempted to find legally grounded solutions that would allow energy communities to participate equally in procurement processes while complying with the law.

Additionally, within the LIFE LOOP project, several workshops have been conducted with other partners focusing on public procurement to gather information and explore implementation possibilities in accordance with local laws and regulations. The issue arises from the fact that energy communities often do not have the same financial capacities as larger companies, putting them at a disadvantage.

The City of Zagreb and ZEZ (Green Energy Cooperative) are collaborating with relevant authorities to establish a mechanism that would allow the procurement process to be conducted in compliance with existing laws while simultaneously enabling energy communities to participate more actively. It is essential to ensure transparency and fairness in the

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procurement process while recognizing the specific characteristics of energy communities as tools for promoting citizen energy.

Through the LIFE LOOP project, the City of Zagreb is actively working on educating citizens about the benefits of citizen energy. It sponsored the "Good Energy" tour organised by the Green Energy Cooperative (ZEZ), aimed at informing and educating citizens about the concept of citizen energy and energy communities. The tour included lectures for residents in city neighbourhood committees, where they had the opportunity to learn more about participation in energy communities, technical and financial aspects, and long-term benefits. The tour served as a platform for raising awareness about energy transition and involving citizens in decision-making processes regarding the city's energy future. Citizens participating in energy communities not only gain financial benefits but also play a broader social role, contributing to the development of the local economy as economic benefits remain within the community instead of being redirected to large energy corporations outside of the community. Joint projects encourage solidarity and collective responsibility for the sustainable development of the city. The City of Zagreb recognizes the importance of including all social groups in these projects, including vulnerable populations, to ensure energy justice and reduce social inequalities.

Additionally, the city has identified the need to establish a special working group focused on the development of citizen energy and energy communities. This working group consists of 13 professionals active in the field of citizen energy, tasked with promoting energy efficiency, renewable energy sources, and energy communities, actively participating in amendments to legal acts related to citizen energy, and collaborating with other relevant stakeholders. Regular meetings of the working group are focused on identifying barriers that hinder faster development of these initiatives, such as bureaucratic obstacles, administrative delays, and technical and financial challenges. One of the key tasks of the working group is to identify specific problems and offer solutions that will facilitate quicker decision-making and ease the approval process for energy transition projects. The project team of LIFE LOOP, with the advice and recommendations from working group participants, has created a Roadmap, a strategic document that outlines guidelines and objectives for implementing community energy projects. The Roadmap represents an action plan, detailing the necessary legal amendments and technical support for energy communities.

Furthermore, the City of Zagreb has established a company called Zagreb Sunny Roofs d.o.o., which is 100% owned by the city, to lead the processes of constructing and managing solar power plants for the market. This company plays a crucial role in overseeing the installation of solar power plants on public buildings and ensures the production and sale of electricity on the market. The establishment of this company allows the city to centralise the management of energy projects, ensuring faster and more efficient implementation of solar initiatives. The company is also responsible for monitoring market conditions and ensuring project profitability. This structure provides the City of Zagreb with greater control over processes related to the

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energy transition while also allowing for flexibility in adapting to market conditions. Additionally, the company plans to encourage citizen involvement in the implementation of solarization projects. The establishment of the company was necessary due to the City's inability to engage in commercial activities related to electricity supply, and the LIFE LOOP project has allowed for other ways to share projects and activities with citizens and energy communities.

The City of Zagreb has developed the "Solar Potential" platform and tool (https://eic.zagreb.hr/solarnaMapaZagreb/), which facilitates citizens assessment of their roofs' solar capacity. Through this platform, users can easily access the necessary initial documentation for starting the implementation of a solar power plant on their roofs with just a few clicks. Additionally, the LIFE LOOP project has introduced a "Matchmaking Tool" that helps identify needs and facilitates the connection between potential projects, citizens, and energy communities for implementation.

## Lessons Learned and Next Steps

During the implementation of solar projects in Zagreb, the city encountered several important challenges and opportunities, one of the key insights being the need to overcome regulatory barriers. At the beginning of the project, procedures such as public procurement and permitting proved to be lengthy and complex, which slowed the progress of solarization. Additionally, the condition of the roofs of public buildings and their management requires further actions by the City to ensure readiness for the implementation of solar panel installations.

The importance of communication with citizens has been recognized, as the execution of projects on public buildings in Zagreb is subject to both internal rules and laws. The City has learned that simplifying administrative processes is crucial for accelerating the implementation of similar projects in the future.

The City also plans to enhance education and information dissemination through both the "One-Stop Shop" center and other digital platforms, aimed at providing technical and financial information to support citizens who wish to participate in the City's solarization process. This will enable residents to more easily access information about solar projects, incentives, and available financial models.

One of the key challenges for the future development of solar and energy projects in Zagreb is the need to adapt the legislative framework. Current laws and regulations often slow down project implementation, especially regarding the establishment of energy communities and obtaining permits for solar system installations. The City of Zagreb proposes reducing bureaucratic barriers by simplifying public procurement processes and accelerating the issuance of permits. This would facilitate faster project realization and increase efficiency in using renewable energy sources.

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It is essential to ensure a legal framework that facilitates the establishment and management of energy communities and provides citizens with easier access to incentives and financial resources. Energy communities are a relatively new concept in Croatia, so further efforts are needed to achieve legal recognition and regulation of their status to allow broader citizen participation in these projects. Long-term, adapting the legislative framework will ensure faster and more effective implementation of solar projects and enable Zagreb to achieve its climate goals by 2030.

Recommendations include encouraging cooperation between local authorities, citizens and private investors to increase the efficiency of financing solar projects. The legal framework must allow easier access to financial models such as PPAs and green bonds, which have proven to be effective in financing sustainable energy projects. Also, it is necessary to enable additional incentives for citizens who participate in renewable energy projects, which would reduce their costs and increase the availability of these technologies. The inclusion of the City in projects such as the LIFE LOOP project enables local self-government units and citizens to be informed about energy communities, civil energy projects and energy communities, as well as easier initiation of projects that differ from the classic approach, which increases and accelerates energy transition processes and energy independence at the local level. The steps taken by the City of Zagreb in terms of solarization projects are to install an additional 100 power plants on the roofs of public buildings by the end of 2025, while the plan is for an additional 10 MW of solar capacity to be installed on public buildings in the next 3 years.

## 3.1. ZEZ Sun - New energy community and project

ZEZ Sun is an energy community founded in 2023 through support by the Green Energy Cooperative (ZEZ) and LIFE LOOP project. It currently has 127 members and is the largest energy community in Croatia. ZEZ Sun brings together citizens for joint, long-term and non-speculative investment in solar power plants to create positive social, ecological and economic values in their community.

ZEZ Sun opened its first call for members in March 2024 to raise funds for a 200 kW solar project in Krizevci. The campaign and call for members was prepared and implemented within the LIFE LOOP project. The funds were raised with existing and new members buying cooperative shares. Each share has a nominal value of 100 EUR and members could buy a maximum of 50 shares (5.000 EUR). This limit was set to ensure accessibility to a larger number of members, rather than raising the funds from just a small number of members holding a large number of shares. Members could expect a return on investment, capped at 5%, while any profit would go towards the Community Benefit Fund, which would support a wide range of projects for the benefit of the local community.

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The call was closed only 10 days later, enough for the cooperative to raise 160.000 EUR from 127 members for its first solar project. This resulted from a well-prepared campaign and the credibility that the ZEZ established with its earlier community energy projects in Croatia.

## Campaign objectives

- The main objective was to collect sufficient funds for the cooperative's first PV plant on the roof of the City Market in the City of Križevci. The targeted amount was 160.000 EUR.
- The campaign was anticipated to contribute to the visibility of the concept of energy communities in Croatia. At the time of the campaign preparation, there was not a single energy community officially registered in Croatia. Through a visible and successful project, ZEZ Sun wanted to showcase the possibilities of energy communities.
- The campaign was also anticipated to attract the interest of local authorities across Croatia to support the use of public roofs for community energy projects.

## Strategy

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The campaign was built around the premise that a significant amount of funds collected in the first few days (at least 30 %) will attract more investments, which is often the case in crowdfunding campaigns. For that to happen, it was important to build the base of potential new members in advance. In the case of ZEZ Sun, that was done in two ways: (I) the cooperative began to build the base of potential members a year ahead of the campaign, right after the cooperative first presented itself to the public, and (II) it started to communicate with the base before the campaign was officially launched. While building the base of potential members, the cooperative collected more than 450 expressions of interest for membership and investment.

For the local community to benefit from the project, the cooperative gave the locals an advantage in applying to become members for the first week after the campaign was launched. This advantage was offered to the citizens of the City of Križevci and four neighbouring municipalities.

Finally, to strengthen the project's credibility, partners were invited to participate in promotional activities. That included local partners - the City of Križevci and the local energy cooperative KLIK, but also the Office of the European Commission in Croatia. The European Commission was identified as a relevant stakeholder to support the efforts of the ZEZ Sun as a prospective energy community in Croatia. Finally, as the establishment of the ZEZ Sun was initiated and is managed by the ZEZ, the campaign has heavily relied on ZEZ's capacities to implement it. As the leader of community energy in Croatia, ZEZ brought significant credibility to the ZEZ Sun and provided established communication channels to deliver the campaign.

## Key messages and communication channels

The narrative around ZEZ Sun and its first call for members was focused on ZEZ Sun as an opportunity to invest in your own energy, and solar energy as a local resource that should be utilised for the benefit of the local community. After the campaign, ZEZ Sun was presented as an example of an energy community in practice to showcase the potential of energy communities in Croatia.

Key messages:

- Let's build our energy! Apply to become a member of the ZEZ Sun.
- Solar energy is our energy - let's keep its value locally.
- We (ZEZ Sun) are a group of citizens who want to do good things for their local community.
- ZEZ Sun presents the first example of an energy community in Croatia in practice.

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As earlier mentioned, the campaign fully relied on the well-established communication channels of ZEZ, including:

- ZEZ's website, where a unique landing page was created: https://www.zez.coop/en/zez-sun/
- Facebook, LinkedIn and Instagram profiles
- ZEZ's Facebook group Solar Club (40.000 members)
- Mailing lists (+ 10.000 contacts)
- Media contacts

The campaign was also implemented through the communication channels of the partner organisations: the City of Križevci and the energy cooperative KLIK.

## Implementation

Most of the campaign was delivered by an internal team of 6 people, including strategy, narrative, media relations, social media management (including advertising), landing page development and design, organisation and implementation of field activities, CRM development, and partnerships management.

The campaign consisted of several phases.

1. **Soft launch phase**, during which the call for members was announced and the wider public was invited to express interest in membership. This phase was used to grow the base of potential investors as much as possible, particularly local investors. It lasted for two weeks and included the following activities:
   - Info-events in the City of Križevci: one for the employees of the local governance offices, including the Communal Centre which owns the building where the PV plant is to be installed, and another for the general public. This phase also included guest appearances at relevant events that took place during this phase.
   - Social media campaign (organic and paid) targeting the local community.
   - Project and event announcements in the media and through the mailing lists. Media announcements included joint appearances with the representatives of the Office of the European Commission in Croatia to endorse the project.

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*First info event with an open discussion with citizens in the City of Križevci during the soft launch phase*

*Interview with Mislav Kirac, ZEZ Sun's manager, and Andrea Čović-Vidović, deputy representative of the Office of the European Commission in Croatia at the Croatian National Television's show Good Morning, Croatia in the soft launch phase*

➔ The soft launch phase resulted in 127 new expressions of interest, on top of 355 gathered a year before the announcement of the 1st call for members.

**2. Phase 1**, during which the call for members was officially open for the local community. This phase was anticipated to last one week after the campaign launch or up to collecting 50 % of the target amount. It included:

- A PR stunt at the City Market in the City of Križevci, where the PV plant will be installed. City Market was used to bring the idea of investing in solar as a local resource closer to citizens. ZEZ Sun's team organised its stand at the market, along with other small

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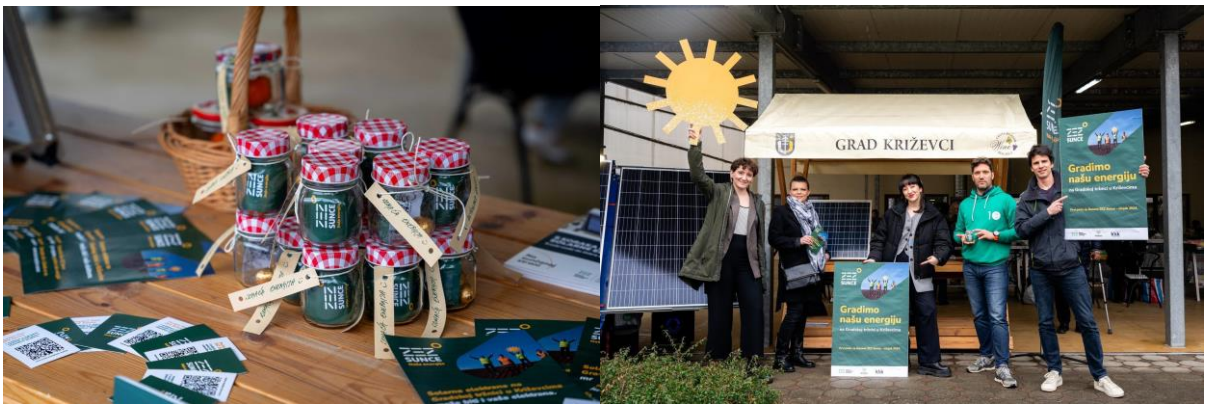
businesses offering their products, where it symbolically offered citizens to buy locally produced solar energy, i.e. to become members of the ZEZ Sun.




*"Homemade energy" offered to citizens by the ZEZ Sun team at the City Market in Križevci during the campaign*

- Social media campaign (organic and paid) targeting the local community.
- Media announcements of the call for members, particularly targeting the local media. To ensure strong coverage in the local press, media announcements were made in collaboration with the PR office of the City of Križevci as the official campaign partner.

➔ Phase 1 resulted in fundraising around 30 % of the targeted amount from the local community.

**3. Phase 2**, during which the call for members was officially open for citizens of all Croatia. This phase was anticipated to last an additional two weeks, but it was over in only one weekend as the required amount was collected quickly. It was planned that this phase would include:

- Online webinar for potential members.
- Social media campaign (organic and paid) targeting citizens in different parts of Croatia. Content included testimonials of current ZEZ Sun members, useful information about joining ZEZ Sun, announcements of campaign activities, marking relevant national and international dates, such as Women's Day, and more. In total, the social media campaign included almost 100 posts across ZEZ's social media profiles.
- Campaign on digital channels included a campaign video to motivate new memberships. Production of this video was used to include the founding members to actively participate in the campaign. Video was produced by one of the members who is a well-known Croatian film director, while a few other founding-members participated as the narrators and storytellers.
- Media announcements oriented toward the national media. In total, the campaign resulted in more than 40 announcements and interviews in local and national media.

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*Social media content for Women's Day included statements on the motivation to join ZEZ Sun by some of the female members of the cooperative*

➔ Phase 2 was finalised in only 3 days. That is how much it took to gather the rest of the targeted amount. After collecting the targeted amount, the call for members was officially closed.

## Lessons learned

It took about 10 days to raise all required funds from 127 members, including 88 new members. If the local community hadn't had an advantage in the first week of the campaign, the funds would likely have been collected even faster. How exclusivity was designed presented a risk as that period was rather long. Alternatively, for future investments, the call could be open for all potential members and the advantage for the local community could be secured with a specific number of shares during the administrative approval of the new members after the campaign. That would minimise the risk of the wider public losing interest in the project during the lengthy period for local investments.

The internal team handled all aspects of the campaign - from strategy to operational activities. Even though that showcases the significant capacities of the team, it represented an extensive workload, as well as a potential risk for successful campaign implementation. In future projects, it would be valuable to ensure a budget for outsourcing some of the activities, such as media relations, social media advertising, or landing page development and design.

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# 4. Pilot location: Crete, Greece

## Overview of the community energy in Greece

Community energy in Greece is quite popular. In December 2023 it was estimated that in Greece there were roughly 1,689 energy communities. From these energy communities, 1,673 were founded according to the first law 4513/2018, which introduced the concept of energy communities in Greece and gave specific licensing incentives for the foundation of new energy communities. These licensing incentives were mainly the licensing priority for a new photovoltaic project with nominal power up to 18 MW or a new wind park with nominal power up to 6 MW. Additionally, 11 of them are Renewable Energy Communities and 5 are Citizen Energy Communities, all of them founded also according to the law 4513/2018 and transformed to their new forms, according to the second law 5037/2023, which introduced for first time in Greece the forms of Renewable and Citizens Energy Communities.

Number of energy communities and projects' power allocation per geographical region in Greece.

| No | Region | Number of Energy Communities | Projects' power (MW) |
|---|---|---|---|
| 1 | Central Macedonia | 334 | 306.2 |
| 2 | Western Macedonia | 294 | 80.5 |
| 3 | Western Greece | 190 | 76.2 |
| 4 | Thessaly | 180 | 266.6 |
| 5 | Attica | 172 | 16.1 |
| 6 | Eastern Macedonia and Thrace | 125 | 180.6 |
| 7 | Central Greece | 116 | 112.7 |
| 8 | Crete | 93 | 10 |
| 9 | Peloponnese | 80 | 48.4 |
| 10 | Epirus | 62 | 58.5 |
| 11 | Ionian Islands | 26 | 21.7 |
| 12 | South Aegean | 12 | 0 |
| 13 | North Aegean | 5 | 0 |
| | **Total** | **1,689** | **1,177.5** |

The total power of energy communities' implemented projects refers to photovoltaics. From the installed 1,177.5 MW of photovoltaic power, only 14 MW refer to net-metering projects, which aim at the annual compensation of the produced electricity with the consumption of the participating members in them. The rest refers to commercial projects, namely to projects which

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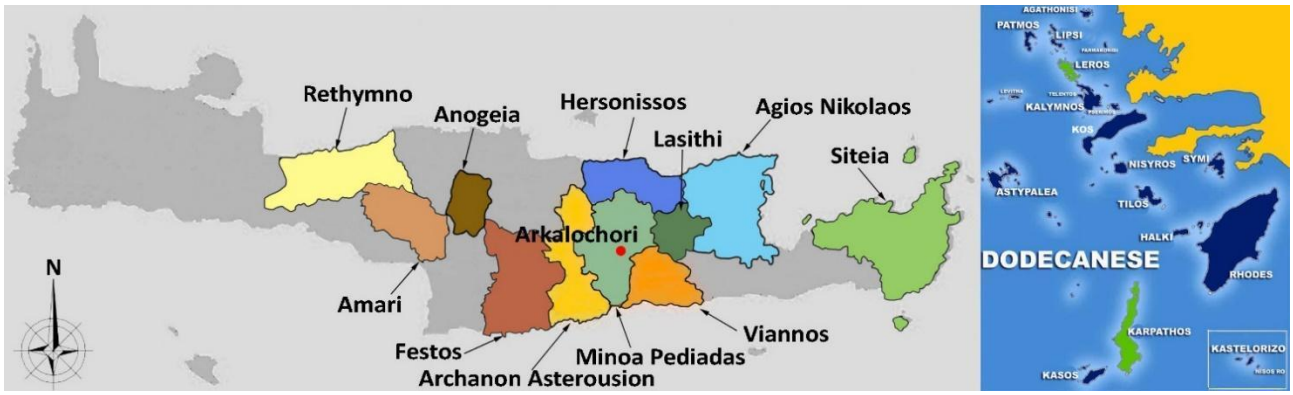
sell the produced electricity to the grid. This fact reveals the attitude of energy communities in Greece. Most of them were founded by a small number of members (15 was the minimum required number according to the law for the foundation of a new energy community), aiming at the construction of one photovoltaic plant with maximum power 18 MW and the selling of the produced electricity to the grid, for profit. So, most of them, practically, are small groups of members, with profit purpose. Only a small number of energy communities are energy communities open for the registration of new members, aiming at the introduction of a real community-based model for energy production and management. This is also revealed by the small number of Renewable and Citizens Energy Communities, which according to the new law do not have any more the incentives initially given with the first law. The interest for the foundation of new energy communities in Greece, after the new law was published, is remarkably low.

## Community energy in Crete: the story of Minoan Energy Community

Minoan Energy Community (MEC) was founded in October 2019 in the town of Arkalochori, Crete, Greece, by 38 founding members. The energy community is the largest in Greece, with 1300 members that gathers physical persons, 13 municipalities (11 from Crete and two more from the Dodecanese Islands), the Regional Authority of Crete, public companies, commercial and agricultural cooperatives etc. From these Municipalities, only the 3 of them had joined the Community right after its establishment (early 2020). The rest 10 joined the Community thanks to the accomplished work in the frame of the LifeLOOP project. In Figure 2 the geographical location of the 13 municipalities – members of the Community is depicted, as well as the location of the town of Arkalochori. Practically, MEC is so far the only active energy community in Crete, which works towards the realisation of the vision of energy community on the island.




*Map with geographical territories of the 10 Municipalities-members of MEC in Crete and the 2 more islands in the Dodecanese Archipelago (Leros and Karpathos).*

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MEC has the goal to convert the process of energy transition in Crete as a lever for a fair and rational economic and social development for all Cretans. To this end, MEC invites and accepts all interested citizens and legal entities in Greece to become members of the Community. So far, the members of the Community are individuals mainly from Crete, local authorities, commercial and agricultural cooperatives, municipal corporations, etc.

In practice, MEC focuses on all technologies that harness the available Renewable Energy Sources (RES) potential in Crete: photovoltaics and solar thermal collectors, wind parks and small wind turbines, combined heat and power plants, operating with biofuels, district heating and cooling networks, open-loop geo-exchange plants, large scale (pumped storage) and small, decentralised energy storage and energy saving passive and active measures in buildings and other facilities. In the next 3-5 years, MEC aims to implement the first large size wind park, more than 10 MW of photovoltaics, energy saving projects for municipal buildings and the first pilot cogeneration plants. Currently MEC has two full time equivalent employees to cover administrative, research, RES development activities, whereas experts in the community work on voluntary basis or under project-specific contracts.

MEC has developed three photovoltaic parks of 405 kW, 1 MW and 1 MW nominal capacity each, for collective self-consumption. The study of the 3rd plant was funded by the LifeLOOP project. The electricity produced by the MEC's three implemented photovoltaic parks is directly compensated with the consumptions of the involved members in these projects. Each involved member participates in the project by owning a portion of the total, nominal power, according to the fee that the member has paid. 550 members participated in the first three solar projects by buying shares and taking advantage of the opportunity of being supplied with green energy via a 25-year contract.

*Top views of the first two photovoltaic parks of MEC, of 405 kW and 1 MW nominal capacity.*

Most members participate in the already implemented photovoltaic parks with an average of 3,000 €, which translates to 3 kW of bought share in the power plant. The cooperative matches the consumption profiles of its members on an annual basis to offer them roughly 70% cheaper energy compared to buying the energy from the supplier by participating in a collective self-

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consumption scheme. With the current electricity procurement prices, this model of energy compensation is becoming even more attractive to the community members, with payback periods ranging from 3-5 years.

For members who are financially challenged special monthly payments are organised to compensate for the investment, in simplest terms they "subscribe" on the monthly basis and compensate for their shares from savings on energy bills. Using experience of establishing collective self-consumption schemes, MEC will develop a model for its members to gain monetary returns by selling the energy to the market.

MEC is addressing energy poverty in the community while using its photovoltaic parks to cover the electricity needs for 50 low-income families, earthquake victims of the strong, 6.1 Richter earthquake which struck the area of Arkalochori on 27th of September 2021. The corresponding cost is covered by the Regional Authority of Crete and the Community.

MEC approaches its members through mailing lists, posts in the official website and the pages in social media (Facebook and LinkedIn), the YouTube channel, the General Assembly and, for specific reasons, through phone calls. With the public, MEC also uses its official pages in social media, the website, the YouTube channel, press releases in the local press, radio interviews, participations in exhibitions, open in public info-days and other. With the local and national authorities MEC has established official correspondence via e-mails, phone calls, physical meetings and the personal contacts that some members of the Community have.


*Photos from tw events of MEC (July 2024) in the commercial exhibition of Messaras (Heraklion Prefecture, Crete) and in a capacity building info-day at the main Hall of the Regional Authority of Crete.*

## Planning and preparation

Two more photovoltaic parks have been already licensed, of 1 MW nominal capacity each, which will also operate as collective self-consumption projects. MEC has also integrated a

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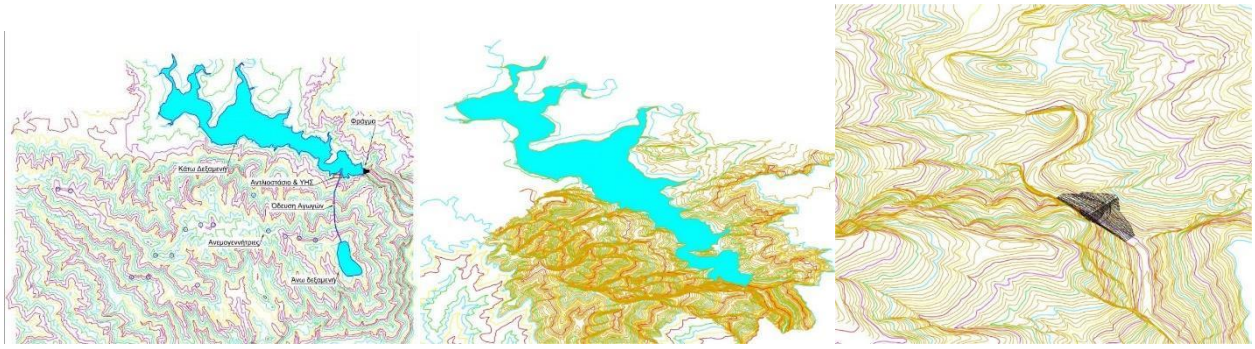
comprehensive study for its first wind park of 12 MW and is in the process of constructing a smaller wind power plant of 60 kW to sell the energy to the grid and offer return on investment to its members.

Also, MEC targets the exploitation of the abundant biomass resources in Crete for the heating through district heating networks and cogeneration plants. Particularly, in the framework of the H2020 emblematic project "Crete Renewable Energy Valley", MEC is going to implement the first cogeneration plant in Crete, with 100 kWe nominal capacity, which will operate with biogas, locally produced in an anaerobic digestion reactor by stock farming and urban organic wastes, the first district heating network in Crete in the town of Arkalochori, with a nominal capacity of 1 MWth, which will operate with solid biomass from olive trees pruning and the first district cooling network in Crete, combined with open-loop geo-exchange plant, in the small coastal settlement of Arvi).

MEC member-experts design commercial RES projects on a voluntary basis, such as large size wind parks, a pumped hydro storage plant and photovoltaic farms. To fund renewable projects all members of the community can participate in additional investments by purchasing additional shares. Practically, MEC aims to exploit all technologies that harness the available major RES potential in Crete: photovoltaics and solar thermal collectors, for electricity and heat production, wind parks and small wind turbines, combined heat and power plants, operating with biofuels and district heating and cooling networks.



*Siting of the designed Pumped Hydro Plant in the south-eastern part of the Prefecture of Heraklion*

Conclusively, MEC aims to undertake a major, leading role on how energy transition is going to be implemented in Crete, claiming the development, construction and operation of most of the energy transition projects which will be implemented in Crete, with the active participation of the Cretan people.

MEC uses all communication channels with its members and the rest of the citizens in Crete and in Greece to promote new projects and attract new members. These include, indicatively, new posts in MEC's official social media pages and the website, press releases, regular interviews in local radio and TV stations, participation in any kind of info-days, workshops etc, following

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relevant invitations and much more. In general, it can be said that MEC hasn't organised so far any particular event or activity to promote any particular energy project, especially regarding the photovoltaic plants. That wasn't necessary, because MEC has already gained considerable popularity and the interest for the participation of new members in its projects, without the need of any additional effort from MEC. The only exception refers to the Crete Valley projects, for which dedicated info-days were organised in June 2024 in the energy valleys, given the innovative attitude of the planned projects and the necessity for the local citizens' involvement. The reaction of the local inhabitants was positive, with high participation numbers in the local info-days. In any case, regardless of the gained popularity, MEC still continues to follow the same dissemination policy from the very beginning of its route, being very active in all the promotion strategies and trying to maintain an active and effective promotion and dissemination profile regarding its general activities and plans.

## Implementation, results and impact

### Inclusion of Municipalities

MEC, within the framework of LIFE LOOP, developed a roadmap that outlines its goals and an action plan for the upcoming period. Minoan's roadmap is frequently monitored and assessed to ensure that these goals are achieved, and any deviations can be corrected immediately.

During the implementation of LIFE LOOP, MEC reached out to municipalities in Crete and other regions outside Crete to invite them to join the Community. Several meetings were held with mayors, deputy mayors and municipal staff. As a result of these efforts, 10 new municipalities joined the community, 8 from Crete and 2 from other islands.

From the Region of Crete, the following Municipalities became members of Minoan Energy Community:

- Municipality of Agios Nikolaos, Prefecture of Lasithi
- Municipality of Sitia, Prefecture of Lasithi
- Municipality of Hersonissos, Prefecture of Heraklion
- Municipality of Oropedio Lasithiou, Prefecture of Lasithi
- Municipality of Rethymno, Prefecture of Rethymno
- Municipality of Anogeia, Prefecture of Rethymno
- Municipality of Amari, Prefecture of Rethymno
- Municipality of Festos, Prefecture of Heraklion.

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In the Region of South Aegean, the following municipalities joined the Community:

- Municipality of Leros, Prefecture of Kalymnos
- Municipality of Karpathos, Prefecture of Karpathos – Kassos.

## Studies and Implementation of new RES projects and support to households

Thanks to LIFE LOOP, Minoan's third photovoltaic plant, with a nominal capacity of 1 MW, was completed and installed in the Western Greece region, during summer 2024. As mentioned also previously, no campaign was necessary or organised for the implementation of this project, regarding the attraction of the participating members. The interest in participation in a new project was already declared by the potential new members in the Community, so once the required permits for this new plant were received, the funds were already secured.

The photovoltaic plant of 1,025 kW is located at the site "Kalamara" in the Municipality of Andravida-Kyllini, in the Prefecture of Ilia, Region of Peloponnese. The project was constructed using 1,768 bifacial photovoltaic (PV) panels with a nominal power of 580 W each and a nominal efficiency of 22.3%, 10 string inverters with a power of 100 kW each and a 1,000 kVA transformer for the connection to the medium voltage grid (Figure 7). The PV station was connected to the Hellenic Distribution Network Operator (DEDDHE) grid on 18/07/2024 and the total annual production is expected to be 1,650 MWh.

This project will provide electricity to 201 households and small businesses in Crete and Western Greece for the next 25 years. It is the first virtual net-metering project implemented outside Crete by MEC since the amendment of the relevant law 5037/2024 and the establishment of the new subsidiary Energy Community of MEC with the name "Minoa Aroania."

Minoa Aroania is one of the three new energy communities created by MEC and established in 2023, sharing the same characteristics, philosophy, and goals, as they operate within the framework of social and solidarity economy. The Community was founded following Minoan's essential targets in the frame of LifeLOOP project. The other two energy communities are Minoa Aiolos Citizens Energy Community based in Kozani, Prefecture of Western Macedonia, and Minoa Phoebus Renewable Energy Community, based in Arkalochori too.

Furthermore, the project of the PV station in the Regional Unit of Ilia helps MEC to achieve two key objectives of LifeLOOP:

1. Design and construction of a significant project that will provide electricity to citizens and foster the creation of a new energy community
2. Establishment of at least two (2) new energy communities in Greece.

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*Stages of Construction of the PV Station (Initial land plot, installation of support structures, placement of PV panels, Installation of electrical equipment, PV station with connection to the grid)*

## Energy performance upgrade studies of municipal facilities

Regarding the energy performance upgrade of municipal buildings or facilities, apart from the accomplished studies on the sports facilities in Arkalochori, funded by the NESOI project,

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presented in the previous section, MEC has also implemented two new studies, in the frame of the LifeLOOP project:

1. Energy performance upgrade study of the 2nd Elementary School of the Municipality of Agios Nikolaos, Prefecture of Lasithi, Crete

2. Energy performance upgrade study of the municipal indoor sports hall in the island of Leros, Region of South Aegean, Dodecanese complex.

The 2nd elementary school in Agios Nikolaos is totally upgraded to a zero-energy building with the full insulation of the opaque surfaces with stone wool, the replacement of all openings, the installation of heat pumps with new hydronic terminal units and hydraulic distribution network and a photovoltaic plant on the building's roof for the compensation of the remaining electricity demand through the net-metering operation. The total primary energy annual saving is estimated at 0.3 GWh.

*General aspect of the 2nd elementary school in Agios Nikolaos.*

The municipal indoor sports hall in Leros is totally upgraded to a zero-energy facility with the application of the appropriate and proposed passive and active systems: external insulation of vertical opaque surfaces with stone-wool panels, replacement of existing roof with polyurethane panels, installation of new openings, installation of solar tubes on the main sports hall for natural lighting during daytime, installation of heat pumps with a central air handling unit for indoor space conditioning and ventilation, installation of a solar thermal collectors field, supported with heat storage tanks, for domestic hot water production, installation of a BEMS and a photovoltaic plant, for the production of the remaining electricity demand. The total primary energy annual saving is estimated at 1.2 GWh.

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*General aspect of the indoor sports hall of Leros*

According to the timeline, the next energy performance upgrade study to be completed in the frame of the LifeLOOP project is for the Cultural Centre of Hersonissos, in the Municipality of Hersonissos.

## Info days

MEC, in collaboration with the Regional Authority of Crete, organises and implements info-days across Crete to inform and raise awareness among citizens on issues related to the energy transition. The goal of these events is to provide information on the opportunities and advantages of utilising renewable energy sources, decarbonization, the operation of broad-based energy communities and their contribution to society. Through comprehensive and multifaceted information, the philosophy of energy democracy and justice is highlighted.

At the same time, the action aims to motivate every citizen to be consciously engaged in the energy transition towards clean energy sources, strengthen local entrepreneurship and support the solidarity economy. In this way, investments in renewable energy sources are made with society as a partner, while the economic and social benefits return to local economies.

The program is funded by the Regional Authority of Crete and, so far, 19 out of 26 info-days have been completed. The program is scheduled to be completed in December 2024. Apart from the open-public info-days, a series of similar educational events in schools has also been scheduled.

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*Photos from the info-days in various areas of Crete (Hersonisos, Chania, Agios Nikolaos and Gazi).*

## Lessons learned and next steps

In conclusion, MEC, as a broad-based energy community, maintains direct contact with citizens who are constantly seeking solutions to their energy problems. The continuously increasing number of members further strengthens the community. As has been observed through the info-days, the public is not well-informed about the available renewable energy technologies and the offered opportunities by energy transition.

MEC will continue its efforts on the awareness raising for the local citizens regarding the energy transition process, the arisen opportunities and challenges, the risks and the potential benefits. Given the successful reaction of the local citizens, at least regarding the expressed interest in MEC's projects and activities, it seems that the already adopted and applied communication policy is on the right path. MEC will keep this policy and will continue to exploit every given opportunity to support, keep and increase its popularity.

Municipalities, due to a lack of staff and other factors, do not have the capacity to implement projects. However, there is a need to conduct energy efficiency studies because of the outdated

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infrastructure in both municipal buildings and private properties, to achieve energy savings. MEC will also continue to provide technical and consulting support for the local Municipalities to achieve the crucial objective of Rational Use of Energy and energy saving.

Another significant barrier in Greece is the constantly changing regulatory framework. MEC, through its scientific team, closely monitors changes in legislation and intervenes, aiming to ensure that any changes are made for the citizen's benefit. Unfortunately, with the distorted development of energy communities in Greece, with the large number of commercial projects, the Ministry of Environment and Energy in Greece removed all licensing incentives for energy communities, which were initially introduced in the law 4513/2018. An unfavourable also very recent amendment (August 2024) is the removal of the net-metering operation as an option for new photovoltaic plants. MEC has requested this option to remain at least for the vulnerable households and the Municipal facilities, however, without success. This change is expected to considerably weaken MEC's activities, which were mainly focused on net-metering photovoltaic plants, which, in turn, were also the main reason for the increase of MEC's size. MEC should expand its activities in other technologies in the future, such as wind parks, for which, unfortunately, the available grid and geographical space in Crete has been totally covered, due to two large size permits of 1 GW total nominal power, issued in 2011 and maintained until today, thanks to a series of controversial legal amendments. Conclusively, given the high wind and solar potential available in Greece and particularly in Crete, there are huge interests from large size investors on wind and solar projects. The Greek Governments, since 2010, seems to introduce favourable revisions in the legal framework, to promote these large size investors' interests and projects' applications, despite the serious negative reactions of the local communities and against their willingness. The real Energy Communities claim the largest share of the available space in Greece, against these interests. The legal framework still supports the interests of the large size investors, being, consequently, unfavourable for the energy communities.

For the upcoming period, MEC will continue its activities as outlined in the roadmap, which include the implementation of RES projects to support citizens and vulnerable groups, the implementation of new energy performance upgrade studies for buildings and facilities, conducting of the info-days, licensing and constructing of the Crete Valley projects and continuous seeking European and national programs to support its collaboration with municipalities for the joint development of projects. MEC will also continue the efforts, as a pioneer, for a rational and fair allocation of the available energy space in Greece, which will enable the implementation of an effective energy transition for all citizens.

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# 5. Conclusions and recommendations

The community energy projects implemented in Bistrita (Romania), Zagreb (Croatia), and Crete (Greece) showcase the varied regulatory, social, and economic environments in which these initiatives have evolved. Each pilot location has encountered unique challenges and opportunities in its pursuit of renewable energy goals, highlighting the importance of adaptable and supportive frameworks that address local needs.

Regulatory differences across the pilot locations have played a significant role in shaping the development of community energy projects. In Romania, the legislative framework for energy communities remains underdeveloped, with limited clarity on key issues such as microgrid regulations and municipal involvement in energy projects. This has led to slower progress in the development of community energy initiatives, as local actors grapple with legal ambiguities and a market dominated by a few large energy providers. Nonetheless, the pilot in Bistrita demonstrates that even in the face of these regulatory challenges, significant progress can be made through local partnerships, such as the collaboration between RoEnergie and Cooperativa de Energie.

In Croatia, the regulatory environment is more advanced, with clearer policies supporting the development of renewable energy projects. However, administrative barriers and public procurement regulations continue to hinder the expansion of energy communities. Zagreb has made progress by preparatory activities by exploring introducing innovative financing mechanisms, such as green bonds, to support solarization projects.

Crete, in contrast, has benefited from a more favourable regulatory framework that has encouraged the growth of community energy projects for many years. The Minoan Energy Community (MEC), the largest of its kind in Greece, has successfully implemented several large-scale projects, with more in the pipeline thanks to the LIFE LOOP project. However, recent regulatory changes, such as the removal of net-metering incentives, pose a threat to the future development of energy communities. Despite these setbacks, MEC's continued success demonstrates the potential for community energy to drive local economic development and social cohesion.

A successful example of community engagement can be seen in the ZEZ Sun campaign, Croatia's largest energy community. Launched as part of the LIFE LOOP project, the campaign focused on raising funds for a 200 kW solar PV in Križevci. The campaign highlights the potential for well-organised community outreach to mobilise citizen participation in energy projects. The success of ZEZ Sun illustrates the power of local investment in renewable energy, showcasing how crowdfunding and transparent communication can accelerate the transition to sustainable energy systems.

The success of community energy projects across the three pilot locations underscores the importance of having a supportive regulatory and policy framework in place. Clear legislation that

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facilitates the creation and operation of energy communities is crucial for enabling citizen participation and ensuring the long-term sustainability of these initiatives. In this regard, the lessons learned from these pilots can serve as valuable guidance for other regions looking to develop similar projects.

Citizen engagement is another critical factor in the success of community energy. The ability of energy communities to mobilise local resources, create partnerships, and foster a sense of ownership among residents has been a defining feature of the projects in Zagreb and Crete. In Bistrita, while citizen engagement has been slower to develop due to historical legacies and regulatory constraints, the pilot has shown that with sustained outreach efforts, local communities can be empowered to take an active role in the energy transition.

The social benefits of community energy extend beyond environmental sustainability. By involving citizens directly in the production and management of renewable energy, these projects promote social equity and local economic development. In Crete, for example, MEC's projects have not only reduced energy costs for participants but also addressed energy poverty by providing affordable energy to vulnerable households. These projects offer a model for how community energy can contribute to social and economic resilience, particularly in regions with high levels of energy dependence.

## Future Potential of Community Energy

The future potential of community energy is immense. The pilot projects in Bistrita, Zagreb, and Crete demonstrate that when citizens are empowered to take control of their energy needs, the benefits extend far beyond environmental gains. Community energy projects can drive local economic development, create jobs, and foster a stronger sense of community ownership and responsibility.

For community energy to realise its full potential, further efforts are needed to remove regulatory barriers and provide accessible financing options. Innovative financial models, such as the crowdfunding initiatives in Bistrita and the green bonds in Zagreb, offer promising pathways for scaling up community energy projects. At the same time, policymakers must ensure that regulatory frameworks are designed to support the long-term sustainability of these initiatives, particularly considering changing market and regulatory conditions

In conclusion, thanks to LIFE LOOP, the pilot projects in Bistrita, Zagreb, and Crete provide valuable insights into the transformative power of community energy. While each location has faced unique challenges, these pilots highlight the potential for community energy to play a central role in Europe's energy transition. By building on the lessons learned from these pilots, other regions can use the power of local communities to drive the shift toward a more sustainable and equitable energy future.

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