ConnectHeat
Community engagement for clean heat

WARMER (AND COOLER) TOGETHER

A Position Paper on Renewable Heating & Cooling for Energy Communities

The LIFE21-CET-ENERCOM-CONNECTHEAT project has received funding from the European Union's LIFE Programme under grant agreement N°101076258

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Abstract

Though heating and cooling (H&C) cover more than half of the EU energy needs, this sector is still widely neglected in many legislation frameworks and in the implementation of decarbonisation plans.

This also happens within the context of renewable energy communities (RECs) where, despite the original definition of the EU RED III Directive which has a quite wide scope, the transposition of at the national levels in the Member States has largely been limited to electricity only. Most of the active RECs, therefore, do not include H&C supply, showing a significant policy gap that limits the potential of energy communities to contribute fully to the energy transition.

To bridge this gap, it is imperative to adapt the strategic and regulatory frameworks governing energy communities for including also H&C.

In this framework, the ConnectHeat project (https://connectheat.ambienteitalia.it/), supported by the EC within the LIFE Clean Energy Transition programme, has developed this Position Paper, with the aim of supporting Municipalities, decision-makers at the local and regional levels and citizens to spread H&C communities in their territory.

This paper describes the current policy status and the remaining barriers, introduces the concept and the specific features of H&C communities, describes the already existing examples in the EU and, finally, gives some policy recommendations that could be implemented at the national, as well as, in some cases, also at the regional or local levels.

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Heating & cooling in the energy transition

In Europe, heating and cooling are responsible for more than 50% of energy consumption and greenhouse gas emissions. Although the decarbonisation of heating and cooling is underway, progress has been slow and about 75% of the energy consumption is still produced with fossil fuels.

The decarbonisation of the heating and cooling sector is therefore essential in the energy transition to reach Europe's ambitious 2050 targets (carbon neutrality) and there is a huge potential for action to increase energy efficiency and sustainability, both through measures to reduce end-use consumption and through the deployment of renewable energy installations.

Moreover, it can increase the overall efficiency of the energy system by enabling the use of district heating and cooling (DHC) based on RES and on the recycling of heat losses from a variety of energy conversion or industrial processes as well as CHP plants.

The EU's strategy for decarbonization, driven by the European Green Deal, RED III, revised EED, the Fit for 55 package and the Energy Performance of Buildings Directive (EPDB), envisions transformative changes in H&C production, distribution and consumption.

Central to this transition are the integration of a high share of renewable energy sources (RES) and waste heat into district H&C systems and the renovation of the building stock, the single largest energy consumer in Europe, responsible for around 40% of the total energy.

By leveraging biomass, geothermal, solar thermal and waste heat, district heating and cooling (DHC) networks are expected to become the backbone of urban heating. The modernization of these systems to 4th and 5th generation district heating, which operates at lower temperatures and maximizes the efficiency of renewable integration, will be crucial.

The revision of the Energy Efficiency Directive (EED) in Art. 26 sets the criteria and the objectives for reaching 'efficient DHC'. These goals foresee the use of increasing shares of renewable energy, waste heat and high-efficiency cogeneration, to meet intermediate targets, starting in 2027, and then reaching the final objective in 2050, when DHC networks must be operated using renewable energy only, or waste heat only, or a combination of renewable energy and waste heat.

Furthermore, within Art. 25.6 it also introduces the obligation, for Municipalities with more than 45,000 inhabitants, to develop specific local plans for H&C, thus recognizing a key role to LRPAs in the decarbonization processes at local level. Finally, the EPDB aims at achieving a highly energy efficient, zero-emission and fully decarbonised building stock by 2050.

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A policy and communication gap: Renewable energy communities for heating & cooling

Renewable Energy Communities, as established under the RED III Directive, are designed to empower local communities to produce, consume and manage renewable energy. However, the implementation of RECs at the national levels has largely been limited to electricity only, excluding H&C. Most of the active RECs, therefore, have been developed considering only electricity generation and distribution and this omission represents a significant policy gap that limits the potential of RECs to contribute fully to the energy transition.

While most active RECs are based on electricity generation and distribution, there are already several ongoing initiatives involving local communities in renewable heat supply through heating networks, highlighting that regulations are clearly lagging behind.

This narrow focus not only limits the potential of RECs to contribute to the EU's climate goals but also excludes a significant portion of energy consumption, the one related to H&C, which is closely tied to energy poverty (through the topic of space heating) and carbon emissions.

To bridge this gap, it is imperative to adapt and expand the strategic and regulatory frameworks governing RECs. The EU's Fit-for-55 package, alongside the updated Energy Efficiency and Renewable Energy Directives, provides a robust foundation for integrating renewable heating and cooling into the scope of RECs.

Therefore, updating and expanding the regulatory framework to fully incorporate and duly valorising renewable heat is crucial for maximizing the contribution of RECs to the energy transition and ensuring a comprehensive approach to EU climate goals.

In this framework, the ConnectHeat project (https://connectheat.ambienteitalia.it/), funded by the EC within the LIFE Clean Energy Transition programme, supports the diffusion of low-carbon community-led energy models in the H&C sector, able to ensure higher shares of local RES, the access to a "cheaper and cleaner energy", positive impacts on local air quality and socio-economic benefits. This objective is being achieved through structural cooperation between PAs, citizens and key stakeholders at local and transnational level, build-up of knowledge and skills, the planning and implementation of pilot initiatives in 6 EU target areas, the development of roadmaps and blueprints for their wide replication and diffusion.

What is a renewable H&C community?

Renewable Heating & Cooling (H&C) communities are more than just collaborative initiatives where members work together to generate, manage and utilize thermal energy derived from renewable sources. These communities are designed to enhance energy efficiency, reduce carbon emissions, and promote energy independence by leveraging local RES for H&C needs.

A key characteristic of renewable H&C communities is their emphasis on inclusive decision-making, governance and educational initiatives, which help to ensure the successful adoption and efficient use of renewable H&C technologies.

In fact, a renewable H&C community can be involved in at least one of the following activities:

A. **Producing, consuming, and storing thermal energy**: Generating heat from renewable sources, utilizing it within the community and storing excess energy for future use to enhance efficiency and reliability.

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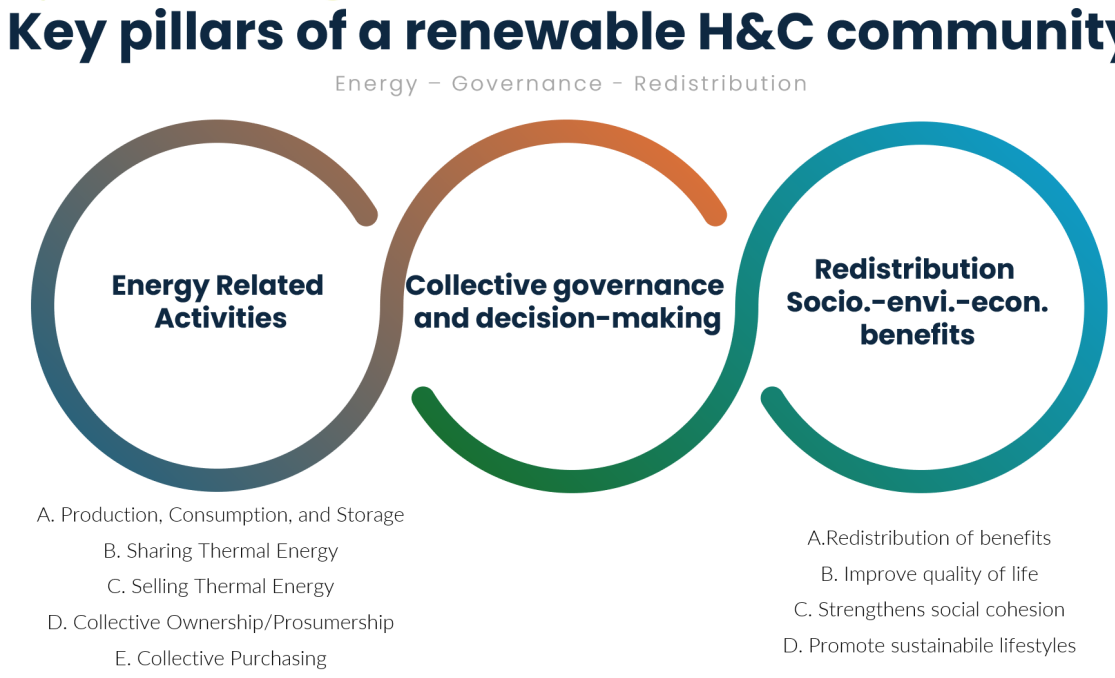
B. **Sharing thermal Energy**: Distributing the generated thermal energy to other community members through systems like single-building setups or multi-building district heating networks.

C. **Selling thermal energy**: Selling surplus thermal energy to non-members, providing additional revenue streams for the community.

D. **Collective ownership and/or prosumership**: Engaging in collective ownership of energy infrastructures or participating as prosumers, where members both produce and consume thermal energy.

E. **Collective purchasing, measures and services**: Pooling resources to implement EE interventions (e.g. building renovation), to buy technologies or fuels at reduced costs, making sustainable energy more accessible.



However, these communities are defined not only by their energy-related activities but also by how they engage their members and use the outcomes of their efforts to benefit the community as a whole (Figure 1).

At the core of a renewable H&C community is the principle of collective governance and decision-making, where members actively participate in shaping the community's direction, ensuring that all voices are heard and that decisions reflect the collective interests. This inclusive approach fosters a sense of ownership and responsibility among members, which is crucial for the successful and sustainable operation of the community.

Additionally, the redistribution of economic, environmental, and social benefits plays a fundamental role. The community collectively ensures that the advantages derived from the projects—such as cost savings, reduced carbon footprints, and enhanced local resilience—are shared equitably among members.

This redistribution can take many forms, for example:

- Lower energy costs for vulnerable households;
- Reinvestment into further community projects;
- Enhanced local environmental quality through reduced emissions.

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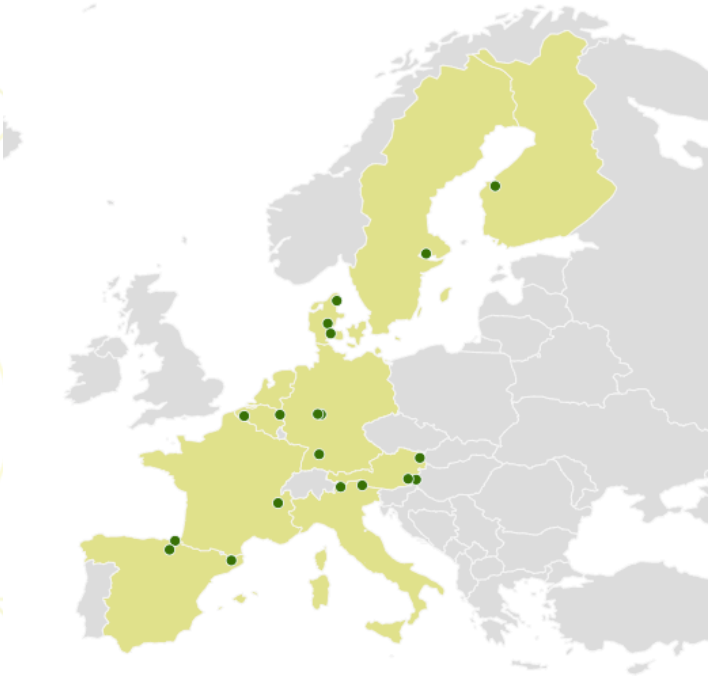
By ensuring that these benefits are shared, the community not only improves the quality of life for its members but also strengthens social cohesion and creates a replicable model for sustainability.

You don’t have to start from scratch! Real-Life Renewable H&C Communities

As reported in the introduction, the legislation about H&C RECs is clearly lagging behind the real life, since examples of community-led projects for H&C have been already operating for many years in several EU countries, such as Austria, Belgium, Denmark, Finland, France, Germany, Italy, the Netherlands, Spain and Sweden.

All of these examples, as explained in the previous paragraph, share a participative approach for the project development, for instance by setting up a cooperative company for managing the H&C supply, even though this is not the only solution for ensuring citizens’ participation.



Another typical feature of such projects is that they supply heat by a massive use of local RES, often by combining several energy sources and technologies, thus making the whole system more flexible and resilient with respect to unexpected changes in the market value chain, in the energy and fuel costs, etc.

To explore the most relevant examples of H&C communities around Europe, you can have a look at the online map developed by the ConnectHeat project: https://connectheat.ambienteitalia.it/hcc-map/

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Concrete proposals for fostering H&C communities

Technologies are there and local communities are ready and willing to go for H&C communities: What are, then, the main recommendation to enhance the policy and strategic framework and give the right impulse to duly ease the realization of these projects?

In the following, some concrete proposals are listed, divided into categories, as the result of a long consultation process within the ConnectHeat project, also through the involvement of external experts in an International Stakeholder Advisory Board.

Legislation & regulations

a) **Explicit inclusion of heat &cooling supply in the regulation of RECs**: National and EU-level regulations should explicitly include heating and cooling within the scope of RECs, ensuring that renewable thermal energy is recognized and supported (eventually subsidized) alongside electricity.
b) **Ad hoc models for virtual heat sharing**: Develop and evaluate models that allow virtual heat sharing within RECs, incentivizing the sharing of surplus heat among community members and recognizing heating prosumers within the regulatory framework.
c) **Open access to heat networks**: Existing district heating and cooling networks have the chance to become the first to implement RECs, by allowing prosumers to sell their heat or cold to other users. Access to the heat networks, therefore, needs to be clearly allowed and regulated.

Financing & incentives

a) **Risk reduction mechanisms**: Implement financial instruments such as revolving funds, price guarantees or insurance mechanisms to reduce the risks associated with developing district heating & cooling infrastructures.
b) **Public support for infrastructure investments**: Provide public funding or subsidies for the development and expansion of district heating networks, particularly those that incorporate renewable energy sources.
c) **Incentives for integrating heat into RECs**: Offer additional financial incentives to 'electric RECs' that choose to integrate renewable heating and cooling, thereby encouraging a holistic approach to energy management.
d) **Renewables incentives in heating & cooling**: Enhance incentives for using renewable sources like biomass, waste heat, solar thermal, and heat pumps in heating networks, ensuring that these technologies are competitive and widely adopted.
e) **Community financial participation**:
    a. There is a need to promote and develop innovative business models based on the concept of “H&C as a service” and able to attract private investments by end users, local businesses, civil society groups or other stakeholders, fostering greater public engagement and ownership. One-stop-shop business models, purchase agreements, leasing and peer-to-peer energy sharing are some examples. New business models for prosumers, for example purchasing groups, crowdfunding as well as initiatives led and financed by citizen cooperatives, can have a major role in adding new sources of capital from widespread investors.
    b. Another crucial point could be to consider co-investment instruments (for example via the European Investment Bank or Structural Funds) and especially first-loss instruments that can help attract private capital in small or micro projects with investment volumes well below institutional interest or/and for projects with additional layers of risk. This might be beneficial irrespectively of the source of private capital, but for sure could especially recognise the risks citizens might take if they chose to allocate capital to such actions.

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c. Finally, crowdfunding, in addition to raising capital, also helps increasing awareness, thanks to the communication and participation of the territories it can activate: In fact, to invest citizen need to first get informed, read the documents on the platform, then invest and follow the development of the project, as well as earn from the returns on the investment.

Awareness raising, capacity building & support

a) **Overall sustainability and public acceptance**: H&C communities can have a large impact on many goals for sustainability, so they can offer several benefits for local communities. Valuable methodologies and tools to assess, compare and monitor socio-economic and environmental impacts of different H&C REC models will be key for reaching acceptance.
b) **Technical and organizational support**: Provide targeted support for communities seeking to develop renewable heating projects, including technical expertise, planning resources, and organizational assistance. One major step in this respect would be to widen the scope of the numerous support services for renewable energy communities, now dealing almost exclusively with electricity, to include also heating & cooling supply, as well as other potential community services, such as energy efficiency, water supply, etc. Examples of specific services for H&C communities come from Denmark, where the national district heating association is supporting the creation of cooperative district heating projects, and Belgium, where, thanks also to ConnectHeat, a Technical Assistance Hubs has been set up in Flanders as a network of 12 regional hubs offering “first aid for energy communities” and also covering the H&C topic.
c) **Role of public administrations**: Empower local governments and public administrations to take a leading role in promoting and supporting H&C communities. Thanks to their cross-sectoral responsibilities, LRAs can duly foster the integrated approaches needed, enhance awareness and social acceptance and concretely boost the commitment and involvement of citizens and local communities. LRAs can show leadership and take a central role in promoting and supporting H&C communities and, therefore, they should be supported to duly play this role through: Integration of H&C RES and EE measures into spatial and urban plans, preparation of suitable building renovation plans or revision and adaptation of the existing ones, revision and update of existing energy strategies (SECAP, SEAP, etc.), development of Local Heating and Cooling Plans, deepening the knowledge of the local H&C system (modelling the local H&C demand in different sectors, mapping the local RES and Waste Heat availability).
d) **Promotion of best practices**: Collect, analyse, and disseminate examples of successful H&C communities to serve as models for other regions, fostering knowledge sharing and the replication of effective strategies.

Conclusions

The high potential of energy communities in the H&C sector could be fully deployed only in case of a clear legislation change, which considers these solutions in the correct light. This policy paper tried to summarise the key policy recommendations for implementing this change and has been elaborated thanks to the contributions from the ConnectHeat project consortium, the ConnectHeat International Stakeholder Advisory Group (ISAG) and IFEC, the Italian Forum of Energy Communities.

In particular, the ConnectHeat consortium would like to acknowledge the valuable input from the ISAG, a group, set up within the project, of international experts on the topics of renewable heating, energy communities and local energy policies, constantly advising on key barriers for heating & cooling communities and how to overcome them.

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