

A photograph of two construction workers in white hard hats and grey work clothes installing large solar panels on a corrugated metal roof. The background shows a mountainous landscape under a clear sky. The image is overlaid with a semi-transparent blue filter.

Scaling up investments in the decarbonisation of district heating in Western Balkan communities

Summary

The decarbonisation potential of district heating in Western Balkan countries is largely untapped, with 97 per cent of heat supplied in district networks produced from fossil fuels and only a negligible share from renewables¹ (around 3 per cent), which is comprised mostly of unsustainable forest biomass. Although financial streams allocated to district heating transformation projects are limited, and mostly accessible to well-established cities with proven renewable energy sources, all cities and countries in the Western Balkans need to decarbonise their district heating systems to achieve decarbonisation goals and prevent coal-dependent communities from being left behind. To address these challenges, this report outlines recommendations for both finance institutions and local and national governments.

Recommendations for finance institutions:

1. Provide funding to encourage the use of a cross-sectoral energy planning approach at the local and national levels to increase the share of district heating and cooling, use thermal storage, and implement energy savings in different sub-sectors.
2. Increase tailored and adjusted funding streams for renewable-based district heating projects planning and preparation – other than forest biomass – in small and medium-sized Western Balkan communities, particularly for those facing economic, knowledge, and administrative burdens. Banks should commit clearly to investing in 4G district heating systems that utilise efficient technologies and integrate sustainable renewable energy sources, contributing to reducing energy consumption, greenhouse gas emissions and enhancing energy security.
3. Facilitate on a larger scale technical assistance for feasibility studies and decarbonisation plans for district heating systems through programmes such as the European Bank for Reconstruction and Development (EBRD)'s Renewable District Energy (ReDE) and scale-up investments in projects that integrate renewable energy sources.
4. No financial investments should include new fossil fuel installations. This means immediately ceasing to provide technical assistance or financing for any gas projects in the WB6, including pipelines and interconnections (such as the Southern Gas Interconnector in Bosnia and Herzegovina or the Greece–North Macedonia fossil gas pipeline).

For more information

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¹ Energy Community Secretariat, [Energy Community CBAM readiness tracker](#), Energy Community, June 2023.

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5. Support the establishment of ambitious targets for deep renovation of buildings and the integration of heat-pumps, heat storage, and other renewable heating and cooling technologies.

Recommendations for local governments:

1. Enforce strong regulations that prohibit new installations of fossil fuel heating systems, including coal, gas, oil and set a clear timeline for the complete phasing out of fossil-fuelled heat generators by 2050 at the very latest.
2. Avoid unsustainable fuels such as primary forest biomass,² waste incineration,³ large-scale biogas⁴ or hydrogen.⁵ These alternatives may appear to solve problems such as waste management or fossil fuel use, but they create other serious problems and hamper sustainability efforts.
3. Establish ambitious targets for the deep renovation of buildings, accompanied by the integration of heat-pumps, heat storage, and other sustainable renewable heating and cooling technologies.
4. Bundle different investments from multiple towns (small and medium-sized ones) and develop joint projects for decarbonisation of the district heating system to make more bankable projects.
5. Mandate metering systems: Implement mandates for establishing metering systems in buildings to accurately measure energy consumption. This will enable better monitoring and management of energy use, contributing to more efficient and sustainable heating practices.

Recommendations for national governments:

1. Adopt strong regulations that prohibit new installations of fossil fuel heating systems, including coal, gas, oil and set a clear timeline for the complete phasing out of fossil-fuelled heat generators by 2050 at the very latest.
2. Embed heating decarbonisation in long-term strategies, such as national energy and climate plans (NECPs), to increase the share of district heating and cooling, use thermal storage, and implement energy savings in different sub-sectors to stabilise the grid with more renewable energy. These objectives should be aligned with the overall goal of phasing out fossil fuels and transitioning to sustainable renewable energy sources.
3. Establish ambitious targets for the deep renovation of buildings, accompanied by the integration of heat pumps, heat storage, and other sustainable renewable heating and cooling technologies.

² Meaning wood cut for the purpose of burning. Small installations using offcuts from the wood industry may be needed to provide peak load for some district heating systems but their size should be strictly limited to what offcuts are readily available and likely to be available in the coming years.

³ Including gasification, pyrolysis and refuse-derived fuel.

⁴ Biogas installations should be solely based on agricultural waste and must not depend on dedicated crop production, which will increase intensive monocultural farming and compete with food production.

⁵ Renewables-based hydrogen will be needed for hard-to-decarbonise sectors such as certain industries and aviation, but will always be energy-intensive and expensive so it is not suitable for heating.

4. Discontinue all fossil fuel subsidies to increase competition among renewables and improve the feasibility of sustainable district heating systems.
5. Ensure that once fully established, emission trading schemes (ETS) revenues are used for improving the energy performance in buildings, reducing energy consumption and thus reducing carbon emissions from the heating sector.

Introduction

District heating networks offer great potential for efficient, cost-effective, and flexible large-scale use of renewable energy for heating, especially when coupled with small-scale clean systems.⁶ However, the decarbonisation potential of district heating in the Western Balkan countries is largely untapped, as 97 per cent of the heat supplied in district networks is produced from fossil fuels, a number that remained almost the same in 2021 as in 2019. The share of renewables is negligible, at around 3 per cent, despite the sector's potential to integrate renewables.⁷

Even most these renewables consist of forest biomass, which emits large amounts of carbon dioxide,⁸ contributes to air pollution and can result in large-scale forest and biodiversity loss if not properly managed. The EU Renewable Energy Directive also contains sustainability criteria,⁹ which means that not all forest biomass can even be statistically counted as renewable.

The Energy Community Ministerial Council has taken a critical step towards achieving climate neutrality of economies by 2050 and reducing reliance on fossil fuels. They adopted 2030 energy and climate targets, including a 60.9 per cent reduction in greenhouse gas emissions below 1990 levels,¹⁰ capping primary energy consumption at 129.88 Mtoe, and final energy consumption at 79.06 Mtoe. The heating and cooling sector, especially the district heating sector, is essential to achieve these goals.

Moreover, national targets are expected to lead to an overall 31 per cent share of renewable sources in gross final energy consumption by 2030, with much higher targets for countries that had a more advanced starting point.

Currently, despite some efforts to develop projects, all Western Balkan countries and their cities are failing to significantly scale up investments in renewable district heating systems as well as to increase energy

⁶ Besides large-scale solutions, it is possible to combine sustainable and cost-effective heating technologies, such as a combination of solar panels with inverter air conditioning units, also studied and suggested for certain communities in the [Analysis of alternatives to coal based district heating for the Bitola region in North Macedonia](#). Also, Municipalities can develop subsidy schemes for this type of technology as an immediate solution.

⁷ Energy Community Secretariat, [Energy Community CBAM readiness tracker](#).

⁸ Forest biomass is often thought to be carbon-neutral due to the idea that trees replacing the ones cut can sequester the carbon dioxide released by burning. However, the timescale available for tackling the climate emergency is now so short that this cannot happen within a relevant timeframe. For more, see WWF European Policy Office, 500+ scientists tell EU to end tree burning for energy, 11 February 2021.

⁹ At the time of writing in September 2023, a new version of the Directive has been adopted by the European Parliament, which would further tighten these criteria. Bankwatch does not consider these criteria adequate, and calls for a halt to public financial support for installations using primary forest biomass due to its climate impacts.

¹⁰ This target includes Ukraine, Moldova and Georgia as additional contracting parties of the Energy Community Treaty.

efficiency, and, as we are already in the second half of the year 2023, it is hardly imaginable that they will succeed.

For the last five years, the primary driver for the development of renewable heating projects has been the support extended by the European Union, mostly the Western Balkan Investment Framework (WBIF) and international financial and development organisations such as the EBRD, Kreditanstalt für Wiederaufbau (KfW) and the Swiss State Secretariat for Economic Affairs (SECO).

In 2023, the Government of the Sarajevo Canton in Bosnia and Herzegovina approved a capital district heating project of EUR 50 million. They will install two 38-megawatt (MW) industrial heat pumps based on wastewater heat and 15 kilometres. These two projects have been initiated in partnership with the EBRD, and a EUR 15 million grant application for the project's capital expenditures under the WBIF is under preparation.¹¹

In 2022, Kosovo received a grant of EUR 54 million from the WBIF and KfW to finance the construction of the Big Solar Pristina project. This initiative involves building a solar collector field covering an area of 58,000 m², seasonal heat storage of 410,000 m³, an absorption heat pump, and an extension of the district heating network by 2028.

The Renewable District Energy in the Western Balkans (ReDEWeB) Programme is driven by the EBRD and aims to assist the local authorities with feasibility studies. This programme is currently collaborating with 11 cities in Serbia, four cities in Bosnia and Herzegovina, one city in Albania, and one city in Montenegro.

However, the financial streams allocated to investments in district heating transformation projects are limited, and more easily accessible to the Western Balkan cities with well-established district heating networks, proven renewable energy source potential, and sound financial health. This includes those with the capacity for debt repayment, or those benefiting from political and financial backing at the national level. However, the need to decarbonise the district heating sector in all Western Balkan cities and countries is paramount in order to attain the decarbonisation goals by 2050 and prevent coal-dependent heating communities from being left behind.

Renewable integration in district heating systems in the Western Balkans: current progress

The EBRD ReDEWeB programme was established in 2019 with the backing of the Austrian Federal Ministry of Finance. The programme, worth EUR 4 million, has made significant strides in funding the integration of renewable sources in the district heating systems of Western Balkan countries. Its greatest impact has been mostly in facilitating the preparation of decarbonisation plans and feasibility studies for district heating systems, while working in parallel on improving the regulatory frameworks for public and private investors.

Additionally, the Renewable District Energy (ReDE) project, which consists of a sovereign loan of up to EUR 30 million to the Republic of Serbia to finance investments in several district heating companies, involves 11 cities and municipalities in Serbia. All of these utilised small and medium-scale projects (EUR 1 million to EUR 9 million) in decarbonisation of the district heating sector. Expected benefits to the towns include

¹¹ Sarajevo Times, [Project of Remote Heating worth 50 Million Euros in Canton Sarajevo](#), *Sarajevo Times*, 14 July 2023.

lower energy costs and increased energy security. Switzerland is donating a EUR 8.5 million grant for the project, the EU approved a EUR 3 million grant, and the EBRD is preparing a EUR 30 million loan for the purpose. This project will promote the implementation of renewable district energy technologies, including geothermal, solar thermal, biogas, biomass, and waste heat from wastewater treatment plants and other industrial sources. The project will be completed in four years' time.¹²

Despite the provision of funding across the Western Balkans for numerous feasibility studies through the ReDEWeB programme, progress has been made by only a select few of the municipalities. Specifically, the programme has secured a contract with the Pristina municipality, Kosovo, while agreements are anticipated to be signed with 13 additional municipalities in Serbia in 2023 through the ReDE programme. Two contracts for capital investment and the detailed development of projects are also expected to be signed with the Sarajevo and Novi Sad municipalities. Nevertheless, four cities, namely Banja Luka and Gradiška from Bosnia and Herzegovina, Žabljak from Montenegro, and Korča from Albania, are in the early stages of negotiation for initiating the funding process.

Although there is a list of 16 municipalities making slow progress in project development, the dynamic at the regional level is not satisfactory. As visible in the cases of some Serbian municipalities, there is a need for smaller-scale investments (EUR 1 million to EUR 3 million) for many small-sized towns facing economic, knowledge, and administrative burdens. However, if they are grouped as one investment, they may become more attractive for partnerships, learn from joint processes, and have a harmonised approach to achieving decarbonisation targets.

Table 1: Preparation stage of renewable district heating projects supported by the ReDEWeB programme (source EBRD 2023)

No.	Country	City	Project scope	Processing stage	Category	Expected CAPEX (EUR)	Expected EBRD investment (EUR)
1	Kosovo	Pristina	Solar thermal	Loan agreement signed in 2022.	Public	80M	22.5M
2	Bosnia and Herzegovina	Sarajevo	Geothermal + heat pumps	Feasibility study completed. Phase 1 funds secured. The plan is to sign the loan agreement in 2024.	Public	Phase 1-20M Total 64M	Phase 1.16M Total TBD
3	Serbia	Niš	Solar thermal + heat pump	Feasibility study completed. Funds allocated in the	Public	15M	30M

¹² Igor Todorović, [Cleaner district heating for 11 cities, municipalities in Serbia](#), *Balkan Green Energy News*, 20 September 2022.

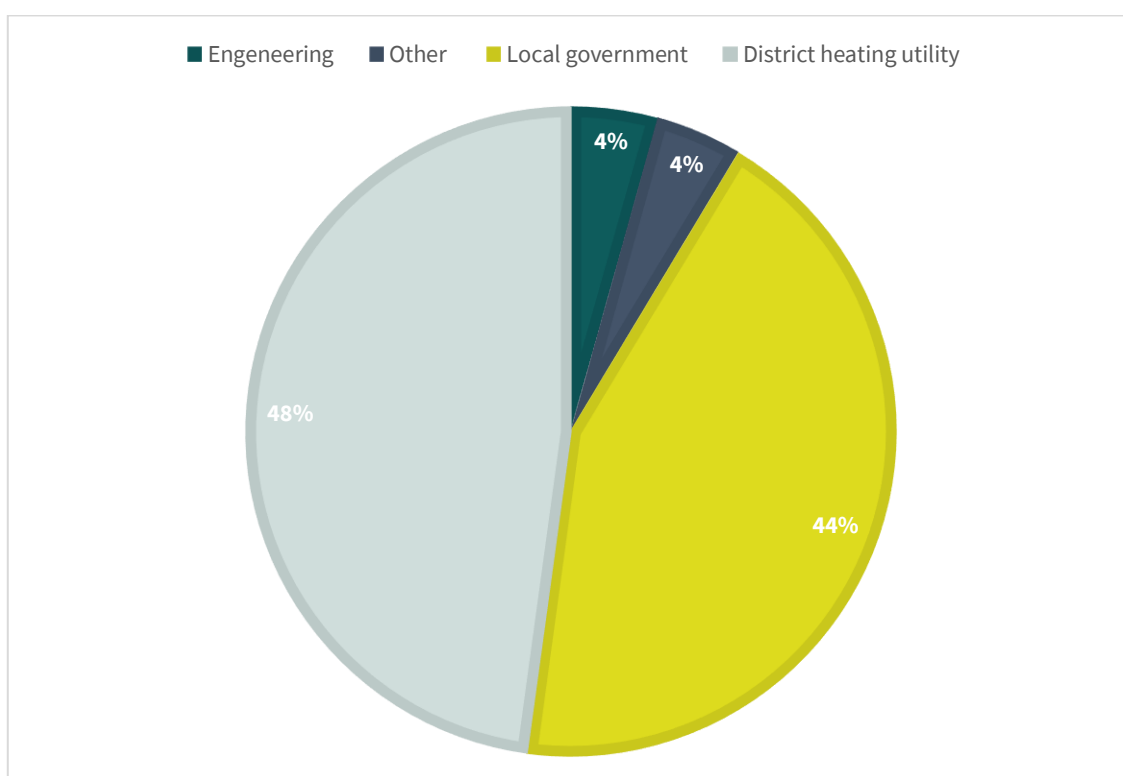
			utilising river water + EE measures	Serbian budget. The plan is to sign the loan agreement in 2023.		
4		Kragujevac	Heat pump utilising data centre waste heat + EE measures		6M	
5		Bečej	Geothermal + heat pump + EE measures		6M	
6		Vršac	Heat pumps utilising wastewater treatment plants + EE measures		4M	
7		Kruševac	Heat pumps utilising wastewater treatment plants + EE measures		7M	
8		Paraćin	Greenfield district heating system + geothermal + heat pumps		3M	
9		Kraljevo	Heat pumps		1M	

10		Novi Pazar	Heat pumps			1M	
11		Bogatić	Geothermal			1M	
12		Pančevo	Solar thermal + EE measures			2M	
13		Vrbas	Geothermal + heat pumps + EE measures			2M	
14	Bosnia and Herzegovina	Zenica	EE measures to prepare the system for heat pumps	Feasibility study completed. The plan is to sign the loan agreement in 2023.	Public	9M	6M
15	Bosnia and Herzegovina	Pale	Biomass + EE measures	Feasibility study completed. The plan is to sign the loan agreement in 2023.	Public	10M	7M
16	Serbia	Novi Sad	Solar thermal + heat pumps	Pre-feasibility study completed. WBIF funds secured in the amount of EUR 705 000 for the detailed feasibility study with preliminary design development. The plan is to sign the loan agreement in 2024.	Public	90M	60M

Identifying non-technical barriers to the uptake of sustainable heating and cooling solutions in the Western Balkans

To identify critical barriers to scaling up investment in modern district heating and cooling, a survey was conducted among city representatives, utility companies, and engineering offices from the region. A total of 23 participants from various towns, including Banja Luka, Gradiška, Kakanj, Pale, Sarajevo, Tuzla, Ugljevik, and Živinice from Bosnia and Herzegovina; Berane, Nikšić, and Pljevlja from Montenegro; Belgrade, Leskovac, Knjaževac, Kraljevo, Majdanpek, and Niš from Serbia; and Bitola, Kochani, and Kichevo from North Macedonia, contributed to the survey. The survey results were used to identify and better understand barriers to investing in modern district heating and cooling technology.

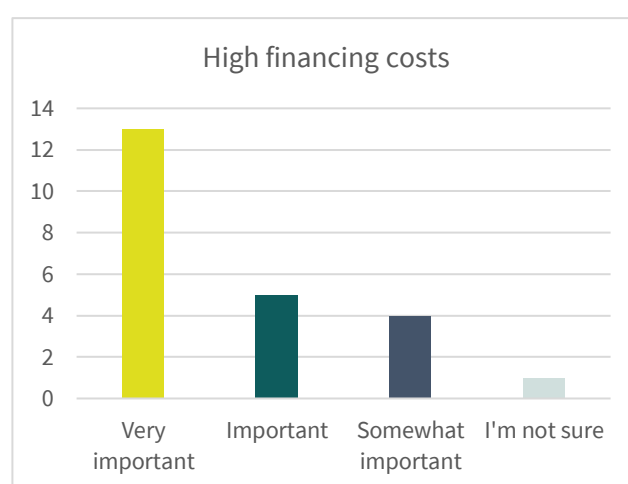
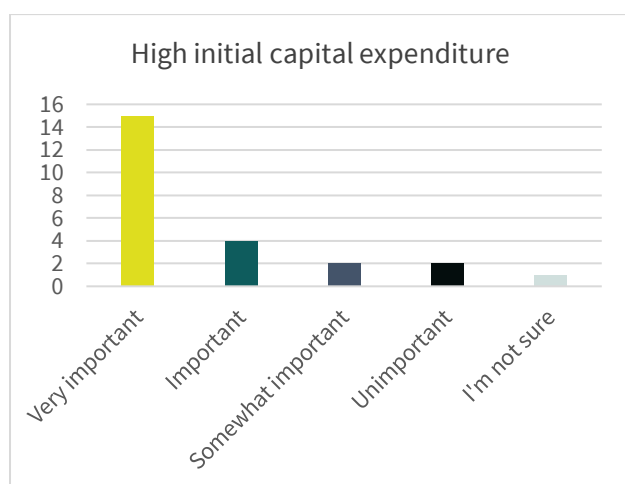
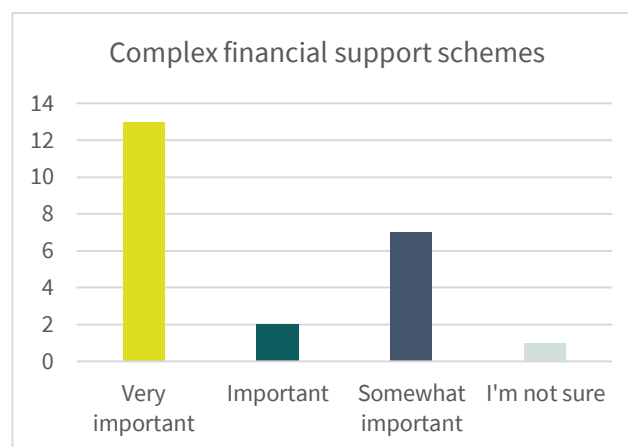
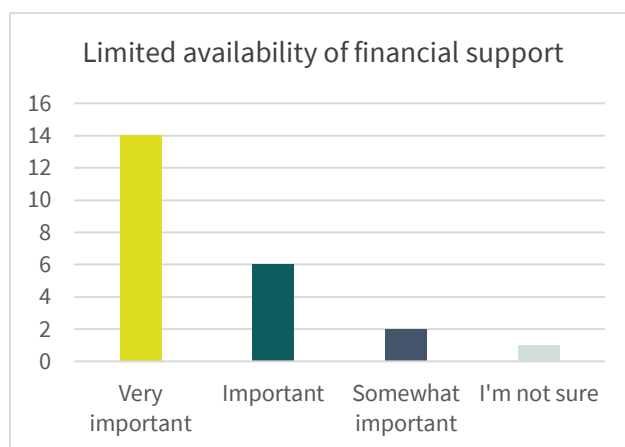
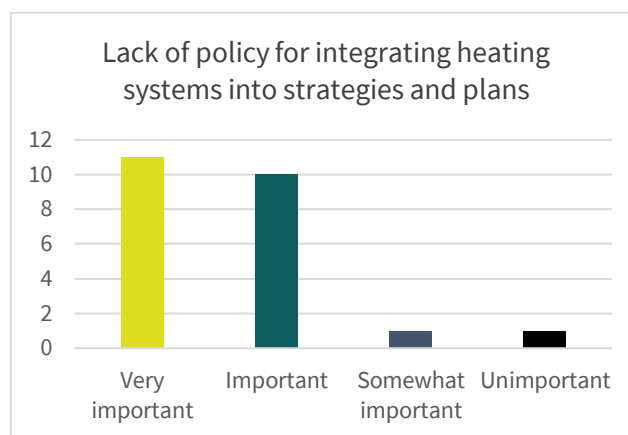
Chart 1: Distribution of survey participants across various sectors

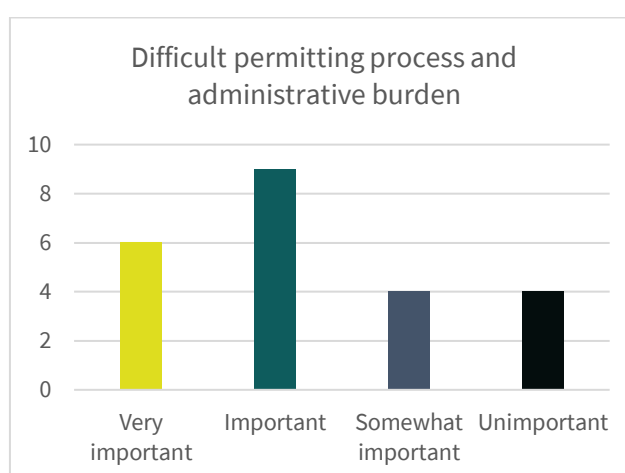
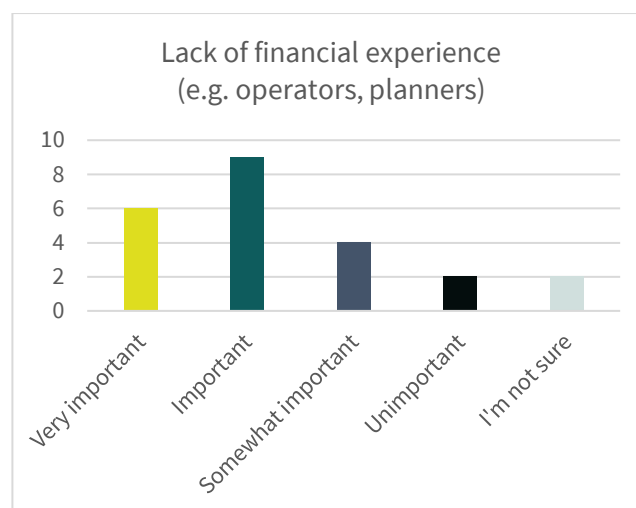
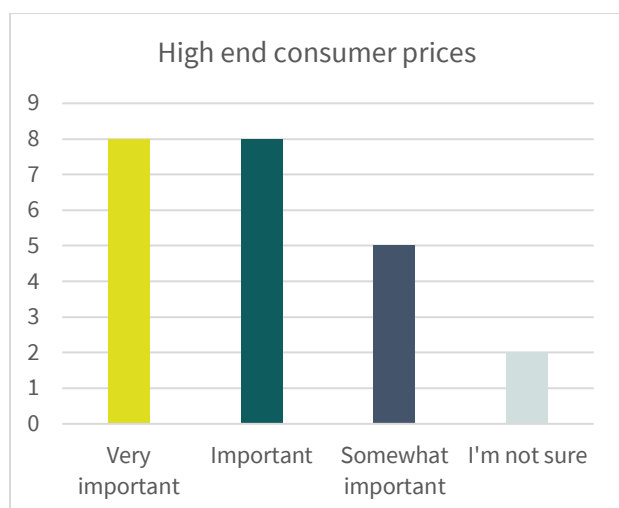


As the results show, local governments, district heating utilities, and engineers are highlighting the importance of both financial and policy barriers, mainly focusing on the high capital investment costs, comprehensive financing schemes, and limited availability of finance support, as well as the lack of prioritisation given to district heating in decarbonisation policies, and its integration into existing strategies and planning processes.

Chart 2: Importance of different barriers for integration of modern district heating in towns.

In your opinion, how significant/important are the following barriers to the introduction of modern district heating in your city?





As Chart 3 shows, almost 70 per cent of the survey respondent towns have not received funds for projects development from existing financial programmes of the EU or banks, while one third of the respondents are beneficiaries of some financial programme. There are various reasons for municipalities not being able to secure funding from financial programmes for district heating.

In their opinion, some municipalities lack financial resources for the initial investment in the primary and secondary circuits of the heating system, while end-users cannot finance the investment in their secondary installations. In addition, the lack of understanding of the importance of district heating by decision-makers, insufficient project documentation, inadequate education of professionals in the field of energy, and an unstable energy market are other contributing factors. Moreover, the absence of financial support for modernising and expanding the district heating system and for the application of renewable energy sources also hinders the progress.

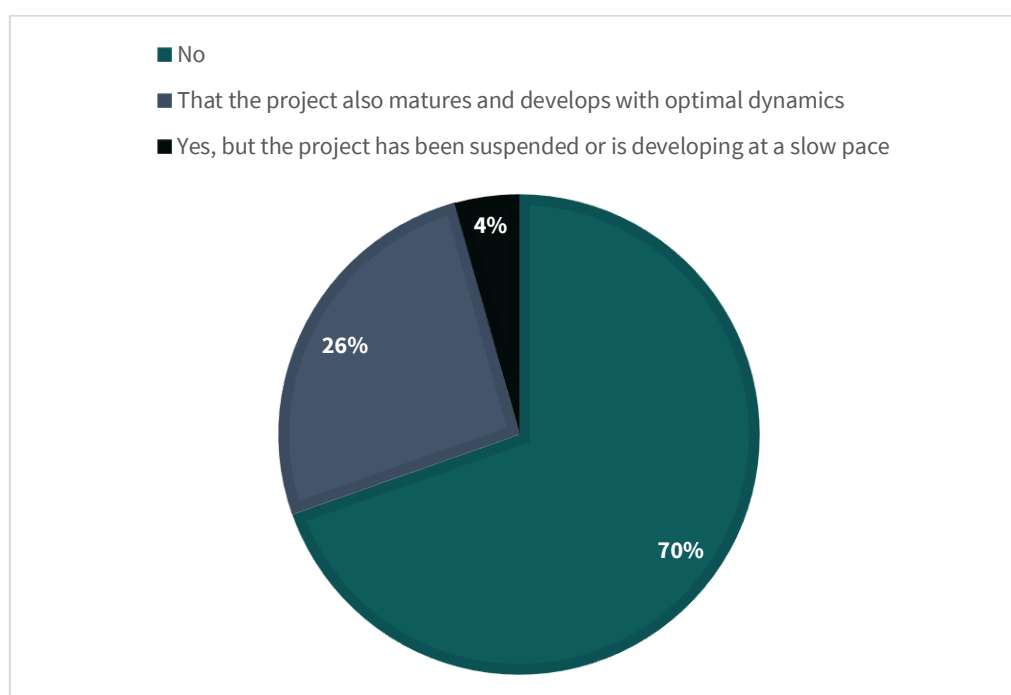
Finally, the lack of a good legal framework, the low level of compliance with urban plans and existing building and infrastructure funds, and the inadequate promotion of the positive effects of district heating are also responsible for the absence of funding.

Of the 30 per cent that have received funds, most – 26 per cent – are happy with the agreed district heating development dynamics, but 4 per cent state that projects are slowed down. Participants have cited several reasons for this, including a lack of financial resources for detailed project development, a large number of

stakeholders without a coordinated state or local self-government body, and excessive bureaucratisation and formalism in public sector and financial institutions.

Chart 3: Usage of funds for the development of the modern district heating system per town

In the last 5 years, have you used funds from funds for the planning and development of district heating projects such as EBRD ReDEWeB, GEFF, KfW funds, EIB or other development banks, the Investment Framework for the Western Balkans (WBIF), etc.



Solutions and recommendations

The current district heating and energy policies in the Western Balkans hinder the transition to sustainable energy due to a reliance on fossil fuels. To achieve a fossil fuel phase-out by 2050, there is a need for a strict prohibition on new installations of fossil fuels, including coal, gas, and oil, and setting up a clear timeline for phasing-out fossil fuel heat generators, including small installations like gas boilers. This will also include avoiding other unsustainable solutions like primary forest biomass, waste incineration, large-scale biogas, or hydrogen.

Moreover, local and national self-governments have to provide clear objectives for heating decarbonisation and embed it under a long-term strategy such as an NECP. Apart from setting up a deadline for a complete phasing out fossil fuels in heating, these objectives can take various forms. These include ambitious aims for the deep renovation of buildings accompanied by the integration of heat pumps or other renewable heating and cooling technologies, and mandates for establishing metering systems, among others. These targets provide stakeholders with a clear understanding of the end goal, and simplify the process of gathering support for the collective decarbonisation efforts.

Inspiring practices:

Six Austrian cities set renewable energy targets in district heating by deploying a large share of industrial heat pumps and solar technologies. For example, Graz introduced new subsidies for solar thermal and solar PV in 2020, while Vienna mandated the installation of solar systems on newly constructed residential buildings and implemented a new subsidy programme to fund these projects.

Vienna has a fossil gas ban as a heating solution in new buildings of the so-called ‘climate protection areas’, and the city has an aggressive heat zoning plan for them, with four districts already banning fossil fuel heating in new buildings and a targeted ban on fossil fuel heating in all buildings city-wide by 2040.¹³

To increase competition among renewables and improve the feasibility of a sustainable energy system, governments need to discontinue all fossil fuel subsidies.¹⁴ Carbon dioxide pricing must be introduced in each of the countries, reflecting the accurate costs of emissions and gathering funds for improving energy efficiency and emission reduction solutions. This is also a necessity if the countries are to avoid the impacts of the EU’s carbon border adjustment mechanism.¹⁵

Utilising cost-effective energy savings is crucial for decarbonising the energy system. Heating of space¹⁶ and the hot water supply currently account for 43 per cent of the Western Balkans’ energy consumption.¹⁷ National policies need to set up ambitious and feasible energy-saving targets (recommendations from the Heat Roadmap Report 2050¹⁸ set this target at a minimum 30 per cent reduction for space heating in buildings) and financial incentives to enable potential energy savings.

The cross-sectoral energy planning approach reveals that increasing the share of district heating and cooling, using thermal storage, and implementing energy savings in different sub-sectors can help stabilise the grid with more renewable energy. Thermal energy storage, which stores surplus heat energy and releases it to the district heating system when needed, is an effective approach to decouple power and heat generation and increase the flexibility of district heating and cooling.¹⁹ An integrated approach to energy demands can result in further savings due to synergies. Decarbonisation can be achieved at lower costs than ‘conventional decarbonisation,’ even without calculating health and climate-related costs.

¹³ Ren21. Renewables now, [Trends in Austria. Facts from the Renewables in Cities 2021 Global Status Report](#), Ren21. Renewables now, 18 March 2021.

¹⁴ In a study published on 3 December 2020, the Energy Community noted that Bosnia-Herzegovina, Kosovo, Montenegro, North Macedonia, Serbia and Ukraine had provided EUR 900 million in coal subsidies in 2018 and 2019, an amount virtually unchanged from the previous three years. Between 2015 and 2019, EUR 2 billion was granted in subsidies.

¹⁵ European Commission, Carbon Border Adjustment Mechanism.

¹⁶ It is atypical for CHPs to solely provide heating for spaces – and not hot water – in the Western Balkan cities, unlike the rest of the EU.

¹⁷ Maja Kambovska, [Heating in the Western Balkans. Overview and recommendations for clean solutions](#), CEE Bankwatch Network, May 2021

¹⁸ Daniel Trier et al., [Guidelines for the Energy System Transition. Recommendations for Policymakers Including the Local and Regional Approach, the National Aspects and the Energy Union Perspective - Heat Roadmap Europe 4](#), Aalborg University, 2018.

¹⁹ [The European Commission recommendation on energy storage, from March 2023](#), highlights the significance of enhancing thermal and other storage developments for system balancing and coupling between the energy and heat RES sectors, while the referent [ENTEC Study](#) further suggests that these recommendations should be considered in the development of NECPs.

Inspiration:

In Denmark, the district heating system plays a critical role in supporting the transition from a traditional fossil-fuel-based energy system to a renewable-based energy system. It can provide considerable flexibility for energy power systems. The pilot project EnergyLab Norhavn in Denmark has demonstrated the technical and economic feasibility of using the flexibility from heat pumps,²⁰ which provide reserves for energy power systems by regulating their power consumption. The comparative results in their research show that district heating systems can play an important role in providing balance to the energy system. This is essential due to the fluctuating nature of renewable energy sources and is a promising option to provide additional regulation capacity, along with flexible resources such as generators and energy storage, to ensure the secure operation of the energy power system. In addition, the profit of the district heating system can be improved by around 2.23 per cent by utilising the flexibility of district heating systems and strategically participating in energy and reserve markets. Based on the proposed model of flexibility regions, the feasibility of deployed reserves offered by the district heating system is always guaranteed.

Bundling investments from multiple towns (small and medium-sized ones) into a larger project for decarbonisation of the district heating system can lead to more efficient, cost-effective, and environmentally friendly systems that promote energy security and sustainability across the region.

There are several benefits to utilising investments from more towns to develop projects for the decarbonisation of the district heating system, including:

1. Economies of scale: by pooling resources from multiple towns, larger projects can be developed that are more efficient and cost-effective compared to individual projects.
2. Increased funding: more towns investing in these projects mean more potential funding sources, making it easier to secure financing from grants, loans, and other external financing options.
3. Shared risk: multiple towns sharing the risk of a project reduce the burden on any one town and provide a safety net in case of unexpected setbacks.
4. Pooling of resources and expertise to overcome barriers: improving collaboration and communication among investors and local energy experts can lead to more efficient deployment of technology and resources, navigating complex regulatory structures for cost-effective and sustainable projects.
5. Realising multiple benefits: the strategic bundling of investments in district heating systems presents a compelling opportunity to unlock a multitude of environmental, energy efficiency, and energy security advantages. This approach can lead to significant reductions in greenhouse gas emissions, accelerate the transition to renewable energy sources, and lay the foundation for a more resilient and balanced development of energy infrastructure.

²⁰ Jin Tan et al., [Strategic investment for district heating systems participating in energy and reserve markets using heat flexibility](#), *Science Direct*, May 2022.



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