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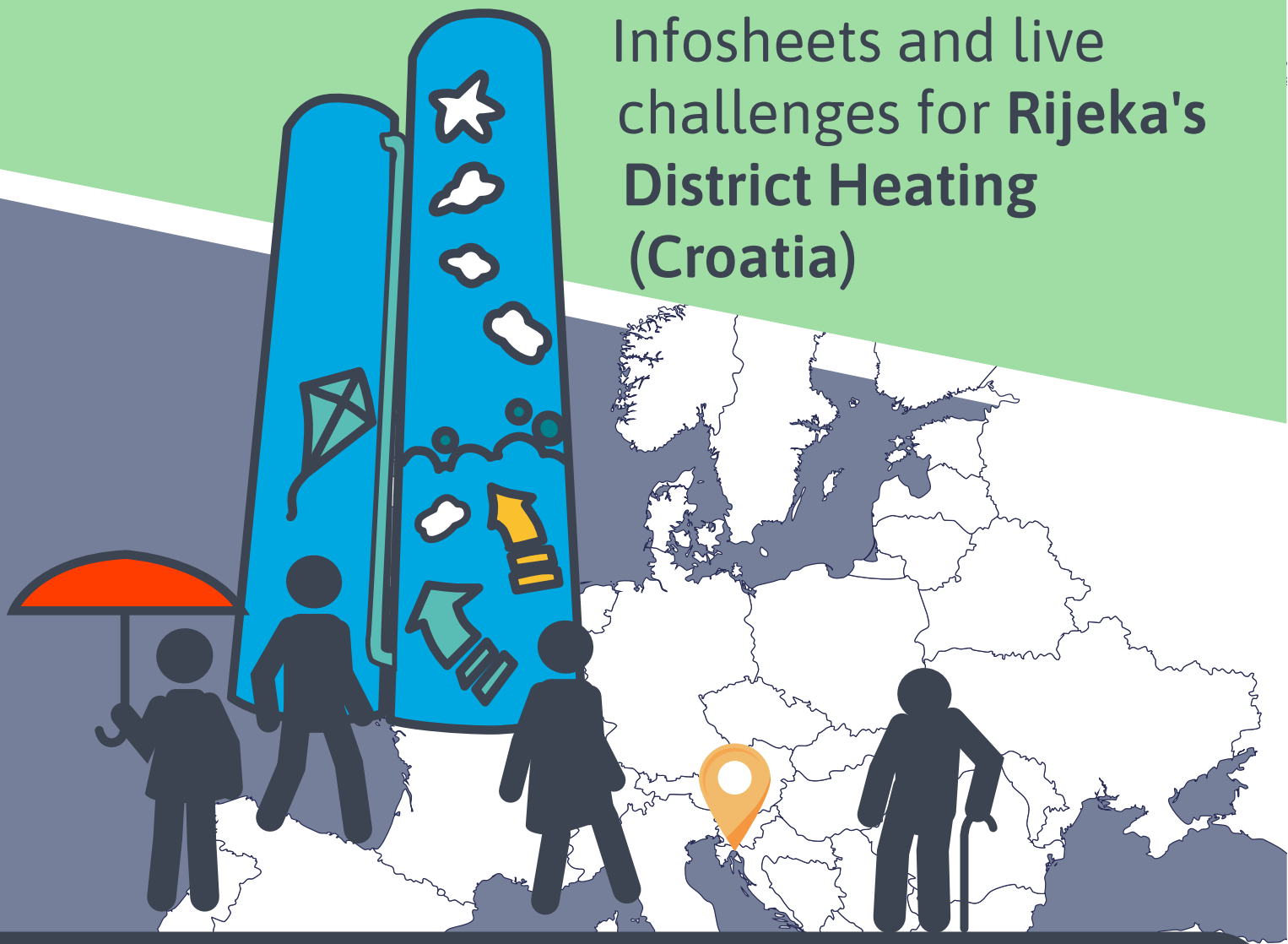
# Insights from Social Sciences and Humanities

## Infosheets and live challenges for **Rijeka's District Heating (Croatia)**



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November 2024

SSH CENTRE
Social Sciences & Humanities for Climate, Energy aNd Transport Research Excellence

# **Insights from Social Sciences and Humanities:** Infosheets and live challenges for **Rijeka's District Heating (Croatia)**

November 2024


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Cover image: this graphic is inspired by water infrastructure near a District Heating network in Rijeka which has been painted, with reference to a nearby planetarium. Cover design & formatting by María Torres-Senés. Acento Comunicación

# List of Contents



# List of Boxes



Rijeka

# Introduction

In 2023, the SSH CENTRE (*Social Sciences and Humanities for Climate, Energy aNd Transport Research Excellence*) project launched its Knowledge Brokering Programme on Sustainability Transitions. The Programme involved six researcher teams working in cooperation with six European city administrations to develop initiatives linking Social Sciences & Humanities (SSH) research with climate, energy or mobility policy-making.

The "Fossil-free heating and cooling" team (Aliaksandr Novikau – International University of Sarajevo, Nicol Staňková – Charles University, and Jessica Zaphiropoulo – Grenoble-Alpes University) worked in partnership with the City of Rijeka.

The research team developed this set of infosheets setting out key takeaways and recommendations from SSH for the future development of District Heating (DH) on the following three topics:

1. Citizen involvement in governance and ownership of District Heating
2. Methods from SSH to support decarbonisation of District Heating
3. Widening our understanding of 'locality' to support District Heating

The International Energy Agency argues that the decarbonisation potential of DH is largely untapped, as globally 90% of the heat supplied in district networks is produced from fossil fuels. The share of renewables in district heating needs to double by 2030 to be able to align with the Net Zero Emissions by 2050 Scenario [1], whilst the European REPowerEU plan suggests a yearly 2.3% increase in renewables in DH by 2030 [2].

The three infosheets presented here are aimed at supporting these targets. They are based on literature review work undertaken by the researchers, and aim to summarise key points from SSH academic work in an accessible way, with illustrative example cases. Drafts were presented at a 2-day workshop organised in Rijeka in May 2024, with the research team, members of the SSH CENTRE consortium, and representatives of the city of Rijeka and selected other cities. The infosheets are aimed at city administrations and other key stakeholders involved in District Heating.

Each infosheet includes key bullet points at the top, and a final section with examples of live issues which were discussed with cities at the workshop. Each infosheet ends with pointers to further reading[1]. Following the three infosheets, a short 2-page report presents live challenges specifically for the city of Rijeka (Croatia) who were our policy partners in this work.

A separate brief is available on the SSH CENTRE website giving reflections from the team on the relationships between research and public policy.

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[1] International Energy Agency. (2023). *District Heating—Energy System*. IEA. https://www.iea.org/energy-system/buildings/district-heating [2] International Energy Agency. (2022). *Is the European Union on track to meet its REPowerEU goals? – Analysis*. IEA. https://www.iea.org/reports/is-the-european-union-on-track-to-meet-its-repowereu-goals

1 Note that the reference numbers found within each infosheet refer to the Reading list at the end of that sheet.

Many thanks to our colleagues from the city of Rijeka and Energo d.o.o. who supported this work, and kindly provided these reflections:

"The future of District Heating in cities is certainly a transition to renewable energy sources or at least those that are less harmful to the environment. The City of Rijeka supports the goals of Europe, which Energo gradually includes and implements within its operations, as well as efforts to make as many users as possible decide on this type of heating. The material created as part of this project will certainly contribute to the achievement of an understanding of the issue of accepting the modernization and expansion of the district heating system."

**Tajana Jukić Neznanović**
**Senior advisor - specialist for sustainable development**
**City of Rijeka**

"Working with colleagues from the SSH CENTRE additionally opened our eyes to the broader issue of establishing a long-term stable and energy-efficient DH system based on renewable energy sources. In addition to our previous focus on technological solutions and users, we realized that it is necessary to take into account the broader picture of the influence of the topic of DH, which includes, among other things, additional cooperation with all involved stakeholders."

**Nereo Milin**
**Head of project planning and development**
**Energo d.o.o.**

"First of all, thanks to colleagues from the SSH CENTRE for providing us with a different insight into the issue of DH in Rijeka compared to the one we had. Simply put, a view from a different angle. What was my focus as the director of the DH sector, predominantly technological issues , now it is a much broader picture that also includes numerous social components."

**Vatroslav Jukić**
**Director of DH sector**
**Energo d.o.o.**

# 1. Citizen involvement in governance and ownership of District Heating

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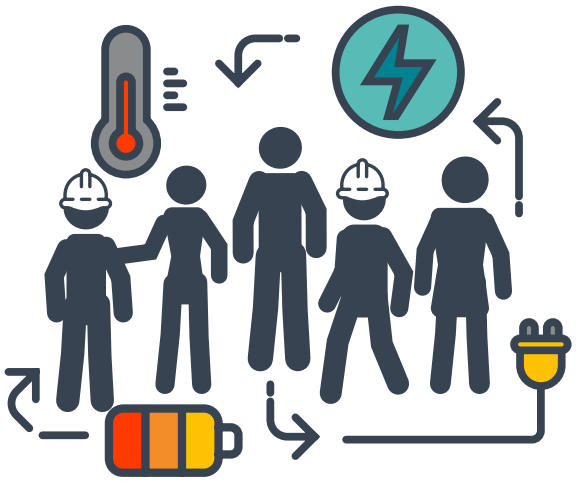

- **Decarbonising the energy sector needs to include a wide set of people in order to result in secure, affordable and clean energy**
- **Citizens can be involved in the governance and/or ownership of district heating**
- **When involvement is guided by principles of energy democracy and justice the benefits can include higher awareness, better and more accepted policies or even higher speed of energy transition**
- **Actions for municipalities include: involving citizens in city-led activities, reaching out to existing citizen initiatives, raising awareness and cooperation among municipal staff, motivating non-municipal actors to be cooperative and sharing resources**
- **Lack of systematic and coordinated approach and overall vision and citizens' disinterest in energy seems to be key issues for cities in Central and Eastern Europe**
- ***This is the first infosheet in a linked set of three on Social Sciences & Humanities for District Heating***

## Citizen involvement in DH

Decarbonisation of the energy sector needs to include a wider set of people to tackle the so-called energy trilemma – providing secure, affordable, and clean energy – for the greatest benefit to the widest range of people [1, 2].

The ways we produce and consume energy in today's society affects everyone. Involving citizens in decisions that affect them and giving them a stake can increase acceptance of solutions to these challenges while also ensuring that the solutions benefit citizens.

This trilemma also applies to District Heating (DH). Provision of DH often remains invisible and energy users are approached as customers of a service (if at all) rather than active participants. Long term contracts and arrangements typically leave little room for citizen engagement [3].

Concepts of **energy justice** and **democracy** can serve as guiding principles when considering any energy-related policies and citizen involvement in them. **Energy democracy** aims at achieving popular sovereignty, participatory governance, and civic ownership [4]. **Energy justice** aims at identifying injustices and overlooked groups and adherence to fair processes [5]. The recommendations contained in this info sheet are led by these values and goals.

## Governance and ownership

Citizens can get involved in the **governance** or **ownership** of DH (the distribution network or heat sources) – see Box 1.1. The specific shape citizen involvement takes depends on local conditions and the citizens involved.

**Box 1.1. Governance and ownership**

***Governance*** *refers to the processes and structures used to direct and manage an organisation's operations and activities [6].*

***Ownership*** *involves individuals, or groups of individuals, acting as investors contributing their own money.*

In terms of **governance of DH** citizens can contribute their time, labour, skills, and expertise and serve as advisers, idea providers, discussion partners or even decision-makers.

In terms of **ownership of DH**, there are three primary options: (1) private control; (2) public control by the state, region or municipality; or (3) community-owned co-operatives (or similar legal bodies). Citizens can have their own financial stakes in an initiative or can be involved through municipal ownership, the latter being more prevalent in Central and Eastern Europe (CEE). Various types of public-private partnerships are common such as public ownership of the distribution network and private ownership of heat generation plants. All these options can be combined with some degree of citizen ownership, this can happen in different legal or regulatory settings such as working groups, initiatives and associations, or cooperatives, or as part of private non-profit or for-profit organisations [7, 8]. An interesting example of citizens being involved in governance and (indirectly) in ownership through municipal ownership happened in Güssing as described in Box 1.2.

**Box 1.2 Case study: Güssing (Austria)**

An example of involving citizens in the governance and (indirectly) in the ownership of local energy happened in Güssing. Local government became the energy producer instead of international companies. The town currently produces all its energy from local renewable sources (electricity and heat production), to achieve energy autonomy. This scheme was combined with insulation of all buildings. As a result, inhabitants are conscious of resource use and keen to look after the surrounding forest to ensure a good supply of renewable energy for the future. This transformation created new jobs and cheaper local energy attracting the younger generation to the town. One key was to involve local inhabitants at an early stage. In addition, very close cooperation was established with potential operators and constructors. An interesting economic aspect of the success is summarised in a "golden rule": 20% of own capital, at least 30% of subventions (e.g. EU, local government), and 50% from bank or private equity lenders [9, 10, 11].

## Benefits of citizen involvement

Citizen involvement in the municipal (heat) energy transition has been found to bring several interlinked **beneficial outcomes**:

- **Higher awareness** of all parties involved – new connections for information transfer are established, citizens gain better understanding of the technical or policy limitations of DH, policymakers gain deeper understanding of how heat is really used in households [12, 13, 14, 15, 16].
- **Better policies** – including local knowledge and addressing issues of concern for the local community leads to more legitimate and robust policies [12, 13, 16], citizens also tend to be attuned to moral and ethical concerns that might be overlooked by policymakers [17].

- **Higher acceptance of policies** – consensus building, and shared ownership of results can reduce controversy and public disapproval thus reducing costs [12, 16, 17].
- Some even argue that involving citizens can lead to a higher **speed of energy transition** [18].

## Five recommendations for municipalities

One of the main challenges that municipalities encounter in terms of citizen involvement is establishing an enabling environment. Current SSH research suggest that municipalities can:

1. **Actively involve citizens in city-led projects and strategic vision documents** (e.g. energy roadmaps) [16, 1]. Involvement should not be considered a one-off consultation; it should be a long-term cooperation. It is crucial to engage citizens from the initial phase of any activity and to ensure a two-way communication as outlined in Box 1.3.

**Box 1.3 Two-way communication**

Transparent and two-way communication by the distribution system operator is essential for citizen involvement. This can be used to explain basics about DH and gather information from citizens. It can build mutual trust help to identify issues and might even prevent some users from disconnecting. Citizens might be interested in various technical details about the system or in price justification. A Czech regional government has provided minimum recommendations for local municipalities [19], as follows:

Website or social media profile
Newsletter (min. twice a year)
Phoneline and email address (mainly for building managers)
Active feedback collection (min. once a year through mail, phone, survey, or public meeting)

2. **Engage and support existing initiatives** [1]. This can be done by offering resources, officials' time, guidance and a more united relationship between citizens and local authorities. Reaching out should also include instances of citizen activism, protest and campaigns.

3. **Raise awareness and cooperation among municipal staff** [1]. Members of municipal staff are experts in the technical, procedural and policy aspects of their respective fields. However, they might benefit from better understanding of the citizen involvement or of interdependence between sectors in energy transition.

4. **Motivate non-municipal actors to be inclusive** [16, 7]. Encourage publicly owned companies to initiate and invest in citizen involvement. Bring key local stakeholders together and initiate memoranda of understanding with the aim of supporting citizen involvement. Set targeted financial support schemes, either direct financial support or indirect tax relief (compatible with national law). Set requirements for awarding energy infrastructure concessions to companies or initiatives that enable citizens to participate in decision-making processes.

5. **Share resources** [16, 7]. Encourage involvement of citizens in energy planning for example by putting in place a framework for cooperation among local stakeholders. Act as aggregators of information and facilitators bringing stakeholders together by running information hubs and centres of expertise (energy info-point, one-stop shop), contribute to building a skill pool and raising interest.

Some practical tools and guidelines were produced as part of the TOMORROW Project – see Box 1.4

**Box 1.4 TOMORROW Project**

Methodological guidelines and several tools to aid designing participatory transformative processes for just and climate neutral cities were developed in the TOMORROW Project incorporating insight from the Serbian city of Niš and Romanian Brasov [20]. Project aimed at the preparation of 2050 transition roadmaps together with citizens and other local stakeholders and served as pilot for the European transition; development of innovative engagement processes was at the centre of attention. These guidelines and tools can prove useful to other municipalities.

## Live issues for cities

A workshop on fossil free heating and cooling was held in Rijeka, Croatia over 7-8 May 2024, gathering several representatives from cities including Leskovac, Serbia; Munich, Germany; Assen, The Netherlands; Čačak, Serbia; Tuzla, Bosnia and Herzegovina.

During the workshop a number of points regarding citizen involvement in DH and other topics mentioned in this infosheet were discussed, as follows:

- Larger scale citizen involvement in governance and ownership of the DH is not common in the CEE region. However, cities aim at maintaining various means of communication and keeping their citizens informed in the case of energy infrastructure renovations or similar.
- Issues of energy supply and infrastructure (and especially DH) are considered to be far removed from ordinary life and not very interesting or relevant to citizens.
- The main interest of citizens is considered to be the cost of service and possibly a healthy environment.
- Citizens' lack of trust in the municipal stakeholders was also discussed.
- Several issues that could be summed up as 'cooperation with stakeholders' on similar or higher levels of governance were mentioned. These include different priorities and policy directions across city departments, lack of political support by the city politics or national government policies that go against the development of DH.
- Pragmatism, improvisation and ad hoc solutions were highlighted as important guiding principles of DH governance.
- Ownership issues potentially leading to the disintegration of the whole DH system were mentioned as well.

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# 2. Methods from the Social Sciences and Humanities to support decarbonisation of District Heating

*Lead author:* ***Aliaksandr Novikau, PhD,*** anovikau@ius.edu.ba

- **There are several social challenges in decarbonising district heating, including engaging consumers, stakeholder capacity barriers, and facilitating collaboration**
- **Diverse methods from various Social Science and Humanities disciplines can help better understand and address these challenges**
- **Analytical market research methods – such as surveys, interviews, observations, and content analysis – can be effective for obtaining standardised data from multiple cases**

- **Engagement and participatory methods – e.g. walking tours, storytelling, deliberation, living labs – can deepen understanding of individual cases and help co-design solutions**
- ***This is the second infosheet in a linked set of three on Social Sciences & Humanities for District Heating***

## Social challenges for low-carbon DH

Decarbonised District Heating (DH) could play a key role in meeting emissions reduction targets across Europe. However, it faces a number of challenges in competing with more established fossil fuel DH technologies and practices, as well as with other types of heating systems.

In this infosheet we outline some of the social challenges for low-carbon DH and introduce methods to help understand and address them.

Moving to decarbonised DH involves a wide range of stakeholders including: incumbent and new heating service providers, policymakers, planners, and consumers.

Amongst these groups, understanding and **engaging with consumers** is often given the most attention. Consumers may feel uncertain about connecting to existing DH systems as they are unfamiliar with the technology and it is important to ensure their views and needs are taken into account at all stages.

However, in addition to this, it is important to understand the roles and dynamics of other stakeholders. For instance, service providers may be hesitant to upgrade DH infrastructure to integrate renewable energy sources or improve efficiency due to budgetary constraints. Policymakers can be reluctant to invest in district heating decarbonisation due to the complexity of developing and implementing effective regulations. Planners may face challenges in integrating new district heating pipelines into existing urban infrastructure, or struggle to secure public buy-in for large-scale projects.

Thus, there can be **capacity barriers** related to lack of awareness, theoretical knowledge, or practical know-how of decarbonised DH systems and their benefits among many stakeholders.

In addition, the stakeholders above possess diverse attitudes and preferences towards decarbonised DH systems, affected by factors such as regulations, economics, environmental concerns, social norms, and cultures. This can bring up challenges in **facilitating effective collaboration** across them.

Indeed, this can include limitations in stakeholders' own understanding of each other. For instance, DH operators may feel that they understand their customers' motivations well, yet reliable data is frequently lacking.

## SSH research methods for DH

Methods from the Social Sciences and Humanities (SSH) can help explore and offer potential solutions to the social challenges outlined above.

Different SSH disciplines ask different questions and use different methods. For example:

- **Public Policy** – can be used to design incentives and regulations that nudge stakeholders towards desired behaviours.
- **Psychology** – can help understand and predict underlying needs, wants, and desires that drive behaviour of stakeholders.
- **Communication Studies** – can be used to tailor communication strategies as well as understand how narratives are formed.
- **Sociology** – can be used to examine how social structures and group dynamics (not just individual behaviour) influence outcomes.
- **History** – by analysing historical successes and failures of energy projects, stakeholders can learn valuable lessons.

There are numerous SSH methods that may be useful for the analysis of DH systems, and we do not cover them all here. Instead, we outline how ***analytical market research*** and ***engagement or participatory*** methods can contribute differently to meeting this challenge.

**Analytical market research methods** include interviews, observations, surveys, and content analysis (i.e. assessing documents for key words). These methods can offer standardised data, however they may need to be narrow in scope and may not dig into the reasons behind results (see Box 2.1).

### Box 2.1. An online survey to explore perceptions of DH

One study, carried out by researchers in Germany and Denmark, surveyed 4,388 individuals from 9 EU countries about their views on DH.

The large sample size enabled statistical methods to be used. DH with a higher share of renewables was seen more positively, as was public ownership. Also, older age groups tended to see DH more positively, whereas gender and education level had no impact [1].

**Engagement and participatory methods** include living labs, deliberative forums, storytelling and other creative and participatory methods. The SSH CENTRE has produced a set of 13 sheets on such methods [2]. They can provide rich, real-world insights for deeper understanding and involve participants in developing solutions. They can be less generalisable and may require more time to design and conduct (see Box 2.2).

**Box 2.2. Walking with energy**

Some projects have worked hard to address the invisibility of DH and raise energy awareness through *material participation*. This concept assumes that engaging with objects can lead to new energy practices, knowledge gain and attitude change. In Shefeld (UK) a series of guided walking tours was run following the route of the DH pipeline to its source at the power plant. Citizens realised the invisible energy flows across, in and out of the city focusing not only on heat production but also on heat waste and interactions with electricity [3].

## Live issues for cities

A workshop on fossil free heating and cooling was held in Rijeka, Croatia over 7–8 May 2024, gathering several representatives from cities including Munich, Germany; Assen, The Netherlands; Leskovac, Serbia; Čačak, Serbia; and Tuzla, Bosnia and Herzegovina.

Workshop discussions revealed the following:

- Cities routinely employ research methods, typically surveys and interviews, to gather customer information. These tasks are usually handled by communication/information departments or personnel. Notably, engagement and participatory methods were absent from the discussion.
- Despite utilising research methods, participants acknowledged a lack of clear knowledge regarding their customer base. Additionally, although information on other stakeholders, such as policymakers, planners, and project developers, would be beneficial, no research efforts target these groups.
- Discussions with city representatives highlighted a need for readily deployable research methods kits. Ideally, these kits would offer guidance on sample selection (including sample size recommendations), specific data collection techniques (e.g., survey questions or detailed descriptions of participatory methods), and data analysis and reporting techniques.
- There is also an issue of the absence of an effective communication strategy that targets customers and other stakeholders. The current focus is primarily on costs, overlooking crucial topics like environmental and social issues. The proposed solution is to create a research-based communication strategy that emphasises environmental concerns.

## Further reading

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# 3. Widening our understanding of 'locality' to support District Heating

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*Contributing Authors:* ***Rosie Robison, Viktor Varjú***

- **Decarbonisation can change locality, i.e. how different places relate to each other, economically, politically and even culturally**
- **Considering local aspects are crucial for District Heating decarbonisation, and locality can be both a driver of, and an outcome from, successful DH development**
- **Locality is not only about spatial aspects but also about stakeholders' relations, with effective stakeholder coordination being crucial for managing DH, as space-sharing involves timing and procedural coordination**
- **Focusing on neighbourhood-level projects via localised planning can foster better cooperation and smoother interactions among stakeholders**

- ***This is the third infosheet in a linked set of three on Social Sciences & Humanities for District Heating***

## Local: from spatial to social

At first sight, the word 'local' often makes us think of **spatial dimensions.** As opposed to a global or macro scale, local refers to what is **small, nearby, decentralised**, particularly when talking about energy.

Urban District Heating (DH) is an example of infrastructure that is local in scale. However we know that what leads to support or opposition to renewable energy projects is more than just this spatial dimension [1].

In recent years social science researchers have deepened what we understand by 'local' and have learnt more about its **social dimensions.** They consider that wider 'locality' is about **how different places and parts of an energy system (resource, heat infrastructure) relate to each other** considering economical, political and cultural aspects.

This means 'locality' can be useful to understand relations and exchanges between actors, institutions, or when looking at common narratives, or sense of belonging for a specific place [1]. This can help to identify why and how stakeholders might consider a particular infrastructure or resource as local (such as biomass, or recovery heat) and not another one (such as some wind turbines or electricity pylons) for example.

This infosheet offers practical tips and strategies for using local resources in urban areas effectively in taking into account relational features (e.g. strong partnership) and contextual ones (e.g. approaches adapted to the area's characteristics) in energy projects**.**

## Challenges connected with locality

There are a number of energy policy challenges that are related to locality:

- Energy autonomy, i.e. people's freedom of choices related to energy matters
- Fostering economic regional development and local industries
- Local governance and citizen involvement **(see Infosheet** n°2)

## Organisational and institutional proximity between stakeholders

In order to facilitate the mobilisation of local resources for heating networks, it is necessary to consider more than just **geographical proximity of energy sources** (i.e. proximity in terms of physical distance, time or transport costs).

Instead, two additional types of **proximity between stakeholders have been found to play an important role** in new local energy projects: (1) organisational proximity and (2) institutional proximity [4,5,6].

**1. Organisational proximity** relates to similarities and connections between stakeholders within organisations including production techniques, the sharing of equipment or know-how. This can usually foster public-to-public relations or private-to-private relations (see Box 3.1).

**Box 3.1. Similar organisations build a public strategy for the whole urban area**

*Lille, France, population 240,000, historically industrial city related to coal, DH power for around 50,000 housing equivalent.*

In 2015, the Lille European Metropolis took over six heating networks serving approximately 50,000 homes. To achieve their objectives of fossil fuel reduction the municipality took advantage of the need to renew an energy recovery centre located 25km from Lille's urban heating networks. One of the essential conditions for using the heat from the centre was to be able to transport it to the existing networks. To achieve this, a 'heat highway' was built serving as a backbone for Lille future energy deployment that enabled the city to interconnect the southern and northern networks of the metropolitan area, and serve areas not connected to district heating in the near future, provided that political agreements can be reached.

This heat recovery project in Lille is based on organisational proximity rather than geographical proximity. The stakeholders chose this heat source despite the distance involved and the availability of closer sources, because the organisational similarity made it possible to secure a long-term and administratively manageable supply. This project led to a major infrastructure which is shaping the future energy strategy of the city [6].

**2. Institutional proximity** relates to a sense of belonging through shared values, motivations and representations between stakeholders. These values often surface when groups try to take collective action or in situations of uncertainty, and can foster public-to-private relations (see Box 3.2).

**Box 3.2. Shared vision helps underpin private-public cooperation in heat recovery**

*Dunkirk, France, population 87,000, industrial and seaport city, DH power for 10,876 housing equivalent.*

In Dunkirk, the heat recovery project is an evolving process that often needs to be revisited and updated to accommodate shifting dynamics, even when it involves the same players. (mainly big industrial firms and public actors such as the energy union of the municipality). It is based on a risk unequally shared between the industrial company, driven by profitability imperatives and unable to guarantee a long-term heat supply, and the local authority, which is investing in infrastructure without assurance of a long-term return on investment.

This imbalance has been addressed thanks to the mobilisation of institutional proximity and the sharing of common values and objectives. Researchers have noted that stakeholders have built a common narrative of territorial identity around Dunkirk's industrial and economic development (rather than energy autonomy for example). This has established recovery of industrial heat, a practice that is part of the urban community's assertive stance on energy issues [6].

## Locality as a driver of demand and an outcome of energy projects

The successful use of local resources depends not only on policies and technical strategies but also heavily on what users want. The idea of locality guides the choice and development of energy resources, often motivated by the desire for energy autonomy and independence. This approach is based on the closeness of production and consumption sites, showing how important **user involvement is in creating common narratives around energy**.

When considering the user's role, researchers have highlighted two key aspects: (1) locality as a suitable context for choosing energy resources, (2) locality and sense of belonging as an outcome of energy projects [3,8].

1. **Locality as a suitable scale and context for choosing energy resources.** According to academic research, the type of resource used in district heating (fossil or non-fossil) is as influential in consumer decision-making for connection as economic factors, such as cost. Authors suggest that the balance between resource type and cost may vary significantly when considering local contexts according to its availability in the area and the social value placed on the resource (cultural and environmental). Thus, local renewable sources are often more cost-effective than other renewable sources, aligning with both environmental and economic criteria [4,7]. Local factors should be considered not only at the beginning of the energy selection process but also for their side effects. For instance, the pollution caused by a particular energy source and the geographical layout of towns like Grenoble (France) or Leskovac (Serbia) have prompted switches to cleaner energy forms. This highlights how local context influences energy choices (for another example see Box 3.3)

2. **Locality as a cultural and social outcome of energy projects.**. When cities develop DH systems, it is essential to recognise that these projects shape the cultural and social fabric of the area. Researchers highlight that installing energy infrastructure isn't just about technology—it's also about building community identity and a shared sense of place and belonging through a common narrative.

Tensions can arise when users, municipalities, and companies have different visions for the area, both in terms of its past and its future. To address these differences, Social Sciences and Humanities researches have underlined the importance to consider the longer-term histories and political dynamics of the locality. By understanding these factors, cities can navigate conflicting interests and

create energy solutions and technology deployments that fit the community's cultural and social landscape [2,1] (see Box 3.2).

**Box 3.3. Developing 100% local, renewable district heating**

*Pécs, Hungary, population 180,000, DH power plant: 35 MW of electricity and 70 MW of heat for 31,000 housing units.*

In Pécs, DH started in 1962 and was mainly fuelled by locally mined coal. However, the power plant caused environmental damages (ash deposits, air pollution etc.). In 2004, due to the closure of the local mining areas, and to the local green turning of the city's energy policy, the power plant changed its fuel from coal to biomass. Initially fuelled by wood, the heating network has gradually incorporated straw from several farms of the area into its fuel supply. The use of a local cheap energy resource available in the area around the city relies on the combination of several proximities (geographical and institutional ones) that guided stakeholders' choices. This has led to Pécs being one of the only cities in Europe using 100% local, renewable resources for heating.

This has had several social consequences:

- Farmers face a dilemma: provide straw to the power plant for financial gain or use it on the field as carbon replacement for the soil, resulting in a clash between sustainable agricultural practices, renewable energy policies, and economic interests.
- The former ash-deposited areas were revitalised and developed in a sports lake and outdoor recreational facilities creating new narratives and descriptions of the city for citizens. [11]

## Live issues for cities

A workshop on fossil free heating and cooling was held in Rijeka, Croatia over 7-8 May 2024, gathering several representatives from cities including Leskovac, Serbia; Munich, Germany; Assen, The Netherlands; Čačak, Serbia; Tuzla, Bosnia and Herzegovina.

At this event several points regarding locality were discussed, including:

- Challenges when mobilising locality for further development of district heating
- Relations between stakeholders involved in heat

The discussions underscored the importance of **relationships between various stakeholders, including city departments and public utility companies**. They highlighted the challenge of **sharing public space** during the modification or expansion of public utilities networks such as district heating (DH). As emphasised in this infosheet, space-sharing is not just a matter of physical space but also involves timing and procedural coordination. These issues are often exacerbated by poor communication between stakeholders. One key consequence of this lack of coordination between stakeholders is the potential damage to relationships with users and citizens at large, as well as difficulties in developing energy projects that depend on local cooperation and dynamics.

**Budget allocation is also a key time for information exchange and negotiation between these different stakeholders** concerning the developments of urban networks and services.

**Planning projects that focus on a specific (neighbourhood-level) area rather than at the whole city scale tend to favour cooperative work** and more fluid relations between stakeholders.

In addressing these challenges—whether resolving conflicts, facilitating exchanges, or handling routine procedures—**the informal nature of interactions between different stakeholders proved to be predominant.** Emphasis was placed on the need to convert the outcomes of these informal exchanges into tangible, lasting resources that can support ongoing and future processes.

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# Eight social challenges for District Heating decarbonisation in Rijeka

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**Context:** Over the last 20 years the City of Rijeka (Croatia) and the company Energo have started a technical process of modernisation of the local District Heating (DH) system, including the extension and reconstruction of the heat energy pipeline and substation to prevent loss, the automatisation of the entire system, and the ability to produce heat and electricity in parallel. This modernisation is intended to support the system's progressive decarbonisation, and ultimately create a more environmentally friendly and economically viable heating network for the residents of Rijeka. The city invited our SSH CENTRE research team to write this short report on the **social-related challenges** they face, identified through in-depth workshop discussions and an on-site visit in May 2024. The challenges are grouped around three areas – Governance, SSH Methods, and Locality – which are the topics of three related infosheets published by SSH CENTRE.

**GOVERNANCE** **SOCIAL SCIENCES & HUMANITIES (SSH) METHODS** **LOCALITY**

## 1 ACHIEVING A SYSTEMATIC APPROACH

We heard how current approaches to updating and managing the DH system in Rijeka are often characterised by pragmatism, improvisation, informal communication and ad hoc solutions. These ad hoc solutions can help projects move forward, but may not consider justice issues and risk overlooking the needs of some groups of citizens.

***Possible solution:*** *It is clear that a great deal of technical learning is happening e.g. continuous updating of infrastructure maps. If processes could be systematised, for example using insights from organisational and process learning, this could enable more inclusive and efficient governance.*

## 2 COOPERATING LOCALLY AND NATIONALLY FOR A JOINED-UP VISION

There are a number of stakeholder groups who may have different visions for what the future of DH should be in Rijeka. It is common for there to be different priorities and policy directions across municipal departments. There can be a lack of support from local politicians, or resistance to change among employees operating DH. A lack of national heating strategy, or even national policies that hinder the development of DH in Croatia, can also affect progress.

***Possible solution:*** *There are already very positive examples of cooperation taking place, including Rijeka's networking with other cities with DH who together can negotiate with the national government. These instances of cooperation and leadership among municipal representatives, as well as Rijeka establishing international connections, can drive the renovation of DH ahead.*

## 3 OVERCOMING PERCEIVED DISINTEREST OF CITIZENS IN ENERGY AND DH

Given the lack of maintenance costs, DH can be a cheap, environmentally friendly and convenient option, however, it is often not perceived as such. We heard how DH is considered by the Rijeka municipality to be rather removed from ordinary life and of limited interest to citizens.

***Possible solution:*** *Topics of interest are mainly seen as being costs of service and possibly a healthy environment, so framing DH in this way was one solution discussed, as well as identifying any day-to-day problems DH could solve for citizens. See also the challenges listed under 'SSH Methods'.*

## 4 UNDERSTANDING STAKEHOLDER NEEDS AND MOTIVATIONS

When cities think about SSH-related work, i.e. the exploration of relevant social issues, they often focus primarily on final consumers. This can overlook other key stakeholders such as businesses, political actors, or DH employees. Further, analytical market research methods (e.g. surveys, interviews) are prevalent, while participatory methods (e.g. living labs, deliberative forums) are less well known and may take more resource. Participatory methods can enable more open exploration of stakeholder needs and motivations.

***Possible solution:*** *The development of readily deployable participatory research method kits, targeting different groups, could support cities such as Rijeka in expanding this work.*

## 5 COMMUNICATING CLEARLY WITH CUSTOMERS AND OTHER STAKEHOLDERS

We heard that communication strategies targeting Rijeka customers (and also other stakeholders) are not always developed systematically. While communicating with customers, the main focus is usually on costs, while potentially important topics such as environmental and social issues may not be mentioned.

***Possible solution:*** *Communication could be an area for development, through effective, evidence-based strategies, including a specific focus on environmental issues.*

## 6 CONNECTING PLACES

We heard that communication strategies targeting Rijeka customers (and also other stakeholders) are not always developed systematically. While communicating with customers, the main focus is usually on costs, while potentially important topics such as environmental and social issues may not be mentioned.

***Possible solution:*** *Communication could be an area for development, through effective, evidencebased strategies, including a specific focus on environmental issues.*

## 7 UNDERSTANDING USER OPPOSITION

To advance its decarbonisation efforts, Rijeka can draw valuable insights from **Čačak's** (Serbia) experience, where attempts to introduce new energy sources, such as a wood-fired solution, failed due to strong user opposition. This was largely due to perceptions that the wood source was not local and secure, which conflicted with community values and raised concerns about supply reliability.

***Possible solution:*** *Investigate and act on the perception of users over the different sources of energy used for the district heating (field inquiries, communication, information meeting).*

## 8 BALANCING NEW INTERCONNECTIONS WITH LOCAL IDENTITY

Integrating new DH networks must also respect local identity and sense of place. For instance, visible infrastructure has been creatively integrated into the community's aesthetic, such as disguising a chimney as a building and painting storage tanks with local motifs inspired from the nearby planetarium by a local artist.

***Possible solution:*** *Keep aligning energy projects with local cultural and socio-economic contexts*

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