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Transformative climate governance in small Swedish municipalities: Exploring the cases of Enköping and Kiruna

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Abstract

Local authorities are important actors in sustainability transformations, but smaller municipalities generally do not have the same capacities as larger ones to work strategically with climate-related risks and long-term sustainability issues. Our study analyses the efforts of two Swedish local authorities to build capacity for transformative climate governance, paying attention to how structural factors and multi-level governance relations shape local capacity building. Drawing on interviews with municipal staff and the analysis of policy documents we show that both local authorities are increasingly applying experimental climate governance approaches. In Enköping, innovative governance processes support sustainability objectives and promote public–private collaboration. In Kiruna, the necessity to move the town centre has advanced innovation capacity but steals attention from other issues. We conclude that vertical and horizontal multi-level governance relations facilitate capacity building, but in a national context where climate action is largely voluntary, more support is needed for smaller municipalities with limited resources to reach their climate goals.

KEYWORDS

capacity-building, climate change adaptation, climate change mitigation, experimental governance, local authorities, multi-level governance, sustainability transformations

1 | INTRODUCTION

In recent years, climate governance literature has recognised the need for transformations in the cultures, structures and practices that support current urban systems (Castán Broto et al., 2019; McCormick et al., 2013; Wolfram et al., 2017; Wolfram et al., 2019). This follows from the notion that conventional policy instruments like greenhouse gas inventories, technology transfer or emissions accounting will not be enough to curb global warming (Hermwille, 2016). Transformations, by contrast, imply "broad, multi-dimensional and radical change" that can effectively steer urban development towards ambitious sustainability targets (McCormick et al., 2013, p. 40).

The ability of local actors to explore "new ways of thinking, organising, and doing" is critical for achieving broad sustainability transformations (Wolfram et al., 2019, p. 441), and many local authorities are now moving from solely inhabiting the roles of planners and regulators to also becoming active facilitators of strategic networks and partnerships for mediating resources and interests (Frantzeskaki et al., 2014; Hölscher et al., 2019). Still, local climate action is not straightforwardly path-deviant, but implies strong dependencies on the localities' political ecology and economy (Wolfram et al., 2019). Furthermore, municipalities, towns and cities are not isolated entities—they are embedded in multi-level governance systems that shape the conditions for local climate action (Betsill & Bulkeley, 2006; Bulkeley & Kern, 2006; Granberg & Elander, 2007). Indeed, scalar tensions, institutional structures and the degree and nature of national government support to local bodies strongly influence how local climate mitigation and adaptation policies are formulated and implemented (Eckersley, 2018; Homsy & Warner, 2015; Kythreotis et al., 2020).

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Authors within climate governance literature have pointed out what appears to be a gap between ambitious rhetoric on local climate governance and limited action on the ground (den Exter et al., 2015; Johnson, 2018; van der Heijden, 2019). In an analysis of climate mitigation ambition of 327 European cities, Salvia et al. (2021) found that only 25% of them strive for climate neutrality, and that ambition was mostly driven by city size. This is in line with findings from various European countries showing that smaller cities tend to lag behind large and medium-sized cities in terms of local climate action (Araos et al., 2016; Otto et al., 2021; Reckien et al., 2018). Ambitious smaller cities certainly exist (Homsy, 2018; Otto et al., 2021), but climate governance literature has been dominated by studies of global and strongly branded cities while mostly ignoring the 'ordinary cities' where climate action is most needed (Castán Broto, 2020; Haupt et al., 2022; van der Heijden, 2019).

Using a case-study methodology, this explorative study contributes to the scholarship on local climate governance by analysing how local authorities in small municipalities in Sweden (Enköping and Kiruna) are building capacity for transformative climate governance. It focuses on aspects of climate change mitigation and adaptation within sustainability transformations, and specifically draws attention to structural factors that shape local capacity building, highlighting how multi-level governance relations influence such processes. The research is guided by the following question: how are local authorities in small municipalities in Sweden building capacity for transformative climate governance in a multi-level governance setting?

The concept of transformations and transformative climate governance is outlined in the next section, followed by an introduction to the capacities framework applied to the case studies. Section 4 presents the Swedish institutional context in brief, before the methods and case selection are elaborated upon in Section 5. The sixth section presents the findings from the two municipalities. This is followed by a discussion of the findings and a conclusion.

2 | TRANSFORMATIVE CLIMATE GOVERNANCE

After the 1992 UN summit in Rio de Janeiro, many European cities started developing Local Agenda 21 initiatives and CO_2 reduction targets, indicators and emission monitoring systems (Kern, 2019; Kern et al., 2007; Otto et al., 2021). Since then, debates on environmental issues have become less prominent and to a certain degree replaced by debates on sustainable development and climate governance (see Meijering et al., 2018). Today, there is less focus on green and sustainable cities in favour of debates on how to achieve transformations towards climate-neutral and resilient cities (Albert et al., 2021; Huovila et al., 2022).

The transformation perspective epitomises climate change as "part of ongoing, complex and radical change processes today's societies are experiencing at increasingly accelerated pace" (Hölscher et al., 2019, p. 791). Such change processes are not always intentional (Iwaniec et al., 2019); climate change and urbanisation are already transforming cities worldwide, and disruptive weather events such as floods or droughts may cause rapid, forced and often undesirable changes to urban systems. O'Brien and Sygna (2013, p. 1) argue that deliberate transformation is "a complex process that entails changes at the personal, cultural, organisational, institutional and systems levels". Further, they note that it is a process characterised by a high degree of uncertainty, as it is not always clear what exactly should be transformed and why, neither how the transformation is meant to happen.

The transformation concept builds on research in different fields that examine social and environmental change. Consequently, multiple conceptual definitions and approaches exist (Linnér & Wibeck, 2021; Salomaa & Juhola, 2020). The two main research fields that have informed the body of literature on transformations in urban settings are socio-technical system studies (STS) and socio-ecological system studies (SES) (Wolfram et al., 2017). STS typically apply a multi-level perspective to examine how disruptive innovations can overthrow unsustainable path-dependencies in sectors like energy supply, water supply, or transportation (Geels, 2002; Hansen & Coenen, 2014; Markard et al., 2012; Smith et al., 2005). SES have their origins in place-based, local resource management studies, and examine interactions between natural and human ecosystems (Colding & Barthel, 2019; De Vos et al., 2019). Both perspectives present specific concepts, frameworks and models of how complex adaptive systems evolve, and examine the extent to which systemic change can be anticipated and handled strategically and systematically.

Drawing on SES and STS, transformation research in urban areas increasingly conceptualise cities as socio-ecological-technical systems (SETS). The term encapsulates cities as complex, adaptive and open systems including (1) socio-economic, political and institutional dimensions; (2) natural resource flows and physical phenomena; (3) and man-made surroundings (Hölscher & Frantzeskaki, 2021, p. 4). Achieving a transformation of these interrelated systems arguably constitutes "a 'design' problem on a grand scale" (McCormick et al., 2013, p. 40), of which governance can be understood both as an important driver and central to understanding, analysing, and shaping transformations (Patterson et al., 2017).

Both SES and STS recognise the need for innovative governance, long-term visions, knowledge transfers and social learning as necessary for achieving systemic change (Wolfram & Frantzeskaki, 2016). However, governance interventions do not necessarily need to be radical or monumental to set off the processes needed to achieve transformations of SETS. Simply questioning assumptions or paradigms can stimulate innovation and encourage change in a more resilient and sustainable direction (IPCC, 2012). Indeed, allowing time to experiment, to see how things can be done differently, and to share such experiences with others can result in small changes to existing practices that can be amplified to create large-scale change. Governing transformational change therefore requires "transformation of the governance systems themselves" (Termeer et al., 2017, p. 571).

Transformation literature stresses the central role of actors in influencing how urban areas are organised and how resources are produced and consumed (Hölscher & Frantzeskaki, 2021). Drawing on polycentric climate governance literature, it recognises the necessary involvement of multiple stakeholders in addressing climate change (Abbott, 2013; Jordan et al., 2015; McCormick et al., 2013). Indeed, in transformation literature, the capacity to transform urban systems is not an attribute of individual actors, but the result of interactions between

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actors that manage to "realign rules, knowledge, and resources" and thus effectively achieve institutional change (Wolfram et al., 2019, p. 439).

Transformative climate governance is by no means a straightforward and effortless endeavour. Urban areas are defined not only by their geographical and administrative boundaries, but also by their physical environments and the meanings that people ascribe to them (Knox, 2005). Consequently, the capacity to transform urban systems is influenced by the ways in which actors perceive the impact, meaningfulness, and desirability of change (Wolfram et al., 2019). Such perceptions are in turn influenced by factors like population dynamics, the local economic structure, geographic location and climate, as well as by large-scale globalisation dynamics and institutional contexts (Hölscher & Frantzeskaki, 2021). Being dependent on actor perceptions of impact, meaningfulness, and desirability also means that urban transformations will always be subjects to contestation. Since transformative capacity reflects the type of power that enables significant changes to urban systems, it draws attention to questions of what kind of initiatives are prioritised, to what end, and in the service of whose interests (O'Brien & Sygna, 2013; Wolfram et al., 2019). Developing capacities for urban transformation is thus "always and necessarily political" (Wolfram et al., 2019, p. 440).

3 | CAPACITIES FRAMEWORK

The analytical framework applied in our study is based on Hölscher et al. (2019), who provide an agency-oriented perspective to evaluate how the activities of different actors create conditions for transformative climate governance. The framework distinguishes between four different types of governance capacities that relate to different transformation dynamics. It has been used to understand and support "already ongoing changes of the climate governance landscape towards more experimental approaches that include multi-scale, cross-sectoral and public-private collaborations" (p. 791). The governance capacities were developed after synthesising different scientific literatures offering complementary concepts and insights for addressing transformation dynamics. Literature on sustainability transitions (e.g. Kivimaa & Kern, 2016; Markard et al., 2012), resilience (e.g. Brown & Westaway, 2011; Termeer et al., 2017), climate governance (e.g. Hermwille, 2017; Meadowcroft, 2009) and meta-governance (e.g. Gjaltema et al., 2019; Sørensen, 2006) was used to define the governance functions required to do the following: (1) address transformation dynamics; (2) identify conditions that manifest in each capacity's existence; and (3) map out activities necessary for creating the conditions. Based on this approach, we discuss adaptive capacity, regulative capacity, innovation capacity, and orchestration capacity. The capacities are presented in the following, along with reviewed literature that exemplify the conditions of each capacity.

3.1 | Adaptive capacity

The conditions manifest in adaptive capacity are informed by resilience and climate governance literature, who study the social, physical, and institutional conditions that can create sound responses to social–ecological systems change, while at the same time improving wellbeing (e.g. Brown & Westaway, 2011; Chapin et al., 2010; Folke et al., 2005; Gupta et al., 2010;). Adaptive capacity is derived from adaptive management, which recognises the complexity and uncertainty of ecosystems and the necessity for a management approach based on flexibility and continuous learning on social-ecological system dynamics (Bunch, 2003; Olsson et al., 2004). Adaptive capacity acknowledges the contribution of both short-term disaster response and governance interventions to achieve long-term resilience (Termeer et al., 2017). Generating knowledge about system dynamics addresses the ability to anticipate emergent disturbances and to identify suitable responses (Chapin et al., 2010). *Strengthening self-organisation* refers to building the capacity to independently and flexibly respond to changes and disturbances (Folke et al., 2005). Lastly, monitoring and continuous learning denotes iteratively evaluating management rules and systematically revisiting and questioning underlying assumptions and objectives (Chapin et al., 2010; Folke et al., 2005; Gupta et al., 2010).

3.2 | Regulative capacity

Regulative capacity addresses the ability of actors to identify and dismantle the driving forces of structural unsustainability and maladaptation (Hölscher et al., 2019). The conditions required for this governance capacity are informed by climate governance and sustainability transitions literature. The former explores mitigation measures such as emissions accounting and disincentives to discourage the continuation of high-carbon practices (Meadowcroft, 2009). The latter investigates processes to destabilise such dominant practices, to redesign infrastructures and to destabilise institutional structures, thereby creating institutional space for sustainability (e.g. Kivimaa & Kern, 2016; Markard et al., 2012). Revealing drivers of unsustainability and path-dependencies enables the identification of institutional features, technologies, and behaviours that need to be phased out (Meadowcroft, 2009). Undermining vested interests and incentive structures facilitates the expansion of sustainable alternatives by reducing the comparative advantage of dominant, high-carbon practices (Hermwille, 2017; Kivimaa & Kern, 2016). Breaking open resistance to change refers to fostering political support for change, reducing support for business-as-usual and raising awareness of alternatives (Kivimaa & Kern, 2016; Meadowcroft, 2009).

3.3 | Innovation capacity

Innovation capacity concerns the enabling and diffusion of innovation and sustainable solutions and the embedding of such novelties in structures, practices, and discourses (Hölscher et al., 2019). The conditions manifested in this governance capacity are informed by sustainability transitions, resilience, and climate governance literatures alike. Each body of literature advocates for developing and testing new ideas, narratives, policies, and solutions that may contribute to the

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TABLE 1 Capacities, conditions, and example activities of transformative climate governance (adapted from Hölscher et al., 2019).

Governance capacity	Conditions	Examples of activities
Adaptive capacity	Generating knowledge about system dynamics	Participate in partnerships and collaborations for knowledge generation; forecast long-term systemic risks and uncertainties; generate knowledge in vulnerability hot spots
	Strengthening self-organisation	Integrate systemic risks and uncertainties into planning and management approaches
	Monitoring and continuous learning	Create an adaptation strategy that iteratively incorporates new knowledge
Regulative capacity	Revealing drivers of unsustainability and path-dependencies	Conduct regular emissions inventories to identify systemic drivers of unsustainability and path-dependency; explore phase-out options in public-private partnerships
	Undermining vested interests and incentive structures	Regulate high-carbon sources; incorporate sustainability demands into public procurement practices; support sustainable businesses
	Breaking open resistance to change	Foster political support for change; provide assistance for sustainable investments and behaviour change
Innovation capacity	Enabling novelty creation	Make use of momentum and opportunities for change; develop and nurture informal networks for innovation
	Increasing visibility of novelty	Create and advocate an inspiring innovation story; communicate future visions; showcase projects and innovations
	Anchoring novelty in context	Formalise operational public-private partnerships; learn from tested solutions and practices; align new solutions with existing processes and structures
Orchestration capacity	Strategic alignment	Identify long-term sustainability goals; provide overarching strategic frameworks; involve diverse types of actors in strategy development
	Mediating across scales and sectors	Initiate public-private partnerships for knowledge sharing and resource synergies; establish cross-departmental working groups; participate in city networks to facilitate knowledge exchange
	Creating opportunity contexts	Integrate long-term thinking into strategies and project plans; secure financing for the implementation of strategic plans

transformation of urban systems (e.g. Loorbach et al., 2015; Smeds & Acuto, 2018; Westley et al., 2013). Enabling novelty creation concerns the provision of space, resources, and networks to nurture innovation (Loorbach et al., 2015). Increasing visibility of novelty is needed to motivate wider acceptance and uptake of innovations in order to challenge dominant regimes (Kronsell & Mukhtar-Landgren, 2018; von Wirth et al., 2019). Anchoring novelty in context refers to the incorporation of novelties into existing structures, cultures and practices (den Exter et al., 2015; Kivimaa et al., 2017).

3.4 | Orchestration capacity

Orchestration capacity concerns the ability to coordinate multi-actor processes and align action with long-term goals. Specifically, it refers to the capacity to foster synergies while minimising conflicts, and to enable 'small wins' while at the same time creating momentum for larger scale changes (Hölscher et al., 2019). As a result, it supports the growth of the other three capacities. Climate governance literature has emphasised the crucial 'orchestrator' role of international organisations in supporting capacity-building for climate action at the sub-national level (e.g. Chan et al., 2015; Smeds & Acuto, 2018). Similarly, sustainability transitions literature points to the central role of strategic partnerships and the important tasks that intermediary organisations such as NGOs, government agencies, public utilities, and private consultancies carry out. These include mediating actor interests, advocating for low-carbon ideas, and influencing production and consumption practices in urban areas (e.g. Fischer & Guy, 2009; Hodson et al., 2013; Horne & Moloney, 2019). Lastly, meta-governance literature examines the relationship between public authorities and governance networks (Gjaltema et al., 2019). It exemplifies ways in which local governments can spread a sense of communality among fragmented networks, institutions, and groups by for example engaging in storytelling and promoting the participation of heterogenous stakeholders in governance processes (Sørensen, 2006).

Strategic alignment refers to defining a long-term, strategic direction and reference points for governance, including shared goals, vision, and narratives (den Exter et al., 2015; Loorbach et al., 2015; Sørensen, 2006). Mediating across scales and sectors concerns the creation of conditions for sharing knowledge and resources, minimising conflicts, and optimising partnerships (den Exter et al., 2015; Jessop, 2011). Lastly, creating opportunity contexts addresses the integration of long-term thinking into strategies and project plans as well as securing financing for the implementation of strategic plans (Hölscher et al., 2019). These types of activities ensure the overarching framework by incentivising and facilitating the necessary action towards long-term goals (Chan et al., 2015; Jessop, 2011).

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The capacities in the framework can mutually reinforce each other. For example, orchestration capacity can support the other capacities by identifying long-term goals and by bringing diverse actors together. However, the capacities can also impede each other when limited mainstreaming leads to trade-offs between sustainability goals. In Rotterdam, charging stations for electric vehicles were set up in a flood-prone area (Hölscher et al., 2019). This shows how regulative capacity (exemplified here as providing incentives for the electrification of transport) can hamper adaptive capacity (ensuring proper water management). Table 1 provides an overview of the capacities framework.

4 | THE SWEDISH INSTITUTIONAL CONTEXT

From the national government's point of view, "local climate policy-making is a case of enabling and guiding rather than steering and control" (Granberg & Elander, 2007, p. 541). Swedish municipalities are given a significant level of authority through the Local Government Act (Kommunallagen), which declares that the municipal council should decide on all matters of principle for the municipality (SFS 2017:725). This includes overall objectives and guidelines, as well as budgets and taxes. The principle of municipal autonomy also ensures the voluntariness of developing local climate mitigation strategies. To promote local mitigation efforts, the national government has initiated a number of programmes and projects in the last two decades in which local authorities can apply for grants (Smedby, 2016). Many of these aim at strengthening coordination between municipalities, private sector actors, academia and citizens through various pilot projects and experimental activities. Local authorities can also apply for grants for climate adaptation measures and for measures to prevent natural disasters through the Swedish Civil Contingencies Agency (MSB). The Planning and Building Act (Plan-och bygglagen) stipulates that municipal master plans (Översiktsplaner) must assess climate-related risks in the built environment and how these risks can be reduced or eliminated (SFS 2010:900).

The 21 county administrative boards (CABs) are the national government's regional representatives and are responsible for coordinating regional efforts to reduce greenhouse gas emissions in line with the Parliament's targets. This includes disseminating knowledge and allocating financial support, developing guides and case worker support for municipal employees, and producing regional energy and climate strategies together with municipalities, industry actors, businesses and interest groups. The regional energy and climate strategies set the goals and general direction for regional sustainable development. They are not action plans but need to be supplemented with concrete policy documents. Since 2018, the CABs are also required to analyse how each county will be affected by climate change, and the municipalities must consult with the boards when drawing up their municipal master plans (SFS 2018:1428). Further, the boards have been tasked with initiating, supporting and monitoring the climate adaptation work of the municipalities. While climate adaptation has often been a deprioritized issue for many local authorities, this mandate has likely contributed to a greater inclusion of climate adaptation issues in recent municipal planning (Kristianssen & Granberg, 2021).

Municipalities also receive support from the Swedish Association of Local Authorities and Regions (SKR), representing Sweden's 290 municipalities and 21 regions. SKR provides professional advice and knowledge to government officials and elected representatives on all issues affecting local and regional authorities. Important functions of SKR include advocacy work, responding to referrals from the national government and other public bodies, and participating in public inquiries. An additional source of knowledge and support in terms of climate mitigation efforts are the 15 regional energy agencies (Energikontor). Their aim is to help achieve the national climate targets by promoting energy efficiency and the use of renewable energy sources through various cooperation and development projects.

Turning to city networks for climate action, there are some regional platforms and networks for climate adaptation, but no national network for municipalities spanning across the whole country. Networks aimed at climate mitigation are more common; alongside a number of regional networks, the two most prominent national city networks for climate mitigation in Sweden are Klimatkommunerna and Sveriges Ekokommuner. By providing platforms for knowledge exchange and for the handling of common strategic issues, both networks aim to be driving forces for sustainable development at the local level in Sweden. Klimatkommunerna also provides support to their member municipalities on how to apply to the Covenant of Mayors network and to various grants.[1]

5 | METHODS AND CASE SELECTION

We utilise the most dissimilar case-study design to analyse capacity building in the municipalities of Enköping and Kiruna. While both are small municipalities, they differ significantly on characteristics such as geographical location, business climate, and population development and emissions profile. At first sight, one could presume that these characteristics would make climate action rather difficult in Kiruna. By contrast, Enköping's characteristics appear to provide a rather beneficial local context for engaging in climate action. By selecting these cases, we hope to bring attention to the heterogeneity of small municipalities and to their potentially differing capacities and needs in terms of climate governance. Further, covering a wide range of small Swedish municipalities arguably provides potential for a generalisation of the findings.

Eight semi-structured interviews with municipal climate officers and project managers were carried out between April and October of 2021.[1] While this is arguably a small number of respondents, being employed by small-sized local authorities means that the interviewees in question were responsible for most if not all strategic sustainability-related work in each municipality at the time of the interviews. The

[1]We conducted the interviews in Swedish and subsequently translated them into English.

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TABLE 2 Comparison of the two municipalities and the average of all Swedish municipalities.

Characteristics	Enköping	Kiruna	Average of all Swedish municipalities
Population (2021)	47,489	22,555	36,043
Population development (2018–2021)	6.9%	-1.9%	2.2%
Municipal territory	1324 km^2	20,553 km^2	–
Employment rate (2020)	81.8%	85.6%	78.3%
Total emissions (tonnes CO_2 equivalent, 2019)	245,997	735,523	175,038
Emissions per inhabitant (tonnes CO_2 equivalent, 2019)	5.43	32.17	4.45 (national average)
Largest emitting sector	Transport	Industry	Transport (largest sector nationally)
Aims to be climate-neutral by	2030	2035	2045 (national target)

Source: Ekonomifakta, Energikontoret i Mälardalen, Energikontoret Norrbotten, Kolada.

interviewees were chosen on the basis of purposive sampling and in some cases snowball sampling. We asked respondents about the municipalities' efforts with regard to the activities in the capacities framework, as well as about what general challenges and opportunities they saw for their municipalities in terms of climate action. To triangulate the interview data, in-depth document research was carried out between April and June of 2021 to trace activities from the capacities framework in written text. We assessed all available official documents that contained information related to the capacities framework (climate, electricity, heating, innovation, public procurement, waste, etc.). This included key policy documents from the local authorities, such as the two municipal master plans, the long-term strategic plan of Enköping's municipal council, and the risk and vulnerability analysis of Kiruna's municipal executive board. Reports from regional and national authorities were also consulted, along with statistical data, website articles, social media posts, protocols from municipal council meetings, presentations, and other relevant documents. The two municipalities are presented briefly in the following, along with a table summarising main characteristics.

5.1 | Enköping

Enköping is located in the densely populated Uppland region circa 80 kilometres northwest of Stockholm in the Mälaren Valley. It is regarded as one of Sweden's oldest towns and is believed to have been a marketplace during the Viking Age. The municipality has seen a continuous population increase in modern times that has been particularly rapid in the last two decades. It currently has a population of approximately 46,000 inhabitants. Almost half of the municipal land area consists of agricultural land, and many entrepreneurs and community associations are active in the growing hospitality and food crafts industries. Enköping also has strong links to the business community in Stockholm through companies found in logistics, construction, and the service sector. The transport sector is the municipality's largest emitter by far, responsible for 69.3% of greenhouse gas emissions (Energikontoret i Mälardalen, 2020). Flooding constitutes the largest risk due to climate change as the Mälaren Valley is one of 10 areas in Sweden identified as special risk areas for landslides, erosion, and flooding (SGI & MSB, 2021).

5.2 | Kiruna

Kiruna is situated in Sweden's northernmost region about 20 miles north of the Arctic Circle. It is Sweden's largest municipality geographically and has vast undeveloped areas, including two protected national parks and several nature reserves and wildlife sanctuaries. The town of Kiruna was founded at the turn of the twentieth century to enable further extraction of iron ore, which had been mined in the area since the 1600s. After decades of rapid population increase, Kiruna's population began a steady decline in the late 1970s when the Swedish industrial sector lost its strong position and many jobs disappeared as a result. The population count has now levelled off at about 23,000 inhabitants. Mining still forms the basis of the municipality's economy, with state-owned mining company LKAB employing 17.8% of the working population (Regionfakta, 2021). The mining industry is also the largest emitter of greenhouse gases due to fossil energy use in extraction and processing. Waste incineration for the production of district heat constitutes another large CO_2 emission source (Energikontor Norr, 2019). Until year 2100, average annual precipitation will likely increase by around 20%. Heavy rainfall may cause flooding of VA systems and buildings, and create problems of erosion, landslides, and silt flows, especially in the autumn and winter months when the ground is often waterlogged (Länsstyrelsen Norrbotten, 2013).

In 2004, a prognosis by LKAB made it clear that fracturing from continued mining would affect the town centre to such a degree that the entire ground on which the town was built might collapse. Consequently, the municipal council decided to have the town centre moved three kilometres to the East, with LKAB bearing all costs. Some buildings are being transported to the new location while others will be demolished. Housing and premises totalling 45 km^2 will be affected until around 2035. Table 2 summarises the main characteristics of the two municipalities.

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6 | COMPARISON OF ENKÖPING AND KIRUNA

This section presents and discusses the findings from Enköping and Kiruna with the ambition of exploring how different kinds of smaller municipalities build capacity for transformative climate governance. The section is sub-divided into the four governance capacities introduced in Section 2. Key findings are summarised in Table 3.

6.1 | Adaptive capacity

The CABs are important sources for generating knowledge about systemic risks. Both the Uppsala board (Enköping) and the Norrbotten board (Kiruna) have made long-term forecasting of systemic risks and uncertainties for their respective counties, resulting in regional action plans for climate adaptation with suggested measures. Enköping has also independently identified key locations at risk in their In-Depth Master Plan for the central town, which lists flooding, torrential rain and heat waves as priority areas and identifies associated guiding planning principles (Enköpings kommun, 2018). General measures on how the town can be climate-proofed against future risks are also elaborated upon, and a comprehensive flood mapping of other densely populated areas in the municipality has been carried out. Enköping has also started a collaboration with other local authorities around Lake Mälaren with the purpose of building resilience against climate effects and implementing common strategic measures for sustainability and economic development. By contrast, Kiruna is not involved in any municipal networks or partnerships of the sort. The municipal Master Plan outlines risks and lists general guiding planning principles to protect the municipality from floods, erosion, and landslides (Kiruna kommun, 2019a), but there has been no mapping of flood risks along rivers and watercourses in large parts of the municipality. In the Risk and Vulnerability Analysis from 2019, the risk of flooding of the town is considered low, but the consequences of a flood could be very serious in terms of property damage and contaminated drinking water (Kiruna kommun, 2019b).

While the CABs carry a large responsibility when it comes to generating knowledge about system dynamics, the two other conditions contributing to adaptive capacity are more dependent on autonomous municipal efforts, which is evident in the two local authorities' very different ambition levels. In terms of strengthening self-organisation, Enköping's Water-and Sewerage Plan provides a comprehensive strategy for public and private water supply (Enköpings kommun, 2015), and a Water Strategist was employed in 2018 to structure the municipality's water management (Interviewee E2). With flooding constituting the biggest climate-related risk, a new approach to water management has been created, in which an operational water group regularly liaises with a water steering group of managers from different administrative units. Political support is provided by a joint working committee for water, and a new comprehensive water plan and storm water management plan is being developed. In Kiruna, the local authority's capacity to respond to changes and disturbances independently and flexibly is very limited since no administrative unit or function assumes responsibility for adaptation work. Kiruna does not have a municipal water-and sewerage plan, neither is there a general adaptation strategy that can integrate long-term, systemic risks and uncertainties into planning and management approaches. Consequently, the capacity for strengthening self-organisation and monitoring and continuous learning are very limited. Enköping also lacks a general adaptation strategy, still, several measures are currently being planned in order to improve monitoring and continuous learning. These include setting up a cross-departmental network for adaptation issues, developing a general action plan for climate adaptation, and creating specific action plans for critical societal functions and areas at risk of flooding (Enköpings kommun, 2018).

6.2 | Regulative capacity

Emissions data from sources like the regional energy agencies (Energikontor) and the national statistics agency (Statistics Sweden) help the municipalities reveal drivers of unsustainability and path-dependencies. Having an Environment and Climate Strategy Officer employed also means that Enköping conducts regular emissions inventories and structured monitoring while identifying key areas for action. Being a member of Sveriges Ekokommuner has provided valuable practical support in this regard (Interviewee E2). By contrast, Kiruna does not have an employed officer solely devoted to environmental and climate issues. This is the main reason why the municipality still has not submitted a sustainable energy action plan to the Covenant of Mayors, despite joining the network in 2015 (Interviewee K3). Both local authorities actively explore phase-out options with private sector actors. In Enköping, the 72-hectare development area Myran is meant to function as a testbed for smart systems within transport, energy, consumption, and production, as well as for new governance processes. In Kiruna, experiments with artificial cultivation environments and smart energy storage technologies were carried out between 2016 and 2020 within the framework of Testbed Kiruna, a collaboration project with private businesses and research institutes. The perhaps most cherished experiment, however, is a collaboration with LKAB where surplus energy from mining processes has been used for heating. Instead of relying on waste incineration, the municipality now uses 100 percent surplus energy between May and September, reducing emissions and making the heating system more circular (Interviewee K2).

The local business climate and geographic location strongly influences the local authorities' abilities to undermine vested interests and incentive structures. As a municipality characterised by entrepreneurship, economic growth and population growth, Enköping has the possibility to shape the development in a sustainable way according to their own vision, for example by introducing public procurement practices and land allocation criteria. Kiruna is at the opposite end of the table–geographically remote, with one very dominant industry actor and with a continuing history of depopulation. According to Interviewee K3, the local authority is not in a position to set demands when procuring building contracts because there is not enough

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TABLE 3 Summary of findings.

Governance capacity	Conditions	Enköping	Kiruna
Adaptive capacity	Generating knowledge about system dynamics	+++	+
	Strengthening self-organisation	++	---
	Monitoring and continuous learning	++	---
Regulative capacity	Revealing drivers of unsustainability and path-dependencies	+++	+
	Undermining vested interests and incentive structures	+++	--
	Breaking open resistance to change	+++	--
Innovation capacity	Enabling novelty creation	+++	+++
	Increasing visibility of novelty	++	++
	Anchoring novelty in context	++	+
Orchestration capacity	Strategic alignment	+++	--
	Mediating across scales and sectors	+++	+
	Creating opportunity contexts	+++	--

Note: The pluses and minuses indicate the status of the municipalities' capacities at the time of the data collection, ranging from very high (+++) to very low (---).

competition for tenders. For some projects, having just one construction company submit a bid has been considered a good result.

Testbed Kiruna had the ambition to support local businesses developing sustainable innovations, but the dominant position of LKAB has obstructed such efforts:

> Today we have a situation where LKAB calls the shots to a tremendous amount. There isn't a contractor or a consultant who isn't busy. I have been to a few meetings with both consultancies and engineering companies, and they say: 'well that sounds really interesting but we don't have the time, we're all tied-up'
> (Interviewee K2).

External actors aside, Enköping has also implemented measures in the municipal organisation to reduce emissions, such as replacing the municipal car fleet and developing a transport strategy. The changes were spurred by an initiative from the Uppsala CAB Board aimed at improving the efficiency of municipal transport (Interviewee E2). Kiruna's municipal car fleet still runs on fossil fuels, but ecological sustainability has been a top priority in the planning of the new town centre, which aims to promote walking, cycling, and public transport options. Still, Interviewee K4 argued that the subarctic climate with heavy snowfall in the winter has made it difficult to cultivate a car-free culture:

> It is a real challenge because the footpaths and cycle paths are not ploughed first. The roads have to be prioritised to avoid the whole town from coming to a halt, and the drivers are not used to seeing cyclists in winter. You hardly ever see them in the summer either (Interviewee K4).

In Enköping, efforts to break open resistance to change are evident in a political willingness to work systematically with sustainability issues. The municipal council's 2019 plan for the remainder of the election period (2020–2023) states that all work in the municipal organisation shall be guided by the intentions and goals of the United Nations' Sustainable Development Goals (SDGs). Goal 11 'Sustainable cities and communities', and Goal 13 'Tackling climate change', are emphasised as being particularly important (Enköpings kommun, n.d.). The municipality is planning large investments in projects contributing to a green transition in the next couple of years, and a CO2-budget will be developed (Interviewee E2). In Kiruna, the local authority runs campaigns to educate its own employees on issues such as sustainable energy use, but broad political support for systematic sustainability work is lacking. A number of citizens' proposals have called on the municipality to employ at least one Environment and Climate Strategy Officer and to develop a comprehensive climate mitigation roadmap with a CO2-budget, but the proposals have so far been voted down by the municipal council (Fridays for Future Kiruna, 2021).

6.3 | Innovation capacity

Both municipalities have enabled novelty creation by making use of momentum and opportunities for change. In 2019, Enköping applied to become part of Viable Cities, a national strategic innovation programme with the ultimate goal of making Swedish cities climate neutral by 2030. Upon joining, participating cities and the responsible government agencies sign yearly revised "climate contracts" that specify the challenges of each municipality and ensure long-term local–national cooperation. As part of the programme, Enköping is currently implementing several work packages with support from actors like RISE Research Institutes of Sweden and STUNS, targeting themes like the built environment and mobility, collaboration and citizen dialogue, and energy and data.

Since a few years, Kiruna is participating in the national innovation programme Innovation platforms for sustainable and attractive

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cities. The necessity to move the town centre was the catalyst for the municipality's application, as the managers of the municipal heating and waste company, TVAB, saw an opportunity to innovate their infrastructure services. The programme aims at strengthening innovation capacity in cities by promoting cooperation between municipalities, research institutes and private sector actors, thereby accelerating sustainability efforts (Zingmark, 2018). After joining, a new fleeting unit named Kiruna Sustainability Center (KSC) was created to coordinate the already ongoing testbed activities with the innovation platform. The aim of the platform has been to establish an innovation culture in the whole municipal organisation by testing new working methods for better decision-making and more collaboration across administrative units.

Both Enköping and Kiruna have made efforts to increase visibility of novelty through various outreach activities, such as hosting "Innovation Days" and setting up new websites to showcase their innovation activities. Enköping has also taken steps to anchor novelty in context by employing a "Green Process Manager" who functions as a direct link between the innovation projects, the Chief Executive and the politicians in the municipal council. By contrast, the innovation activities in Kiruna appears to have so far been confined to a rather small group of actors and mostly disconnected from the existing strategic and organisational processes of the municipal administration. However, innovative governance processes appear to slowly be taking root in the municipal organisation, supported by local politicians who hope to achieve synergies between more innovative working methods and cost-savings (Interviewee K3).

6.4 | Orchestration capacity

Enköping has ensured strategic alignment by signing a number of sustainability pledges with the Uppsala CAB (Enköpings kommun, 2019). By signing the pledges, the local authority commits to implementing a number of measures related to transport, energy use, renewable energy, and the indirect climate impact from consumption. The pledges also include assessments of required resources and bi-annual evaluations of outcomes. In Kiruna, the CAB appears to be more absent. Interviewee K3 expressed a wish for more support, for example in implementing the SDGs:

> We are 290 municipalities in Sweden, and all of us have a mission to work with the SDGs. Surely, we should be able to help each other more than we do. Not only the county administrative board, but also SKR could offer methodological support in particular, because I haven't seen much of that. That kind of help would be fantastic, because it would save both time and energy so that not everyone has to invent their own model (Interviewee K3).

In Enköping, the Viable Cities programme and particularly the signing of the Climate Contract has gathered all levels of the municipal organisation in working strategically towards sustainable development (Interviewee E2). Enköping has also established a long-term vision for the municipality based on citizen input, and a share of the funding from Viable Cities has been spent on developing new ways to engage citizens in urban planning processes in collaboration with RISE (Interviewee E1). One of the conditions for receiving funding from Viable Cities was to establish an "Innovation Team" with the mandate to accelerate the transition to climate neutrality. To do this, the local authority reached out to the Westerlundska Upper Secondary School, where several interested students signed up for workshops and submitted their ideas. This process is meant to be refined and eventually implemented into the regular school curriculum as part of the testbed activities (Interviewee E3).

In Kiruna, overarching strategic frameworks for aligning priorities and projects have been largely lacking, with the consequence that climate action has been de-prioritised (Interviewee K3). Each municipal committee and municipal company should submit an annual action programme for sustainable energy usage, but the implementation of measures lacks systematic monitoring and evaluation, and the level of ambition and detail differs between the various administrative departments and municipal companies. An ambitious initiative was taken in 2018, when the local authority adopted 16 local environmental targets, developed with input from most administrative units and companies in the local authority corporation, but little has been done so far to actually achieve the targets (Interviewee K4). According to Interviewee K4, succeeding with the town transformation is the top priority for Kiruna's politicians, leaving little room for other issues on the agenda:

> If someone asks me 'what is your biggest sustainability problem in Kiruna?' I would say housing supply. We have an acute housing shortage, not for the people of Kiruna, but for the contractors who need to be in place. So I understand that if I'm shouting about the climate and the municipal council says that the town transformation is coming to a halt, well then they will focus on the town transformation (Interviewee K4).

The ability to mediate across scales and sectors has been strengthened in Enköping, where efforts have been made to improve cooperation across departments and facilitate management of partnerships with non-state actors (Interviewees E1, E2, E3). In Kiruna, no such reorganisation has taken place, but on a smaller scale, KSC has the ambition to improve working processes across the whole local authority corporation (Interviewees K1, K3). While public-private partnerships for knowledge-sharing have been initiated in both municipalities, sustainability efforts in Enköping have also benefited from a long history of inter-municipal collaboration and knowledge exchange in line with strategic goals.

Lastly, in terms of creating opportunity contexts, securing future financing in Kiruna is rather precarious. Respondents mentioned ideas to upgrade KSC's work and link it to LKAB's immense expansion plans, but concrete plans have yet to be formulated. By contrast, Enköping will

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likely receive financial support from Viable Cities for developing and implementing a climate investment plan, and economic development is also closely tied to long-term goals and strategic development. Respondents (E1, E3) spoke of a changing role for the municipality vis-à-vis business actors.

> We are looking at a development where the business community gets a stronger role. The municipality should be like a recording studio for different interests and stakeholders, but we shouldn't stand on stage and play solo, that is not our mission. Our mission is to create the conditions, trying to be as good a coach as possible for the stakeholders (Interviewee E1).

Respondents from both municipalities argued that the innovation programmes have provided valuable financial support, but finding the time and resources necessary to even submit an application was described as far from easy (Interviewees E1, E2, K1, K2, K4).

> If you are going to apply for this kind of grant, you have to be well acquainted with these things already, otherwise it is kind of hopeless. You wouldn't even get to the application process. It takes enormous resources. If I had one million SEK to invest, I would hire someone who just sat down and applied for money, because that person would quickly become self-sufficient (Interviewee E1).

7 | DISCUSSION

The findings show how the local authorities in Enköping and Kiruna have begun applying experimental approaches to reach their sustainability targets. Particularly in Enköping, climate governance is becoming increasingly defined by cross-departmental collaboration and partnerships with non-state actors. Such trans-sectoral engagement and mixes of formal and informal relationships have been shown to strengthen sustainability agendas in other small Swedish municipalities (Isaksson & Hagbert, 2020). In Enköping, experimental governance approaches are propelled by a beneficial economic and demographic development that allows for the exploration of partnerships for sustainability. In Kiruna, by contrast, the town move and structural factors such as a challenging geographic location, a non-diversified business sector and a shrinking population have impeded efforts to engage in climate and resilience work.

The importance of structural factors notwithstanding, the municipal administration in Kiruna also suffers from not having human resources that can ensure strategic direction and oversight–a direct consequence of political de-prioritisation. Meanwhile, in Enköping, climate action has grown in importance and resources are channelled into the municipal administration to ensure that strategies are developed and implemented. Thus, the two cases illustrate the importance of local political will for successfully carrying out sustainability work in smaller municipalities.

In Enköping, orchestration capacity supports the other three governance capacities by ensuring strategic direction, by facilitating cross-departmental collaboration and by connecting diverse actors in working towards sustainability targets. In Kiruna, orchestration capacity appears to only support the development of innovation capacity, while adaptive and regulative capacity is limited due to the before-mentioned factors. A further observation is that both local authorities analysed in our study appear to prioritise efforts aimed at mitigation over adaptation actions. This may be due to the fact that climate change has not yet had severe impacts in either municipality, and may also be related to the general deprioritisation of adaptation work that has been observed in Swedish municipalities (Dymén & Langlais, 2012; Wamsler & Brink, 2014).

Vertical support structures provide building blocks for developing adaptive and regulative capacity in the two municipalities, but whether these get translated into tangible strategic frameworks and action plans is ultimately a question of local abilities and priorities. This is in line with previous studies of Swedish municipalities that stress the influence of local circumstances on sustainability efforts (Fenton et al., 2015; Gustafsson & Mignon, 2020). The findings from Kiruna show that even in cases where ambitious goals exist, they are not necessarily translated into robust action. The Swedish multi-level governance system with strong municipal autonomy is meant to allow for local action based on different needs and prerequisites, but for this model to work, municipalities with few resources and weak political will must receive more targeted support to develop and implement measures.

In Enköping, horizontal support in the form of knowledge exchange with other local authorities has provided valuable inspiration and support for developing and implementing policies and activities. However, the findings demonstrate how joining city networks for climate action can be difficult for municipalities like Kiruna, who have not yet come very far in their sustainability efforts. The CABs can activate municipalities and help them establish a strategic direction in their sustainability work, but the level and nature of support appear to vary in different parts of the country. The national government could do more to strengthen alignment within this context. Furthermore, to consolidate local capacity–particularly in small municipalities with few resources–responsible government agencies could simplify the application procedures of national innovation programmes and offer long-term agreements in which coherent methodological and financial support is provided for the implementation of local climate measures. In order to overcome weak political will at the local level, the national government could also amend the National Climate Act so that municipalities are required to prepare or update a climate action plan every term of office, similar to what Finland has implemented from 2023 onwards (RP 239/2022 rd).

8 | CONCLUSION

Studies on capacity-building in smaller municipalities have been largely lacking from the climate governance literature. Drawing on expert interviews and the analysis of policy documents, our paper has aimed at responding to this research gap by exploring the efforts of

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two very different small municipalities to build capacity for transformative climate governance. The findings illustrate two quite diverging approaches and priorities in the municipalities' capacity building efforts, and emphasise structural factors of strategic influence. Consequently, our study calls attention to the variety that exists across small municipalities in terms of will, efforts, and more or less favourable starting points for engaging in sustainability work.

It should be noted that the study's relatively low number of interviews is a limiting factor. However, it did cover the municipal employees engaged in strategic sustainability work in both municipalities. Furthermore, our study has taken an exploratory approach and does not have an explanatory ambition. Consequently, further studies are needed to examine explanatory observations in more detail. For example, the findings point to the influence of political factors on local sustainability work, but further studies are needed to uncover what factors influence political (un)willingness to engage in such work in small municipalities.

Smaller municipalities cannot simply copy the models of larger, successful forerunners. Therefore, future studies should further examine similarities and differences within and across countries and between different kinds of smaller municipalities. Such research is needed to identify their specific conditions, needs, and motivations for successfully implementing transformative climate governance.

CONFLICT OF INTEREST STATEMENT

The authors have no conflicts of interest to declare that are relevant to the content of this article.

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