

Strategic Local Heating & Cooling Planning



BACKGROUND

Through the European Green Deal and other supportive key legislations such as REPowerEU, the EU is currently aiming to achieve at least 57% domestic emissions reductions and at least 42.5% binding renewable energy target by 2030. In addition, the EU has set a binding energy efficiency target for the first time, aiming to reduce final energy consumption at EU level by 11.7% in 2030 compared to 2020 levels.

One of the preconditions for reaching these objectives will be the decarbonisation of the heating and cooling sector. Energy for heating and cooling (H&C) represents almost 50% of the EU's total gross final energy consumption. In 2021, the share of renewable energy in gross final consumption for H&C purposes in the EU was 22.9% which has gradually increased over time, mostly due to the contribution of biomass and heat pumps.

The revision of the Renewable Energy Directive aims to increase the share of renewable energy in H&C by at least 1.1% per year, while the annual increase of the share of energy from renewable energy sources (RES) and waste heat and cold in district H&C should be by at least 2.2%. Moreover, under the Recast of the Energy Efficiency Directive, EU countries will have to promote local H&C plans in large municipalities having populations above 45,000.

The local character of heating and cooling means that local authorities play a key role in developing and implementing sustainable H&C solutions. Strategic H&C planning is an effective tool to develop measures locally and to drive the decarbonisation of the sector.

To facilitate this transition, sustainable H&C planning requires combined efforts of energy efficiency measures, an efficient heating and cooling supply, provided through the use of local RES and excess heat, with increased electrification and a significant deployment of more district H&C in urban areas.

Strategic H&C planning is still in its infancy in most EU countries. However, based on the **Danish experience**, with its long tradition in H&C planning, it is much easier and quicker to transition from fossil fuels to renewable technologies, especially via district heating, when the municipality already has a comprehensive plan of their future H&C systems.

Cities and municipalities can drive strategic heating and cooling planning as well as linking these policies and practices with climate action at the regional and (inter) national level, and thus enabling to be more ambitious and better aligned with scientific recommendations under the IPCC. Since many years, European local authorities' commitment and willingness to take action against climate change has already become

visible, primarily through Covenant of Mayors, the reporting platform CDP-ICLEI Track or more recently the 100 Climate-neutral and Smart Cities Mission.

The following policy recommendations listed in this document are outcomes of the findings, case studies and discussions implemented within the ICLEI's Strategic Heating & Cooling (H&C) Support Package funded by the European Climate Foundation (ECF)¹. The programme brought together a distinguished group of European cities to peer-exchange on five specific topics relevant for the strategic development of more efficient and renewable H&C systems:

- 1) Strategic municipal heat planning in times of the energy crisis,
- 2) Energy community driven H&C projects,
- 3) Partnership models and finance of new and refurbished H&C infrastructure,
- 4) Procurement of H&C plants and solutions,
- 5) H&C resilience through blue and green infrastructure.

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POLICY RECOMMENDATIONS

🔄 Policy Recommendations for National and Federal Authorities:

Introduce mandatory H&C planning for local authorities and allocate required human and financial resources – Mandatory H&C planning for cities is needed to assess the potential and make the best use of local H&C resources as sustainable options will differ from one region to another. Planning has to be carried out in an integrated manner, considering interest of various stakeholders, and aligned with other sectoral plans (e.g. urban development, industry park etc.). National and federal state authorities are required to facilitate the process by formulating strategic objectives and providing an ambitious, operative framework within which local H&C planning is carried out. They are also responsible for providing adequate support structures for local authorities.

Support and regulate institutional setting to enable long-term investment – A long-term investment horizon is required considering the long payback periods of H&C infrastructures, technologies, and measures. Government support in the form of financial and fiscal incentives, such as tax credits, loans schemes, de-risk schemes through e.g. insurance or heat supply guarantees, direct subsidies and accelerated depreciation can be crucial in overcoming the barrier of high upfront cost.

🔄 Policy Recommendations relevant for all governmental levels:

Increase deployment of renewable heat and electricity sources – Decarbonisation of the H&C sector is key to achieving climate neutrality in the EU. Studies like [Heat Roadmap Europe](#) show that this can be realised already now by using existing technologies such as geothermal, solar thermal, solar PV and complemented by sustainable bioenergy. Moreover, decarbonisation can be most cost-effective, when deploying district heating and cooling in urban areas and heat-pumps in less dense regions. This is not only economically the most feasible, but socially also the most acceptable way, minimizing harmful impacts on people and the environment. The integration of heating, cooling and

electricity sectors, the increasingly cost-competitive production of renewables and the improvement of the system flexibility through energy storage, enable the highest possible uptake of fluctuating renewables and improve the energy efficiency of H&C as well as the electricity system.

Support district heating and cooling (DHC) – DHC is one of the main infrastructures enabling the integration of local RES and sector coupling. Modern DHC systems enable more efficient use of energy, increase opportunity to exploit a wider range of heat sources and facilitate the transition to smart energy systems. However, district heating still has a very limited market share across Europe, and most networks still rely on fossil fuels. At the same time if an existing system is enabled to switch to RES is a game changer for the path towards local climate neutrality.

Systematically integrate and use sustainable excess heat – Use excess heat from industries and other sources that is otherwise wasted. This includes direct use from conventional sources, such as power plants, waste-to-energy plants, and energy intensive industrial activities, but also expands to a wide range of additional unconventional sources, such as data centres, wastewater treatment plants, metro systems and refrigeration processes. With low temperature district grids even further sources can be tapped in tertiary buildings such as hospitals, fitness centres or supermarkets.

Empower and facilitate community energy and collective action to be part of the H&C market – Although most renewable energy cooperatives focus on electricity generation, there is also potential to engage citizens in sustainable H&C initiatives. This can also be facilitated through partnerships between profit-driven utilities and thermal energy cooperatives (TEC). TECs can be a solution in those municipalities where, due to the scale, it is not profitable for a developer/utility to invest into a district heating grid.

🔄 Policy Recommendations for Cities and Local Authorities:

Use digital tools to implement H&C systems faster than ever before – Strategic H&C planning can be very time intensive and costly when done from scratch, often needing to cover not only the jurisdiction of the local authority but also the surrounding region housing the green energy sources. However, there are scientifically verified digital tools at hand that can help us optimise the planning process, reducing the time and resources required to obtain an accurate result. For instance, the [Hotmaps](#) tool enables the rapid identification of “go-to areas” for H&C systems implementation, while the [THERMOS](#) tool helps us design thermal networks in a cost-effective manner.

Encourage stakeholders’ involvement in strategic H&C planning – The transition of the H&C system requires coordination between different sectors and institutional and governance levels to enable all stakeholders to cooperate. Local authorities should provide the platform and strategically steer a stakeholder dialogue on H&C planning, as they are well positioned to consider all the main interests and needs and derive common goals for the well-being of citizens within a just society.

Increase awareness about current and future cooling needs – Sustainable cooling is a crucial topic in which municipalities lack adequate knowledge and action planning. Cooling demand has increased rapidly over the past three decades due to rising temperatures and other social and economic factors. Thus, local and national action is urgently needed to curb the unsystematic, rapid growth of individual and thus often inefficient and unsustainable responses. European cities are expected to witness a rise in temperature close to 3 degrees Celsius by 2050. Sustainable cooling measures will be crucial to ensure the liveability of our urban settlements, especially due to an ageing population and urbanisation. Governmental action on all levels is needed as the population is becoming more vulnerable to heat, particularly poorer households.

Promote sustainable cooling solutions – To avoid maladaptation, sustainable cooling should include urban cooling solutions, passive cooling techniques and rational use of energy efficient and zero-carbon

cooling systems. Especially, low temperature district grids serving heating and cooling needs should be promoted. Additionally, awareness raising and behavioural learning and changes should be implemented, aiming at different target groups, including vulnerable groups to reduce health risks, inequalities, and summer energy poverty.

Mainstream Nature-Based Solutions (NBS) in local policies and urban development strategies – NBS offer an important component for cooling cities and reducing the Heat Island Effect as they reduce air temperature and heat stress without contributing to climate change. Trade-offs, e.g. due to limited availability of space in urban areas, can be avoided through integrated energy planning on a district level. If properly designed, NBS for cooling, e.g. parks, green corridors, ponds, can also benefit biodiversity and human well-being, tackle environmental challenges such as climate change, floods, and address societal challenges. For inspiring NBS examples visit [NetworkNature](#).

Implement a sustainable public procurement (SPP) process in the purchasing of goods, services and works – SPP enables appropriate balance between

the economic, environmental and social impacts of H&C decarbonisation. It is necessary to look beyond short-term needs and consider the longer-term environmental and social impacts of a purchase by adopting a Life-Cycle-Costing approach that assesses the real costs of a procured good or service, particularly during operation.

Define the city's specific needs in the SPP – Consider the specific purpose, technical skills and context of a purchase when determining the appropriate procurement procedure for H&C. It is recommended to engage with potential suppliers to understand the current market opportunities and consult other public authorities who have undertaken similar procedures. Also, it is useful to refer to the (voluntary) EU GPP Criteria on 'Electricity' and 'Office Building, Construction and Management', consider requiring or referencing relevant environmental labels (e.g. EU Ecolabel, national ecolabels) when developing technical specifications and award criteria. Last but not least, participate in networks (such as [Procura+](#)) that connect local and regional authorities to exchange and act on sustainable procurement to assess information about the latest good practice.

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This paper reflects the position of the ICLEI Europe network of Local and Regional governments as a whole, and may not reflect the position of every Member individually.

