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PROGRESSING HEATING AND COOLING DECARBONISATION IN CENTRAL AND EASTERN EUROPE

TOOLS TO SUPPORT STAKEHOLDERS IN PLANNING NATIONAL AND LOCAL APPROACHES

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Decarbonising heating and cooling is essential to the EU's energy security, its citizens' wellbeing, and the climate transition. However, progress in Central and Eastern Europe needs momentum. Significant gains are possible even in the short and medium term, if actors work quickly and collaboratively.

The need to decarbonise heating and cooling is increasingly recognised year-on-year, and a growing number of stakeholders will be involved in planning the heating and cooling energy transition. National-level officials, local decision makers, experts and citizens will all need to understand the major policy tools available, as well as the practical considerations in their local context.

This briefing provides recommendations for a common approach among these actors, covering:

- > **An overview of trends, challenges and advances in the heating and cooling transition** in Central and Eastern Europe. We draw insights from notable examples in the region: Poland, Slovakia, and Bulgaria.
- > **An overview of key pieces of new EU legislation** and instruments within the European Green Deal that set requirements for heating and cooling planning. This is an important reference for stakeholders involved in strategy development, planning, and advocacy.



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- > **A checklist for assessing progress** in countries' heating and cooling decarbonisation plans. It provides a tool for planners and independent observers to ensure the plans are both comprehensive and effective.
 - > **A selection of suggested further reading** on planning heating and cooling decarbonisation, which can help actors deepen their understanding and expand their perspective beyond this briefing.

Introduction

The main energy needs of buildings in the EU are space heating and cooling and hot water, accounting for 50% of the consumed energy – and as high as 80% in the residential sector.¹ Heating and cooling are thus a major concern from an energy security perspective, as well as a foundation for good quality of life.

The EU is poised to make a significant shift towards higher targets for renewable energy sources as part of policies agreed to under the European Green Deal (EGD). Within the EGD, the EU views heating and cooling largely as part of the energy framework. While progress in the heating and cooling sector has been somewhat fragmented, there's growing recognition of its importance and huge potential within the broader energy landscape. Underscoring this shift, EU governments have committed under the Energy Performance of Buildings Directive (EPBD) to largely phase out fossil fuels in heating and cooling by 2040.

However, many member states still lack comprehensive heating strategies, and there is room for more ambition on using renewable energy sources (RES) for heating and cooling. With power sector decarbonisation gaining momentum, heating and cooling is one of the next key policy areas where system-wide and cost-efficient wins can be achieved across Central and Eastern Europe (CEE).

Member states and municipalities must plan for long-term, sustained programs and exponentially increasing effort in the coming years, implementing all new legislation and preparing to add upcoming instruments like the Social Climate Fund. Preparations should be underway to allow for the future two yearly review of progress made under NECPs to support an increase in ambition in heating and cooling.

¹ Eurostat, February 2023, [Heating and cooling from renewables gradually increasing](#)



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Heating and cooling ambition in CEE

CEE countries have significantly increased their ambition on the share of renewables in the energy required for heating and cooling in the latest revised NECPs,² when compared to 2020 levels (Figure 1). However, the increase in ambition is overall modest compared to the targets in the first draft NECPs, and in many countries the ambition for heating and cooling lags behind that for the power sector.

Renewables ambition in power generation and heating and cooling in CEE countries



Source: Country NECPs. 2020 figures are actuals where available from later NECPs, or otherwise the stated 2020 ambition. 2030 figures are the latest available from draft NECPs at the time of publication.



Figure 1: Across CEE, ambition to roll out renewable energy sources is higher, and has increased more rapidly, in power generation (RESe) than in heating and cooling (RESH). (According to draft and final revised NECPs submitted by end of July 2024.)

Three country cases to shed light on the regional ambition

Public support programs to decarbonise heating and cooling are available in many regions, yet substantial progress hinges on market dynamics. Improved affordability and efficiency of clean technologies like heat pumps have led to increased adoption. Even countries with seemingly impressive renewable energy targets for heating and cooling can make further advancements through targeted policies and support initiatives.

² All iterations of countries' NECPs are available from European Commission, **National energy and climate plans (NECPs)** (webpage, accessed July 2024)



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Poland – ramping up the ambition

Poland has made remarkable strides in heat pump adoption, particularly accelerated by the recent energy crisis. The market for heat pumps is more than doubling year-on-year with 120% growth in 2022 compared to 2021.³ The country has also become a hub for heat pump manufacturing.

Poland operates some of the largest district heating networks in CEE in an economically efficient manner, with extensive networks in many cities. Efforts to combat air pollution have led to significant progress in phasing out coal and other polluting fuels in individual heating installations, supported by initiatives like the Clean Air program, which funds the replacement of outdated heating devices. Numerous pilot projects across the country, facilitated by a stable business environment, use approaches such as low-temperature district heating, waste heat utilisation, sustainable biomass, and heat pumps.

Poland's national heating and cooling strategy is primarily centered on modernising district heating networks and making them more efficient. However, there is a notable reliance on market conditions for electrification uptake. The strategy does not explicitly outline specific measures and targets for decarbonising heating and phasing out fossil fuels, and nor does the NECP. Coal use is still envisaged in long-term plans for district heating plants.

Although the new NECP reflects a significant increase in renewable energy targets for heating and cooling – from 21.4% to 32.1%⁴ – Poland can go further by 2030. The country has already piloted numerous initiatives that prove the business case and scalability of various solutions. These tested solutions can be scaled up in an economically viable manner, and in line with the Paris goals. Examples include the low-temperature district heating in Szczecin,⁵ recovery of waste heat in Poznan,⁶ and geothermal projects like Poddebice and Stargard.⁷

Slovakia – heating and cooling a key way of hitting EU renewable energy targets

Slovakia is a particularly interesting case, because the dominance of the nuclear energy in its power mix (nearly 60%) gives the country less room to hit EU RES

³ EHPA, February 2023, **2022 was the year of the heat pumps in Poland**

⁴ European Commission, March 2024, **Poland – Draft updated NECP 2021–2030**

⁵ RewardHeat, **Szcecin, Poland** (webpage, accessed July 2024)

⁶ Veolia, **Waste heat recovery** (webpage, accessed July 2024)

⁷ There are currently six geothermal district heating plants in operation in Poland, with a total installed capacity of 76 MWth and heat production of 227 GWh. International Geothermal Association, August 2018, **Country update – Poland**



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targets through that sector compared to most other CEE member states. To compensate to some extent the government have increased the RES ambition in heating and cooling from 19% to 28%.⁸ Thus the increase in this sector is the major contribution to the overall RES target of Slovakia.

Slovakia is heavily dependent on fossil gas for the district heating of homes and is already piloting key initiatives in the development of geothermal sources for heating. Households represent the most significant ambient heating demand in Slovakia, and gas is currently the dominant energy source, followed at some distance by solid biomass.

Considering Slovakia's overreliance on gas, the European Commission has been quite explicit in their recommendation to harness the potential of biomethane production and to further diversify sources, reduce energy imports from Russia and encourage gas demand reduction.⁹ (Very similar recommendations have been issued to neighbouring Hungary, and without the reference to Russian imports to Czechia and Romania.)

Bulgaria – high ambition with a lot of room for restructuring within the heating and cooling target itself

With 43.66% renewables target by 2030 in heating and cooling, Bulgaria already stands out.¹⁰ Yet much of this contribution comes from the burning of firewood in homes, which accounts for 36% of the heating in inhabited households.¹¹

Bulgaria also has some more severe endemic problems compared to other CEE EU member states, and which moreover often remain unrecognised and untouched by public policies. A staggering near 40% of the 4.25m dwellings in the country are uninhabited.¹² This is not only in rural depopulated areas but also in all big cities, including the capital of Sofia. This poses an additional obstacle to renovating multifamily buildings, as the need to allocate the costs of renovating empty homes can complicate funding arrangements. Moreover, building renovation in this context can inadvertently lead to increased energy

⁸ European Commission, September 2023, Slovakia – **Draft updated NECP 2021–2030**

⁹ European Commission, December 2023, **Commission recommendation: Assessment (SWD) and Factsheet of the draft updated National Energy and Climate Plan of Slovakia**

¹⁰ Ministry of Energy and Water and Ministry of Environment and Water, June 2024, **The Ministry of Energy and Water and the Ministry of Environment and Water propose an updated integrated National Plan “Energy and Climate” for public consultation** (in Bulgarian)

¹¹ National Statistical Institute of Bulgaria, **Census 2021**

¹² Ibid.



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consumption. The newly insulated facades envelop the entire structure, including unoccupied units, meaning these spaces must also be heated to maintain the comfort of the building's occupants.

More positively, heating and cooling in 48% of inhabited Bulgarian homes is already electrified. However, some of this heating is provided by inefficient devices, so this space hides a potential to further restructure towards more efficient electric heating, integrating renewable energy, thermal storage and more. Biomass for heating may not be phased out soon, but it could also be seriously restructured to use it more efficiently and gradually turn it into a secondary heating source or a back-up only. Fossil gas has a minor role as direct heat source for households, but Sofia District Heating consumes one-third of all the gas imports in Bulgaria and is the key to plan a renewable energy overhaul of the operations and a serious phase-down of the use of fossil gas.

CEE stakeholders must take into account a number of key factors in the design of policies

To drive both electrification and growth in renewables in heating and cooling will require a stronger display of political will, decisive action, and strategic planning. Policies need to prioritise RES power, alongside the adoption of sustainable fuels and harnessing waste heat. This needs to happen quickly: the time horizon to decarbonise heating is 2040, not long after the 2035 timeline for decarbonising power systems.

Key factors that stakeholders need to take into account in policy development include integrating heating and cooling with the approach to decarbonising power, taking a realistic approach to the role of biomass, and balancing the role of the market with policy support. Stakeholders will also do well to take advantage of the numerous opportunities out there in heating and cooling planning.

Heating and cooling must be integrated with energy systems thinking

The EU's energy systems integration approach¹³ considers how heating and cooling interacts with other energy uses. It involves analysing its role in stabilising other sectors like power and industry, exploring synergies, and utilising excess energy efficiently. For instance, energy that is wasted in one sector could be captured and repurposed for another, or energy could be consumed during off-peak times by one user and stored for use when others

¹³ European Union, [EU strategy on energy system integration](#) (webpage, accessed July 2024)



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need it. This integrated perspective aims to optimise energy use across the board, making the system more efficient and sustainable.

Indeed, **RES heating and cooling can contribute significantly to the balancing of the grid.**¹⁴ Without effective management, high levels of electrification can lead to grid imbalances and spikes in energy consumption. By strategically controlling when energy is drawn from or supplied to the grid, RES heating and cooling can act as a dynamic tool for demand side response. This involves using market signals and digitalisation to optimise energy consumption times, thereby reducing peak loads and contributing to overall grid stability. Planning for this balancing role early in the sector's development is essential for maximising its effectiveness and ensuring a stable energy supply.

Moreover, heating and cooling based on renewable energy sources is **eligible for EU funding**, while the space for the use **fossil gas is shrinking** quickly due to economic and geopolitical reasons. This requires reconsideration of existing plans for gas network expansion and investing more effort into saving energy, harnessing waste heat and replacing fossil-based heating with heating and cooling using renewables.

Policy needs to be realistic about the role of solid biomass

The current overreliance on solid biomass in individual homes in many CEE countries will not go away overnight; most energy models for the region predict a role for biomass in heating for decades to come. The policy effort should evolve to gradually turn biomass (especially solid forms) into a backup solution rather than a main source of heat. Policies should be introduced with care to avoid public alienation and to ensure that sustainability criteria are applied. It is both easily said and done: the comfort and economy that comes with well-designed heat pump systems is something households will be unlikely to turn their back on once they experience it.

A balanced approach to the role of the market is crucial

Policies should prioritise cost-efficient and market-based solutions that encourage liberalisation and reduce market interference. However, while market dynamics have driven the uptake of technologies like heat pumps in CEE, strategic policy support is essential to address specific social challenges that these dynamics alone cannot resolve – such as energy poverty and skills development. Such support includes: streamlining permitting procedures;

¹⁴ Empower Europe, January 2024, **Smart connection of heat pumps to the power grid**



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providing public support where technological breakthroughs are needed; fostering the local manufacturing of technology; and enhancing workforce skills. Integrating these technologies into regional industrial strategies can also provide a more robust foundation for their widespread adoption.

Economic opportunities and structural advantages for making progress

The decarbonisation of heating and cooling is a huge economic opening, with a lot of potential for positive spill-over effects in local manufacturing, maintenance and jobs – added value that can be retained locally. There is also scope for cooperation between CEE countries on value chains for technologies, which would bring further economic benefit. Countries should establish dialogues and seek to gradually improve cooperation, facilitated by political support and in support of the emerging market tendencies.

Stakeholders should also keep an eye out for structural factors that will help things more in the right direction. For example:

- > There are already successful pilot projects around the region.¹⁵ These must be recognised, improved and adapted to the local context, scaled up and replicated at local, regional level and between member states.
- > Many CEE countries still have an abundance of old networks and industrial land and facilities that could be repurposed for the construction of the needed RES capacity and large-scale thermal storage.

EU's strategic legal framework and designated funding for heating and cooling decarbonisation

The strategic legal framework and designated EU funding under the EGD has resulted in a much more integrated framework to tackle the economic transition with a prominent role for heating and cooling. We provide here an overview of the key elements of this framework and its most relevant features, see Figure 2 for a summary.

¹⁵ European Commission, October 2023, **District Heating Toolkit**



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The EU's strategic legal framework and designated funding supporting heating and cooling decarbonisation

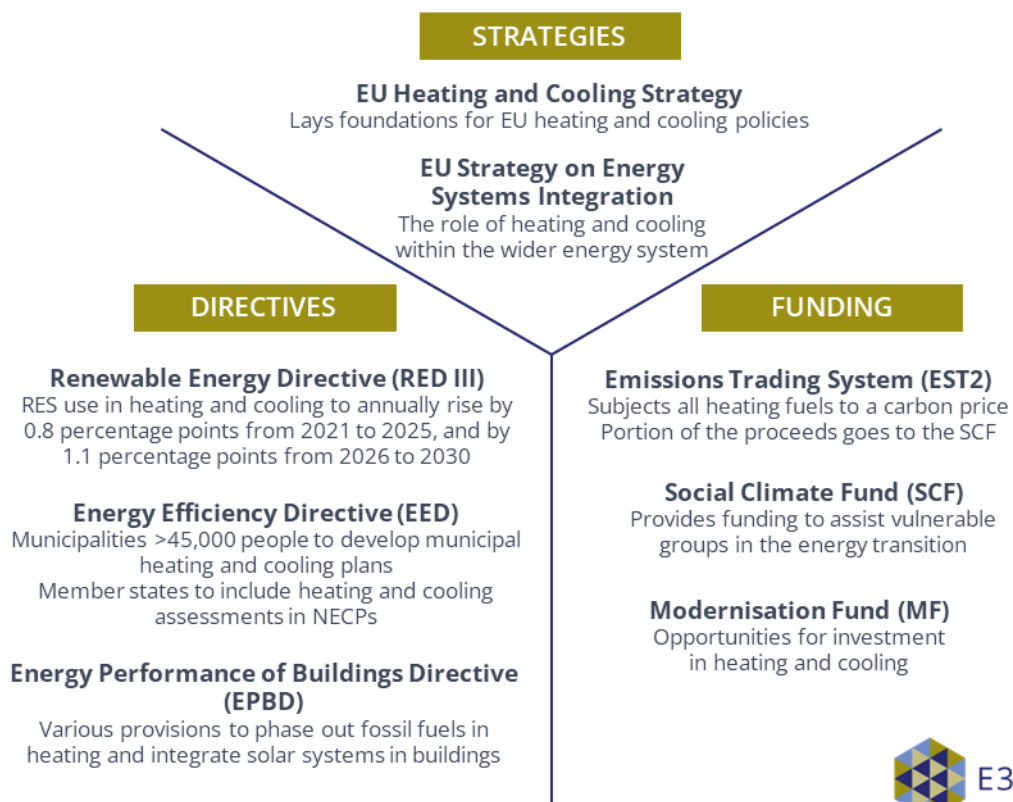


Figure 2: The EU has several strategies and directives in place relating to heating and cooling decarbonisation. There are also funding streams available to support with aspects of the transition.

1. The EU Heating and Cooling Strategy

The 2016 Heating and Cooling Strategy¹⁶ was a first attempt to target the energy consumption and environmental impact of heating and cooling in buildings and industry. It emphasises energy efficiency by promoting efficient heating and cooling systems and the use of renewable energy sources. The strategy also encourages the expansion of district heating and cooling networks, the implementation of energy-efficient building standards, investments in research and innovation, updates to policies and regulations, and the exploration of financing mechanisms to support sustainable heating and cooling projects.

¹⁶ European Commission, 2016, **An EU Strategy on Heating and Cooling, COM/2016/051**



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Overall, the strategy aims to enhance the sustainability and efficiency of heating and cooling systems across the European Union.

The strategy lays the foundations for EU heating and cooling policies. However, with the finalised EGD it will soon require revamping to clearly reflect the need to decarbonise heating and cooling and more rapid emergence of electrification and low-temperature heating systems as the new standard of sustainable heating and cooling and consumer comfort.

2. EU Strategy on Energy System Integration

This strategy's main aim¹⁷ is to create a more efficient, sustainable, and interconnected energy system by seamlessly integrating various energy carriers, sectors, and technologies, thus maximising the use of renewable energy sources, reducing emissions, and ensuring a reliable energy supply for Europe's transition to a greener future. Key elements include recognising heating and cooling's substantial energy consumption share, integrating them into the energy system alongside traditional and innovative solutions, prioritising efficiency and electrification, integrating renewable energy sources, emphasising waste heat recovery, fostering synergy with other sectors, leveraging digitalisation for system optimisation, and engaging consumers. It is a backbone and a core concept around which the mindset of all new energy planning should be built.

3. Renewable Energy Directive III (RED III)

The centerpiece directive for the new European RES architecture.¹⁸ It aims to overhaul Europe's energy landscape by prioritising renewable energy adoption, incentivising electrification of heating, addressing tax inconsistencies, decarbonising the gas market, improving customer awareness, and enhancing infrastructure planning. Key provisions include setting a new 2030 collective target of 42.5% (aiming for 45% if possible) renewables in final energy consumption, with a focus on innovative technologies.

RED III mandates a gradual increase in renewable energy use in heating and cooling, with a yearly rise of 1.1 percentage points from 2026 to 2030 and 0.8 percentage points from 2021 to 2025. It requires member states to lead by example in renewable energy usage in public buildings, allowing third-party installations on rooftops. It also encourages electrifying building heating, promoting heat pumps and limiting the length of their permitting procedures,

¹⁷ European Commission, [EU Strategy on Energy System Integration](#) (webpage, accessed July 2024)

¹⁸ European Commission, [Renewable Energy Directive](#) (webpage, accessed July 2024)



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which eventually combined with the plans for expanding electric vehicle charging infrastructure will further enhance the potential of our buildings to balance the grid.

Sector-specific measures will be developed to facilitate renewable electricity use, with pilot projects funded through Horizon Europe and the Innovation Fund. Efforts will also address tax and levy inconsistencies, aiming for harmonisation across energy products. A competitive decarbonised gas market will be established, accompanied by consumer empowerment initiatives and improved industrial product sustainability information. Holistic infrastructure planning will integrate large-scale and local projects, with a focus on optimising energy supply and demand through modern low-temperature district heating systems.

4 Energy Efficiency Directive (EED)

EED introduces several key provisions to enhance energy efficiency across various sectors.¹⁹ It raises the target for annual final energy savings and prioritises efficiency measures in transmission networks, public buildings, and district heating systems.

Municipalities with populations exceeding 45,000 are mandated to develop municipal heating and cooling plans, while member states are required to include heating and cooling assessments in their National Energy and Climate Plans (NECPs). These plans should focus on facilitating the transition to renewable heating and cooling sources, as well as phasing out fossil fuels by replacing old and inefficient appliances with highly efficient alternatives. The directive also sets stringent targets for renewables and waste heat in district heating and cooling by 2050. However, the directive still allows the continued use of fossil gas in efficient district heating and cooling systems until 2030, raising concerns about the continued reliance on fossil fuels.

Additionally, provisions are included to address energy poverty, with targeted support for vulnerable households and the promotion of energy communities to ensure equitable access to energy efficiency improvements.

5. Energy Performance of Buildings Directive (EPBD)

The EPBD aims to accelerate renewable energy deployment, establish zero-emission standards for new constructions, and phase out fossil gas from

¹⁹ European Commission, [Energy Efficiency Directive](#) (webpage, accessed July 2024)



buildings.²⁰ Recognising that a significant portion of household energy consumption goes towards heating, cooling, and hot water, the directive emphasises modernising buildings and integrating energy systems for improved efficiency. It introduces one-stop-shops for energy renovations catering to homeowners, small businesses, and other stakeholders. Solar energy deployment is expedited, targeting new public and commercial buildings by 2026, renovated non-residential buildings by 2027, new residential buildings by 2029, and existing public buildings by 2030.

While the directive aims to phase out fossil fuel boilers by 2040 and end subsidies for standalone boilers powered by fossil fuels after 2025, concerns persist over the promotion of “hybrid heating systems with a significant share of RES”, which may inadvertently pave the way for hydrogen boilers with concerns over their economic efficiency and safety.

6. Emission Trading Scheme 2 (ETS2)

The ETS2, set to be fully operational by 2027, aims to address CO₂ emissions from fuel combustion in buildings, transport, and industry not covered by the existing ETS.²¹ It addresses a distortion in heating costs by ensuring all heating fuels are subject to a carbon price, unlike current practices where only electricity and co-generation heat face such charges. This initiative encompasses commercial and private transport, buildings, and small-scale industry, with revenue allocated to decarbonising heating and cooling of buildings and promoting electric vehicles and car sharing. All emission allowances will be auctioned, with a portion of the proceeds designated for supporting vulnerable households and micro-enterprises through a dedicated Social Climate Fund.

Multiple layers of funding opportunities for the sectoral decarbonisation

Established in response to the implementation of ETS-2, the **Social Climate Fund** (SCF) offers member states dedicated funding to assist vulnerable groups, such as households facing energy or transport poverty, ensuring they are not marginalised during the transition to greener practices.²² Member states can use the SCF to support measures including investment in energy efficiency, building renovations, clean heating and cooling systems, renewable energy integration, and low-emission mobility solutions. Additionally, member states have the

²⁰ European Commission, **Energy Performance of Buildings Directive** (webpage, accessed July 2024)

²¹ European Commission, **ETS2: buildings, road transport and additional sectors** (webpage, accessed July 2024)

²² European Commission, **Social Climate Fund** (webpage, accessed July 2024)



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flexibility to allocate part of the resources towards temporary direct income support. With a mandatory 25% contribution from member states to their Social Climate Plans, the SCF is projected to mobilise at least €86.7 billion between 2026 and 2032.

Another significant source of funding is the Modernisation Fund, which will accumulate resources in the coming years, offering substantial opportunities for investment in heating and cooling, particularly in district heating networks.²³ Conservative estimates suggest that the Modernisation Fund could amount to €57 billion from 2021 to 2030, based on a carbon price of €75/tCO₂.

Both funds are subject to fluctuations in carbon prices, but they pool significant public resources that could potentially exceed initial estimates in the years ahead. Countries should leverage resources from both funds to accelerate the decarbonisation of their heating and cooling sectors.

EU funds and the new MFF

EU funds have played a major role in driving the energy transition in the region, supporting heating decarbonisation programs and pilots in most Central and Eastern European (CEE) countries. The current Multiannual Financial Framework (MFF) will end in 2027, and the next MFF will cover the period from 2028 to 2034. This transitional period offers an opportunity to strategically plan ahead, set more ambitious heating decarbonisation targets, and explore the most effective ways the upcoming MFF can contribute to the decarbonisation of heating and cooling in the EU.

The planning for the new MFF will begin not long after the new European Commission is in place in 2024. The post-election period will focus on implementing already agreed-upon goals, while also preparing for the repayment of the Recovery and Resilience Facility (RRF) over a 30-year period from 2028 to 2058. This may lead to a reduction in public resources available beyond 2028, but it also provides an opportunity to optimise synergies with existing resources. It is essential to consider the changed financial and political landscape in the second half of the decade and adapt planning accordingly.

The potential funding available for sustainable heating and cooling extends to vehicles that support local governments, such as the financial mechanism ELENA. Financial institutions operating in the EU and the surrounding regions, such as

²³ Modernisation Fund, <https://modernisationfund.eu> (website, accessed July 2024)



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the EBRD, have already launched initiatives in sustainable heating and cooling in Central and Eastern Europe (CEE), serving as a pilot phase for further replication by more actors in the region. The involvement of these international financial institutions offers additional technical assistance and ensures improved transparency.

CEE countries have traditionally relied heavily on EU funds; however, national and municipal budgets can play a significant role beyond the required co-funding of EU resources, provided they adhere to the EU's common market rules.

Despite the broad range of public support available, there should be a shift from grant-based funding to the increased use of financial instruments. This shift would encourage citizens and businesses to invest in their own projects for personal benefit and as shareholders in larger initiatives. In CEE, citizens and businesses often hold substantial savings in the form of deposits, highlighting the need to provide incentives and tools for active shareholder participation in the energy transition by investing part of those savings.

What good looks like for sustainable heating and cooling plans in CEE and beyond

Both the technologies for the energy transition of the heating and cooling sector and the required EU policies are in place. Much of the focus in the coming years will be on testing, scaling and rapid implementation. We offer a checklist to help policymakers and stakeholders assess the progress in their country or region.

Criterion	Indicators
1. Integrated approach to heating and cooling	<ul style="list-style-type: none">> Are heating and cooling seen from an energy system integration perspective, for example in how it relates to all other energy use in the country, providing synergies and preventing wasteful use of energy with other sectors? For example, are there plans and targets for the use of waste heat and are the potential sources identified, listed and considered?> Are heating and cooling plans part of local sustainable heating and cooling strategies as mandated under the new EED?> Are those local strategies expected to feed into a broader national strategy (NECP and/or designated strategy)?> Are there renewable energy targets that encompass various heating sources, and that cover the variety of end users (individual homes; district heating; industry)?



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Criterion	Indicators
	<ul style="list-style-type: none"> > Are transboundary projects also considered where there is potential to use waste heat, for economy of scale reasons, etc.?
2. Legal obligations for stakeholders	<ul style="list-style-type: none"> > Has relevant EU legislation been fully transposed? > Are legal obligations enforced regarding the incorporation of renewable energy for heating and cooling during construction and renovation? > Are there local legislation and programs that go beyond the EU required ambition for the integration of renewable energy sources in buildings?
3. Accessibility and market for heat	<ul style="list-style-type: none"> > Are district heating networks accessible to independent heat and cooling producers? > Is there an absence of legal or non-legal barriers to the utilisation of recovered waste heat (e.g. from industry, sewage water, etc.)?
4. Addressing energy poverty	<ul style="list-style-type: none"> > Are perverse incentives and forms of energy aid avoided that perpetuate rather than reduce energy poverty and the use of fossil fuels for heating? Have steps been taken to remove any that exist? > Are vulnerable groups protected through targeted support while at the same time ensuring overall market functionality. functional and liberalised energy markets are exposing everyone else to price signals? > Are the measures planned, rolled out and sufficient?
5. Scaling up from pilot schemes	<ul style="list-style-type: none"> > Do existing funding and programs cover a range of heating solutions – from individual homes to district heating – and support scaling up from pilot schemes to local or nationwide programs? (Note that pilot programs may focus not only on technologies, but also social schemes, business models, financial instruments and more.) > Are there plans to both develop new district heating networks and convert existing networks to renewable energy sources? > Are the programs developed in a long-term way, so as to avoid stop-and-go mode, for example by ensuring sustained funding? > Are long-term, sound economic solutions prioritised over short-term incremental gains, in terms of both decarbonisation and cost efficiency? (Negative examples: Replacing a coal furnace with a gas boiler to achieve initial efficiency and decarbonisation gains in comparison, but hindering further decarbonisation for another two decades at least; installing heating systems in buildings that haven't had energy efficiency measures fitted, thus ending up with oversized heating systems after a deep renovation?) > Is there a sound approach to scale up successful pilot programs, district heating initiatives, low-temperature systems, upgrades, hybrid solutions and community schemes?



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Criterion	Indicators
	<ul style="list-style-type: none"> > Is there a plan to identify and support non-public actors who can lead the change by developing new financial and business models, blueprints for implementation, know-how and capacity sharing?
6. Efficiency and circularity	<ul style="list-style-type: none"> > Do plans for supported heating and cooling systems emphasise: efficient use of energy; balancing potential (e.g. for grid stability); and circularity of the technology (e.g. are the systems as a whole or their components recyclable or can they be used again at another location)?
7. Public funding and support for RES for heating and cooling	<ul style="list-style-type: none"> > Is there a clear plan to gradually scale up public finance to RES for heating and cooling and phase out support for fossil alternatives? > Are there one-stop shops for entities and individuals who want to invest in decarbonised heating, that will help with going through the permitting process, access to funding, financial instruments management of the new systems, and choice of a system? > Are there financial instruments universally accessible to every target group in society? > Does the support for energy-poor consumers avoid subsidising fossil fuels by making fossil-free alternatives affordable? Is the use of the support restricted to avoid its use to purchase fossil-based energy or other dirty fuels (e.g. firewood with high moisture content)?
8. Engagement of local economy in value chains and industrial strategies	<ul style="list-style-type: none"> > Are there value chains and manufacturing plans that actively engage the regional economy, including considerations for industrial and export strategies, regional cooperation and regional specialisation?
9. Deprioritising the use of fossil gas	<ul style="list-style-type: none"> > Is fossil gas still prioritised in network development and retail strategies? > If so, is there a sound reasoning behind this, and a clear net zero commitment and trajectory leading to the decarbonisation and where necessary decommissioning of the gas networks by a certain year since this is now a requirement under the gas package?
10. Phase-out of fossil fuel subsidies	<ul style="list-style-type: none"> > Are fossil fuel subsidies transparently accounted? > If such subsidies are present, is there a commitment to phase out fossil fuel subsidies by a certain moment in the future?
11. Phasing out fossil fuel heating technologies	<ul style="list-style-type: none"> > Is there an end date and a defined trajectory for phasing out fossil fuel heating technologies from the market and from use (i.e. a ban on use), at both national and local levels, including a target year for completion?



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Further reading – Policy and strategy

Finally, for all actors willing to deepen their knowledge and perspective on the development of policies and business models that can help decarbonise heating in a socially just, cost-efficient and market-oriented manner we have a few recommendations for long reads – all recently developed by various CSO teams.

The Clean Heat Standards Handbook – Marion Santini and the Regulatory Assistance Project (RAP) team²⁴

Provides step-by-step guidance on constructing clean heat policies. Emphasises the need to consider sector-specific barriers, place equity at the core of policy design, favour long-term environmental benefits, explore various design options, and incorporate complementary policies. Includes checklists, comparisons, and examples.

Making renewable heating accessible and affordable in the rental sector – policy briefing by CAN Europe²⁵

Existing policy incentives for renewable heating often neglect landlords, leaving tenants vulnerable. This briefing delves into the essential steps required to make renewable heating accessible and affordable for all, emphasising the need to address energy poverty and ensure that no-one is left behind.

Fahrenheit 2040: heating and cooling in the EU – Cool Heating Coalition²⁶

The Fit for 55 legislative package aims to reduce emissions by 55% by 2030, including significant actions to decarbonise buildings. However, fragmented directives pose challenges, leaving gaps in achieving full decarbonisation. This study evaluates the EU's progress and alignment with long-term goals, and identifies crucial gaps for the 2040 framework.

Further reading – Technical solutions

Technologies for individual heating decarbonisation solutions

The REPLACE Project's Replacement Handbooks²⁷ offer tailored guidance for adopting sustainable heating and cooling systems. These resources are designed for end consumers, intermediaries, and investors, and are available in nine

²⁴ Regulatory Assistance Project (RAP), April 2024, **Clean heat standards handbook**

²⁵ CAN-Europe, February 2024, **Making renewable heating accessible and affordable in the rental sector**

²⁶ Cool Heating Coalition, May 2024, **Fahrenheit 2040: heating and cooling in the EU**

²⁷ Replace, **Replacement Handbooks** (webpage, accessed July 2024)



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languages. Among others, the handbooks provide comprehensive technical insights into renewable solutions, including planning guidance, business models, and financing options.

District heating decarbonisation

The European Commission's Toolkit for District Heating,²⁸ developed as part of the Initiative for Coal Regions in Transition, provides an in-depth look at the technologies available to decarbonise district heating (DH) networks. It is a comprehensive guide for regional and local authorities, SMEs, civil society organisations, and other stakeholders engaged in district heating projects at local and regional levels.

For an insightful exploration of the evolution of district heating, the 5GDHC Interreg project's webpage provides a detailed overview of the five generations of district heating and cooling.²⁹ It includes examples of pilot projects for district heating network transformation.

Thermal storage technologies (TES)

Thermal storage technologies (TES) capture surplus thermal energy for later use, supporting a wide range of applications and scales.³⁰ They can store heat or cold generated from multiple sources like renewable energy, heat pumps, or waste heat from industrial processes, enhancing energy system efficiency by balancing supply and demand across seasons and time of day.

²⁸ European Commission, October 2023, **District Heating Toolkit**

²⁹ Interreg, **5GDHC in short** (webpage, accessed July 2024)

³⁰ **Medium- and high-temperature thermal energy storage**, IRENA (webpage, accessed July 2024)



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About E3G

E3G is an independent climate change think tank with a global outlook. We work on the frontier of the climate landscape, tackling the barriers and advancing the solutions to a safe climate. Our goal is to translate climate politics, economics and policies into action.

E3G builds broad-based coalitions to deliver a safe climate, working closely with like-minded partners in government, politics, civil society, science, the media, public interest foundations and elsewhere to leverage change.

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