Deliverable 7.2: Impacts on civil society and opportunities of social innovation

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List of Acronyms

SC	Space Cooling
D	Deliverable
EU	European Union
M	Month
RE	Renewable Energy
SI	Social Innovation
T	Task
WP	Work Package
FAIR	Finable, Accessible, Interoperable, and Reusable
GDPR	General Data Protection Regulation
R&I	Research and Innovation

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Keywords list

- Social Innovation
- Space cooling
- Social Innovation experts

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Executive summary

This document constitutes Deliverable 7.2 of the CoolLIFE project and presents a comprehensive analysis of the project's impacts on civil society through the lens of social innovation. It forms a critical element of **Task 7.3, "Leveraging Social Innovation"**, and is scheduled for submission in April 2025 (M30). The overarching aim of this deliverable is to evaluate the potential benefits of the CoolLIFE project and its associated open-source CoolLIFE Tool on fostering social innovation within the space cooling sector, particularly in terms of engaging civil society and promoting sustainable practices and is dedicated to detailing the specific activities undertaken to integrate social innovation into the project. From the very inception, the project involved three social innovation experts, representing Italy, Croatia, and Greece, whose participation has been instrumental in shaping the project's trajectory. Their initial engagement took place during the project's **Kick-Off Meeting on 8th November 2022**. During this event, the experts not only familiarized themselves with the consortium's goals and the project's framework but also introduced their extensive experience in the energy sector. Their contributions at this early stage were crucial in redirecting the project's focus from a purely data-driven approach to one that encompasses broader societal needs, thereby underscoring the importance of incorporating a social innovation perspective into the development of sustainable space cooling solutions. Following the Kick-Off Meeting, the social innovation experts played a pivotal role in supporting the development of the CoolLIFE Tool. They introduced their institutions and described their main areas of activity. They clarified the type of content they would need to engage their members and civil society contacts. They focused on relevance, clarity, and ease of use. They also outlined expectations regarding the format of knowledge outputs. For example, they expressed interest in modular content, simple language, and context-specific examples. Furthermore, they provided suggestions on how knowledge transfer could take place. This included local workshops, peer-to-peer exchanges, and the use of trusted intermediaries. Their input was taken into account during the tool's early design phase. It helped ensure that the CoolLIFE Tool would be both accessible and meaningful for non-technical audiences. Afterwards, their involvement continued with the **Mid-term Conference held in Brussels on 4th April 2024**, where the project partners unveiled a demonstrative version of the tool, complete with an overview of its calculation modules. These modules, which cover areas such as space cooling demand, economic feasibility, and policy implications, were designed to provide users with actionable insights into the adoption of sustainable cooling technologies. In the aftermath of this demonstration, a video was released to further illustrate the tool's functionalities, and the social innovation experts were invited to provide a preliminary evaluation. Their feedback was important during the iterative development process, as they highlighted several areas requiring improvement. Specifically, they noted the absence of a functionality that would enable direct comparisons between different space cooling technologies within the same geographical area, the need for the inclusion of building-level data to enhance the granularity of the analysis, and the importance of integrating factors such as comfort, lifestyle, and user behavior—particularly in the context of energy poverty. In addition to their technical input, the social innovation experts also played a significant role in disseminating knowledge about the CoolLIFE Tool within their local networks. Recognizing the importance of effective communication in fostering broader social innovation, the project team, in collaboration with its

communication partner REVOLVE, organized a **series of dissemination activities**. The experts were encouraged to share their personal testimonials regarding the tool's usability and impact, which were subsequently published on the CoolLIFE website. Furthermore, a targeted campaign was launched on LinkedIn to increase the tool's visibility among potential users. This campaign featured a range of multimedia content, including a promotional video and several explanatory videos that detailed the tool's key functionalities, such as its ability to select and compare space cooling technologies, evaluate their accessibility, and facilitate collaboration between experts and civil society. Complementing these efforts, an **interview with an energy policy expert was conducted in March 2025**. The interview, available in both written and audio formats on the project website, provided additional insights into sustainable space cooling solutions and highlighted the broader policy implications of the tool. Looking forward, the social innovation experts are set to participate in **the project's final event, scheduled for October 2025**. This concluding session, designed as a hybrid event to maximize accessibility, will offer the experts a platform to present a comprehensive analysis of the tool's impacts and benefits. Their presentations will focus on how the CoolLIFE Tool has not only advanced technical solutions for space cooling but also acted as a catalyst for empowering local communities and fostering innovative practices. Through their detailed evaluations, the experts will provide constructive feedback on the tool's performance and outline potential pathways for future development and adoption within the energy sector. The final event is expected to serve as a critical forum for multidisciplinary dialogue, bringing together researchers, policymakers, community leaders, and other stakeholders to discuss strategic approaches for enhancing the long-term impact of the CoolLIFE project.

Deliverable 7.2 offers an exploration of how the integration of social innovation within the CoolLIFE project has contributed to bridging the gap between its technological development and societal needs. By engaging social innovation experts throughout the project lifecycle—from the initial Kick-Off Meeting, through active participation in tool development and dissemination activities, to their anticipated role at the final event—the project has established a robust framework for incorporating civil society's insights into the design and implementation of sustainable space cooling solutions. This comprehensive approach not only enhances the relevance and usability of the CoolLIFE Tool but also sets a precedent for future initiatives that seek to combine technological innovation with social empowerment in the pursuit of a more inclusive and sustainable energy future.

1. Introduction

The CoolLIFE project, part of the LIFE-Clean Energy Transition (LIFE-CET) research program, addresses the growing need for sustainable SC solutions within the EU. Its primary goal is to develop an open-source, open-data tool designed to promote the adoption of environmentally friendly SC options in decision-making processes across both the public and private sectors. The **CoolLIFE Tool** enables users to map SC demand at various scales, offering valuable insights into efficient SC strategies, lifestyle impacts, and relevant policy frameworks. Complementing this, a dedicated knowledge hub provides data and resources aligned with the FAIR (Finable, Accessible, Interoperable, and Reusable) principles, supporting energy-efficient SC practices in residential buildings. During the project proposal phase, three social innovation (SI) case studies and their corresponding local social innovation experts were identified. These experts serve as a crucial link between the CoolLIFE project and civil society, disseminating knowledge about open-source energy data acquired through dissemination activities (Task 7.3 “Leveraging social innovation”) to their networks and broader local audiences. As detailed further in Section 3, these SI experts actively contributed to the development of the CoolLIFE Tool’s key functionalities. In fact, the CoolLIFE Tool offers calculation modules categorized into three key areas. In the “Demand” section, it includes modules for District Cooling, Space Cooling Demand, Economic Feasibility, Comfort, Lifestyle, and User Behaviour, and Technologies & Measures, allowing a thorough analysis of SC needs and strategies. The “Policy” section features the Legal and Regulatory Layers module, which helps assess the policy framework influencing cooling systems. In the “Finance” section, the Mapping module provides insights into financial instruments and investment pathways for sustainable SC solutions. Also, the **CoolLIFE Knowledge Hub** has benefited from the review of social innovation experts, ensuring that its content integrates cutting-edge research, policy insights, and innovative approaches to support informed decision-making in the cooling sector. Finally, SI experts have since been instrumental in communicating the benefits and impacts of open-source energy data and the Tool to their communities. **The selected social innovation experts are based in Italy (énostra), Croatia (IRENA), and Greece (Region Peloponnese).** They are expected to continue fostering awareness and promoting sustainable SC practices within their regions. For additional information, including an overview of the CoolLIFE project consortium and the social innovation case studies, please refer to Figure 1.

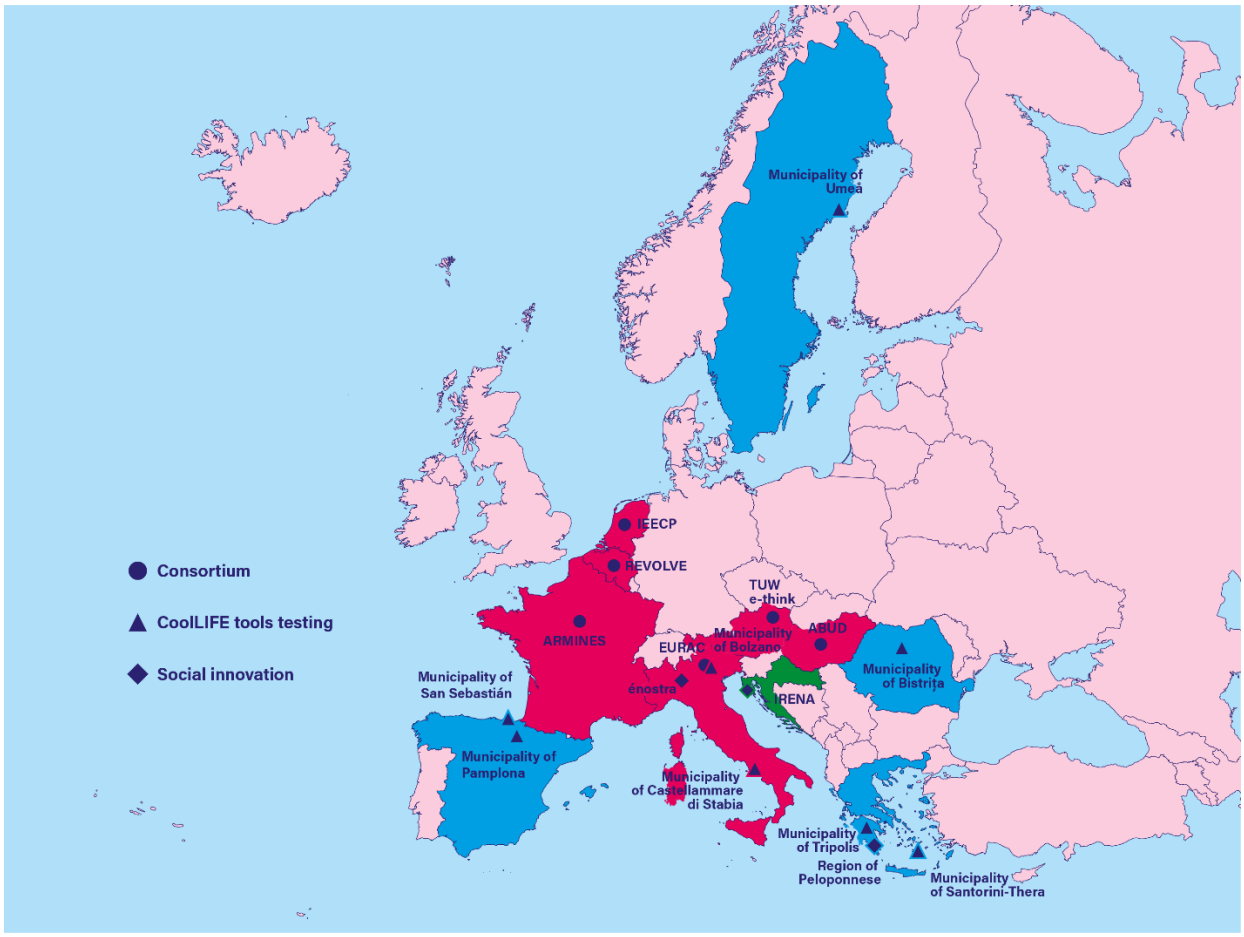

Figure 1. CoolLIFE consortium, tools testing locations as well as social innovation case studies

Figure 2 provides a visual representation of the **interactions among the target groups** involved in the CoolLIFE project, as previously outlined. It emphasizes the pivotal roles played by public administration officers working in the SC sector and social innovation experts. In fact, these groups act as key intermediaries, leveraging the knowledge generated through the CoolLIFE Tool to amplify the project's impact. Public administration officers focus on informing and influencing policymakers, while social innovation experts work to bridge the gap between the project and the broader community, ensuring that the insights and benefits of the tool reach local stakeholders, fostering widespread adoption and understanding. The segmentation depicted in this chart was initially adopted at the project's inception and has undergone continuous refinement over the ensuing months. Iterative adjustments, driven by emerging data patterns and stakeholder feedback, have progressively enhanced its analytical precision and overall robustness.

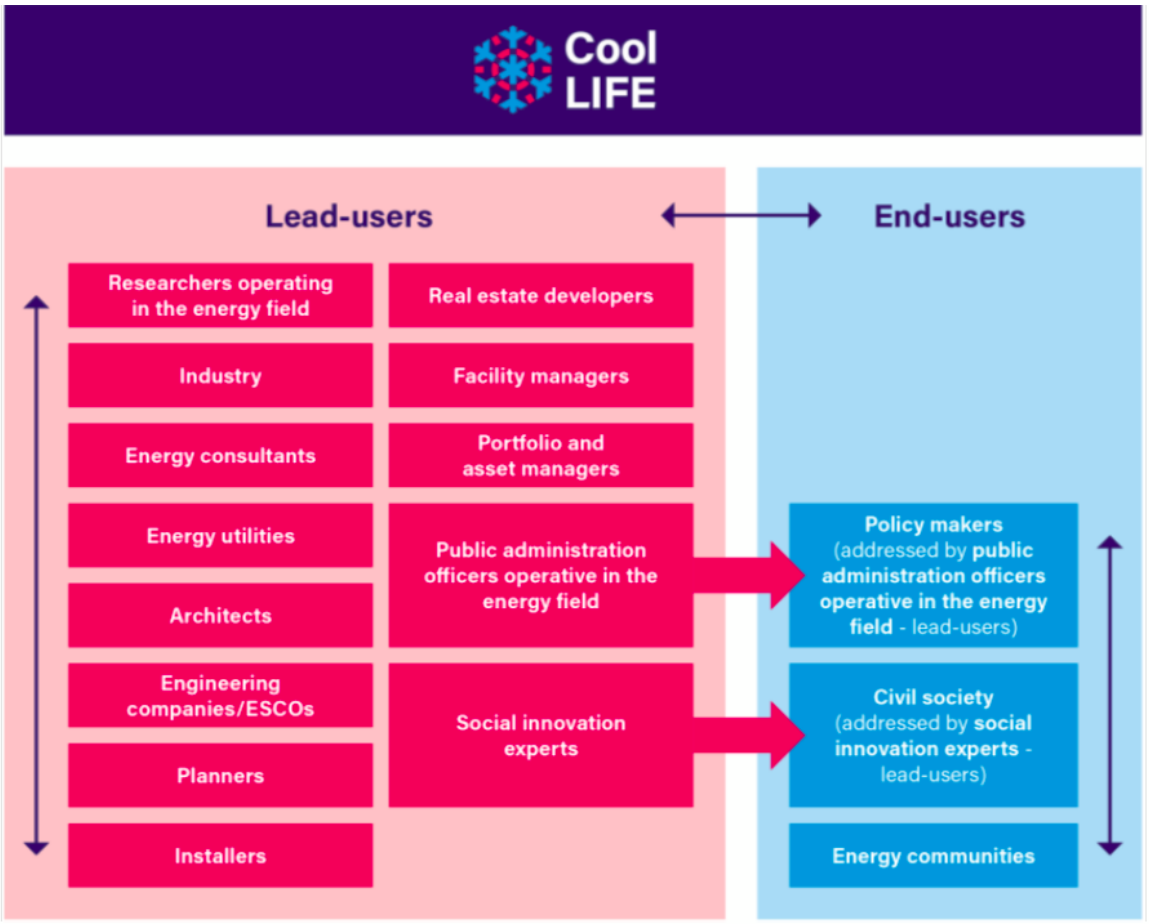

Figure 2. Lead and end-users (target groups) of CoolLIFE and the knowledge transfer sector (symbolized by arrows)

The primary objective of this Deliverable 7.2 is to describe the linkages between the CoolLIFE project and the broader concept of social innovation, as well as to assess the role of the CoolLIFE Tool in supporting ongoing social innovation initiatives or catalyzing new ones within the energy sector. The report is organized as follows: Section 2 initially introduces the general concept of social innovation, followed by its integration into EU objectives and policies, and finally, its application within the SC sector. Section 3 subsequently situates the social innovation framework within the context of the CoolLIFE project, detailing the contributions of social innovation experts engaged and the project's activities. Finally, conclusions are included in Section 4.

2. The role of social innovation

The CoolLIFE project integrates the concept of social innovation, recognizing its critical role in addressing societal and environmental challenges, as highlighted by the European Commission. This section initially provides a comprehensive overview of the general framework of social innovation, followed by a detailed contextualization within the domain of energy research and policy, with an emphasis on aligning with the EU policy agenda. The analysis aims to focus on how social innovation can contribute to advancing energy solutions and strategies, particularly in the context of the European Union's evolving priorities and directives. This approach underscores the significance of incorporating social dimensions in energy-related initiatives to foster more sustainable and inclusive outcomes.

2.1. Definitions of social innovation

First of all, it is essential to define the **concept of social innovation**. Generally, innovations encompass not only advancements in science and technology but also novel applications of existing knowledge, technologies, and social practices. Social innovation, specifically, refers to innovations designed collaboratively with and for societal benefit [1]. This approach involves the participation of various stakeholders, often represented by the model, which includes academia, industry, government, and civil society, divided between lead and end users, as depicted in Figure 3.

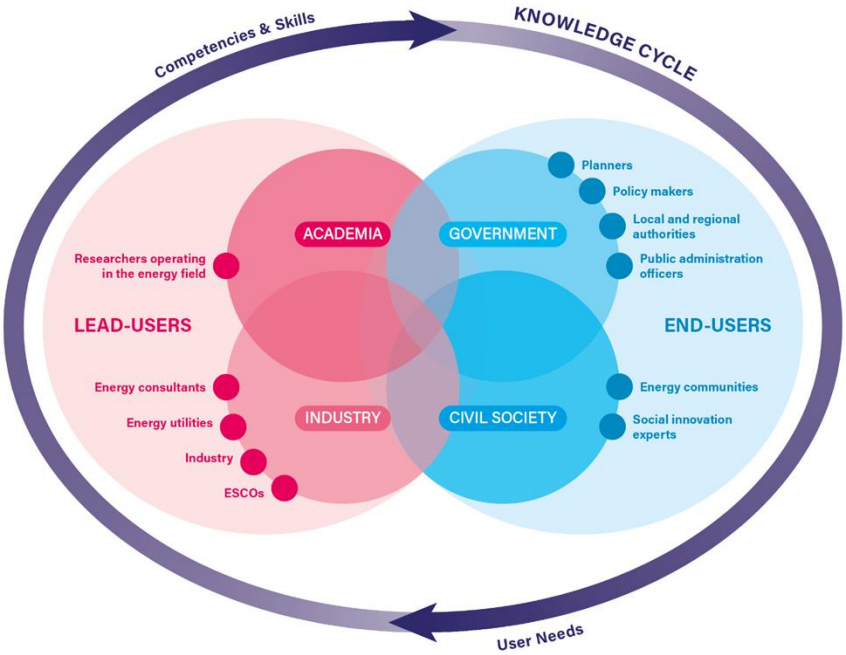

Figure 3. Stakeholders' mapping and interactions in CoolLIFE, with lead and end-users' identification (CoolLIFE Deliverable 7.3 [2])

The academic discourse surrounding social innovation has garnered significant attention over the past decade, continuously evolving in scope and complexity [3]. Definitions and interpretations of social innovation vary depending on the disciplinary lens through which it is examined, influencing the perceived purposes and the range of actors involved. For instance, social innovation can be characterized by initiatives aimed at addressing social issues while fostering societal transformation through mechanisms such as inclusion, empowerment, participation, and the development of new social relationships [4]. Another definition posits that social innovations are novel solutions—ranging from products and services to models and processes—that not only fulfill societal needs more effectively than existing alternatives but also enhance societal capacity and social relationships, thereby optimizing resource utilization [5]. Furthermore, social innovation may be viewed as the reconfiguration of social practices in response to societal challenges, with the overarching goal of enhancing societal well-being through active engagement with civil society actors [6]. These various definitions collectively emphasize both the objectives (i.e., the "what") of social innovation—namely, the resolution of social challenges and needs—and the methods (i.e., the "how") by which these goals are pursued, primarily through the inclusion, participation, and active involvement of civil society actors.

2.2. Social innovation in the European Union objectives and policies

The Social Innovation Community project [7] in 2018 released the Lisbon Declaration on Social Innovation as a Path to a Sustainable, Resilient, and Inclusive Europe, advocating for the integration of SI into the EU's strategic framework to address pressing social challenges projected to impact Europe in the coming decades. This section explores **the role of SI within the context of EU objectives and policies**. Recognizing its significance, SI has been designated as a cross-cutting theme within the Horizon Europe Program, appearing across all program areas [8]. It is considered critical for the active involvement of end-users throughout the project lifecycle, which is essential for enhancing the likelihood of results being adopted and effectively tackling global challenges [9]. Consequently, the European Commission has supported various Research and Innovation (R&I) action projects under the Horizon 2020 R&I Framework Programme and Horizon Europe, focusing on social innovation within several key policy and societal challenges, such as "Secure, Clean, and Efficient Energy" and "Europe in a Changing World – Inclusive, Innovative, and Reflective Societies. "These initiatives aim to engage civil society in R&I actions and policy-making processes. Under the "Secure, Clean, and Efficient Energy" objective, the energy transition challenge was a primary focus, resulting in funding for nearly forty R&I projects [10]. A subset of these projects specifically addressed the application and practice of SI within the energy sector, highlighting its relevance for framing SI in the context of the CoolLIFE project. The subsequent section will discuss specific projects that have been acknowledged for their contributions to this framing within the CoolLIFE initiative. References to similar initiatives and discussions can be found in literature such as the reports by the OECD on SI in public services [11] and studies on user-driven innovation in energy transitions [12].

2.3. Social innovation in the space cooling sector

The decarbonization of space cooling sector requires not only technological progress but also a paradigmatic shift in the way energy is governed and consumed. SI is increasingly recognized as a critical enabler of this transition, facilitating greater inclusivity, local engagement, and democratization of energy governance. The following sections explore the emergence of SI in energy buildings, the structural and agency-related barriers it faces, and a range of promising initiatives that suggest pathways for further advancement.

2.3.1. Rise of Social Innovation on Energy Buildings

Mitigating and adapting to climate change is an urgent global challenge, necessitating a profound transformation of energy systems towards sustainability through the phase-out of fossil fuels [13]. This transition demands not only technological advancements but also societal innovations, as renewable energy systems fundamentally differ from traditional, centralized fossil-fuel-based models [14]. In these new systems, non-state actors and decentralized governance play increasingly pivotal roles in decision-making processes, reflecting a shift towards energy democracy [15]. **Energy democracy emphasizes the need for inclusivity and representation in energy governance, advocating for a more participatory approach where diverse stakeholders, including local communities, actively contribute to decision-making** [16]. This approach aligns with the broader trend of SI in the energy sector, which encompasses various initiatives like renewable energy cooperatives, energy communities, and crowdfunding platforms [17]. Such initiatives are driven by participant motivations, including economic benefits and environmental values, as well as contextual factors such as policy support and energy price fluctuations [18]. In this context, the concept of prosumers—where consumers also produce their own renewable energy—emerges as a key element of future energy systems, with projections suggesting that prosumers could meet up to 50% of electricity demand by 2050 [19]. The rise of prosumers and decentralized energy production is facilitated by technological advancements, such as smart grids and energy storage solutions, which support the integration of renewable sources at the local level [20].

2.3.2. Barriers to the development and scaling of Social Innovation

Despite the growing momentum of SI in the energy domain, significant obstacles remain that hinder its widespread adoption and scaling. **These barriers can be broadly categorized into structural and agency-related dimensions**. Structural barriers include inadequate legal and regulatory frameworks, limited financial mechanisms, and insufficient access to critical information regarding available technologies, applicable regulations, and existing subsidy schemes [21]. Agency-related barriers, on the other hand, involve individual and collective behavior, such as societal passivity, lack of experience in social innovation, and insufficient stakeholder engagement. The absence of a coherent policy environment creates uncertainty and limits the scalability of many SI initiatives. On the other hand, agency-related barriers pertain to behavioral and cultural factors. These include a general societal passivity towards active energy engagement [22], a lack of prior experience in managing or participating in SI initiatives, and weak or fragmented stakeholder engagement. In many cases, communities lack the organizational capacity or

social capital needed to mobilize and sustain such initiatives over time. Overcoming these barriers is essential for unlocking the transformative potential of SI, particularly in promoting a more equitable and participatory energy transition [23].

2.3.3. New promising initiatives to explore the advance of social innovations

To address the aforementioned barriers, several **EU-funded projects** have emerged with the explicit aim of supporting and scaling social innovation in the energy sector. Projects such as *SocialRES*, *SMARTEES*, *COMETS*, *NEWCOMERS*, and *SONNET* have provided empirical and theoretical insights into the mechanisms through which SI can be catalyzed, especially by empowering non-state actors and reinforcing community-led governance. [24]. On this track, CoolLIFE focuses on overcoming the lack of access to necessary information by providing open and user-friendly energy data, thus addressing one of the critical barriers to SI. The academic and policy discourse increasingly highlights the importance of supportive regulatory environments and the active engagement of stakeholders in fostering SI. Studies suggest that targeted interventions are needed to build capacity, enhance societal readiness, and support the scaling of successful initiatives [25], [26]. By aligning policy frameworks with the needs of social innovators and removing structural and agency-related barriers, a more just and equitable energy transition can be achieved [27]. In conclusion, while the transition towards sustainable and decentralized energy systems presents significant opportunities for SI, it also requires concerted efforts to address existing barriers. Through a combination of technological and SI, supported by inclusive governance frameworks, the potential for a more democratic and sustainable energy future can be realized [28].

3. Social innovation in CoolLIFE

The CoolLIFE project has strategically integrated the concept of SI within Task 7.3, titled "Leveraging Social Innovations". The activities, carried out by the team, were coordinated by a Social Innovation Manager; to be noted that, the Social Innovation Manager Silvia Tomasi was substituted by Dario Bottino-Leone for this Task due to maternity leave. This Task has dual objectives: firstly, to expand the potential list of lead and end users for the CoolLIFE Tool; and secondly, to address existing gaps in the application of SI within the SC sector (please refer to Section 3.3 for details). This objective was pursued by engaging three SI experts from three distinct EU member states (Italy, Greece, Croatia), each representing unique contextual environments. Although the SI experts' names have been omitted for GDPR [29] reasons, They are located in Italy (énostra), Greece (Region Peloponnese) and Croatia (IRENA), as shown in Figure 1. From the project inception, the involvement of SI experts was planned as a continuous engagement from the initial to the concluding phases of the CoolLIFE project. The selected experts participated in the project's Kick-Off Meeting (KoM) on 8th November 2022. Following the Kick-Off, the experts were actively involved in supporting the development of the CoolLIFE Tool. Their contributions included providing feedback on the tool's potential to initiate SI initiatives. Subsequently, the experts were regularly briefed on the tool's development and functionalities once the Tool was operational. This engagement aimed to disseminate knowledge on the impacts and advantages of open energy data and the functionalities of the CoolLIFE Tool within the experts' local networks, including partners in other projects, members of energy cooperatives, and citizens. A significant milestone was reached with the Mid-term Conference in Brussels on April 4th, 2024, where project partners unveiled the CoolLIFE Tool—an open-source platform aimed at supporting climate adaptation strategies. During the event, they also introduced the calculation modules (CMs) that has been integrated to enhance the platform's capabilities. The final version of the tool was released October 2024 (M24), accompanied by a feedback phase to optimize its usability. To further disseminate key insights, an expert interview in March 2025 examined the tool's impact and potential applications, followed by other dissemination activities and the final event, scheduled in October 2025. During this event, they will present to the consortium the potential impacts and benefits of utilizing the open-source CoolLIFE Tool for local civil society. The following subsections describe in detail all the activities introduced.

3.1. Social innovation – End-users of CoolLIFE

The CoolLIFE project places social innovation at the heart of its strategy for sustainable space cooling. This means treating end-users not only as recipients of technological solutions, but also as co-creators of knowledge and local agents of change. The knowledge generated through the CoolLIFE Tool—on sustainable cooling practices, behavioural change, and system-level interventions—is intended to be mobilized through civil society actors embedded in local contexts. The end-users of CoolLIFE span across different sectors, as visualized in the project's Knowledge Cycle framework. On the civil society side, this includes energy communities, social innovation experts, members of local environmental associations, and citizens engaged in cooperative initiatives. These actors are motivated by tangible social needs:

reducing energy bills, improving indoor comfort, responding to heat-related health risks, and contributing to climate action. In practical terms, **the knowledge provided by CoolLIFE enables these end-users to:**

- *Adopt energy-efficient space cooling strategies adapted to their local climate and building stock.*
- *Implement collective actions, such as neighborhood campaigns or cooperative investments in passive cooling solutions.*
- *Translate complex technical information into accessible guidelines and practices for vulnerable households.*
- *Influence local policy discussions by providing evidence-based feedback to municipalities or regional authorities.*
- *Build bridges across sectors, fostering collaboration between citizens, NGOs, planners, and energy experts.*

SI emerges through these processes of appropriation and adaptation. For example, energy cooperatives like énostra (Italy) use this knowledge to design awareness campaigns and community-based retrofitting programs. Regional networks such as IRENA (Croatia) serve as intermediaries, translating technical content into actionable plans for local governments and citizens. Public actors like the Region of Peloponnese (Greece) act as enablers, incorporating these insights into regional adaptation and energy poverty strategies. Beyond individual adoption, CoolLIFE contributes to the structuring of knowledge ecosystems where end-users become part of a circular dynamic: expressing needs, receiving tailored knowledge, and feeding back insights that refine and expand the tool. This supports a shift from top-down dissemination to participatory knowledge governance, aligning with the principles of energy democracy and just transition. In summary, the CoolLIFE Tool empowers civil society to take active roles in climate mitigation and adaptation. The benefits include lower energy consumption, enhanced health and comfort, greater resilience to heatwaves, and stronger community cohesion around shared sustainability goals.

3.2. Social innovation experts' participation in the project's kick-off

The first activity foreseen by the T7.3 was the involvement of the SI experts in the Kick-Off event of the CoolLIFE project, in order for them to meet the consortium partners and to get to know the project's activities and content, and for the project partners to meet them and to be introduced to the concept of SI in the energy sector. Hence, the 3 identified SI experts have participated in the **Kick-Off event of the CoolLIFE project, that took place on 8th November 2022**. The three experts are based in Italy (énostra), Croatia (IRENA), and Greece (Region Peloponnese). In that occasion they had the possibility to present to the consortium their experience in SI within the energy field. Their intervention during the kick-off event was particularly meaningful as it brought the attention of the participants on the civil society needs in the energy transition and shifted the discussion from a merely data-driven point of view to a broader one. Following the Kick-Off Meeting, the social innovation experts contributed to the early development of the CoolLIFE Tool. Representatives from Italy (énostra), Croatia (IRENA), and Greece (Region of Peloponnese) shared insights based on their institutional roles and community engagement experiences.

These actors represent different sectors: community-based energy initiatives, regional energy agencies, and public administration. During the exchanges, they identified key needs emerging from their interactions with civil society. These needs are primarily environmental, economic, and health-related. For example, citizens are concerned about climate-related risks, energy affordability, and the health impacts of inefficient housing. The experts stressed the importance of developing content that responds to these concerns in concrete and accessible ways. They recommended practical, modular materials that can be adapted to different local contexts. They also emphasized the importance of simple language and case-based examples to support outreach. These suggestions helped shape the tool's early design and ensured that knowledge transfer would be rooted in real-world priorities and capacities.

3.3. Social innovation experts support the development of the CoolLIFE Tool

The CoolLIFE Tool has been developed throughout the running of the CoolLIFE project. During the development, several activities required the involvement of the SI experts to provide their indications for the tool, and at the end of this process their feedback on the final version of the tool from a social innovation point of view. In the context of the CoolLIFE **Mid-term conference in Bruxelles on April 4th, 2024**, the partners presented the user-friendly and open source CoolLIFE Tool and provided an overview of the calculation modules (CMs) that will be developed and integrated into the platform. Afterwards, a demonstrative video of the tool was released [30]. This video was then sent to SI experts, for a preliminary evaluation of the developed contents.

The **final release of the Tool, in October 2024** (M24), marked an important milestone for the project development. After this release, the three SI experts were involved again by asking feedback on the final product, bringing their perspective and the needs of civil society to the development of the CoolLIFE Tool. From the responses provided by the SI experts, several key insights emerged regarding the limitations and potential areas for improvement in the evaluation and application of SC technologies, collected in Table 1. Firstly, it was highlighted that there is no functionality to directly compare two SC technologies within the same geographical area. The absence of this comparative analysis capability hinders informed decision-making and may limit the efficiency of technology selection. Implementing such a feature could significantly enhance the mechanisms for choosing the most suitable SC solutions based on specific regional requirements and constraints. Additionally, the CM currently lacks explicit considerations for "comfort, lifestyle and user behaviour" in relation to energy poverty. The experts emphasized the importance of integrating data on average income levels with expenditures for SC. Such an approach would provide critical insights into the affordability and accessibility of SC technologies, particularly for vulnerable populations. Addressing this gap would not only strengthen the module's relevance but also align it with broader social equity goals. Another significant shortcoming identified is the absence of information regarding the SC technologies already installed in a given area. This lack of data creates a blind spot in understanding the existing technological landscape, which is crucial for assessing the baseline conditions and planning effective interventions. Without this knowledge, it becomes challenging to evaluate the incremental benefits of new technologies or to design strategies that complement existing systems. Lastly, while large-scale data on SC technologies is available, there is a notable lack of

information at the building level. This granularity is essential for tailoring solutions to specific buildings and for achieving precise energy efficiency improvements. The integration of building-level data would enable a more localized and impactful approach, bridging the gap between macro-scale analysis and actionable micro-scale interventions.

Table 1. List of limitations of the tool detected by the SI experts and relative improvements caused by suggestion.

Limitation of Tool	**Improvement Caused by Suggestion**
No functionality to directly compare two SC technologies within the same geographical area	Enhances the mechanisms for choosing the most suitable SC solutions based on specific regional requirements and constraints
Lack of explicit consideration for "comfort, lifestyle and user behaviour" in relation to energy poverty	Supports the integration of socio-economic dimensions, improving the relevance of SC evaluation for vulnerable populations and aligning with social equity goals
Absence of data on SC technologies already installed in a given area	Improves understanding of the existing technological landscape, enabling baseline assessments and better planning of complementary interventions
Lack of building-level data on SC technologies	Allows for more localized and precise interventions, bridging the gap between macro-scale analysis and building-specific energy efficiency improvements

3.4. Diffusion of knowledge within the Social Innovation experts' local networks

The input from the SI experts has been crucial for the development of the CoolLIFE Tool, which facilitates access to key information on sustainable cooling (SC) technologies and addresses gaps that hinder the acquisition of accurate and useful results for the adoption of these technologies by civil society. The next step is to disseminate the feedback and insights from the SI experts to clearly identified end users—such as energy communities, social cooperatives, and local civil society organizations—as well as to other professionals in the field, including municipal technicians, urban planners, regional energy agencies, and consultants involved in building renovation or climate adaptation. To this end, EURAC, with the support of its communication partner REVOLVE, will carry out a series of carefully designed actions to maximize the tool's reach and understanding across these target groups.

One of the first actions was to **ask the three SI experts who participated in the project's KoM and provided feedback on the tool in October 2024, to share their personal testimonies**. These testimonies focus on the user experience of the tool, highlighting its positive impact for both civil society and other SI experts. The aim of this action is to build trust and encourage potential users to adopt the tool. These testimonies were published on the CoolLIFE website homepage, just after the section that describes the tool, providing real and direct examples of its effectiveness and value. This way, users can understand how CoolLIFE can benefit them in concrete terms.

Additionally, a communication campaign has been launched on LinkedIn to increase the visibility of the CoolLIFE Tool and strengthen the community that has been built over these three years. The campaign contributes to the broader communication strategy, which also includes visibility actions through social media channels, newsletters, and participation in events hosted by SI institutions. Its objective is to increase awareness and foster engagement among target audiences. KPIs for the campaign include YouTube engagement metrics (views, likes, shares), website traffic, and the number of stakeholders reached through direct outreach and mailing lists. Throughout the campaign, various topics are highlighted regarding the different uses of the tool, such as:

- Selection and comparison of SC technologies
- Evaluation of the accessibility of SC technologies
- Analysis of already installed SC technologies
- Customisation at building level
- Promoting collaboration between social innovation experts and civil society

To facilitate users' experience with the tool, the campaign includes a **promotional video** that gives a first look into the Tool and a series of explanatory videos that shows how to navigate the CoolLIFE Tool and each of its modules prepared by our partner e-think and with the collaboration of TU WIEN and Eurac, providing a first point of contact and a user-friendly introduction to its features. The videos (Figure 4) are available in the CoolLIFE YouTube playlist and e-think YouTube playlists (trainings here).

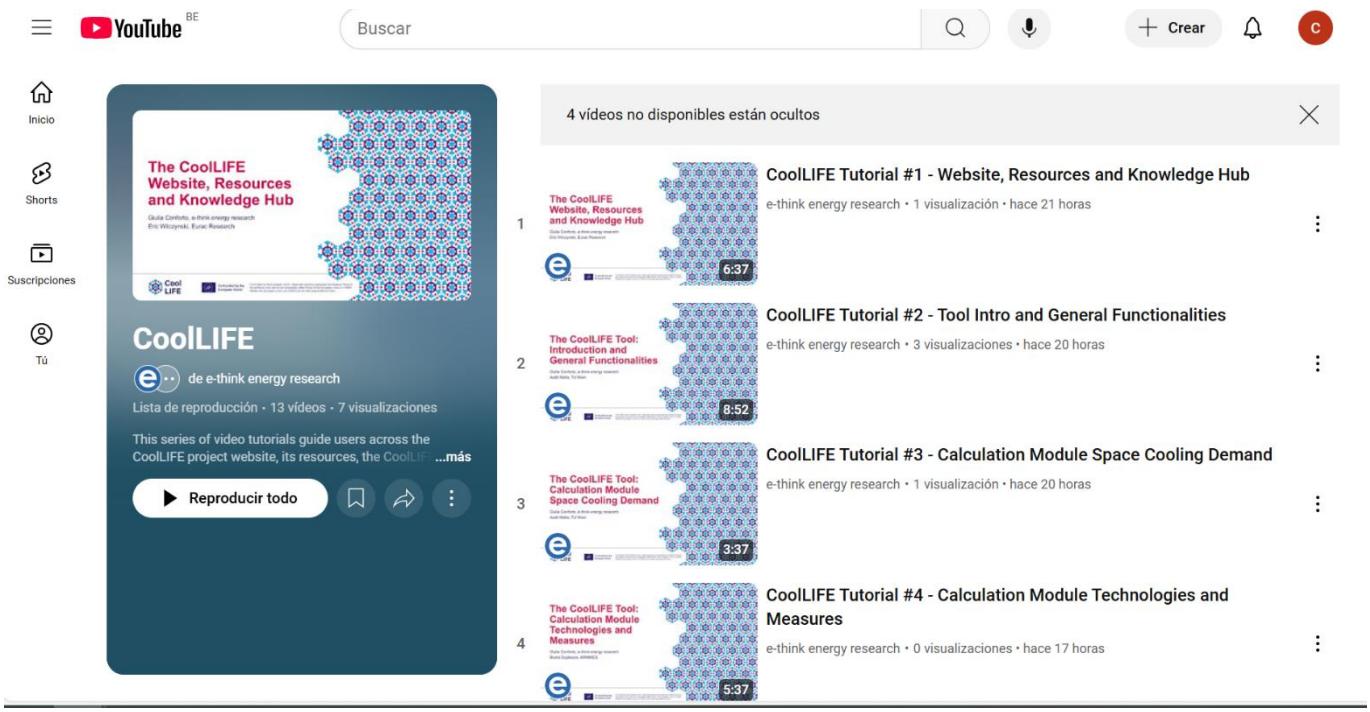

Figure 4. Screenshot of the CoolLIFE YouTube channel with the trainings.

In addition to these media products, social innovation case studies have been used to support knowledge transfer within civil society. This includes direct outreach through events organized by SI institutions, such as energy community assemblies, where knowledge gained through the CoolLIFE project is shared with members. These gatherings serve as practical forums for peer learning and dialogue. Continuing with the dissemination activities, EURAC, with the support of REVOLVE, contacted an energy policy expert to conduct an interview, recorded in audio format. **Published in March 2025 on the CoolLIFE website, the interview is available in both written and audio formats**, allowing users to read or listen for a more accessible experience. This activity aimed to share insights on sustainable space cooling, highlight policy implications, and raise awareness of energy challenges (Figure 5).

Figure 5. Screenshot of the interview realized with Jean-Sebastien Broc, senior policy expert. Full interview: Space Cooling Solutions: Challenges and EU Policy Insights

3.5. Social innovation experts participate in the project's final event

Social innovation experts will be invited to participate in **the concluding event of the CoolLIFE project, scheduled for October 2025**. This final session, organized as a hybrid event with both in-person and online components, is designed to ensure extensive accessibility and robust engagement from a diverse audience. During the event, the experts will deliver a comprehensive analysis of the potential impacts and benefits of the CoolLIFE Tool. Their presentations will demonstrate the tool's pivotal role in advancing energy efficiency and promoting sustainable practices at the local community level. Moreover, these experts will provide detailed insights and constructive evaluations to the consortium, underscoring how the CoolLIFE Tool can serve as a catalyst for empowering civil society and stimulating innovative local initiatives. They will elucidate the mechanisms by which the tool not only supports actionable change but also fosters a collaborative environment to address climate challenges effectively. This event will also offer a valuable forum for multidisciplinary dialogue among researchers, policymakers, community leaders, and other stakeholders. Through this exchange, participants are expected to explore strategic pathways for future collaboration and develop models that enhance the long-term impact of the tool. Ultimately, the session aims to establish a precedent for integrating technological innovation with social dynamics, thereby contributing to a more sustainable and resilient approach to climate action. The involvement of SI experts will extend beyond the final event through a structured follow-up mechanism. In particular, ongoing consultations will be made available in both bilateral and group formats, allowing experts to provide strategic input as the CoolLIFE Tool continues to be implemented and adapted across various local

contexts. Additionally, a dedicated online collaboration space will facilitate continuous dialogue, enabling experts to exchange resources, co-develop recommendations, and remain actively engaged with the consortium and relevant stakeholders. This sustained interaction is intended to ensure that the insights of SI experts continue to shape the project's long-term trajectory and real-world applicability.

3.6. Social Innovation Outcomes Triggered by the CoolLIFE Tool

The CoolLIFE Tool does not only offer technical guidance on sustainable cooling technologies; it also acts as a catalyst for social innovation processes at the community level. Through its knowledge-generation and transfer mechanisms, the tool enables civil society actors to frame cooling-related challenges as collective, actionable issues, thereby fostering new forms of organization, participation, and cooperation. The transfer of knowledge occurs through direct interaction between the tool and end-users, but more significantly via mediated knowledge sharing facilitated by SI experts. These experts play a crucial role in contextualizing the tool's outputs during online and in-person events—such as workshops, energy assemblies, and local climate initiatives—transforming data into strategies tailored to the needs of local communities. Discussions held in October 2025 with SI experts from Italy (énostra), Croatia (IRENA), and Greece (Region of Peloponnese) will focus on several concrete outcomes of this process:

1. Empowerment of energy communities through better decision-making

The tool's ability to compare SC technologies and assess their accessibility has allowed energy communities to make more informed choices when planning cooling-related interventions. For example, community members involved in renovation projects now consider passive cooling solutions as viable, low-cost alternatives to traditional air conditioning systems, especially for vulnerable households. This shift in perception reflects a broader behavioral change.

2. Local replication of participatory knowledge-sharing formats

The use of the tool during energy community assemblies has led to the emergence of structured spaces for dialogue around SC, energy poverty, and adaptation strategies. These assemblies have evolved into local learning platforms, where community members not only receive information but also contribute their experiences and priorities. This dynamic has strengthened social capital and mutual learning.

3. Cross-sectoral collaboration facilitated by common reference points

By offering a neutral, science-based knowledge base, the CoolLIFE Tool has become a common reference point for civil society organizations, municipal officers, and technical experts. In some cases, the tool has been used as a discussion support in working groups for local adaptation planning, helping align community needs with institutional policies.

4. Awareness raising and agenda-setting in underserved territories

In regions with limited prior engagement on SC issues, the tool has served as a trigger for first-time discussions. In the Peloponnese, for instance, the tool's introduction enabled local actors to initiate community-led mapping of overheating risks, particularly in schools and public buildings. This represents a form of agenda-setting driven by data accessibility.

5. Measuring Social Innovation Impact

Assessing the impact of the tool in terms of SI involves both qualitative and quantitative approaches. Suggested metrics include:

- Number and type of community events where the tool is presented or used
- Emergence of new partnerships or collaborative initiatives following tool deployment
- Changes in awareness or attitudes, captured through user surveys and interviews
- Uptake of cooling-related decisions informed by the tool (e.g. technology selection, behavioural change)
- Replication or adaptation of knowledge-sharing formats across contexts

Ultimately, the CoolLIFE Tool contributes to social innovation not by prescribing solutions, but by enabling collective agency, contextual adaptation, and long-term resilience building. Its impact lies in transforming knowledge into shared capacity for action.

3.7. Knowledge Transfer Roll-Out Plan for End-User Engagement through Social Innovation Networks

This section outlines the strategic framework for transferring knowledge to end-users through targeted engagement with social innovation networks. As stipulated in the Grant Agreement, knowledge transfer will be operationalized through a suite of dissemination outputs including instructional videos, and supplementary written reports. These formats are selected not only for their accessibility and replicability, but also for their potential to embed the project's results into diverse socio-institutional environments. The CoolLIFE Knowledge Hub will serve as the central platform for hosting and distributing these materials. Designed as a user-oriented digital infrastructure, the hub will feature an integrated repository of resources, including:

(i) Video tutorials and testimonials showcasing real-world use cases and community engagement processes;

(ii) Analytical reports detailing the outcomes of pilot activities, evaluation metrics, and lessons learned.

These outputs will be co-developed with input from social innovation experts and local stakeholders to ensure relevance and scalability. Their function is twofold: to provide technical guidance on tool usage, and to contextualize energy transition pathways within specific cultural, economic, and governance settings. Following the project's completion, the dissemination and communication package will support the continued activation of knowledge transfer through periodic releases of curated content—such as

thematic briefings, podcasts, and infographics—targeted at both practitioners and decision-makers. This ensures that the legacy of the project extends into policy discourse and local practice well beyond the funded period. Moreover, social innovation experts will play a sustained role in this knowledge ecosystem. They will act as intermediaries for peer-to-peer learning, moderators of collaborative forums, and advisors in the adaptation of resources to emerging community-led initiatives. Their involvement guarantees that the CoolLIFE Tool remains responsive to real-world needs and contributes actively to the emergence of energy social innovation across Europe. In this way, the combination of multimedia tools, written handbooks, and expert-led facilitation establishes a robust foundation for knowledge transfer that is both technically grounded and socially embedded.

4. Conclusion

This deliverable provided an analysis of the prospective impacts of the CoolLIFE project and its accompanying CoolLIFE Tool on civil society, with a focus on the integration of social innovation in the field of sustainable space cooling (SC). The document presented the work carried out under Task 7.3, “Leveraging Social Innovation”, and explored how the project contributes to empowering civil society actors by improving their access to knowledge, tools, and networks relevant for SC adoption. **Section 1** introduced the structure and scope of the report, offering background information on the project consortium and its partners. **Section 2** outlined the conceptual foundation of social innovation, framing it as a participatory and collaborative approach to addressing societal and environmental challenges. Within the SC sector, social innovation (SI) has a specific role in enabling civil society to take part in the design and implementation of fair and sustainable energy systems. Despite its transformative potential, the field continues to face barriers, particularly in terms of fragmented access to technical information, limited institutional support, and the complexity of regulatory and financial instruments. The CoolLIFE project addresses these limitations through the development of an open-access tool designed to facilitate user engagement and knowledge transfer. Quantitative evidence of SI outcomes has been documented in the M18 technical report. This includes data on stakeholder engagement, participation in co-design workshops, and early feedback from targeted user groups. In particular, the involvement of three case studies—énostra (Italy), IRENA (Croatia), and Region of Peloponnese (Greece)—has been instrumental in illustrating how knowledge generated by the tool is shared through structured events such as community assemblies and technical briefings. All the most important activities are described in **Section 3**. The role of the social innovation experts was concentrated on moments of strategic relevance, such as the Kick-Off Meeting and feedback phases around tool testing and communication planning. Their involvement helped identify key civil society needs—primarily related to environmental concerns, economic vulnerability, and health risks—and inform the development of accessible, context-sensitive materials. While their presence did not extend across all technical stages of the tool's construction, their input provided important insights on user expectations and supported the alignment of the tool with real-world practices. Future iterations of the project documentation may benefit from including direct expert quotations and structured evaluation forms to reinforce the traceability and weight of their contributions. Evaluating the impact of CoolLIFE on SI requires both quantitative and qualitative approaches. From a methodological point of view, the project incorporates several layers of observation and assessment, including tracking participation in training activities, collecting feedback through surveys, monitoring media and platform engagement, and documenting knowledge dissemination pathways. These dimensions provide an empirical basis for understanding how the tool activates or supports SI processes. Moreover, as supported by literature, such tools can act as infrastructures for engagement—helping to create conditions for knowledge circulation, cross-sectoral collaboration, and long-term community resilience. The Final Event in October 2025 will serve as a key moment to consolidate these insights. It will offer a platform to validate the lessons learned, highlight the most effective pathways for future scaling, and reinforce the connection between digital tools and bottom-up innovation. In this sense, the CoolLIFE Tool stands not only as a repository of data and functionalities, but also as a vehicle for enabling collective agency and adaptive strategies in the face of climate change.

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