

SUPPORTING THE DEVELOPMENT OF SUSTAINABLE HEATING & COOLING SYSTEMS TO DECARBONISE THE BUILDING STOCK

INTRODUCTION

In 2021, Energy Cities gathered three cities from Serbia and Poland, who discussed barriers and levers they experienced to develop sustainable heating and cooling systems.

PROFILE OF PARTICIPATING CITIES	
KARTUZY (PL)	<ul style="list-style-type: none"> ⊕ Current heat sources use coal or gas as fuel ⊕ Plans to achieve no less than 80% RES in DHC ⊕ Currently 20% of buildings covered by DH ⊕ Plans to eliminate smog and solid fuel combustion by 2030; achieve carbon neutrality in heating by 2050 ⊕ Exploring potential use of hydrogen
ŁÓDŹ (PL)	<ul style="list-style-type: none"> ⊕ 83% of heat produced from coal; 17% from biomass ⊕ Plans to produce 50% of energy from gas or electricity by 2026 ⊕ Plans to invest 430 million EUR into renovation (the biggest renovation project in PL) ⊕ Plans to install PV panels on municipal buildings
NIS (RS)	<ul style="list-style-type: none"> ⊕ 95% of heat from natural gas, 5% from oil ⊕ Plans for gasification in the suburbs, DH in the city centre ⊕ Largely focused on efficiency increasing activities, renovation ⊕ Exploring geothermal potential

PLANNING

Data is required for smart energy efficient renovation of buildings

All projects require some basis in data. The difficulty lies in acquiring and working with it, oftentimes due to a lack of knowledge about existing tools or time to learn how to use and implement them. In addition, data should be standardized and easily accessible, to increase collaboration between municipal actors (departments) and to reduce the difficulties in introducing new workers to the data.

Kartuzy proved to be a case where the interest in new data management tools is strong, but the implementation is lagging, as the municipality does not have the means to provide proper training on their use. Nevertheless, different tools for energy planning for studies at city-, district- or building-level were discussed¹ and the local energy planners intend to use them in the future.

Thanks to a new Polish legislation, the city of Łódź expects to have access to a database of heating appliances of buildings and thus their emissions in 2022. This will allow them to prioritise the order of renovation based on data.

Watch out! Whilst data management tools exist and are generally more efficient than in-house solutions, the municipality has to support the departments in implementing them (i.e., via

¹ For a presentation on the topic, please contact Energy Cities

trainings). To avoid potential language barriers, it is advised to choose multi-language tools where possible.

Best practice from Bistrita (RO, municipality invited as speaker)²:

Bistrita participated in the EU-funded Hotmaps project, which developed an online heat planning toolbox for cities. In addition to the development of a heat strategy for Bistrita with the support of experts, two training sessions for a large number of city officers were organised on the use of the Hotmaps toolbox. It was noted that younger employees with stronger English and computer proficiencies gave the best reviews of the training sessions.

This first heat strategy allowed for recognition of avenues for further research. The municipality is now sure that they will continue using the toolbox in the future.

Financing the Green transition is still difficult

The cities of Kartuzy and Łódź reported that, if an efficient district heating system were to be defined as one that is equipped with efficient cogeneration capacity from 2026, Poland, with its large amount of coal-fired heating plants, would be in a difficult situation. With the decrease of public aid to fossil-fuel technologies across Europe, the district heating sector in Poland needs large amounts of investments to be decarbonised and stay competitive. In addition, insulative material price has also skyrocketed as of late, posing an additional challenge to heating.

Municipalities are ready to decarbonise their heating networks, but financing remains one of the key obstacles. Green Bonds are a potential solution, but they are still largely unknown in Poland and no bank offers them. The city of Łódź has thus decided to work with Norwegian financial institutions to establish the appropriate methodology and processes.

Watch out! All Green Bonds in the EU will soon have to comply with the EU taxonomy. Therefore, as not to necessitate revisiting and rewriting of them in the near future, it is recommended to already implement them according to EU taxonomy.

Best practice from Niš:

The national government is supporting a project in Niš that subsidises the cost of energy efficient renovation, specifically 50% of investment for windows, insulation and efficient boilers. This not only decreases current energy use, but also allows for potential use of lower temperature (4th Generation) district heating.

Use of renewable energy in district heating

Whilst renewable energy sources and solutions in electricity production are generally well known, the situation is different for heating. Potential sources of renewable heat in general include heat pumps and solar thermal, with waste heat and geothermal energy being good sources also, but highly contingent on location. However, they are not yet well spread in Poland nor Serbia, and their potentials not well known at local level. The use of biomass is the most common but poses problems of sustainability of the source and the criteria for determining it.

² Presentation available upon request

For example, about a million households in Serbia use wood fired stoves, which is renewable, but poses problems of efficiency, pollution, and health.

Waste incineration plants are another potential source of low-carbon heat, but Poland is behind in regard to this technology. There are very few waste incineration plants in Poland (nine in total), whilst they could, in the opinion of Łódź, be a temporary solution to quickly decarbonise heating while working on the reduction of waste generation. As such, Łódź is planning to build one but is unsure about the future of waste incineration plants in the long-term as they are currently not included in the EU taxonomy.

Meanwhile the National Centre for Research and Development of Poland has launched a competition for 10 teams looking for RES solutions for heating (for 80+% of the heat generated), aiming to reach about 1,5 MW, with half a million zloty allocated for writing the project until February 2021. The team that successfully reaches this goal will be given 7 million euros to implement it.

Watch out! To be able to fully profit from renewable heating, the sources of it should be varied and solutions for storage should be considered, to balance out the production-demand peak, which is characteristic of both renewables and heat use in general.

Best practice from Kartuzy: Plans to construct a thermal pit storage

Kartuzy is currently developing plans for creating a thermal pit. If the plans come to fruition, this will be the first partially buried pit storage tank in Poland. This design will allow the use of less steel in the construction, which is currently especially important due to high steel prices.

ENGAGING CITIZENS AND STAKEHOLDERS

Citizen engagement is key to sustainable district heating

Citizen engagement allows for increased trust between cities, service providers and inhabitants, which allows for more efficient collaboration and, hopefully, active engagement of the citizens (e.g., co-ownership of energy production modes, energy communities, etc.).

DH companies are often not seen in a positive light, due to what seem like high costs and rigidity in operation. Therefore, cities that want to engage citizens have a difficult road in front of them, one that must begin with building trust. Increased citizen engagement and trust typically leads to more connections with the district heating grid, which, in turn, leads to more revenue. Thus, citizen involvement can be seen as a long-term investment in the company.

Previously an example of where the public perception was negative enough to go out and protest, Niš's heating providing company is now recognised as one of the best examples as how to involve citizens in the decision-making process both regionally and internationally. Niš implemented consumption-based billing, which increased the trust in the DH company, as well as the sense of responsibility of the citizens.

Watch out! Citizens need to feel like their participation isn't just tokenism. If citizens are not truly listened to, one might receive the exact opposite reaction to the desired one. The city should play a mediative role only if they actually want to engage citizens.

Best practice from Łódź: The Citizens' panel³

Łódź organised a six-month long project of citizen involvement (6 meetings on the weekends). A symbolic remuneration to citizens who took part in all six of the public discussions organised on greening the urban environment proved to be an effective way of engaging citizens, although finding the legal framework to pay them was difficult at first. In the end this was done through an NGO that also facilitated the discussions.

Energy communities

Whilst interest in energy communities as a strong form of prosumerism by the citizens was found to be intriguing by all cities involved, it was also stated that national legislation still often makes it difficult to implement them.

For example, energy communities in Poland can only be connected to distribution networks with a rated voltage level of no more than 110 kV, posing geographical limitations. Additionally, energy communities cannot generate profit, posing a problem for non-subsidised expansion.

In Serbia, meanwhile, “not a single transmission system operator in the country is unbundled in line with the Third Energy Package”, posing a serious limitation to implementing energy communities.

Watch out! Power infrastructure is usually made with central producers in mind. Thus, skilled professionals and additional investments will have to be made to adapt the power grid for decentralised production and especially consumption, with storage being the key point.

Best practice from Frome (UK): Establishing a community-owned energy co-op⁴

The inhabitants of Frome banded together and established their own energy community – Freco. With small seed funding from the municipality (500 EUR), they created a co-op of renewable energy, raising 300 000 EUR in 4 days through community shares, offering a 6% interest rate. This has allowed them to install solar panels on more than 100 residential homes, along with several bigger projects on public buildings.

³ Presentation available upon request

⁴ Presentation available upon request