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Transformation in Emergency Mode?
Exploring the impact of climate emergency declarations on the transformation capacity of two German cities

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Abstract

The last decade saw a surge of Climate Emergency Declarations (CEDs) passed by local governments worldwide, countering insufficient climate action on national and international levels. These declarations can be understood as governance instruments, passed with the hope to transform urban climate governance into an "emergency mode" – thus, establishing a more conducive environment for a Sustainable Urban Transformation (SUT). So far, research on the implementation of CEDs and evidence for their effectiveness is scarce. Different strands of literature are combined to develop a transformation capacity approach to CEDs, to fill this gap. This novel approach is applied to two German mid-sized cities, Erlangen & Jena, to better understand the local government's response following the declaration. Desktop research and interviews with local officials involved in the process were combined to answer the following questions: (1) How does the local government implement the CED in the three years after the declaration and (2) to what extent does this strengthen the city's ability to transform? In line with previous research, both city governments formulated an ambitious climate goal and developed a Climate Emergency Plan (CEP) outlining a pathway to reach it. However, this thesis identifies substantial variation in supporting governance activities, which leave Erlangen better prepared for a SUT. The study points to resource provision and available time as explanatory factors for the differing outcomes.

Keywords: *Sustainable Urban Transformation, Urban Climate Governance, Climate Emergency Declaration, Transformation Capacity*

Zusammenfassung

Im letzten Jahrzehnt haben Kommunen weltweit Klimanotstandsresolutionen verabschiedet, um den unzureichenden Klimamaßnahmen auf nationaler und internationaler Ebene entgegenzuwirken. Diese Resolutionen können als Governance-Instrumente verstanden werden, die mit der Hoffnung verabschiedet werden, die städtische Klima-Governance in einen „Notfallmodus“ zu versetzen – und damit ein günstigeres Umfeld für die nachhaltige Transformation der Stadt zu schaffen. Bislang gibt es nur wenige Untersuchungen, die sich mit der Umsetzung von Klimanotstandsresolutionen beschäftigen, wodurch Belege für deren Wirksamkeit fehlen. Um diese Lücke zu schließen, werden verschiedene Literaturstränge zusammengeführt, um einen Forschungsansatz zur Bestimmung der positiven Wirkung von Klimanotstandsbeschlüssen auf die Transformationsfähigkeit von Städten zu entwickeln. Dieser Ansatz wird auf zwei mittelgroße deutsche Städte, Erlangen & Jena, angewendet, um die Reaktion der Kommunalverwaltungen auf die Klimanotstandserklärung besser zu verstehen. Es wurden eine ausführliche Recherche und Interviews mit lokalen Beamten kombiniert, um die folgenden Forschungsfragen zu beantworten: (1) Wie setzt die Stadtverwaltung den Klimanotstandsbeschluss in den drei Jahren nach dem Beschluss um und (2) inwieweit stärkt dies die Fähigkeit der Stadt, sich zu transformieren? Übereinstimmend mit früheren Untersuchungen haben beide Stadtverwaltungen ein ehrgeiziges Klimaziel formuliert und einen Klima-Notfallplan entwickelt, der einen Weg zur Erreichung dieses Ziels skizziert. Diese Arbeit zeigt jedoch erhebliche Unterschiede in den unterstützenden Governance-Aktivitäten, die Erlangen besser auf eine nachhaltige Stadttransformation vorbereiten. Als erklärende Faktoren für die abweichenden Ergebnisse werden Unterschiede in der Bereitstellung von Ressourcen und in der zur Verfügung stehenden Zeit angeführt.

Schlagwörter: *Nachhaltige Stadttransformation, Lokale Klima-Governance, Klimanotstandresolution, Transformationsfähigkeit*

Contents

List of Figures

List of Tables

Acronyms

AfD Alternative for Germany (German: *Alternative für Deutschland*)

CDU Christian Democratic Union of Germany (German: *Christlich Demokratische Union Deutschlands*)

CED Climate Emergency Declaration

CEDAMIA Climate Emergency Declaration and Mobilisation in Action Project

CEP Climate Emergency Plan

COP-21 21st Conference of the Parties

CSU Christian Social Union in Bavaria (German: *Christlich-Soziale Union in Bayern*)

FDP Free Democratic Party (German: *Freie Demokratische Partei*)

Green List Voters' Association Green List Erlangen (German: *Wähler*innenvereinigung Grüne Liste Erlangen*)

Greens Alliance 90/The Greens (German: *Bündnis 90/Die Grünen*)

IPCC Intergovernmental Panel on Climate Change

KAP Climate Action Plan Jena (German: *Klima-Aktionsplan Jena*)

KBR Advisory Board for Climate Protection and Sustainable Development (German: *Beirat für Klimaschutz und nachhaltige Entwicklung*)

Left Party The Left (German: *Die Linke*)

LEK 2014 Energy and Climate Protection Mission Statement Jena 2014-2020 (German: *Leitbild Energie und Klimaschutz der Stadt Jena 2014-2020*)

LEK 2021 Energy and Climate Protection Mission Statement Jena 2021-2030 (German: *Leitbild Energie und Klimaschutz der Stadt Jena 2021-2030*)

RTKU Round Table on Climate and Environment Jena (German: *Runder Tisch Klima und Umwelt Jena*)

SETS Urban Social-Ecological-Technical System

SPD Social Democratic Party of Germany (German: *Sozialdemokratische Partei Deutschlands*)

SUT Sustainable Urban Transformation

1 Introduction

The recent decades saw two diverging trends: High ambitions of national and international climate policy, on one side. Missing progress to meet the declared goals, on the other side. In this context, scientific and popular attention moved to climate action on the local level. Cities, conceptualised as historically grown Urban Social-Ecological-Technical Systems (SETSs), both substantially contribute to climate change and are highly vulnerable to its effects. Therefore, the need to conduct a Sustainable Urban Transformation (SUT) of these systems is frequently highlighted (Hölscher et al., 2019; McCormick et al., 2013; McPhearson et al., 2021). This narrative deems the traditional urban climate governance regime insufficient and underlines the necessity to radically transform the urban system to reach global climate goals (Loorbach, 2020). SUT denotes both to the normative goal of a radical redirection of the urban system towards a more sustainable pathway and the descriptive tool to describe the processes contributing to it on the ground (Hölscher and Frantzeskaki, 2021). Contemporary research highlights the role of local governance in facilitating the SUT and argues a transformation of urban climate governance must precede a transformation of the urban system (Krueger et al., 2022; McCormick et al., 2013; Wolfram and Frantzeskaki, 2016).

Against this background, a growing number of local governments worldwide declared climate emergency (Ruiz-Campillo et al., 2021). The rationale behind these Climate Emergency Declarations (CEDs) is, that they transform local climate governance to an "emergency mode" to appropriately address the consequences of climate change (Davidson et al., 2020). Thus, CEDs can be interpreted as a governance instrument implemented to transform urban climate governance in a way, that it facilitates the SUT. However, only little research exists to uphold or disprove such a claim. Current research exploring the implementation of CEDs focuses primarily on the existence and the contents of Climate Emergency Plans (CEPs) (Chou, 2021; Greenfield et al., 2022; Davidson et al., 2020; Harvey-Scholes, 2019). This is problematic since it remains unclear what other activities follow up the declaration of climate emergency and to what extent they facilitate the sustainable transformation of the urban system.

In order to address this gap, this thesis develops a transformation capacity approach and applies it to the CED-implementation process of the local governments in two selected

German cities: Erlangen and Jena.[1] Thus, this thesis aims to respond to the following questions: (1) How does the local government implement the CED in the three years after the declaration and (2) to what extent does this strengthen the city's ability to transform? In the following, chapter 2 lays out the conceptual foundation of this thesis and develops the transformation capacity approach. Chapter 3 discusses the research design, explicating case selection and methodological approach. Chapter 4 presents the case studies and discusses the results. Finally, the conclusion in chapter 5 situates the results in context of existing literature and lays out avenues for future research.

[1] German quotes were translated by the author to English and included in this thesis.

2 Literature Review and Theoretical Framework

This chapter provides the theoretical framework for the subsequent analysis. To this end, section 2.1 conceptually frames CEDs as policy instruments, employed to facilitate a SUT by transforming urban climate governance to an "emergency mode". Based on this understanding of CEDs, section 2.2 provides a literature review of CED-related research, structured around the various phases of the policy cycle. This review unveils blank spots in the research on the implementation phase and highlights the need for a new approach to assess the implementation of CEDs. Section 2.3 introduces the concept of transformation capacity and develops a model to better understand the implementation process following a CED.

2.1 Conceptual Framing

2.1.1 Sustainable Urban Transformations

Almost nine years after the adoption of the Paris Agreement, critical observers are far from satisfied with the progress made by the signatory states (see e.g. Boehm et al., 2022). The agreement made on December 12th, 2015, among 195 countries at the 21st Conference of the Parties (COP-21), was perceived from several commentators as a groundbreaking success for international climate politics. Besides the decision to limit global warming to "well below 2 °C above pre-industrial levels and pursuing efforts to limit the temperature increase to 1.5 °C above pre-industrial levels" (UNFCCC, 2015, p. 22), a novel system was implemented on how to reach this goal. This mechanism focuses on the participating states, which are submitting concrete targets for their countries – thus allowing comparisons and accountability (Falkner, 2016, p. 1107). Current reports on the progress, however, sketch a quite pessimistic image: despite general positive developments in the past years, most of global climate action is far away from what is necessary for keeping global warming below 1.5 °C (Boehm et al., 2023).

Together with this growing frustration about climate action on national and international level, cities and local governments moved into focus as the "strategic front" for tackling

environmental and climate issues (Davidson et al., 2020; McCormick et al., 2013, p. 1). Cities are frequently conceptualised as systems, that emerge from the interplay of social (e.g. state and non-state actors), ecological (e.g. natural resources) and technological (e.g. physical infrastructure and built environment) subsystems (short: SETS) (see e.g. Krueger et al., 2022; McPhearson et al., 2016). The current design of these urban systems – reflecting our cultural, social and political history – is contributing substantially to global climate change with 75% of global greenhouse gas production originating from urban areas (Ryan, 2013, p. 190).

This can be visualised with the example of urban mobility. Since the 1950s, policy makers and planners (social system) adjusted and extended the structure of cities purposefully in line with the principles of automobility (technical system) (Newman and Kenworthy, 2015, p. 110). The legacy of this design facilitates automobility which is responsible for a large share of GHG emissions – while largely neglecting other modes of transportation like public transport and bicycling (Gössling, 2016, p. 1). This not only contributes to global warming but makes the cities also vulnerable to its effects, like rising heat and more intense rain events (ecological system). This decade-long development reinforces a path dependency and leads to a "Lock-in" situation, making it difficult to change it and to facilitate less carbon intense modes of transportation (Low et al., 2005). Against this backdrop, the question how to create path-deviant change towards more sustainable urban systems gained prominence.

Since the beginning of the millennium, a growing strand of literature from different scientific disciplines explores ways out of this lock-in situation under the notion of SUT (Burch et al., 2018; Hölscher and Frantzeskaki, 2021; McCormick et al., 2013; Nagorny-Koring, 2018; Wolfram and Frantzeskaki, 2016). This strand of literature argues, the continuation of business-as-usual (McPhearson et al., 2021) or incremental changes (Smedby and Quitzau, 2016) are only expected to aggravate global climate change. Therefore, a radical change of the design of the urban system is necessary to bring cities on a pathway, which is in line with global climate goals.

Some researchers in this field are concerned with the transformation of cities, focusing on how transformation dynamics affect the functioning of urban systems (Hölscher and Frantzeskaki, 2021, p. 7). Here, the notion of sustainable urban transformation has a dual meaning according to Hölscher and Frantzeskaki (2021): First, a *descriptive meaning* as way "to describe and understand the continuous, complex and contested processes and dynamics manifesting in cities" (p. 2-3) and second, a *normative meaning* as the notion also implies an "orientation that emphasises the need for radical and systemic change in order to overcome persistent social, environmental and economic problems and to purposefully move towards sustainable and resilient cities in the long-term" (p.

3). Importantly, Castán Broto et al. (2019) emphasise, the transformation should not be perceived as a "simple linear process of achieving desired futures" but rather as an "ongoing process of social learning" which considers sustainability objectives as a "moving target", that cannot be ultimately realised (p. 450).

Following this line of thought, SUT can be defined as "complex, long-term, uncertain and contested processes of radical change in urban systems" which allow cities to develop in a more sustainable pathway. According to Krueger et al. (2022), various dynamics in cities can emerge which "incrementally or abruptly, alter established paths and act as building blocks towards transformative change" (p. 5). The next section will explore the role of governance as a potential driver of transformative change in cities.

2.1.2 Governing the Transformation

Several researchers emphasise the role of governance processes in facilitating SUTs (Krueger et al., 2022; McCormick et al., 2013; Wolfram and Frantzeskaki, 2016). Krueger et al. (2022) argue, governance "determines the evolution of the SETS as a whole: how people live together and how they live within their social-ecological-technological environment [...]" (p. 3). According to McCormick et al. (2013), governance and planning can be perceived as one of the main drivers of "radical" change in cities i.e. having the potential to "bring about change in the urban contexts" (p. 4). This is supported by Wolfram and Frantzeskaki (2016), who identify policy and planning as one of seven enabling factors for urban transformations (p. 21). Finally, Krueger et al. (2022) argue, despite the "urgent need for governance aimed at increasing urban sustainability", research on this relationship is still scarce (p. 1).

To better understand the role of governance in SUTs, it is useful to reflect on the shift in research from government to governance in the last decades. Traditional accounts of urban politics focused on analysing the *government*, thus "the formal institutions of the state that perform the action of governing based on their monopoly of legitimate coercive power within a demarcated territory" (Stoker, 2018, p. 17). In contrast, the notion of *governance* can be defined more generally as the "formulation and pursuit of collective goals at the local level of the political system" (Peters and Pierre, 2012, p. 2). In this sense, governance focuses on the breadth of "governing mechanisms" independent from the authority of political institutions and involving other actors – thus blurring the "boundaries between public and private sectors" (Stoker, 2018, p. 17).

Over the past decades, a sophisticated "climate governance regime" developed in response to global climate change, which spreads across multiple scales and encompasses "institutional structures, scientific processes and deep knowledge, a shared discourse and shared

practices" (Loorbach, 2020, p. 432). This *traditional* approach is also present on the local level under the notion of *urban climate governance*. The literature defines the concept as "a set of arrangements which engage key external non-state actors [...] in collaboration with local government actors" (Lee and Painter, 2015, p. 568) for steering "cities towards mitigating and adapting to climate change" (Romero-Lankao et al., 2018, p. 587). While *adaptation* policies aim to (re-)design the local "social and built environment" to lower the effects of climate change outcomes, the aim of *mitigation* is to tackle the root causes of climate change by reducing "current and future GHG emissions" (Lee and Painter, 2015, p. 567).

Using the notion of governance, when it comes to climate action on the local level is important, because it broadens the scope of which actors and what processes are involved in delivering mitigation and adaptation policies. It goes beyond the local government and "highlights the importance of non-state actors in both contributing inputs to the policy process and also participating in producing the outputs, or implementing public policies" (p. 568). Lee and Painter (2015) differentiate between four relevant actors involved in urban climate governance: (1) The mayor and/or vice mayor, (2) the city departments and their respective staff and directors, (3) NGOs and businesses as well as (4) the research community. This also highlights, the local government is not a monolithic actor. It consists of elected politicians (in the following referred to as the *city council*) and bureaucrats (in the following referred to as the *administration*) (similar distinction was used by Rilling and Tosun, 2021). The cooperation between this variety of actors is important because, as Lee and Painter (2015) emphasise: "A single entity, such as a climate change team in city environment bureau, could hardly assess information, mobilize participation, and implement a comprehensive climate change policy by itself" (p. 568).

Despite its changing role within this network of actors, the local government still holds a pivotal position. Lee and Painter (2015) highlight, the network of actors involved in urban climate governance enables "cooperative, voluntary, and locally inclusive decision-making processes" which are important to complement, but don't replace "the centralized command-and-control form of local authority policies" (p. 568). Thus, despite the changing role of government institutions in recent years, they can still be expected "to play a leading if not dominant role in urban governance" (Peters and Pierre, 2012, p. 2), since they provide "unique resources and capacities and remain the legitimate actor for passing policies and distributing power and responsibilities to other actors" (Medina-García et al., 2021, p. 6). Instead of merely exercising their formal powers on the local environment, the institution's role lies in setting up "goals and coordinate the actions of public institutions, market actors, and voluntary associations" (p. 4). This also shows the particular value of the governance approach: It acknowledges urban climate politics as a multi-actor

endeavour, while still recognising the local government's role as an important coordinator of the overall process.

Loorbach (2020) criticises this traditional climate governance regime for addressing symptoms of climate change instead of addressing its origins – "an unsustainable economic development pathway" (p. 431). While this regime indeed contributes to a better understanding of climate change and a "societal consensus on the drivers and dangers of climate change" (e.g. through the work of the Intergovernmental Panel on Climate Change (IPCC)), it fails to showcase, what changes are necessary to avoid the developed scenarios (p. 434). Instead, a multiplicity of actions are taken which aim for "short-term optimization" and focus on climate change as an isolated issue – detached from its more systemic origins (p. 432-433). This traditional climate governance regime, manifested in the urban climate governance discourse, becomes increasingly problematic as actions merely "[slow] down negative trends" while nurturing structures, that inhibit necessary transformative changes (p. 431-432).

If we continue considering SUTs as a radical change of urban systems towards a more sustainable pathway, and governance as the process, which determines the system's development – governance is an important driver of the SUT. This is true, however, only if governance meets certain conditions. According to Hölscher et al. (2019), SUTs "cannot be managed or brought about by traditional urban policymaking and planning approaches that merely aim at sustaining and optimising existing urban regimes" (p. 187). This holds true also for the established climate governance regime in the form of urban climate governance. Instead, another type of governance is needed (sometimes referred to as *urban transformation governance* or *transformative climate governance*), which creates the "conditions for mobilising and navigating the driving forces and dynamics of urban transformations in alignment with long-term sustainability and resilience goals" (Hölscher et al., 2019, p. 187).

Thus, the established governance system must be transformed before it can facilitate the transformation of the urban system, or how Termeer et al. (2017) fittingly summarise it: "Governing transformational change thus requires transformation of the governance systems themselves" (p. 571). This is in line with Krueger et al. (2022), who argue, transformational change of the urban system can either emerge from an "outside force" (e.g. epidemic) or from the inside through "deliberative acts that focus on changing the governance process" (p. 6).

But how can transformative climate governance be achieved in a city? According to Krueger et al. (2022), governance for SUTs

> "requires identifying and **setting sustainability goals, facilitating the process of achieving these goals** through proactive planning, learning, unlocking, and overcoming

> undesirable system states and path-dependencies, while also anticipating and responding to unknown shocks and stressors" (p. 10; emphasis added).

The quote highlights the importance of ambitious goals and an adequate governance system to achieve it. This is in line with the leverage point theory, originating from the work of Meadows (1999) and applied to sustainability transformations by Abson et al. (2017). This strand of literature argues, interventions to transform a system (e.g. the urban system) can target different places in the system. Some of these leverage points are shallower and easier to address, while others are deeper, harder to affect but potentially leading to a more substantial change. Thus, interventions to transform a system should aim for deeper leverage points like the *intent* (manifested in the proclaimed goals and the mindset it emerges from) and the *design* of the system (manifested in the ways social structures and institutions are put in place) to achieve this goal (Abson et al., 2017, p. 32). Thus, to implement transformative climate governance in an urban system, the intent and design of the governance system needs to be adjusted.

Governance instruments, in their character as the "operational tools of public policy" (Majoor and Schwartz, 2015, p. 110), can have an important role in this context by establishing a more facilitative governance environment for SUTs. The notion of governance instrument (or governance tool, terms are used interchangeably) refers in this context to governance techniques, "which, one way or another, involve the utilization of state resources, or their conscious limitation, in order to achieve policy goals" (Howlett and Rayner, 2007, p. 2). These techniques are employed "to intervene in society to stimulate specific types of behaviour and activities, while seeking to discourage undesirable behaviour" (Majoor and Schwartz, 2015, p. 110). Or how Schneider and Ingram (1990) put it: they aim "to get people to do things that they might not otherwise do" (p. 513). In the context of SUTs, a governance instrument can potentially help to implement a more ambitious governance system, that ultimately facilitates the transformation of the urban system. CEDs can be considered such a governance instrument and will be introduced in the next section.

2.1.3 CEDs: Governance Instruments for SUTs

CEDs are resolutions passed by local governments worldwide to proclaim their support for "emergency actions to reverse global warming" (Davidson et al., 2020, p. 2). The first CED was passed on December 5th, 2016, in Darebin, Australia, by the local city council (Greenfield et al., 2022, p. 2). The Darebin declaration was the city's response to a long campaign by local actors in the rather progressive northern suburb of Melbourne (p. 2). This declaration inspired many other cities to follow. Since 2016, at least 96 local

governments in Australia declared climate emergency, which encompasses more than eight million people (Greenfield et al., 2022, p. 2). According to data from the Climate Emergency Declaration and Mobilisation in Action Project (CEDAMIA), at least 2348 local governments declared climate emergency worldwide in 40 different nations in the period between 2016 and 2023 (CEDAMIA, n.d.).

What is important about CEDs, is the hope associated with them, of initiating a radical change at the local level. According to Davidson et al. (2020), CEDs are expected to "accelerate" local climate governance to an "emergency mode", going far beyond the so-called "business as usual" (p. 2). To this end, an "urgent mobilisation of economic and social resources at an abnormal level of intensity and scale" is envisioned to adequately address the effects of climate change (Davidson et al., 2020, p. 3). Supporters of the climate emergency movement hope, in this "emergency mode" the municipality mobilises all available resources for "community education, advocacy for action by other levels of governments, mitigation (to end greenhouse gas emissions), draw down excess carbon dioxide and resilience in the local area" (Spratt, 2019, p. 5).

A transformation of urban climate governance must precede a SUT, as the previous section highlighted. In line with this thought, CEDs can be conceptualised as governance instruments that aim to establish a more adequate governance environment for transformative change by switching traditional climate governance to an "emergency mode". This emergency mode is characterised by acknowledging the environmental risks climate change poses to the local context and mobilising resources to implement adequate actions to mitigate the effects. Conceptualising CEDs as governance instruments offers a fruitful starting point for further investigations. From a functionalist perspective, it highlights the pragmatic character of the instrument as it is purposefully implemented for "solving problems and achieving certain specified goals" (Majoor and Schwartz, 2015, p. 110). Furthermore, from a "political sociology" perspective, the political character of the instrument is highlighted, as it also manifests a specific understanding of the problem governance actors are confronted with (Majoor and Schwartz, 2015, p. 111). In case of CEDs, these perspectives can be elaborated by applying the frequently employed heuristic of the policy cycle to the phenomenon. The conceptual foundation was developed by Lasswell (1956) and further developed by various authors.

Despite the explicit focus of the policy cycle on policies, the heuristic can still be applied to CEDs, which are framed here as governance instruments. Both terms describe the same phenomenon, they just emphasise a different set of actors involved in their emergence. While policy instruments were usually analysed in relation to the institutions of states (Le Galès, 2011, p. 144), governance instruments emphasise the diversity of actors, that can be involved. This is in line with Stoker (2018), who argues, that the output of both,

government and governance is the same. What matters is the "difference in processes" that lead to the output (p. 14). Therefore, a CED can be framed as both, depending on what the author wants to highlight: the role of the state institutions or the interplay of actors.

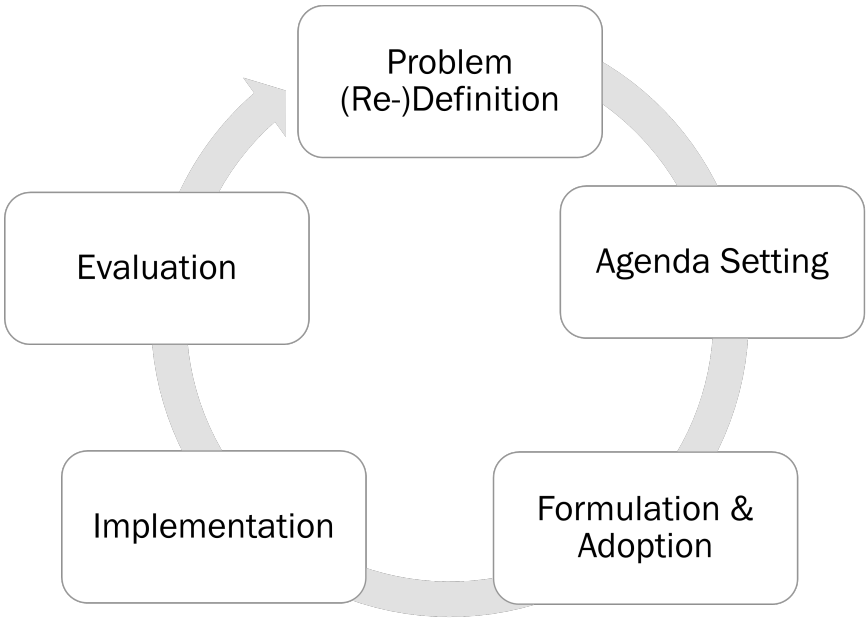

Figure 2.1. The ideal policy cycle, Source: own work adapted from Jann and Wegrich (2014).

Several versions of the model exist today. All these models, however, share the assumption that policies or policy instruments pass through different phases (see figure 2.1). The policy cycle was frequently used to organise and systematise the research on public policies (Jann and Wegrich, 2014, p. 43). Therefore, applying the phases of the policy cycle to CEDs creates the basis for a systematic literature review of CED-related research. The five phases are listed in the following: (1) Problem (Re-)Definition (2) Agenda Setting (3) Formulation and Adoption (4) Implementation (5) Evaluation. As a heuristic, the policy cycle offers a simplified and abstracted view of reality (Jann and Wegrich, 2014, p. 124). Thus, the phases can only be differentiated as clear-cut within the model: "In political practice, they sometimes take different orders, with individual phases overlapping or even being omitted" (Blum and Schubert, 2018, p. 154). For further critique see Sabatier (2007). Despite these inherent limitations, the heuristic of the policy cycle provides a useful framework for enhancing our understanding of CED-related research. For this purpose, the next section will use the model as described by Blum and Schubert (2018), which builds upon Jann and Wegrich (2014).

2.2 CEDs in Research Literature

This thesis explores a relatively new phenomenon where research is still scarce, with the first CED passed by a local government in 2016. In the beginning, mainly grey literature (e.g. Spratt, 2019) explored the phenomenon. Since 2020, however, the number of peer-reviewed scientific literature increases steadily. A first strand of literature is theoretically oriented, and explores the meaning and implication linked to the usage of an emergency framing in urban climate governance (e.g. Anderson et al., 2020; Davies et al., 2021; Hulme, 2019; Mazon et al., 2022; McHugh et al., 2021; Patterson et al., 2021).

A second strand of literature is empirically focused and conducts case studies all around the world. Among this empirical research, most studies are small-n studies focusing on cases in Anglo-Saxon countries like New-Zealand (Cretney and Nissen, 2022; Davidson et al., 2020; Nissen and Cretney, 2022), Australia (Chou, 2021; Davidson et al., 2020; Greenfield et al., 2022) and the UK (Dyson and Harvey-Scholes, 2022; Harvey-Scholes et al., 2022; Howarth et al., 2021). However, a growing literature also explores cases in other countries like Germany (Hirschl and Pfeifer, 2020; Rilling and Tosun, 2021), Spain (Satorras, 2022) and Italy (Salvia et al., 2023) or engages in large-n studies (Ruiz-Campillo et al., 2021). According to Salvia et al. (2023), this disparity is connected to the concentration of CEDs in New Zealand, UK and Australia (p. 3).

In the previous section, the phenomenon of CEDs was linked to broader concepts and framed as a governance instrument implemented to transform the local climate governance to an emergency mode. By doing this, CEDs want to establish a more facilitative governance environment for the sustainable transformation of the local urban system. Based on this understanding of CEDs, the following literature review gives a detailed overview of the CED-related literature by relating it to the different phases of the policy cycle. This approach allows structuring the literature review around what is known about CEDs and identifying, what blind spots still exist today.

2.2.1 Problem (Re-)definition: From Climate Change to Climate Emergency

Before a policy can be even imagined, a "social problem" must be identified that requires a political intervention (Jann and Wegrich, 2014, p. 107). In liberal democracies, this process of problem definition usually takes place in public debate and is shaped by experts and mass media (Jann and Wegrich, 2014, p. 108). In this process, different actors can promote different frames of a problem. Thus, while talking about the same phenomenon they highlight different facets of it (McHugh et al., 2021, p. 2). It is important how a problem is

framed, because it affects which solutions are deemed appropriate to solve it. Concerning climate change, decision-makers may follow frames, conveying a different seriousness of the problem, and therefore "develop different policies, strategies and practices to deal with this challenge" (Aldunce et al., 2016, p. 6). CEDs are based on a different framing of climate change compared to preceding discourses (Davies et al., 2021, p. 2), which raises the question: How did the climate emergency frame emerge on the local level and how does it differ to earlier discourses?

The relatively new phenomenon of CEDs declared by local governments, builds upon a legacy of environmental issues and climate change being discussed on the local level. The Brundtland report from 1987, for example, emphasises the necessity to tackle environmental issues on the local level, highlighting the increasing relevancy of cities for sustainable development in an urbanising world (Nagorny-Koring, 2018, p. 39). In the 1990s, a first wave of pioneering cities in Europe and North America developed climate change policies – originally rather focusing on mitigation (p. 231). Then, in the early 2000s, a second wave emerged, characterised by the creation of new municipal networks and a broader geographic distribution of active cities (p. 232). The active cities, now with greater representation from the global south, are increasingly recognising that "issues of vulnerability and adaption are as significant as mitigation" (p. 233). These efforts can be perceived as a part of the already mentioned traditional urban climate governance regime. They are following a framing of climate change as a risk in the future, according to McHugh et al. (2021). This conception of risk assumes that "people can reduce uncertainty by calculating the consequences of activities in the present to manage future outcomes" (p. 3). Climate change is thus understood as a problem that entails negative consequences, but also as an opportunity providing a basis to act upon.

In recent years, the discourse changed from framing climate change as a "future risk" to framing it as a "current crisis" (McHugh et al., 2021, p. 5). This "crisis" frame is manifested in the rise of the concept of climate emergency. Since 2016, the term was used more frequently by newspapers and picked up in the CED-movement in Australia (p. 1). In 2019, the term was declared word of the year by the Oxford dictionary "noting an increase in its use of 10,796 %, compared to the previous year" (p. 2). Since then, several authors examined this changing problem framing (Mazon et al., 2022; McHugh et al., 2021; Patterson et al., 2021; Stacey, 2022). McHugh et al. (2021) argues this shift to climate emergency "indicates a fundamental and un-interrogated shift in the way scientists, policymakers, and the public define and understand the issue of climate change" (p. 2). Instead of understanding climate change as a problem of the future with uncertain effects, it is now seen as an "immediate danger or threat to people, ecosystems, natural resources, infrastructures, and/or to a particular jurisdiction" (p. 6).

It is important to emphasise, climate emergency is a socially constructed framing, intentionally used to influence climate action (McHugh et al., 2021, p. 9). In this sense, the frame serves as "an important advocacy tool for actors" involved in the public debate, "affecting what policymakers and the public consider the problems" (p. 2). However, it must be noted it is still not clear whether the usage of the emergency frame is actually "conducive or counterproductive to mobilizing sustainability action" (Patterson et al., 2021, p. 841). According to McHugh et al. (2021), the emergency situation can be either perceived as an opportunity or as a threat. Depending on the interpretation, this causes the defence of the status quo, or its change (pp. 9–10).

2.2.2 Agenda Setting: Bottom-up or Top-down?

No political system has the capacity to consider all potential solutions for all potential problems all the time (Birkland, 2001, p. 106). Therefore, it is necessary to select and prioritise them in the political agenda. The political agenda can be defined as "a collection of problems, understandings of causes, symbols, solutions, and other elements of public problems that come to the attention of members of the public and their governmental officials" (p. 106). Multiple agendas exist at all levels of government (p. 106). Political actors try to emphasise their problem frames and their proposed solutions to enhance its position in the political agenda (Jann and Wegrich, 2014, p. 155). This process, "by which problems and alternative solutions gain or lose public and elite attention", is typically called *agenda setting* (p. 106). Research on the agenda setting process of CEDs so far explored the role and interplay of different actors in the initiation of a declaration. The actors can be broadly separated in civil society actors like social movements (bottom-up) and local officials (top-down). This phase raises the following questions: How do climate emergency declarations enter the local political agenda of cities? What role does the civil society play in contrast to local officials?

Much of the current CED-related research highlights the role of bottom-up initiatives and civil society actors in promoting the declarations in the local agenda. A glimpse at the first case in Darebin, Australia, already gives the impression of CEDs as an effort by the local civil society. According to Greenfield et al. (2022), the declaration was a response to a long campaign by local actors (p. 2). Other authors also emphasise the role of citizens in the declaration of climate emergency (Gudde et al., 2021; Harvey-Scholes et al., 2022; Satorras, 2022). A survey in 13 Australian cities found, "that 'community pressure' was a key deciding factor for Councils declaring a CE" (Greenfield et al., 2022, p. 11). Greenfield et al. (2022) argue the emergency frame was "cultivated and popularized by civil society actors, such as Extinction Rebellion" (p. 3). Furthermore, Gudde et al. (2021) emphasise the group's role in shaping "the tone of citizen participation by publishing

and advocating that governments and other institutions 'tell the truth' about climate change by making a public climate and ecological emergency declaration" (p. 3). But also ordinary citizens, independent of such groups contribute to the CED-movement in a form of "policy entrepreneurship" (Harvey-Scholes et al., 2022). Citizens thus engage in "problem framing, developing policy solutions, networking and coalition building, and strategically seeking advocacy opportunities" (p. 14).

In an effort to systematise the agenda setting process of CEDs, Gudde et al. (2021) identify two patterns of agency which further support the role of bottom-up processes. In the first case, a group of citizens initiates the CED-process in a city. In the second case, elected officials initiate the process and are being supported by citizens. In both cases, "citizens were playing an important role in disseminating (and developing) the problem frame and broadening the supportive coalition". Thus, they contribute an important resource to the endeavor that politicians lack: "citizen demonstrations and interventions whether self-organised or recruited, were able to supply direct evidence of wide and strongly felt public support" (p. 15-16). Also the case study of a CED in Barcelona, Spain, supports this idea, as it demonstrates, how activist groups engaged in disruptive co-production "to incorporate radical demands from local organisations" (Satorras, 2022, p. 191). However, Gudde et al. (2021) also caution this strategy may backfire: "The impact of a relatively small popular lobby has achieved a shift in local political ambition. The risk is that while there is a lot of popular support that climate change must be addressed [...], it is argued that the wider population will not buy into the necessary action [...]" (p. 10).

Despite this undoubtedly central role of civil society actors in the agenda setting process, the literature highlights the need for a combination of community pressure and local leadership for a successful declaration. Greenfield et al. (2022) argue: "It is clear that the CE is driven by community pressure as well as leadership from elected councillors" (p. 12). By examining the emergence of 28 CEDs in London councils, Howarth et al. (2021) identify four patterns of agency and sketch a more nuanced image of the agenda setting process. Declarations may be initiated (1) "actively from above" (motivated by devolution or party-political allegiances), (2) "passively from above" (motivated by opposition forces in the council) (3) "actively from below" (motivated by citizens or groups) or "passively from across" (motivated by other cities) (p. 8). The German case also confirms the complex interplay of councillors and civil society, responsible for the declaration of climate emergency. From 26 declarations examined by Hirschl and Pfeifer (2020), most CEDs were introduced to the local legislative system by members of the green party, the social democrats or individual citizens (p. 17). The initiative, or agenda setting, outside the official institutions can be attributed in many cases to the activist group Fridays for Future (p. 18).

2.2.3 Formulation & adoption: Between Symbolic and Hard Components

After a problem gains public consciousness and is introduced into the local political agenda, an appropriate policy needs to be formulated and subsequently passed in the local council. In this phase of the policy cycle, "expressed problems, proposals, and demands are transformed into government programs" (Jann and Wegrich, 2007, p. 48). CED-related research concerning this phase, is mainly concerned with exploring the ambiguous nature of the declarations and their contents. Therefore, analysing this phase of the policy cycle raises the questions: What are the contents of CEDs? What are the aspirations behind them?

Despite general similarities and patterns in the design and formulation of CEDs, the specific details vary considerably. Most declarations combine a symbolic core. For the case of Germany, Hirschl and Pfeifer (2020) argue most declarations acknowledge the human made climate change as a severe threat and refer to the goals of the Paris Agreement. Climate action on national level is deemed insufficient to live up to these goals, and calls for a more active local climate action and the consideration of climate change in all local decisions (p. 11). Greenfield et al. (2022) analyse the contents of 26 declarations in the state of Victoria, Australia, and identify similar themes: A sense of urgency connected to the problem of climate change, emphasising the resulting vulnerability of the local context, and stressing the potential of climate action on the local level (led by the local authorities and in cooperation with other actors) (p. 10). Salvia et al. (2023) explored the CEDs of 105 Italian cities and describe their common goals "to give climate change the highest priority on the municipal administration's agenda, to respect the principle of climate justice and to keep a dialogue open among local associations and regional and national institutions willing to increase the effectiveness of their actions" (p. 11).

Despite their common symbolic core, Hirschl and Pfeifer (2020) argue, "differences can be seen both in the concretisation and in the binding nature of the resolutions" (p. 11). These variations may reflect the varying intentions of actors behind the declaration of climate emergency. Howarth et al. (2021) conducted semi-structured interviews with different stakeholders involved in the climate emergency movement in the UK (with a focus on London). The authors propose three "interwoven purposes" actors link with CEDs: First, the CED as a statement of intent "without necessarily providing a strategy for taking action with appropriate tools highlighted for implementing them". Second, the CED as a political gesture "reinforcing the previous theme of CEDs being a statement of intent resulting from scepticism as to what can be delivered in practice". Finally, the CED as a way of "stimulating local action" (p. 26-27). The declarations can contain a different mix of rather "symbolic components" (e.g. non-binding targets and general statements)

and "harder components" (e.g. adjusted mitigation goals and other measures), depending on the dominating purpose (distinction proposed by Hirschl and Pfeifer, 2020, p. 29).

One often cited harder component of CEDs is the specification of a local mitigation target. In the case of Barcelona, Spain, the main output of the declaration of climate emergency is said to be an increase of mitigation ambitions: The old target (as outlined in the 2018 Barcelona climate plan) aimed to achieve a 45 % reduction of GHG emission by 2030 compared to 2005. This was replaced by the ambition to reduce 50 % GHG emissions by 2030 compared to 1992 (Satorras, 2022, p. 189). In the Italian case, 30 % of CEDs explicitly included the objective of reducing GHG emissions. Two cities aim to reach 40 % GHG reduction by 2030 and 22 aim for carbon neutrality. The date to reach carbon neutrality varies between 2030 (14 cities) to 2050 (4 cities) (Salvia et al., 2023, p. 8). In the UK, mitigation targets are also a central component of CEDs. Harvey-Scholes (2019) reports, 67 % of the analysed cities included deadlines for decarbonisation. Variation was identified in the scope of decarbonisation, either in "the whole jurisdiction or the council's activities".

Another harder component, primarily discussed in the German context, are mandatory climate impact assessments. According to Hirschl and Pfeifer (2020), many CEDs in German cities included a system to assess the climate impact of decisions made by the local council. The design of this assessment varies, from the need to discuss climate aspects of government decisions, to a mandatory assessment and up to the so-called "Klimavorbehalt". This would only allow decisions which are climate-neutral or climate positive (p. 1).

However, research suggests, the more symbolic components of a declaration should not be undervalued. According to Ruiz-Campillo et al. (2021), a CED "signals a spirit of solidarity and unity that may support further action and ambition. It shows the role cities are willing to play at the international level to give answers to global challenges and respond to the demands of an increasingly aware society" (p. 25). This performative character of the declaration may produce "enduring alliances and lasting perceptions of what it means to live in a society under threat of climate change" (p. 25). Answering the question, to what extent the CEDs remain merely symbolic, can only be answered by looking at individual cases and by tracing, what happens afterwards – in the implementation phase.

2.2.4 Implementation: More Than a Symbol?

The implementation phase is described as one of the "most important innovations in policy-research of the 1970s" (Jann and Wegrich, 2014, p. 114). It depends on the implementation, if a policy is "successful" or if it is being delayed, modified or even thwarted

(p. 114). The phase considers the further specification of the policy, the provision of resources and the decision-making on the ground (p. 114). Although research on the implementation of CEDs is successively growing, our knowledge about it is still very limited. Chou (2021) stresses:

> "Indeed, there is currently little analysis and understanding of what obligations local governments incur from declaring a climate emergency whether those that have made such a declaration have fulfilled their obligations, and whether climate emergency declarations exceed the remit of existing local government environmental and climate roles and policies" (Chou, 2021, p. 615).

Thus, exploring this phase in relation to CEDs raises the question: What actually happens after climate emergency is declared in the respective municipalities?

One important finding of the literature is, to have an effective impact on the urban system, the declaration of climate emergency is not enough. As Gudde et al. (2021) phrase it: "The next twelve to eighteen months [after the declaration] will [...] be vital to their success" (p. 10). While analysing the implementation of CEDs in Australian cities, Chou (2021) highlights, "climate emergency declarations in themselves have little legal weight and merely constitute the first of five crucial steps needed to inaugurate the broader climate emergency mobilisation mode that sees climate emergency solutions prioritised across all council's business" (p. 615). After the initial declaration, the local administration should develop a Climate Emergency Plan (CEP), that further specifies relevant targets and measures. This plan then needs to be "prioritised in the council's Strategic Plan [sic!]" and additional staff must be employed for the implementation. Finally, this effort should be combined with a communication strategy with the "broader community" (p. 616). Chou (2021) emphasises, these steps are needed to "ensure that climate emergency solutions are prioritised across all council's business" (p. 616).

So far, much of contemporary research focuses on the second step in Chou's conceptualisation: the development of a CEP (sometimes referred to as climate action plan). According to Harvey-Scholes (2019), from 237 cities that declared climate emergency in the UK, 89% have "set in motion the development of a 'Climate Action Plan' or a report detailing, what action on the CE means in practice". From a total of 94 Australian local governments analysed by Chou (2021), "only little over half of these have also taken the next crucial step of developing, or vowing to develop [a CEP]" (p. 615).

Davidson et al. (2020) explore the contents of two CEPs in New Zealand and Australia (Auckland and Darebin) and analyse, to what extent the plans symbolise a "changing narrative" towards a "climate emergency mode" (p. 2). They therefore created a conceptual framework with "10 key attributes which form a climate emergency mode" and applied it

to these plans (p. 2). While most attributes were included in the plans, the crucial aspects of "institutional resource mobilization" and "priorisation of climate emergency action" were found insufficient in both plans, "which in turn limits the potential of implementing a full climate emergency mode response" (p. 13). Greenfield et al. (2022) used the same framework to analyse 26 plans from local governments in Victoria, Australia. While the plans met most of the attributes proposed by Davidson et al. (2020), Greenfield et al. (2022) criticise a missing "Priorization of action" in the plans. Thus, the plans remain ambiguous, "how CE actions were being prioritized above other council policies and actions" (p. 11).

Only few authors go beyond the development of CEPs and their propositions, when analysing the implementation of CEDs. Authors in the German context discuss, for example, the potential effects of mandatory climate impact assessments. Rilling and Tosun (2021) interviewed representatives of six German cities to assess the effect of these new institutions. They find a heightened role of the city administration, which "can now block decisions or ask for modifications in projects and proposals. Further, they can push ahead and place climate-relevant projects on the decision agenda as well as cooperate with politicians and induce them to adopt a more climate-friendly approach to their policy projects" (p. 112). However, their analysis also highlighted, despite these changes in the procedure, "the design of the policies adopted has not [changed] – or at least not within such a short period following the declaration of a climate emergency" (Rilling and Tosun, 2021, p. 112).

Several authors stress the importance of adequate resource provision for the implementation of the CEDs but, so far, no study explicitly focused on this issue. Gudde et al. (2021) argue, there is "insufficient evidence that the appropriate level of financial planning is happening", which raises doubts about the often ambitious mitigation goals like net zero (p. 10). According to interviews conducted in the UK, the declarations indeed led to a "step change" in some cities "with 'in-house funding' providing for 'dedicated officers' [...], thus building capacity for local government CE responses" (Greenfield et al., 2022, p. 11). Other evidence supports the idea, that the CEDs prompted the local government to "establish conditions which encourage and enable local carbon emissions reductions" (Dyson and Harvey-Scholes, 2022, p. 54). For example, through institutional reforms "such as, establishing climate responsibilities in Cabinet [sic!] and other committees, adding a climate impact assessment to their decision-making processes, ensuring strategic policy alignment with zero carbon and running local engagement forums" (p. 55).

2.2.5 Evaluation: Towards a New Approach

Governance instruments like CEDs are ultimately intended to solve or to mitigate a problem. It is the focus of the evaluation phase, to assess whether the intended effects are achieved and what unintended effects emerged (Jann and Wegrich, 2007, p. 53). Evaluating a CED would thus mean raising the question: Was the declaration of climate emergency successful? If a CED is understood as a governance instrument with the goal to facilitate a SUT by establishing a more adequate local climate governance, the crucial question remains whether the thousands of declarations worldwide were successful in this endeavor. Answering this question, however, is not straightforward and raises at least two fundamental methodological concerns: (1) How can we measure the success of a CED, and (2) when can it be assessed?

The question for an appropriate measure to assess the success of a CED is crucial and sheds light on the often-highlighted difficulty to measure outcomes of urban climate governance (see Van Der Heijden, 2019, p. 6). As mentioned in the previous section, most of the current research on the implementation of CEDs focuses on the existence and design of CEPs. Focusing on the development of a CEP has the advantage of being easily scalable, however, it only offers limited findings. It is easy to find CEPs for hundreds of cities in different countries and to compare their contents. While this testifies their good intentions and aspirations, it doesn't say much about whether the city actually invests more resources in achieving their proclaimed goals and succeeds in establishing a more transformative governance system.

Indeed, several researchers of CEDs acknowledge this problem of measurement. For example, Howarth et al. (2021) talk about a potential "disconnect between where the sense of urgency is being communicated *from* and where the capacities lie to respond to this urgency" (p. 27, Emphasis in original). They caution, the local ambitions may be "thwarted in some councils by the lack of resource, skill and capacity to deliver". This would leave the declarations as "symbolic acts rather than platforms upon which further action is delivered" (p. 19). Similarly, Gudde et al. (2021) emphasise, "without strong leadership, clear planning and adequate resources political commitments to tackle the climate 'emergency' will inevitably experience dilution and attention will be diverted by other demands on limited public resources" (p. 10).

Various disciplines highlight the need for adequate resources for the successful implementation of policies. Public management literature emphasises, receiving necessary resources doesn't necessarily lead to the success of a project. However, the lack of resources makes the project almost impossible (see Cohen et al., 2013, p. 183). This is also well-established knowledge in sustainable transformation literature. Van Der Heijden (2019) proposes: "to assess a city's 'true commitment' to climate action a researcher may

wish to focus on the level of congruence between stated commitments and allocated resources [...]" (p. 6). He further argues, "Indicators of high congruence could be the budget and staff allocated to implement governance interventions, or the dedicated processes that are in place for governance evaluation and learning" (p. 6). CED-research should therefore look for a new measure to not only capture the *intended outcomes* of a CED but also to grasp the *processes* it initiates and the resources, that are provided and how these bring a city closer to the ideal of a SUT.

New CED-research furthermore must acknowledge the problem of timing, as the ideal process of CED-implementation needs time to deliver on the intended goals. However, due to the recency of the phenomenon, most of the literature was published just soon after the declarations were passed. This causes limitations, that many authors admit (Davidson et al., 2020; Hirschl and Pfeifer, 2020; Nissen and Cretney, 2022; Rilling and Tosun, 2021). Rilling and Tosun (2021) emphasise: "we must bear in mind that this assessment could change in the years to come as the emergency status is maintained and new staff is hired that is more sensitive to the need for integrating climate change into other policy sectors" (pp. 111–112). Also other authors stress the limitations of the early research: "It is early days for the declarations, and their meaning [...] remains open-ended and contested". Referring to interviews conducted with people involved in a declaration of climate emergency, they further highlighted their hope, that the CEDs "may inspire more radical change over time" (Nissen and Cretney, 2022, p. 351). Davidson et al. (2020) acknowledge these limitations and argue, "this type of assessment is necessary at this early stage, as momentum is building around climate emergency declarations and planning across the world" (p. 14).

2.3 A Capacity Approach to CEDs

The preceding section introduced CEDs as governance instruments that aim to realise a SUT by establishing a more adequate mode of climate governance in the declaring city. These declarations are usually introduced to the local agenda by civil society actors in cooperation with local council officials. They aim to transform local climate governance to an "emergency mode" by setting ambitious climate targets and triggering an unprecedented increase of resources and personal. Whether the declarations can live up to these aspirations is still unclear. Previous efforts to measure the implementation of CEDs focus on the development and the contents of CEPs, which further specify the goals and measures associated with the declaration. While this approach testifies the ambitions of the city, it fails to go beyond and assess the "congruence between stated commitments and allocated resources" (Van Der Heijden, 2019, p. 6). Thus, a new approach to measure

the implementation of CEDs is necessary to not only capture the intended outcomes of a CED but also to grasp the processes it initiates and how these facilitate the city's SUT. To this end the following section proposes the concept of transformation capacity as a novel measure to assess the implementation and outcome of the governance instrument CED.

2.3.1 Transformation Capacity Research

In policy literature, different kinds of capacities were discussed in the past. From, institutional capacity (Healey, 1998), to governance capacity (Innes and Booher, 2003) up to organisational capacity (Gasco-Hernandez et al., 2022). All these concepts are similar insofar as they are asking for what characteristics and abilities stakeholders need, in order to engage in a certain behavior. This holds true also for Wolfram (2016), who proposed the notion of urban transformative capacity to respond to the question: "what enables cities and urban stakeholders to purposefully initiate and perform such [urban sustainability] transitions?" (p. 121). He defines the concept as "the collective ability of the stakeholders involved in urban development to conceive of, prepare for, initiate and perform path-deviant change towards sustainability within and across multiple complex systems that constitute the cities they relate to" (p. 126). Developing these capacities thus helps "to enable, and partly also drive, systemic change towards sustainability" (p. 125).

Building upon the foundational work of Wolfram (2016), Hölscher et al. (2019) and Hölscher et al. (2018) propose a framework to assess the development of these capacities. Their framework "provides an agency-oriented perspective to bridge how activities of actors create conditions for governing urban transformations" (p. 187). Hölscher et al. (2019) use the idea of "urban transformation governance" as a basis, which is defined as "an ideal-type and normative approach that enables to mobilise and influence the driving forces and dynamics characterising urban transformations towards achieving sustainability and resilience in the long-term" (p. 187-188). Here, governance capacity play a crucial role because they describe the "emergent processes and patterns resulting from activities by which actors mobilise and put in use structural governance conditions and in the conditions themselves" which are enabling and determining urban transformation governance (p. 187).

The authors inductively generated and described four capacities that allow the stakeholders involved in urban governance (for a better readability referred to as "the city" in the following) to facilitate different transformation dynamics in their local context. For each of these capacities, the authors furthermore determined so-called "sub-functions that enable delivering" these capacities (p. 189) which can be understood as the activities contributing to the capacity. In the following, the transformation capacities and the

respective activities contributing to them, are described and applied to the scope of this thesis.

- First, **stewarding capacity**, is defined as the ability to "anticipate, protect and recover from risks while exploiting opportunities beneficial for sustainability" (p. 189). To put it differently, it is about the city's ability to understand climate change in the local context (both origins and effects) and to provide an institutional setup adequate to navigate sustainable pathways and ensure continuous learning. This capacity is developed by activities that (1) generate knowledge about the local origins and effects of climate change and describe potential pathways to mitigate and adapt to its effects, (2) change the city government's institutional structure to facilitate the transformation of urban climate governance and that (3) implement new mechanisms for monitoring the goals and effects of transformative climate governance and thus allow continuous learning.
- Second, **unlocking capacity**, is defined as the ability to "recognise and dismantle structural drivers of unsustainable path-dependencies and mal-adaptation" (p. 189). To put it differently, it is about the city's ability to identify and undermine structural drivers of climate change (e.g. building structure depending on fossil fuel energies) in the local context. To fulfill this capacity, the city can engage in activities that (1) identify historically grown path-dependencies and structural drivers of climate change, (2) mitigate their effects and (3) overcome emerging resistance.
- Third, **transformative capacity**, is defined as the ability to "create novelties (for doing, thinking, organising) that contribute to sustainability and resilience and to embed them in structures, practices and discourses" (p. 189). To put it differently, it is about the city's ability to generate new mechanisms for transformative climate governance and to implement them in the local context. To fulfill this capacity, the city can engage in activities that (1) facilitate the generation of these novelties (2) increase their visibility in the local context and (3) anchor them among relevant local stakeholders.
- Finally, **orchestrating capacity**, is defined as the ability to "coordinate multi-actor governance processes and foster synergies and minimise trade-offs and conflicts across scales, sectors and time" (p. 190). To put it differently, it is about the city's ability to involve and mediate between relevant stakeholders in the creation of transformative climate governance and to incentivise the implementation. To fulfill this capacity, the city can engage in activities that (1) align stakeholders from multiple sectors and scales behind shared goals (2) mediate their interests and resources and (3) incentivise them to implement shared goals.

2.3.2 Theoretical Model

If CEDs aim to realise a SUT by establishing a more adequate mode of climate governance, then the CED should be followed up by governance activities which develop the city's transformation capacity, thus strengthening the "collective ability of the stakeholders involved in urban development" to transform the urban system (Wolfram, 2016, p. 126). This idea is reflected by Castán Broto et al. (2019), who argue transformation capacity can even serve as an indicator of the "ability of a dynamic constellation of public and private actors to steer urban development in a radically different direction from historical pathways" (p. 450).

The following subsection sketches a theoretical model that illuminates the city government's response to the declaration of climate emergency and its conducive effect on the city's transformation capacity. Certainly, also the response of other actors (e.g. civil society organisations or businesses) can contribute to the city's ability to transform. A focus on the local government is nonetheless justified for two reasons: First, subsection 2.1.2 highlighted that despite the multiplicity of actors involved in urban governance, the city government still holds a central position as the coordinator of the process due to its unique resources and authority. Second, although the framework is focusing on activities initiated by the local government (usually by decision in the local council), this doesn't ignore the fact, that other actors may be involved in the activities. In contrast, the framing of CEDs as governance instruments highlights the important role other actors play in the emergence and implementation of the declaration. Therefore, figure 2.2 visualises an ideal CED-implementation with focus on the processes initiated by the local government.

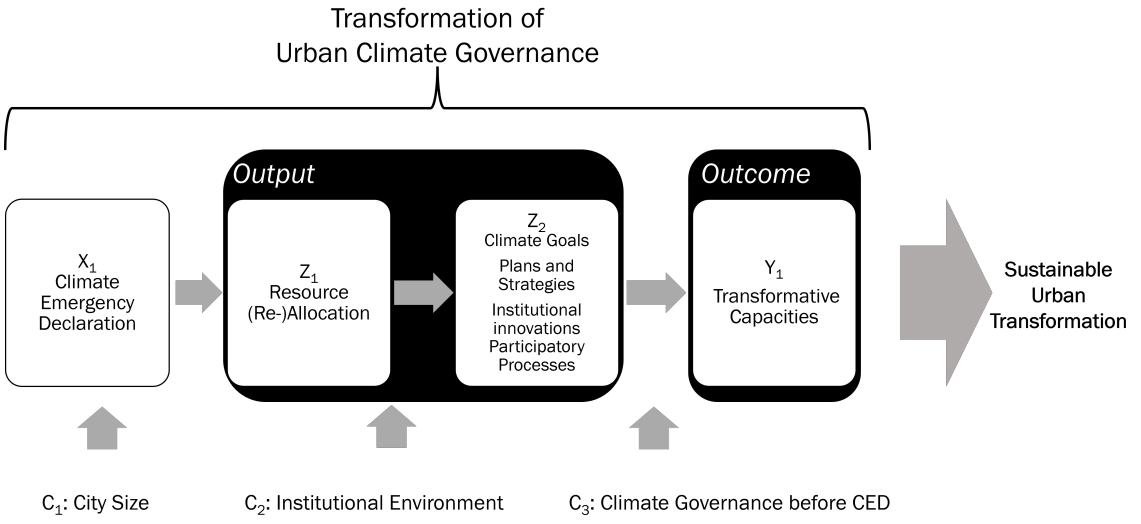

Figure 2.2. Ideal CED-Implementation process from the perspective of a local government, Source: own work.

First, the local city council passes a declaration of climate emergency (X_1) which highlights

the intent of the local government to intensify local climate governance and which triggers a response (Z_1 and Z_2) of the city government. This response can be described as the direct output of a CED. Here, output refers to the immediate activities and consequences resulting from a political decision (Blum and Schubert, 2018, p. 197). First, the declaration ideally triggers the (re-)allocation of resources (Z_1) where the city government assigns administrative staff to implement the declaration. If there are not enough human resources available within the administration, the city may recruit additional staff members or commission external companies with certain tasks.

The local government then initiates novel or intensified climate governance activities (Z_2). CEDs are conceptualised as governance instruments passed with the aim of transforming local climate governance in order to facilitate the sustainable transformation of the urban system. In line with the leverage point theory mentioned in subsection 2.1.2, to achieve this goal, the resulting activities need to alter the underlying intent and design of the established climate governance system. Based on contemporary climate governance literature, one can distinguish four interrelated climate governance activities which seem especially relevant in context of sustainable urban transformations: (1) the setting of ambitious climate goals, (2) the development of new climate governance related plans and strategies, (3) the adjustment of the institutional governance structure and (4) the engagement of non-city stakeholders in participatory processes.

First, the intent of the climate governance system is tackled by setting more ambitious climate goals. The literature review highlighted the ubiquity of local mitigation targets with varying ambitions in CEDs worldwide (demonstrated e.g. by Harvey-Scholes, 2019; Salvia et al., 2023; Satorras, 2022). Such goals are either part of the CED itself or developed in the subsequent process to further specify the CED. The potential of these climate goals is high, as they "can contribute to disrupt carbon lockins and set the city on a pathway towards deep decarbonisation and climate transformation" (Hofstad et al., 2021, p. 1). According to Vedeld et al. (2021) the setting of goals "is central to enhance the efficiency and effectiveness of any public policy and governance strategy" (p. 348). The climate goals of cities are often more ambitious than those of nations (p. 348) and are central in motivating actors to engage in innovative climate action (Hofstad et al., 2021, p. 1). Achieving the proclaimed goals is, however, an intricate endeavor which necessitates further measures to adapt the design of the climate governance system.

Thus, second, the city should generate concrete and manageable pathways to achieve these goals. The literature emphasises the frequent development of CEPs as a necessary tool to specify "what action on the CE means in practice" (Harvey-Scholes, 2019). Already before the emergence of CEDs, similar tools like carbon roadmaps were developed by local governments for "describing, planning and tracking the technological, managerial,

institutional and behavioral changes consistent with the Paris goals" (O'Brien et al., 2006, p. 153). These can demonstrate "systematic attention" given to the issue of climate change on the local level and may "establish an ongoing framework for climate action" (Yalçın and Lefèvre, 2012, p. 105).

Third, the local government's institutional arrangements need to be adjusted to "allow cities to be more adaptive and better prepared under uncertain and evolving climate change futures" (Patterson and Huitema, 2019, p. 375). CED-research mainly discussed the implementation of mandatory climate impact assessments in this regard (Rilling and Tosun, 2021). However, the breath of potential institutional changes is wider. Patterson and Huitema (2019) first level of institutional innovation, concerns " 'visible' changes in institutional arrangements brought about through intentional interventions" which may encompass "changes in policy and legal frameworks that structure decision-making, changes in policy instruments for implementation, changes in organisations to meet new objectives, and changes in coordination arrangements between different actors" (p. 380).

Finally, the achievement of ambitious climate goals is also highly dependent on the inclusion of other actors. Vedeld et al. (2021) emphasises:

> "any policy or governance system that tries to improve levels of collective climate action is dependent on the willing cooperation of citizens and private firms and a certain level of trust by the participants that others are (also) complying with the adopted goals and policies" (p. 348).

Thus, in order to establish a more facilitative governance environment for SUTs, other actors like private companies and the civil society need to be included in the governance activities.

These output activities contribute to a broader outcome – the more general effects of a political decision in a policy area (see Blum and Schubert, 2018, p. 197). In this case, the intended outcome of the CED is defined as the strengthening of the city's ability (i.e. all actors involved in urban governance) to conduct a sustainable transformation of the urban system (or: to develop transformation capacity). Following the framework proposed by Hölscher et al. (2019), the output activities initiated by the local government may contribute to the development of the city's (1) stewarding (2) unlocking (3) transforming and (4) orchestrating capacity. For example, the local government raises the city's ability to steer the local transformation by commissioning a study on the local drivers and effects of climate change. To give another example, the local government may improve the city's ability to orchestrate the transformation by involving citizens and business actors in a participatory process to draft a shared climate goal. All of these governance activities may increase the city's transformation capacity, thus facilitating a SUT.

The just elaborated idealised process aims to visualise the expected causal mechanism that is triggered by the declaration of climate emergency, mediated by the provision of adequate resources and the initiation of climate governance activities through the city government and which ultimately increase the city's ability to conduct a SUT. The reality is, however, usually more complex than theoretical descriptions like this one allows, which makes "isolating the influence and impact of a specific policy measure on policy outcomes" a difficult task (Jann and Wegrich, 2007, p. 54). Just because we can observe several climate related activities contributing to the city's transformation capacity after a CED was passed, doesn't necessarily mean it is because of the declaration of climate emergency. Or to put it differently: correlation does not imply causality. This problem will be further discussed in subsection 3.3.

Furthermore, there are a number of potential confounding variables which may influence the ideal process at various points. Three variables seem especially important. First, the size of cities (C_1) may affect the potential for the development of transformation capacity. Depending on the size of the city, the local government can be assumed to have a different number of resources (i.e. financial or human resources) at their disposal. In this sense, the number and extensiveness of climate governance activities a large city with 500.000 inhabitants can engage in, substantially differs to a small town with 6.000 inhabitants. This would lead to the generation of a higher level of transformation capacity in these bigger cities. This claim is supported by an extensive literature analysing the role of city size in influencing local climate policy (Otto et al., 2021; Reckien et al., 2018).

Second, depending on the location of a city (C_2), it may face different constraints from other levels of government which limits the ability to develop transformation capacity. According to Peters and Pierre (2012): "Cities, to a much higher degree than national government, are deeply embedded in a web of institutional, economic, and political constraints which creates a set of complex contingencies in the process of governing" (p. 2). For example, the relationship between central government and local government varies from country to country which leads to a situation where local governments in Sweden have more autonomy than a local government in the UK (p. 3). In this sense, the location of a city within a specific institutional context may facilitate or inhibit more elaborate climate governance activities, ultimately affecting the development of transformation capacity.

Third, also the climate governance activities before the CED (C_3) may influence a city's response to the declaration. A pioneering city that started working on climate issues in the 1980s has different starting conditions than a city without structured climate governance efforts before the CED. Otto et al. (2021) demonstrated that German cities with the most elaborate mitigation and adaptation measures today can look back on

30 years of climate-related activities, suggesting that “climate policy leadership is path dependent” (p. 17).

3 Research Design

The two preceding chapters visualise the theoretical considerations underlying this research. In light of insufficient efforts of international climate politics, the local level moved into the focus as the "strategic front" for tackling climate issues. In this context, the necessity for cities to conduct a SUT is frequently highlighted. SUT refers to the ideal or moving target of a radical change of the urban system towards a more sustainable pathway. Against this backdrop, CEDs emerge as governance instruments that aim to facilitate the local SUT by establishing a more adequate form of urban climate governance. Despite a growing literature exploring CEDs, there is still uncertainty whether the CEDs can live up to this ambition. Most of the literature on CED-implementation focuses on the development of CEPs. While this document specifies a city's ambition, it does not say much about, what other measures are being taken and if these measures facilitate the local sustainable transformation.

To fill this gap in the literature, a capacity approach is developed to assess the implementation of CEDs and ultimately their effectiveness in facilitating a SUT. This approach is based on the idea, that the various actors involved in urban climate governance respond to the declaration by mobilising additional resources to engage in intensified climate governance activities. These activities develop their "collective ability [...] to conceive of, prepare for, initiate and perform path-deviant change towards sustainability" – thus, strengthening their ability to conduct a SUT (Wolfram, 2016, p. 126). The local government holds a central position within this constellation of actors with its unique resources and authority. It contributes to the city's transformation capacity by setting ambitious climate goals, developing plans on how to achieve them, adjusting the local governments's structure and including other stakeholders in these processes. This thesis applies the novel approach to two German cities, Erlangen and Jena, to respond to the following questions: (1) How does the local government implement the CED in the three years after the declaration and (2) to what extent does this strengthen the city's ability to transform?

3.1 Methodology

This study employs a qualitative multiple-case design. This research design is particularly well suited for this situation, where an already established concept (transformation capacity) is applied to better understand the implementation and effect of CEDs. It is qualitative insofar as it focuses on the collection and analysis of non-quantitative textual materials such as policy documents and interview transcripts (Saldaña, 2011, p. 3). It is a multiple-case design because it is conducting an in-depth examination of multiple cases in their respective context. Small-n studies are commonly referred to be a useful approach for developing and testing theories (Flyvbjerg, 2006, p. 236) while other more quantitative approaches are better in providing evidence on the prevalence of the phenomenon in a population and the variation between cases (p. 241).

The aim of this research is to determine, how a city's ability to transform as a whole improves after the declaration of climate emergency. Therefore, the unit of analysis (the entity the research will say something about) are cities, understood here as a SETS. The unit of observation (the entity analysed), however, differs since the focus is specifically on the city government's response to the declaration and how these activities contribute to the city's ability to transform. This is an important distinction, because the city government is not the only actor involved in urban climate governance and the activities of other actors could equally contribute to the city's ability to transform. This, however, exceeds the scope of this study.

In contrast to large-n studies which strive for "statistical generalization", the goal in this case study is "analytic generalization" (Yin, 2013, p. 36). In this sense, it is not aiming to generalise from the analysis of a sample to a broader population. Instead, "a previously developed theory is used as a template with which to compare the empirical results of the case study" (p. 38). The "analytical conclusions", which can be derived from such a comparison, are considered more robust, when they are based on multiple cases instead of one – thus when the application of the theory can be reproduced multiple times (p. 61). Yin (2013) argues the analysis of two cases is already preferred over the focus on just one case (pp. 60-61). Two cases are also frequently employed in other CED-related research designs (e.g. Davidson et al., 2020; Nissen and Cretney, 2022). Therefore, two cases are selected for this case study analysis.

3.2 Case Selection

So far, CEDs in German cities have rarely been discussed in scientific literature. The literature review already mentioned, most empirically focused small-n studies are exploring

cases in Anglo-Saxon countries like New-Zealand (Cretney and Nissen, 2022; Davidson et al., 2020; Nissen and Cretney, 2022), Australia (Chou, 2021; Davidson et al., 2020; Greenfield et al., 2022) and the UK (Dyson and Harvey-Scholes, 2022; Gudde et al., 2021; Harvey-Scholes et al., 2022; Howarth et al., 2021). To the best of the author's knowledge only two studies focus (excluding thesis publications) on the German context. In the first study on CEDs in Germany, Hirschl and Pfeifer (2020) conducted an explorative survey (n=26) to understand which cities declared climate emergency in Germany, who was involved in the process and what contents the declarations usually include (p. 12). In contrast, Rilling and Tosun (2021) conducted a small-n study (n=6) to understand the effect of CEDs on decision-making processes in declaring cities.

This underrepresentation of German cities in CED-related research is problematic because Germany holds an important role in the global and European CED-movement. According to data from CEDAMIA (n.d.), at least 2348 local governments declared climate emergency worldwide in 40 different nations as of October 2023. Figure 3.1 visualises the distribution of CEDs worldwide. This dataset lists Germany on the 8th position with 106 jurisdictions with a declaration of climate emergency. Together with Italy (113 declarations), both countries are the front-runners of the climate emergency movement in the European Union in terms of absolute declarations.

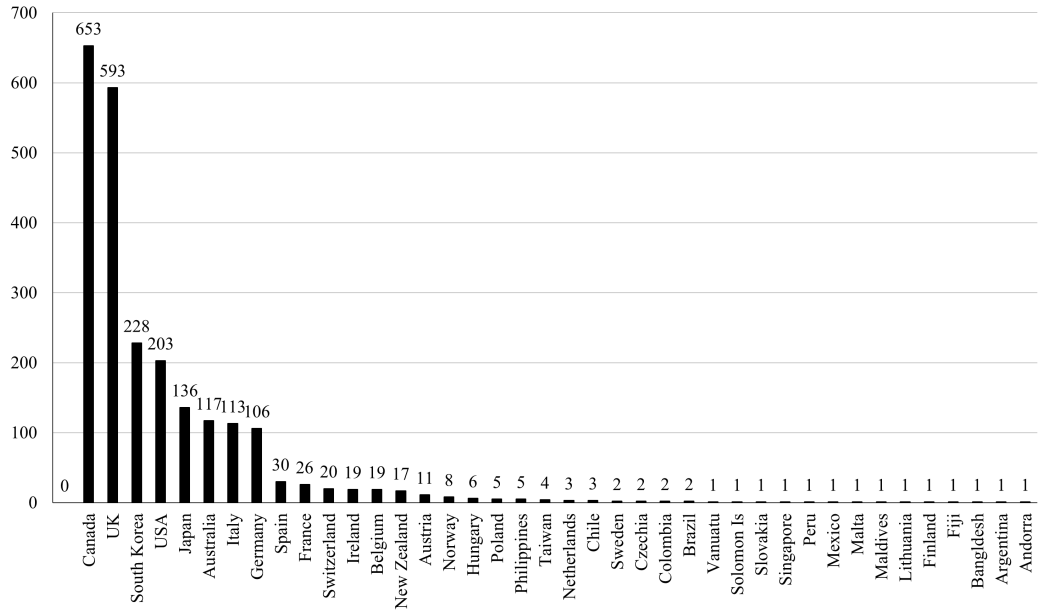

Figure 3.1. Absolute number of jurisdictions with CEDs per country, Source: own work based on data from CEDAMIA (n.d.).

CEDAMIA is a NGO based in Australia, which supports the idea of CEDs and created an online resource in 2018 to keep track of CEDs from all around the world. The database is crowdsourced insofar as volunteers can propose cases of CEDs to be included in the

collection (Harvey-Scholes et al., 2022, p. 20). The list is, therefore, most likely not exhaustive, but can serve as a hint of the CED incidence across countries. Indeed, by integrating and verifying multiple datasets, Kücükkaya (2020) found at least 112 cities in Germany, which declared climate emergency until March 2020. This encompasses at least 13,5 million people, who live in a city with climate emergency declaration in Germany (p. 24).

Furthermore, the German political system is an interesting environment to study CEDs as it hosts a comparatively fertile environment for climate action on the local level. First, in the German federal system, local governments enjoy a higher degree of regulatory autonomy compared to other European countries. In general, local politics is highly influenced and constrained by national politics and supranational policies (Peters and Pierre, 2012). The set of constraints, however, may vary from country to country. This is exemplified with the following quote by Cucca and Ranci (2022):

> "In Manchester, urban policy is embedded within strong, all-encompassing state constraints; in Barcelona and Milan regulation and decision-making are more devolved to local authorities; Lyon and Copenhagen, in contrast, display a balanced equilibrium between self-government and central control (Kjellberg 1995); finally, in Munich, the local government enjoys a higher degree of autonomy strongly reinforced by the federalist structure of the German state" (pp. 1504-1505).

Against this backdrop, the German federal system is expected to give German local governments more regulatory autonomy in the realm of climate governance than other European countries. This may allow local governments to respond more pronounced to the declaration of climate emergency, thus facilitating the development of transformation capacity.

Second, the German state has a long and consistent history in supporting climate policy on the local level (Otto et al., 2021, p. 2). In 2008, the German government launched the national climate initiative (German: *Nationale Klimainitiative*), which included the so called *Kommunalrichtlinie*. The program offers financial incentives for local measures reducing GHG emissions (Nagorny-Koring, 2018, p. 41). This national framework is especially important, as climate policy is considered a voluntary activity of German cities. According to Nagorny-Koring (2018), the climate related activities of most German cities are guided by economic incentives provided by the State or the *Länder* (p. 59). This makes her even argue: "Municipal climate protection developed as a discipline in its own right mainly because of the Kommunalrichtlinie" (p. 59). Due to this system of financial incentives, German cities can be expected to build upon an already sophisticated tradition of local climate adaptation and mitigation policies, thus, making it easier for them to give an ambitious climate governance response to the declaration of climate emergency.

Concerning the selection of two cases for this multiple-case research design, Yin (2013) argues "the selection of two or more cases that are believed to be literal replications [would be the simplest]" as they create similar outcomes relevant for the research question (p. 59). Based on this rational, the two cases of Erlangen and Jena were selected with the assumption, that both cases exhibit similar requirements, that allow an elaborate climate governance response, leading to a pronounced development of transformation capacity. Both cases have a similar size (Erlangen: 118.581, Jena: 110.791), declared climate emergency around the same time (Erlangen: 29th May 2019, Jena: 4th September 2019) and demonstrate an intensive legacy of urban climate governance already before the declaration (see next section for more information). Furthermore, both cities are administratively independent cities (German: *Kreisfreie Großstädte*) i.e. they are independent municipalities, that don't belong to a county, thus combine responsibilities of both political entities (Otto et al., 2021, p. 5).

However, it must be noted, the cities also differ in some important regards, which may affect the result of the case study: First, while the city of Erlangen is located in the state of Bavaria, the city of Jena is in Thuringia. This may be relevant if the German *Länder* have an important role in local climate policy. However, according to the literature, important competences in the field of climate policy are concentrated on the national level (Monstadt and Scheiner, 2016, p. 194). Therefore, the *Länder*-affiliation is not expected to have relevant effects on the analysis.

Second, considering each city's GDP per capita highlights potentially relevant economic disparities between the cases. While Erlangen has the third-largest GDP per capita of German cities with approximately 104.000 € per capita, Jena only has 73.000 € per capita (Statistische Ämter des Bundes und der Länder, 2024a). This could affect the analysis since Erlangen has more resources available to invest in climate governance activities (leading to a higher level of transformation capacity). Nonetheless, the effect is expected to be only limited. As of December 2022, Jena's budget didn't exhibit any public debts, which is exceptional as the average debt per capita of German municipalities was 1.576€ (Statistische Ämter des Bundes und der Länder, 2024b). Therefore, the level of transformation capacity is expected to be higher in Erlangen due to a higher GDP per capita, but the comparatively comfortable situation of Jena with zero debts may still lead to a higher level of transformation capacity compared to other cities with the same size.

3.3 Methods

Using the cases of Erlangen and Jena, this research aims to analyse to what extent the declaration of climate emergency and the subsequent governance process initiated by the

local government improve the city's ability to conduct a sustainable urban transformation. To this end, an in-depth understanding of each case is necessary, which create high requirements for data collection and analysis. A flowchart visualising the research is provided in figure 3.2.

A comprehensive database was compiled through the triangulation of various data sources. First, newspaper articles were gathered through wiso-net.de and a google search to get an overview of the local government's climate governance activities. Second, desktop research was conducted to collect strategy documents, press releases, reports, and webpages to better grasp the city government's activities and how they are actively communicated to the public. Third, and most importantly, semi-structured interviews were conducted with local officials who were involved in the climate emergency process. This third source of information is crucial to become aware of processes within the city that were not actively communicated to the public. Two interviews were conducted either in person or remote via zoom in the period between November 2023 and July 2024. Both interview partners were working in a central position related to the local government's climate and environmental activities and involved in the implementation of the CED. A generalised interview guideline can be found in appendix A.

A deductive content analysis was conducted to analyse the gathered material, encompassing the period between the declaration of climate emergency until the end of 2023 This method allows the systematic investigation of a large quantity of qualitative data in relation to preconceived concepts (Saldaña, 2011). This is deal for a research endeavour, that aims to apply an established theoretical framework (transformation capacity) on a novel phenomenon (CEDs). The gathered material was analysed through computer-aided text analysis (using the software maxqda) by assigning various codes to text segments, which reflect a certain meaning on the surface. A code is "a researcher-generated construct that symbolizes or 'translates' data [...] and thus attributes interpreted meaning to each individual datum for later purposes of pattern detection, categorization, assertion or proposition development, theory building, and other analytic processes" (Saldaña, 2011, chapter 1).

Before it is possible to assess, how the CED-implementation process fostered the city's ability to transform, it is necessary to determine the climate governance activities launched by the local government in response to the declaration. Therefore, the first part of the analysis focuses on the following question: How does the local government implement the CED in the three years after the declaration? Thus, it tries to assess the immediate output of the CED (see theoretical framework in section 2.3.2). This step is inspired by the approach of Hölscher et al. (2019), used to investigate the transformation capacity of the city of New York. Before the analysis of transformation capacity, the authors tried to

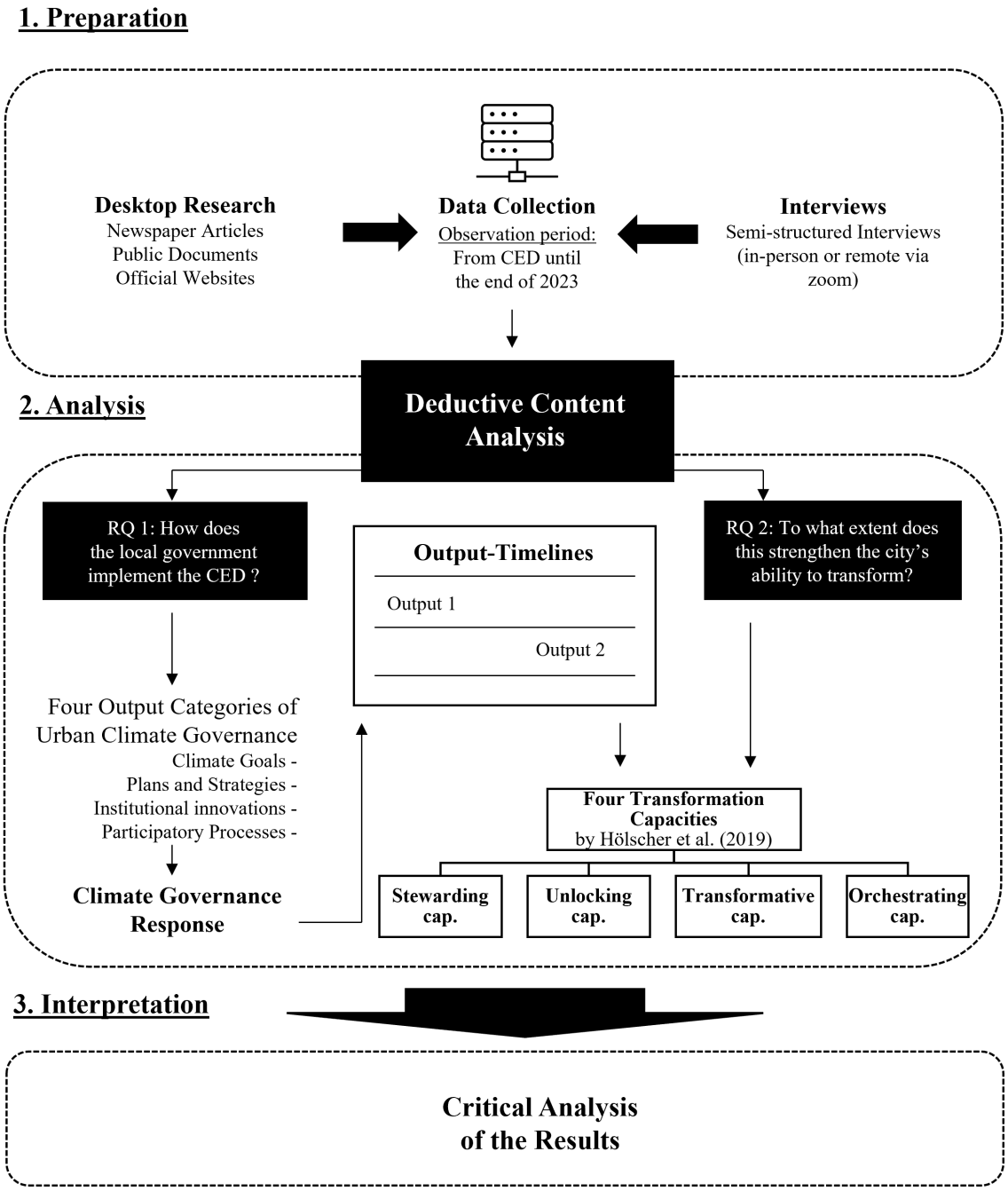

Figure 3.2. Visualisation of the research process, Source: own work.

identify "urban climate governance activities and actors" and raised the question: "What strategies, programmes, actions, regulations etc. exist" in the city which contribute to the development of transformation capacity (p. 191). Hölscher et al. (2019) remained ambiguous about what activities exactly they expected to contribute to transformation capacity. For the deductive content analysis however, it is necessary to specify typical urban climate governance activities, which are expected to be relevant for the development of transformation capacity, before starting the analysis. Therefore, the following four output categories were developed in section 2.3.2 and are used as codes in the first part

Table 3.1. Overview of the codes used to analyse the city government's response to the declaration of climate emergency, Source: own work.

Code	Working Definition	References
Climate Goals	The city's declared goal to mitigate GHG emissions as agreed upon by the local council.	Hofstad et al. (2021), Lee and Painter (2015), and Vedeld et al. (2021)
Plans and Strategies	Publicly available documents commissioned by the city administration that specify the local vulnerability to climate change effects and describe pathways to counteract climate change (both mitigation and adaptation).	Bassett and Shandas (2010) and Yalçın and Lefèvre (2012)
Institutional Innovations	The deliberate and visible change of institutional arrangements within the local government with relevancy to urban climate governance.	Patterson and Huitema (2019) and Vedeld et al. (2021)
Participatory processes	Formal governing arrangements initiated by the local government, that include non-state stakeholders in climate governance related decision-making processes for a limited period of time.	Ansell and Gash (2008) and Vedeld et al. (2021)

of the analysis: (1) climate goals, (2) plans and strategies, (3) institutional innovations and (4) participatory processes. A definition of each code can be found in table 3.1.

This approach comes with two limitations. First, these four output categories are certainly not an exhaustive list of potential climate governance activities, that can be initiated by the city government in response to the declaration of climate emergency. However, all four categories seem relevant for the development of transformation capacity and thus serve as a solid base for the second step of the analysis. The four categories are still adequate to visualise the effect of CEDs in increasing a city's ability to transform, although not extensive. Second, in reality, it is difficult to determine a clear output of a CED. It is difficult to argue with certainty, that none of the climate governance activities initiated by the local government after the declaration would not have been initiated without the declaration of climate emergency. Therefore, the causality between declaration and activities needs more evidence than merely the temporal sequence of events. To mitigate this limitation, only activities were considered, which were initiated after the declaration of climate emergency and which fit one of the following criteria: First, the activity was mentioned in the CED as a measure in response to the declaration of climate emergency. Second, the implementation of the activity was justified in the city's public outreach or in the interviews with the declaration of climate emergency.

Building upon the climate governance activities identified in the first part of the analysis, the second part aims to connect them to the city's ability to conduct a SUT. Therefore,

the second analysis is guided by the question: How does the city government's response contribute to the city's transformation capacity? The theoretical framework is provided by Hölscher et al. (2019) and was discussed in section 2.3. The authors specify four capacities, which facilitate SUTs: stewarding, unlocking, transforming and orchestrating capacity. Each capacity is furthermore specified with three "sub-functions", that are contributing to the development of each capacity (Hölscher et al., 2019, p. 189). These sub-functions were used to operationalise the second analysis.

For example, to assess to what extent a governance activity contributes to the city's *stewarding capacity*, the relationship between the activity and the three sub-functions was assessed. In this case, the analysis investigated if the activity (1) generates knowledge about the local origins and effects of climate change and whether it describes potential pathways to mitigate and adapt to its effects, (2) changes the local government's institutional structure to facilitate urban climate governance, or (3) implements new mechanisms for monitoring the goals and effects of urban climate governance and thus enables continuous learning. A climate emergency plan, describing a pathway how a city can achieve its ambitious climate goal, would contribute to stewarding capacity in two ways. First, it describes a concrete pathway how the GHG emissions of relevant sectors must develop until a certain date, to stay in line with the declared climate goal (sub-function 1). Second, it details a list of measures to achieve this GHG reduction, facilitating the monitoring of the process (sub-function 3). The results of the second part of the analysis are summarised in appendix B.

This approach helps operationalising the otherwise rather abstract concept of transformation capacity. It comes, however, with two important limitations: First, the assessment of a governance activity's conducive effect on the development of transformation capacity is just an approximation. This approximation however can be seen as a necessary evil, used in order to grasp and compare the relationship between the governance activity and a city's ability to transform. Crucial for a robust assessment of this relationship is an in-depth understanding of each activity. To this end, the triangulation of different data sources and the inclusion of interviews with experts involved in the process are an important part of the research design. Second, this research design is only considering conducive effects of climate governance activities on the development of transformation capacity. Doing this, ignores whether some activities contribute to one capacity but negatively affect another capacity. Such negative effects are expected to be only minor and their analysis would distract from the scope of this research: Exploring the effectiveness of CEDs in creating a more conducive environment for SUTs.

4 Analysis & Results

The previous chapters introduced CEDs as governance instruments passed in cities worldwide, to facilitate the local SUT by establishing a more adequate form of urban climate governance. This process is mediated by a variety of climate governance activities, conducted by the local government and triggered by the declaration. These activities, like the passing of ambitious climate goals, commissioning of strategic documents, changes in the local government's institutional setup and participatory processes ultimately contribute to the city's capacity to transform. Thus, the local government's response to the declaration contributes to the ability of the city (understood here as all stakeholders involved in urban governance) to bring about a radical change of the urban system towards a more sustainable pathway.

This chapter applies and tests the theoretical framework developed above to analyse the CED-implementation process in two German mid-sized cities. To this end, Erlangen and Jena were selected as case studies since they exhibit a conducive environment for a pronounced response by the city government to the CED, expected to lead to a visible development of transformation capacity. Thus, the analysis aims to answer the following questions: (1) How does the local government implement the CED in the three years after the declaration and (2) to what extent does this strengthen the city's ability to transform?

To respond to these questions, two in-depth case studies are presented in the next sections. Each case study is structured around the following five steps:

1. A general introduction to the city.
2. An overview on the state of climate governance before the declaration of climate emergency.
3. A description of the emergence of the CED.
4. An overview on the city government's climate governance response to the declaration of climate emergency.
5. An analysis of how these activities contribute to the city's ability to transform.

The overview given on the local government's climate governance response is structured around four phases. Each phase relates to important milestones in the CED-implementation process. First, the immediate aftermath of the declaration of climate

emergency. Second, the specification of the CED with an ambitious climate goal. Third, the development of a CEP, outlining a pathway to achieve the goal. Fourth, the implementation of the CEP. As the literature review highlighted, the passing of ambitious climate goals and the development of CEPs are important themes in CED-research. However, here, they are mainly used to structure the overview, which aims to go beyond: demonstrating the variety of activities, initiated in response to the CED and how they support the city to conduct a SUT. After the analysis of each individual case, the results are summarised and a discussion compares the findings and relates them to the literature.

4.1 Case I: Erlangen

The city of Erlangen is part of the metropolitan region Nuremberg in the German state of Bavaria. As of March 2023, 118.581 inhabitants were registered in the jurisdiction (Stadt Erlangen, 2023e). The city serves as a central site for the University of Erlangen-Nuremberg and international companies like the Siemens AG. Thus, commentators associate the university city with a high level of education and prosperity (Irmisch et al., 2022, p. 54). Since 2014, the directly elected mayor is member of the Social Democratic Party of Germany (German: *Sozialdemokratische Partei Deutschlands*, SPD). He ended an almost 20 years long legacy of a Christian democratic mayor from the Christian Social Union in Bavaria (German: *Christlich-Soziale Union in Bayern*, CSU) (Stadt Erlangen, 2024b)[1]. During the emergence of the CED, a ruling coalition between the SPD, the Voters' Association Green List Erlangen (German: *Wähler*innenvereinigung Grüne Liste Erlangen*, Green List)[2] and the Free Democratic Party (German: *Freie Demokratische Partei*, FDP) dominated the local governments activities (SPD-Stadtratsfraktion Erlangen, 2014). Since 2020, a ruling coalition between SPD and the CSU dominates the implementation of the CED (Müller, 2020).

4.1.1 Climate Governance Before the CED

Erlangen is described as a forerunner in climate politics (Irmisch et al., 2022, p. 59), with a history of climate governance dating back to the 1990s. The first climate protection report was published in cooperation with the neighbouring municipalities and the city joined the international climate alliance during this time (p. 53). However, according to Irmisch et al. (2022), the importance of climate change for the ruling parties varied in the past

[1]The CSU is the regional branch of the Christian Democratic Union of Germany (German: *Christlich Demokratische Union Deutschlands*, CDU), which is active in the other parts of Germany

[2]The Green List is a local voters' association related to the Alliance 90/The Greens (German: *Bündnis 90/Die Grünen*, Greens)

decades (p. 54). In 2001, the local government established an Agenda 21 advisory board (German: *Agenda 21 Beirat*) (Stadt Erlangen, 2020b, p. 1) to involve local stakeholders concerned with environmental issues, which have been strong for many years (Irmisch et al., 2022, p. 54). In 2016, an integrated climate protection concept was developed with the aim to assess local greenhouse gas emissions and potentials for reduction (Stadt Erlangen, 2016, p. 2). It also proposed the development of a climate adaption concept, to analyse climate change effects on the city of Erlangen and to develop measures to mitigate these effects. The concept was published in 2020 (Stadt Erlangen, 2020d, p. 2). Despite these earlier efforts, Irmisch et al. (2022) argue, the ruling coalition since 2020 is pursuing an even more progressive agenda (p. 54).

Over the past decades, these activities were underpinned with various climate goals, whose ambition stayed relatively stable. Since 1995, with its membership in the climate alliance, the city aimed to reduce CO_2 emissions by at least 95% until 2050, in comparison to 1990 (Irmisch et al., 2022, p. 56; Klima Bündnis, 2023). In 2011, the council decided to aim for 50% renewable energies in the city's electricity supply until 2030 and 100% renewable energies in the heating supply until the year 2050 (Stadt Erlangen, 2014, p. 11). These goals were extended in 2014 with the so-called "energy efficiency strategy", which declared the goal of a climate neutral housing sector until 2050 (p. 5). The most recent decision dates back to 2017, when a climate pact for the whole metropolitan region aimed for the 2-degree goal (referring to the COP-21) and a GHG reduction of 95% until the year 2050 (Metropolregion Nürnberg, 2017).

4.1.2 Declaration of Climate Emergency

The declaration of climate emergency in Erlangen was initiated "actively from below", meaning, it was motivated by local citizens or activist groups (referring to the typology by Howarth et al., 2021). The local Fridays for Future group initiated a resolution in the local town hall meeting, calling for the declaration of climate emergency in the city council. Town hall meetings (German: *Bürgerversammlung*) are local institutions codified by the Bavarian state in the so-called *Gemeindeordnung* (short: GO). These meetings have to be convened at least once a year by the mayor, but can also be initiated by residents (GO Art 18. Abs 1 and 2). The participants of the Town hall meeting can formulate proposals to the city council, which need to be dealt with within three months (GO Art 18. Abs 5).

The activists used the town hall meeting from March 27th, 2019, where the participants passed two of their proposals. First, the declaration of climate emergency and, second, a list of measures to counter the declaration. On May 29th, 2019, the city council adapted and passed the first proposal with a majority, thus declaring climate emergency (Stadt

Erlangen, 2019a). The second proposal with the concrete measures was postponed (Stadt Erlangen, 2019a, p. 1).

4.1.3 Climate Governance Response

Phase 1: Aftermath of the CED

Over the past four years an elaborate implementation process unfolded in response to the declaration of climate emergency, initiated by the local government. The original declaration serves here as a starting point, where symbolic components were combined with harder components. Besides the declaration of an explicit climate emergency it announces the containment of climate change and its effects as a "task of highest priority" for the city (Stadt Erlangen, 2019a, p. 1). The 1,5-degree goal, established by the IPCC, was mentioned multiple times and a study was announced, which should assess, what is necessary to reach it within the city's jurisdiction. Furthermore, a participatory process is envisaged to accompany the next steps.

The original CED also includes the ambition to implement a mandatory climate impact assessment, evaluating the impact of council proposals on climate and sustainability (Stadt Erlangen, 2019a, p. 1). Already a few months later, the council decided on a concrete mechanism, which is in use since the 1st of January 2020 (Stadt Erlangen, 2019b). A new section on "climate effects" (German: *Klimaauswirkungen*) was added to the council proposal templates with a basic assessment of the decision's climate effect (with the options: yes positive, yes negative and no effect) and potential (less carbon intense) alternatives. According to personal communication, this mechanism should help "consistently considering and implementing climate protection" in the local government (Stadt Erlangen, 2024a). This assessment method is still in place, however, the city participated meanwhile in a research project to develop a more elaborate assessment mechanism (Stadt Erlangen, 2020c; Stadt Erlangen, 2023a, p. 29). After the research project ended, the tool was not adopted by the local government due to unclear maintenance of the software and the growing number of legal regulations in Germany, making the test partly obsolete (Stadt Erlangen, 2023b; Stadt Erlangen, 2024a). Since 2023, the administration additionally uses a software to quantify GHG emissions related to its building stock and construction projects (Stadt Erlangen, 2023b, p. 2).

Phase 2: Specification of an Ambitious Climate Goal

Central to the process of substantiating Erlangen's so-far vague climate goal was the development of the "Baseline Study: Climate Emergency" (German: *Grundlagenstudie Klimanotstand*) (KlimaKom eG, 2020). The report represents the first official document

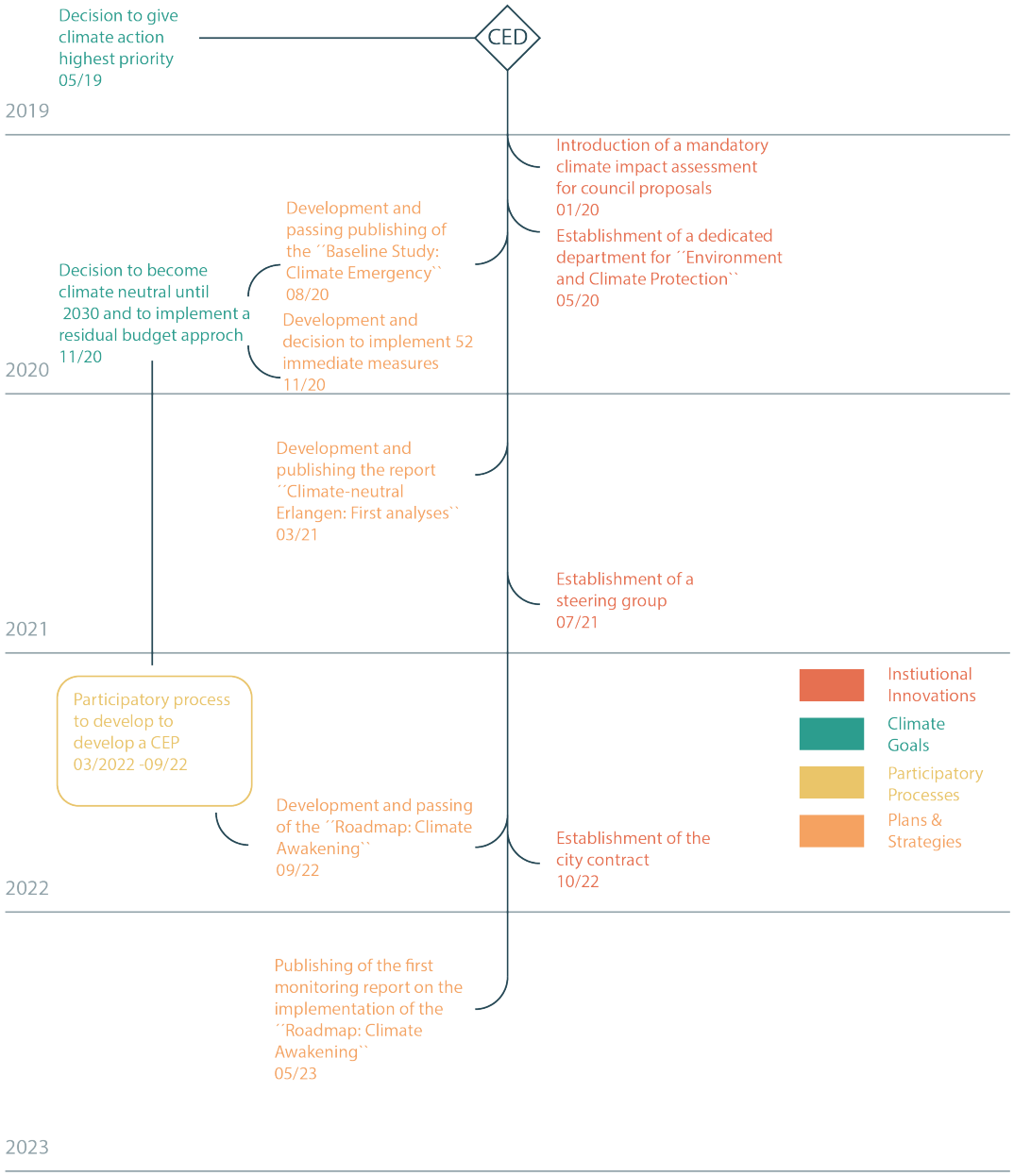

Figure 4.1. Timeline of the local government's response to the CED in Erlangen, Source: own work

published after the CED, commissioned by the local government and drafted by an external office. In preparation for the subsequent process, it is outlining the consequences of declaring the climate emergency (e.g. becoming climate neutral until 2035 at the latest), (p.11) describing areas of activity and proposing formats for participation (pp. 11–12). Thus, it forms the conceptual basis for the next steps.

Although not mentioned in the CED, the second phase also saw first institutional innovations taking place within the city government as a response to the CED: The restructuring of the administration's department structure and a first surge of dedicated personnel.

First, a new department was established for "environment and climate protection" (German: *Referat VII - Umwelt und Klimaschutz*) through the combination of several subunits, which were previously associated to other departments (Stadt Erlangen, 2020a). The interviewee perceived this measure as a consequence of the CED and "[…] as a sign, that this topic [climate protection] is being taken seriously and given the importance it deserves by establishing a separate department and not just subordinating it in one of the many departments in the city administration […]" (Stadt Erlangen, 2023c). Second, a new head of this department was recruited, whose job description explicitly listed the implementation of the climate emergency declaration as a task (Stadt Erlangen, 2023c). Furthermore, during this time at least one position was additionally established in the department as a response to the declaration (Stadt Erlangen, 2023c).

Based on the baseline study and the new institutional setup, the local government proceeded with the refinement of its climate goals and outlying the next steps in the implementation process with a novel council decision in November 2020 (Stadt Erlangen, 2022b). At the core of the council decision is the ambitious goal of achieving climate neutrality in the city of Erlangen until the year 2030. The document emphasises the ambition to take sufficient actions to reach the 1,5-degree goal on the local level. Since the goals from the Paris Agreement can hardly be reached only by the actions of a single city, the city adopted a GHG residual budget approach to operationalise this goal. The idea originates from the German Advisory Council on the Environment (German: *Sachverständigenrat für Umweltfragen*) and was picked up by the baseline study (KlimaKom eG, 2020, pp. 25–30). It tries to calculate the maximum amount of GHG emissions that can still be emitted within the jurisdiction to be in line with the 1,5-degree goal. For Erlangen, this residual budget until 2030 was determined to 3,4 Mt of CO_2 (Stadt Erlangen, 2022b, p. 2).

The council decision also specified the next steps in the process to achieve the ambitious goal. First, by passing a list of 52 immediate measures to be implemented by the city government and municipal companies. Second, by announcing the development of the so-called "Roadmap: Climate Awakening" (German: *Fahrplan Klimaaufbruch*), which can be interpreted as Erlangen's CEP. This decision also enshrines a switch of the framing: Although the city council explicitly declared climate emergency in 2019, the subsequent process after 2020 is reframed as "climate awakening" (German: *Klima-Aufbruch*). From now on, the notion of climate emergency is avoided in the public outreach.

Phase 3: Specification of a Climate Emergency Plan

The efforts to develop the local CEP start with the commissioning of a new strategic document: "Climate-neutral Erlangen: First analyses" (German: *Klimaneutrales Erlangen Erste Analysen*). It specifies the pathway to achieve climate neutrality until 2030 by

giving a more technical account of the city's carbon footprint and outlining the necessary transformation of the energy supply (electricity and heating energy) and mobility (Stadt Erlangen, 2021a, p. 6).

From March until September 2022, furthermore, an elaborate participatory process was conducted to develop the CEP (Stadt Erlangen, 2022b). To this end, the local government initiated a steering group (German: *Lenkungskreis*) consisting of representatives of the fractions in the city council, the administration, and the municipal utility company (German: *Erlanger Stadtwerke*) to oversee the process and to facilitate the communication between project managers and the council (Stadt Erlangen, 2021b; Stadt Erlangen, 2022b, p. 28). The council also decided to keep this platform after the participatory process ended (Stadt Erlangen, 2022a, p. 1).

The city government initiated two other institutions for the development of the CEP, within this participatory process: First, a citizen council, consisting of 25 randomly selected inhabitants of Erlangen (p. 25) and, second, a stakeholder group for 35 representatives of local educational institutions, associations, companies, and the city government (p. 28). Both institutions first received background analyses and recommendations prepared by a third-party research institute. In a series of three to four sessions, both groups used the provided input to formulate measures, while exchanging and commenting on each other's results. In the end, both committees agreed on a set of 41 measures (summarised in the final report of the "Roadmap: Climate Awakening") to achieve the local climate goals. The results were proposed to the city council, which ultimately had to confirm them (p. 23).

With its decision from October 27th, 2022, the city council decided to only implement 14 out of 41 measures in 2023, focusing on those promising "a fast and high reduction of CO_2 emissions and [which] motivate other actors within the urban society to act" (Stadt Erlangen, 2022a, p. 11). The other measures would be incorporated into the work agenda for 2024 and the following years. This delay in the remaining 27 measures resulted in severe criticism by local activist groups (Wenzel, 2022).

Step 4: Implementation of the Climate Emergency Plan

After having specified a pathway to move forward with the "Roadmap: Climate Awakening", the local government substantiated its efforts with several institutional innovations. First, for the implementation of the declared measures, even more personnel was recruited across the administration. A report published by the city government mentions a total of 17,5 positions, which were newly established explicitly for the implementation of the 14 prioritised measures (Stadt Erlangen, 2023a, p. 20). This is, however, only slightly more than half of the total positions, which were originally demanded for these fourteen measures (total of 31 positions) – excluding also the positions demanded for the other

measures, which were postponed to the next years (Stadt Erlangen, 2023a). The interviewee emphasises the importance of the newly recruited staff members, but also highlights the need for more: "now we need a second wave to make it clear once again, that we are building up the capacity to really implement it [the "Roadmap: Climate Awakening"]" (Stadt Erlangen, 2023c).

Second, the local government initiated a city contract (German: *Stadtvertrag Klima*) to involve other stakeholders and residents in the efforts to implement the CEP and to achieve climate neutrality. Various stakeholders (companies, institutions etc.) and the local citizens are asked to make voluntary commitments (German: *freiwillige Selbstverpflichtung*), to contribute to the specific measures included in the CEP and beyond (Stadt Erlangen, 2022b, p. 22). For the ordinary citizens, the members of the citizen council created the so-called citizen contribution (German: *Bürgerschaftsbeitrag*) with guidelines for residents to reduce their carbon footprint and to contribute to the climate goals of the city (Stadt Erlangen, 2022c, pp. 13–19). Other stakeholders like educational institutions and local companies are asked to provide an individualised concept, how they want to contribute to the measures of the city (pp. 21–57). According to the city's website, currently 124 residents signed the citizen contribution and 31 institutions submitted their voluntary contribution (Stadt Erlangen, 2023d).

Finally, a first monitoring report on the implementation of the climate emergency plan was published in May 2023 (Stadt Erlangen, 2023a). It includes an overview of positions created thus far (pp. 20–21) and the state of implementation of each of the prioritised measures (p. 27).

4.1.4 Development of Transformation Capacity

The preceding subsection provides an overview of the multiplicity of climate governance activities initiated by Erlangen's government in response to the CED. Keeping in mind the framing of the thesis, which perceives CEDs as a governance instrument, passed in order to facilitate the local SUT, raises the question: To what extent, do these activities contribute to the city's transformation capacity? This question is answered in the following by relating the activities described above to the four transformation capacities proposed by Hölscher et al. (2019).

Transformative capacity

The local government's response contributed to the city's transformative capacity, i.e. the city's ability to generate new mechanisms for transformative climate governance and to implement it in the local context. The transformative ambition of the CED-

implementation process in Erlangen was already highlighted in an early stage. The baseline study argues in this context:

> "It requires the mobilization of actors and the implementation of pilot projects and experiments. To ensure that the transformation efforts do not remain unconnected in experiments side by side, a transformation agenda is needed in the sense of a coordinated action plan that is sufficiently open to new development, but nevertheless sets the 'big line' " (KlimaKom eG, 2020, p. 98).

The local government substantiated this announcement, first, by passing an unprecedentedly ambitious climate goal. In line with Abson et al. (2017), changing the intent of a system is one of the most important leverage points to create transformative change. Therefore, it characterises the first step in transformative climate governance (Krueger et al., 2022). This leverage point is addressed in Erlangen by specifying the climate emergency with the goal of climate neutrality until 2030. This goal is ambitious in an international comparison (Salvia et al., 2023) and the commitment to a residual budget for the city's GHG emissions is innovative. Although the interviewee in Erlangen doubts the goal can be actually achieved, due to missing action on other levels of government, it provides basis for a transformation of the governance system (Stadt Erlangen, 2023c).

Second, by launching the "climate awakening"-process, the local government picked up this dynamic, increased its visibility and translated it into the climate governance system. To stay with Abson et al. (2017) and Krueger et al. (2022), after changing the intention of the governance system with an ambitious climate goal, the design of the system must be adjusted accordingly. Only then, it is justified to speak about transformative climate governance. In the case of Erlangen, this is realised with a multiplicity of novel climate governance activities the local government initiates for the implementation of the CED. Much of these activities can be linked to the "climate awakening"-process. The process involves numerous stakeholders who collaboratively, under the leadership of the local government, draft a unified strategy to achieve the city's ambitious goal.

Finally, the inclusiveness of the process facilitates anchoring the transformative climate governance among relevant stakeholders. The CEP breaks down the goal into a total of 41 measures. The final report details, how the responsibilities for implementing these measures are distributed among stakeholders associated with the local government. But also stakeholders outside the local government are included in the implementation strategy. The participatory process made local institutions, private companies and selected citizens formulate voluntary contributions, how they want to support the implementation of these measures.

Stewarding capacity

The local government's climate emergency response developed the city's stewarding capacity, i.e. it fostered the city's ability to understand climate change in the local context (both origins and effects) and to provide an institutional setup adequate to navigate sustainable pathways and ensure continuous learning.

This is done through various activities, which contribute to a better understanding of potential pathways to reduce the city's GHG emissions in relation to the goals posited by the Paris Agreement. In this context, the final report of the "Roadmap: Climate Awakening" specifies three scenarios, based on climate goals with varying ambition: The "1,5-scenario" is the most ambitious, demonstrating the pathway necessary for not emitting more CO_2, than the residual budget allows (Stadt Erlangen, 2022b, p. 39). The "Klima-scenario" uses the less ambitious long-term targets set in 2021 by the German national government. This would mean climate neutrality until 2045 and a CO_2 reduction of 65% until 2030 (p. 39). Finally, the "Klima-plus-scenario" gives a third pathway in between the previous two. The reports also projects, how specific sectors (e.g. energy, mobility etc.) must be transformed in order to achieve the goals. For example, in case of the "1,5-scenario" a renovation rate of 10% is necessary (p. 40) and car traffic must be reduced by 50% from 2020 to 2023 (p. 44). The "Roadmap: Climate Awakening" builds upon the preparatory work conducted in the baseline study and the report "Climate-Neutral Erlangen: First Analyses". Together, these reports provide a scientific justification for the city's ambitious climate neutrality goal, thus fostering understanding and support for the implementation process.

Changes in the local government's institutional structure also develop the city's stewarding capacity by facilitating the achievement of the declared goals. In this context, two activities are relevant: First, the establishment of a steering group facilitates the communication between political actors in the council, the project team in the administration and the contractor. This measure was intended to facilitate "landmark decisions and to push for implementation in their administrative units", thus increasing the city's manoeuvrability (Stadt Erlangen, 2021b, p. 1). Second, the creation of a dedicated department for climate issues within the local government establishes a central coordination for the implementation of the city's ambitious plan.

Finally, adjusting the city's monitoring system also contributes to its stewarding capacity. The declared goal of achieving climate neutrality until the year 2030 and its substantiation with the residual budget of 3,4 Mt CO_2 is clear and measurable, providing a solid basis for a monitoring system. The reports explicate the pathway, how the various sectors need to develop for achieving climate neutrality. The development and passing of specified measures and an associated system of indicators in line with these pathways, ensure continuous monitoring. The "Roadmap: Climate Awakening" describes an elaborate

system to continuously monitor the transformation throughout the next decades, which supports stewarding capacity:

> "In order to be able to assess current developments and the resulting options for action in a timely manner, municipal climate protection management needs to regularly determine its position as a long-term task. In the case of a failure to meet the targets, timely intervention and readjustment is required" (Stadt Erlangen, 2022b, p. 166).

Therefore, the local government adopted a mix of top-down (e.g. carbon footprint) and bottom-up indicators (measuring the effects of proposed measures) for the novel monitoring system and tested it in the first implementation report (Stadt Erlangen, 2023a).

Orchestrating capacity

The local government's response also contributed to the city's ability to involve and mediate between relevant stakeholders in the creation of transformative climate governance and to incentivise the implementation.

This is done, first, by aligning council members from various fractions behind the shared goal of climate neutrality until 2030. After the initial CED in response to public protest with its rather vague components, the passing of the climate neutrality goal for 2030 is a major achievement in light of the diverse composition of the local council. This decision was certainly facilitated by the reframing of the process from "climate emergency" to "climate awakening" as an answer to some criticism of council members (Stadt Erlangen, 2023c). Furthermore, the city government further helped to justify the goal by generating a shared knowledge base and evidence on the necessity and adequateness of the measures with two preparatory reports.

Second, mediating the interests and resources of stakeholders from various scales and sectors in the "climate awakening"-process also contributes to orchestrating capacity. This is particularly relevant in the process to develop a shared implementation strategy for the city's goal. The steering committee facilitates the communication and mediation between stakeholders within the local government. The interests of other stakeholders like local institutions, private companies and citizens are mediated through the elaborate participatory process.

Third, by incentivising stakeholders to implement the CEP and to contribute to the shared climate neutrality goal the local government furthermore strengthened the city's orchestrating capacity. Among actors within the local government, the clear assignment of responsibilities for the measures included in the CEP is central. For other actors, especially the participating companies and institutions, the voluntary commitments formulated under the umbrella of the city contract creates an incentive to join the action. This is, however,

to the best of the author's knowledge only on a voluntary basis. There is no monitoring process in place, that would control whether these promises are actually implemented.

Unlocking capacity

The city government's response also contributes to the city's ability to identify and undermine structural drivers of climate change in the local context.

First, the local government develops an awareness of the structural drivers of climate change in the local context and the necessity for a transformation. The baseline study already emphasises the legacy of historically grown drivers of climate change and the need to tackle them:

> "It will not be sufficient to rely on technological modernization strategies alone. Rather, it is necessary to identify and change the development patterns and underlying mechanisms that are responsible for today's unsustainable normality" (KlimaKom eG, 2020, p. 35).

This can be visualised with the mobility sector. The report holds, that efficiency gains of cars barely lead to a reduction of total emissions in transportation due to rebound effects like the increasing weight of cars and increased mobility needs (p. 63). Therefore, it argues a "complete decarbonization of passenger and freight transport between 2035 and 2038 [is necessary] to comply with the Paris Agreement" (KlimaKom eG, 2020, p. 65). This does not only include the electrification of private cars but "a fundamental shift in our understanding of mobility [...]: away from individual car use and towards flexible and multimodal mobility" with an emphasis on public transit and active modes of transportation (p. 66).

Second, the effect of these structural drivers is mitigated by (1) addressing them with dedicated measures in the CEP, and by (2) unveiling them in the everyday work of the local government. The general awareness for structural drivers of climate change in the baseline study is translated with the CEP into measures countering their legacy and creating path-deviant change. To stay with the example of mobility, the CEP aims to decrease car ownership and usage through (M1) changes of the urban structure (e.g. less parking lots and improved pedestrian infrastructure) (Stadt Erlangen, 2022b, p. 127) and (M3) an increased attractiveness of public transport (p. 132). Furthermore, the support of these structural drivers of climate change in everyday decision-making in the council is undermined by implementing the mandatory climate impact assessment. Since 2020, this mechanism forces decision-makers within the city government to reflect on the climate impact of their decisions and to propose potential alternatives.

Third, potential resistance to these measures is weakened through an inclusive governance response. The local government included all political fractions of the council in the

development process of the CEP through the steering group, tackling doubts at an early stage and facilitating joint action. Furthermore, the local government included other stakeholders and citizens in the participatory process for drafting the CEP and in the city contract, ensuring broad support.

4.2 Case II: Jena

The city of Jena is located in the Central German Metropolitan Region in the German state of Thuringia. Approximately 110.000 inhabitants are registered in the jurisdiction in 2024. With around 21.000 registered students, Jena is the biggest university town in the state of Thuringia (Stadt Jena, 2024b). Since the year 2018, the mayor of Jena is a member of the FDP. Before he took office, the mayor was member of the SPD (MDR Thüringen, 2024). The most recent elections for the city council took place in 2024 and 2019. In 2019, just before the declaration of climate emergency, the most successful parties were the The Left (German: *Die Linke*, Left Party) and the Greens with around 20 % of the votes. These were followed by the CDU, the FDP and the SPD with around 12 % of the votes. The right-wing populist party Alternative for Germany (German: *Alternative für Deutschland*, AfD) held 10 % of the votes and the other parties held around 12 %. In 2024, the vote share of the Greens, the Left Party and the FDP declined around 4 % each. In contrast, the vote share of the CDU and the AfD grew around 4 %. Other smaller parties also benefited in this election (Stadt Jena, 2024c).

4.2.1 Climate Governance Before the CED

Jena can look back on a long history of climate governance, dating back at least to the early 2000s. Starting in the year 2005, the city participated in the European Energy Award, a quality management system supporting local governments in renewable energy policies. Jena participated in this program until the year 2017 (Stadt Jena, n.d.[b]). A major focus of the early period of climate governance was climate adaption. In the year 2009, the city started participating in a national research project focusing on local strategies to adapt to the effects of climate change (Stadt Jena, 2012, p. 6). Between 2009 and 2012, this led to the development of a climate adaption strategy for the city of Jena. As part of this process, the city developed a decision-making tool facilitating local climate adaption processes (Stadt Jena, n.d.[a]) and a handbook for local decision-makers (Stadt Jena, 2012). Following this focus on climate adaption, a report on the city's vulnerability to climate change was commissioned (Hoffmann et al., 2014) and a research project explored the role of green space for Jena's climate adaption (Stadt Jena, n.d.[c]).

However, also the issue of climate mitigation soon became relevant in the city's agenda. Starting in 2007, the city formulated an energy and climate protection mission statement with mitigation targets, addressing various sectors like electricity, heating and mobility. A new version of the vision statement, the Energy and Climate Protection Mission Statement Jena 2014-2020 (German: *Leitbild Energie und Klimaschutz der Stadt Jena 2014-2020*, LEK 2014), was formulated for the period from 2014 to 2020 (Stadt Jena, 2014). The new version, however, only held minor modifications of the goals from the 2007 document. The authors of the document themselves, describe the goals as not very ambitious (p. 4). To support the implementation of the vision, a monitoring system was established including a report every two years (p. 1) and a climate protection concept was developed (Stadt Jena, 2015). Furthermore, the city developed a sustainability strategy including strategic goals and a variety of measures for its implementation, since the year 2017 (Stadt Jena, 2020e). The goals were passed in May 2019 (Stadt Jena, 2019d), however, the corresponding measures were not passed until the end of 2020 (Stadt Jena, 2020e).

Overall, the city's climate goals included in the main strategic documents (sustainability strategy and LEK 2014) remained not very ambitious. The LEK 2014 was inspired by the 2008 mitigation targets by the European council with the title "20-20-20", implying a 20% reduction of GHG emissions and a 20% increase of renewable energies and of energy efficiency (Stadt Jena, 2014, p. 2). The sustainability strategy included strategic and operational targets for the fields of mobility, natural resources and environment, consumption and way of life, global responsibility and climate and energy (Stadt Jena, 2019a). Here, the city declared the ambition, for example, to reduce 20-30% CO_2 emissions until the year 2030 (in comparison to 2016) (Stadt Jena, 2019a, p. 12).

4.2.2 Declaration of Climate Emergency

Similar to Erlangen, the declaration of climate emergency in Jena was also initiated "actively from below" (referring to the typology by Howarth et al., 2021). After the first CEDs were declared in Germany in May 2019, the local Fridays for future organisation in Jena also started protesting for more ambitious climate action. Starting with smaller protests, the local movement mobilised at its peak 3500 protesters in September 2019 (Groß, 2019). One of their demands was the declaration of climate emergency by the local council (Büker, 2019a). In response to this growing pressure, the idea was picked up the fractions in the city council, who introduced multiple proposals with varying contents to the local council (n.d., 2019). Main points of divergence were the explicit reference to "climate emergency" and the inclusion of harder measures in the declaration (Stadt Jena, 2024a). In the following, the administration convened the representatives of the fractions to draft a joint proposal, which combines most preceding proposals and that is supported

by a broad coalition of parties (Büker, 2019b; Stadt Jena, 2024a).

The CED was adopted in two parts on September 4th 2019: The first part is the explicit and mainly symbolic declaration of climate emergency (Stadt Jena, 2019b). The second part doesn't explicitly refer to the concept of climate emergency, but includes a list of short and mid-term measures the city should implement to "address the climate crisis with highest priority" (Stadt Jena, 2019c). In the following, when referring to the CED in Jena, the combination of both council decisions is meant.

4.2.3 Climate Governance Response

Phase 1: Aftermath of the CED

In September 2019, Jena's city council declared climate emergency, emphasising the city's vulnerability to climate change effects and its willingness to tackle them "in all policy areas" (Stadt Jena, 2019b, p. 2). Simultaneously, the council passed a list of measures to be implemented in the subsequent months. These measures include institutional innovations, like the renaming of the Committee for Urban Development and the Environment (German: *Ausschuss für Stadtentwicklung und Umwelt*) to Committee for Urban Development, Environment, Climate Protection and Sustainability (German: *Ausschuss für Stadtentwicklung, Umwelt, Klimaschutz und Nachhaltigkeit*). Besides the renaming of the committee, implying a broadening of scope and focus on issues of climate change and sustainability, the meetings of the committee are regularly opened to members of the public (Stadt Jena, 2019c, p. 2).

Second, the already established Agenda 21 Advisory Board (German: *Beirat Agenda 21*) was transformed to the Advisory Board for Climate Protection and Sustainable Development (German: *Beirat für Klimaschutz und nachhaltige Entwicklung*, KBR) (Stadtrat Jena, 2019b, p. 2). Thus, the advisory board was extended both in the scope and size. It is now seen as an "independent council of the city of Jena concerning questions of sustainability and climate protection" (Stadt Jena, 2022a, p. 14). The Board is allowed to give general recommendations to the city council and, after this restructuring, to submit formal proposals to the Committee for Urban Development, Environment, Climate Protection and Sustainability (Stadt Jena, 2024a). It consists of a total of 20 members including city councillors, representatives of the local Agenda 21 association (German: *Agenda Verein*), experts on related issues and delegates of the Round Table on Climate and Environment Jena (German: *Runder Tisch Klima und Umwelt Jena*, RTKU) (p. 14).

The RTKU can be framed as the third institutional innovation following the CED, although it is not explicitly mentioned there. Originating from the bottom-up pressure demanding

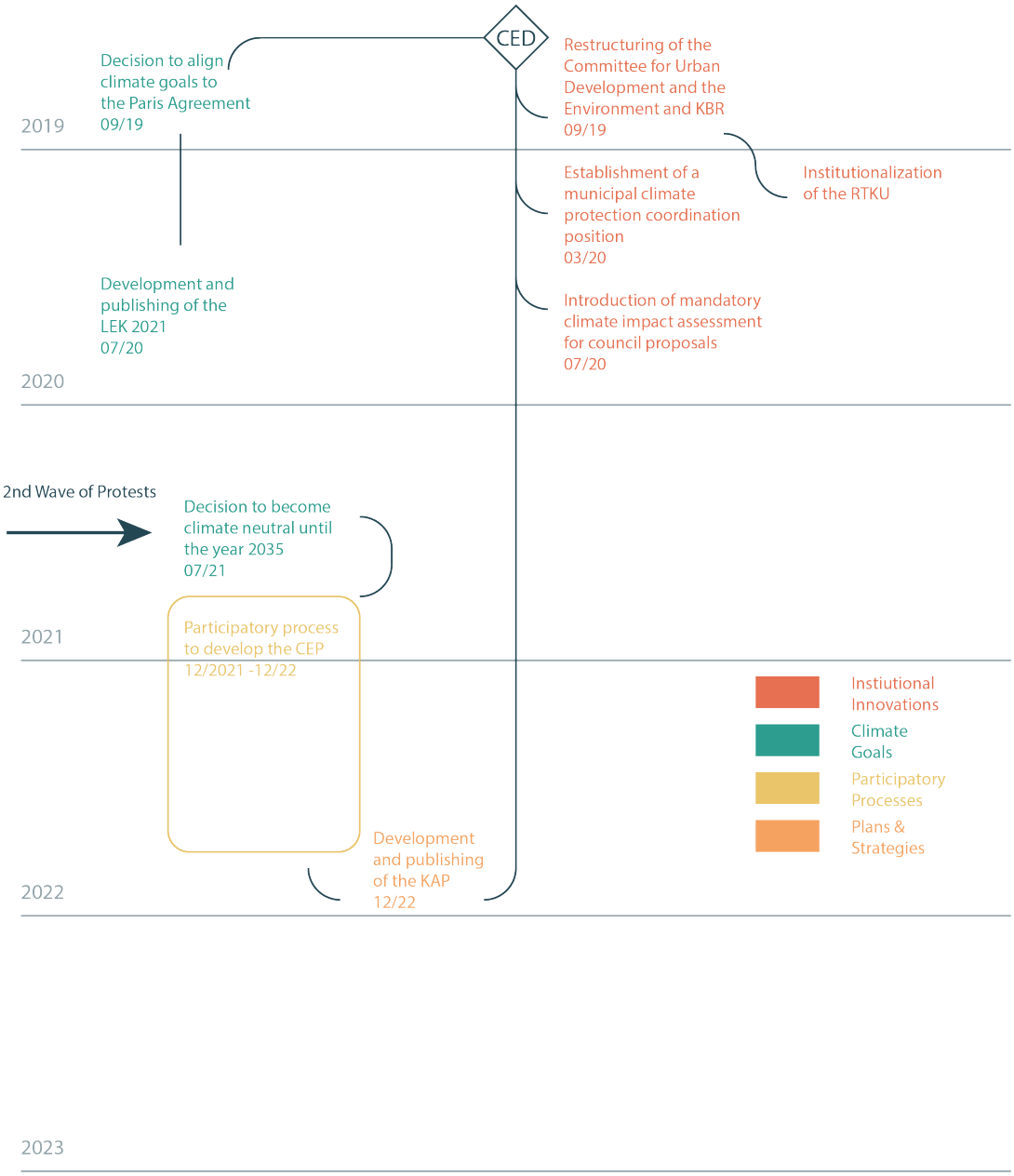

Figure 4.2. Timeline of the local government's response to the CED in Jena, Source: own work

a CED for Jena in 2019, the RTKU was founded as a societal communication platform for citizens and groups engaged in climate issues (Stadt Jena, 2022a, p. 14). With the declaration of climate emergency, three delegates of the RTKU are officially invited to the KBR. Thus, the institutional innovation is less the creation of the RTKU (as it was not initiated by the local government), but rather the institutionalisation of the RTKU in the KBR. As an intermediary institution, the group combines knowledge and ideas from its participating groups (e.g. local -for-future organisations) and contributed to strategic documents (RTKU, 2022, p. 2). Indeed, the interviewee mentioned, several ideas

emerged from the RTKU in recent years, which later led to official proposals by the KBR and which were ultimately passed in the city council (Stadt Jena, 2024a). According to the interviewee, this measure led to a "good inclusion of the civil society into local politics" (Stadt Jena, 2024a).

A fourth innovation mentioned in the CED and subsequently implemented was the establishment of a municipal climate protection coordinator (German: *Kommunale Klimaschutzkoordinationsstelle*) (Stadt Jena, 2019c). The new position was created in March 2020 for the coordination of local climate protection within the local government, enabled through state-level subsidies. The coordinator's role is to gather funding, initiate and implement climate protection measures, engaging in public relations and thus, to provide a link between civil society, local politics and the city administration (Stadt Jena, 2020c). After the initial funding period of three years ended in 2023, the city declared to keep the position (Stadt Jena, 2022a, p. 14).

Finally, the CED also demanded the introduction of a mandatory climate impact assessment (Stadt Jena, 2019c, p. 2). In the following months, a mechanism to evaluate the climate impact of council decisions was developed and finally passed on July 16th 2020 (Stadt Jena, 2020a). The evaluation is divided into two steps: First, a pre-check is conducted to categorise the respective council proposals into decisions (1) with generally no-climate effect (e.g. appointments), or (2) with climate effect. The latter group is furthermore divided into proposals for construction projects and all other proposals. Second, a climate-check is conducted for those proposals with a climate effect. The climate impact of general proposals is evaluated based on 12 guiding questions concerning different dimensions (CO_2-emissions, mobility etc.) offering three potential answers: positive, negative or no effect on climate. Construction proposals are evaluated by estimating the CO_2-emissions of the final building (p. 3-4). Besides this qualitative assessment of the proposal's climate impact, another approach was developed which quantitatively estimates GHG emissions. This second approach is, however, not yet in use (Stadt Jena, 2024a).

Phase 2: Specification of an Ambitious Climate Goal

An important measure listed in the CED ist the revision of the LEK 2014 by considering, both, the recently passed sustainability targets and the Paris Agreement from 2015 (Stadt Jena, 2019c, p. 2). To this end, the KBR developed a draft for the Energy and Climate Protection Mission Statement Jena 2021-2030 (German: *Leitbild Energie und Klimaschutz der Stadt Jena 2021-2030*, LEK 2021), which was subsequently finalised by the city government and passed on July 16th 2020 by the city council (Stadt Jena, 2020b). Just like its predecessor, the LEK 2021 describes several goals for the various sectors: electricity, heating, mobility, development of renewable energies, life and economy. This

revision, however, barely led to an increase of ambitions in comparison to the LEK 2014. For example, in 2014 a 10% reduction of electricity needs was envisioned until the year 2020 (Stadt Jena, 2014, p. 3). The new document similarly aimed for a 10% decrease until the year 2030 (Stadt Jena, 2020b, p. 3). The mobility sector sees some more improvement. While the 2014 plan didn't specify a concrete reduction goal for motorised private traffic (Stadt Jena, 2014, p. 3), the 2021 plan aims for a reduction from 34% to 30% until the year 2023 (Stadt Jena, 2020c, p. 4). In addition, the LEK 2021 mentions the idea to develop an implementation strategy including a catalogue of measures (Stadt Jena, 2020b, p. 6) and to monitor the progress on a yearly basis (in contrast to a monitoring every second year) (p. 7).

The perceived lack of ambitions of the LEK 2021 led to the formation of renewed protest in Jena. Similar to other cities in Germany, an initiative formed under the name "Climate Decision Jena" (German: *Klimaentscheid Jena*), which initiated a process for a public petition, asking for an increase of climate goal ambitions. In their first press release, the group argues:

> "Two years after the first major climate demonstrations and the city council's decision to declare a climate emergency, a lot has happened in Jena too. But in light of the urgency of the climate crisis, it must be said: Our city's targeted contribution is not enough to meet the 1.5° target. The targets are neither sufficiently strong, nor is their implementation being tackled consistently" (Klimaentscheid Jena, 2021).

After starting the collection of signatures, which is necessary for an actual referendum to take place, representatives of the city government adopted the demands and introduced a proposal to the city council, making a referendum obsolete (n.d., 2021). According to the interviewee, around half a year of time was saved by omitting this referendum and appropriating the movement's demands (Stadt Jena, 2024a). This disruption indeed led to a fundamental increase of the city's ambition. On July 14th 2021, the city council decided to become climate neutral until the year 2035 and to create a CEP, the Climate Action Plan Jena (German: *Klima-Aktionsplan Jena*, KAP), which defines the pathway to reach the goal (Stadt Jena, 2021). Thus, the new decision is replacing the previously declared climate goals and the recently finalised LEK 2021 (Stadt Jena, 2024a).

Although, this new development is not mentioned in the CED from 2019 it is still linked to it and can be interpreted as part of the city government's response to the CED. The movement behind the initiative makes a clear reference in their public outreach to the declaration from 2019, justifying their petition with the perceived lack of ambitions of the previous climate goals. Without the original CED, it is unlikely, that the renewed protest would have emerged. Even if a "Climate Decision"-initiative would have formed, their demands would have been weaker, since they couldn't build upon the general declaration

of intent, which the CED symbolises.

The representative of Jena's administration largely supports this interpretation. Although the Interviewee questions the relevancy of the explicit declaration of climate emergency, he sees a connection with the simultaneously passed list of measures and the more general process:

> "if it hadn't been for the whole Fridays for Future movement and the discussion about the climate, the state of emergency, etc. then these eleven specific measures would not have been adopted in 2019, you can say that. But to link it solely on the term [climate emergency], I would say no, that's [the climate neutrality decision] not a direct result" (Stadt Jena, 2024a).

Phase 3: Specification of a Climate Emergency Plan

Jena's CEP was announced in the council's climate neutrality decision and subsequently developed between January and November 2022 by an external company in cooperation with the city (Stadt Jena, 2022a, p. 4). It was published in December 2022. After assessing the current situation, the report sketches a scenario how the city can become climate neutral until the year 2035 and develops measures necessary to reach this end (p. 4). The measures are detailed in a separate document (Stadt Jena, 2022b). A participatory process was implemented to develop both parts of the KAP starting in December 2022. At the core lies a working group (German: *Arbeitskreis*) consisting of delegates from the local government, municipal companies, housing industry, public transport company, the RTKU and the KBR, which met seven times during this period to discuss relevant themes (p. 27). Furthermore, an online platform was launched where the general public was able to propose small-scale measures.

Phase 4: Specification of a Climate Emergency Plan

Although many of the measures listed in the CEP fit the climate governance categories created for this project, most of them are still in development and are therefore irrelevant for the analysis in the next section. Among the still unfolding institutional innovations, for example, is the recruitment of three new staff members in the local climate protection unit until the end of 2024. So far, only one position was newly established (the climate protection coordinator, mentioned above) (Stadt Jena, 2024a). Furthermore, a local climate protection agency (German: *Kommunale Klimaschutzagentur*) is announced to support the implementation of the KAP with outreach and counselling services (Stadt Jena, 2024a). One of the agency's tasks will be the creation of a new participatory process with the climate workshop (German: *Klimawerkstatt*) (Stadt Jena, 2024a). Here, a randomly selected sample of local citizens will be invited to counsel the city government regarding its climate activities. Finally, several strategic documents are currently in development, with the "Thermal Planning" (German: *Wärmeplanung*) and a communication strategy

(Stadt Jena, 2024a).

4.2.4 Development of Transformation Capacity

How did the local government's implementation of the CED in Jena contribute to city's capacity to facilitate a SUT? To answer this question, the city's governance response was rated to determine to what extent it contributes to the four capacities described by Hölscher et al. (2019): stewarding, orchestrating, transformative and unlocking capacity.

Transformative capacity

The city government's response contributed to the city's transformative capacity, i.e. the city's ability to generate new mechanisms for transformative urban climate governance and to implement it in the local context.

The first two years after the CED barely created any transformative momentum in the local climate governance environment. Although the declaration of climate emergency in 2019 is a novelty in the city's history, the local government's first response can hardly be described transformative, as it included just a gradual increase of ambition and mainly relied on established climate governance tools like the LEK 2021.

Only with passing the climate neutrality goal as a response to a new wave of protest, the local government laid the ground for a more transformative climate governance. Changing the intent of the governance system is the first crucial leverage point to establish transformative governance, in line with Abson et al. (2017) and Krueger et al. (2022). By passing the goal to become climate neutral until 2035, the city's ambition saw a major increase and a redirection.

The visibility of the novel climate goal was increased and integrated into the local climate governance system with the development of the CEP. After changing the intention of the governance system with an ambitious climate goal, the design of the system must be adapted (see Abson et al., 2017; Krueger et al., 2022). The development of the CEP provides a framework for a number of activities which help transform local climate governance in line with the declared goal. The initiation and development of the CEP is an important step, not only to detail an implementation strategy, but also to foster public attention.

Finally, the inclusive process conducted to develop the CEP, helps anchor the plan among stakeholders within the administration. The CEP breaks down the local government's implementation strategy into 73 measures (Stadt Jena, 2022b, p. 6). The responsibilities for implementing these measures are distributed among the stakeholders within the local government.

Stewarding Capacity

The local government's response to the CED, helped the city to develop stewarding capacity, which can be described as the city's ability to understand climate change in the local context (both origins and effects) and to provide an institutional setup adequate to navigate sustainable pathways and ensure continuous learning.

First, the city government initiates various activities to generate knowledge about pathways to tackle climate change on the local level, contributing to stewarding capacity. However, it must be noted, that the ambiguous and ambition-lacking goals in the beginning of the process supported the city less, than the precise and ambitious climate-neutrality target. Thus, the main contribution to stewarding capacity came about after the decision to aim for climate neutrality until 2035, when the local government tries to illuminate the consequences of the ambitious goal. The KAP and its development process is a crucial output in this regard. The document details a scenario for implementing the city's climate neutrality goal, outlining potential reduction pathways for the different sectors.

Second, the adjustment of the city government's organisational structure facilitates the implementation of the city's goals, thus fostering stewarding capacity. The reform of certain climate-related institutions strengthened their embeddedness and acceptance among the population. The KBR was extended both in scope and size, transforming it into a central discussion platform for the cooperation of relevant stakeholders in climate issues. The KBR can make proposals to the Committee for Urban Development, Environment, Climate Protection and Sustainability, which was strengthened in its role as the council's central committee on climate-related issues. Besides this, the recruitment of a municipal climate protection coordinator in the early phase after the CED facilitated the coordination of the unfolding process.

Finally, the specification of concrete climate goals and a pathway to get there provide a basis for monitoring and continuous learning processes. Here, the climate neutrality goal and the derived KAP are again more important, than the earlier goals in the LEK 2021, as they substantiate the ambitious goals with 73 concrete measures. Based on the available information it is unclear whether there are already indicators designated to measure the successful implementation of the measures (Stadt Jena, 2022b). The monitoring system is said to be still under development (Stadt Jena, 2022a, p. 77). However, the publishing of monitoring reports on a yearly basis was a key achievement of the LEK 2021 (Stadt Jena, 2020d, p. 7), which was later continued with the KAP (Stadt Jena, 2022a, p. 76).

Orchestrating Capacity

The governance response also substantially improved the city's orchestrating capacity, i.e. its ability to involve and mediate between relevant stakeholders in the creation of

transformative climate governance and to incentivise the implementation.

First, this is done by aligning the various stakeholders behind the shared goal of climate neutrality until 2035. Before the second wave of protests in 2021, not much orchestrating capacity was developed. The local government's first response hardly increased the declared goals, thus, making it unnecessary to gather broad support. After renewed protests, however, Jena's government was able to gather enough support from within the council to pass the climate neutrality goal, thus making a public referendum obsolete.

Second, the local government successfully engaged in the mediation of interests and resources of stakeholders in the development of the CEP. For example, by negotiating roles and tasks of various stakeholders in achieving climate neutrality within the KAP. The focus was, however, on political fractions represented in the council and various branches of the administration – only few representatives of the civil society were included in the working group. Stakeholders outside the local government were, however, not completely excluded. The council's institutions were strengthened, where the mediation between these stakeholders and council members takes place like the Committee for Urban Development, Environment, Climate Protection and Sustainability and the KBR.

Third, the city government's activities created incentives for stakeholders to implement the shared goal of climate neutrality. This is, however, limited to actors within the local government, who are incentivised through the distribution of responsibilities for the implementation of the measures listed in the CEP.

Unlocking capacity

The local government's response also contributes to the city's unlocking capacity, i.e. the city's ability to identify and undermine structural drivers of climate change in the local context.

First, after the refinement of its climate goal, the local government demonstrated an awareness of structural drivers of climate change in the local context. While the first efforts by the city government following the CED (especially the LEK 2021) specified the city's goals to reduce GHG emission, they didn't address the structural origins of these emission. This can be visualised with traffic emission. The LEK 2021 aimed for a reduction of traffic emissions by 50% until the year 2030 compared to 2017 (Stadt Jena, 2020d, p. 5). To this end, the share of walking, bicycle and public transit in the modal split should be slightly increased until 2023 (e.g. public transit from 19% to at least 20%) (p. 4-5). How to reach these goals and which drivers need to be tackled remained ambiguous. This maybe would have changed, if the announced implementation strategy for the LEK 2021 would have been developed (p. 6). In contrast, the KAP goes more into depth and demonstrates an awareness to the underlying structural factors: The document mentions the necessity to

strengthen electric car mobility, but highlights: "However, a change in mobility behavior is much more decisive" (Stadt Jena, 2022a, p. 53).

Second, the awareness for the structural factors of climate change was furthermore translated into concrete measures with the development of the CEP. Concerning mobility emissions, the KAP wants to limit the attractiveness of individual car mobility through an extension of speed reduction zones (LM 21), testing the superblock concept (BM 13) and simultaneously improving the attractiveness of other modes of transportation by expanding pedestrian and bicycle infrastructure (LM 17) (Stadt Jena, 2022b). Addressing these structural factors is also facilitated through the need to reflect on the climate impact of decisions made in the council with the madatory climate impact assessment.

Finally, through the inclusiveness of the implementation process, the local government strengthened its ability to overcome emerging resistance. In this light, the participatory process implemented to develop the KAP manifests a promising effort to undermine potential resistance of those involved in the process, to the profound measures developed in relation to the city's climate neutrality goal. However, the process focused mainly on stakeholders associated with the local government, neglecting the broader population and other relevant stakeholders.

4.3 Summary

The analysis above can be summarised with two arguments: First, the local governments in Erlangen and Jena responded to the declaration of climate emergency with a variety of climate governance activities. Second, this response, although structured around a shared core of activities, differs in some important aspects. This leads to a different level of transformation capacity, leaving the city of Erlangen better prepared to conduct a SUT than the city of Jena. This development is linked to the differing roles, the local governments fulfilled in the CED-implementation process: In Erlangen, protests initially urged the local government to declare climate emergency. The subsequent implementation, however, is primarily steered by the local government. In Jena, the CED was also initiated through protests, but after an initial response by the local government, renewed protest emerged urging, for an increase in ambitions. This leaves the impression, the local government in Jena was less proactive and at least initially less ambitious, than the one in Erlangen.

Generally, both cities succeeded in creating a transformative climate governance environment. Erlangen started slightly more ambitious with the goal to achieve climate neutrality until the year 2030. In comparison, Jena's ambition is to achieve climate neutrality by the year 2035. Both cities increased the visibility of the new transformative climate governance by developing a CEP – the "Roadmap: Climate Awakening" and the KAP. It must be said, however, that the plan was anchored differently among the stakeholders within the city: Erlangen succeeded to involve both, actors within the local government and actors beyond. The local government in Jena, however, focused mainly on actors within the local government.

The development of stewarding capacity sketches an even more diverse picture. Originating in the differing roles the local governments had in the process, in Erlangen the local government developed several preparatory reports outlining the city's options before proposing its ambitious climate goal to the council. In Jena, the climate goal was determined by the renewed protest. The role of the city government was to develop a pathway to reach it. This leads to a broader knowledge base and a better scientific justification for the next steps of the implementation process in Erlangen. Furthermore, both local governments facilitate achieving the goal by changing the city government's institutional design. While Erlangen facilitates the communication between the project team and the city council and established a dedicated department, Jena strengthened already existing committees and established a dedicated position within the local government. Finally, both local governments facilitate the monitoring of its progress by determining a clear goal and a pathway to reach it – operationalised with a list of measures. Erlangen, however, further supports these efforts with the residual budget approach and the

development of indicators to measure the success of the process.

Erlangen's local government contributed more intensive to the development of orchestrating capacity, as it had to align both local government actors and the public behind the goal of climate neutrality until the year 2030. Jena, in contrast, responded to renewed protest with the goal of climate neutrality until the year 2035 and only had to negotiate with the city council members. Both engaged differently with stakeholders within and beyond the local government to develop the CEP. Erlangen initiated a steering group to coordinate within the local government and conducted an elaborate participatory process to engage citizens, companies and other relevant institutions. In Jena, a working group consisting mainly of local government stakeholders developed the CEP. Actors beyond were indirectly involved through the strengthening of committees with civil society involvement and an online platform. Similarly, both city governments established different incentives for implementing the CEP. In Erlangen, a mechanism was put in place to incentivise both local government actors and actors beyond to contribute to the CEP, with the city contract. In Jena, mainly local government actors are incentivised to implement the CEP through the distribution of responsibilities in the KAP.

Finally, both cities demonstrate the development of unlocking capacity. Both cities foster an awareness for structural drivers of climate change and develop measures to counter them. The main difference is, that Erlangen started earlier with the writing of preparatory reports, while Jena only started after renewed protest with the development of the CEP. Furthermore, both cities try to mitigate resistance to their ambitious plans to a different degree: In Erlangen, the broad participation of actors within the city government and beyond make it unlikely that resistance will emerge. In Jena, the participatory process mainly focused on the local government, neglecting the broader population and local companies. This potentially leads to a disconnect between the local government and other stakeholders in the city.

4.4 Discussion

Thousands of local governments worldwide declared climate emergency in the past decade — among them, Erlangen and Jena in Germany. This thesis conceptualises these declarations as governance instruments, passed with the ambition of transforming local climate governance to an "emergency mode". Doing this, they are expected to generate a more facilitative governance environment for a SUT. Whether the declarations succeed in this endeavor is unclear, as much of the research literature on the implementation phase of CEDs stays superficial and focuses mainly on the existence and the contents of CEPs.

In a first step, this research demonstrated the variety of climate governance activities initiated by the local government in Erlangen and Jena to implement the CED. The analysis confirms the central role of the CEP and the climate goal it is based on, usually highlighted in the literature. The implementation processes in both cities are structured around the specification of the CED with an ambitious climate goal and the development of a CEP outlining a pathway to realise it. However, the research also highlighted, since the declaration of climate emergency in 2019, both cases initiated a multiplicity of supporting governance activities in response to the CED. Among these activities, the research identified (1) several preparatory studies forming the conceptual basis of the CEP in Erlangen, (2) the establishment of a dedicated climate-related department or position within the local government, (3) the creation of new or strengthening of established committees within the local government, (4) the introduction of a mandatory climate impact assessments for council decisions and (5) a dedicated participatory processes to involve other stakeholders in the development of the CEPs.

In the second step, a new approach was applied, to measure the success of the CEDs in establishing a more facilitative environment for a SUT. To this end, the governance activities were analysed to what extent they contribute to the city's transformation capacity – thus strengthening the ability of stakeholders involved in urban governance to conduct a SUT. In line with the literature, the central role of the climate goal and the development of the CEP was confirmed as they contributed substantially to transformation capacity in both cities. The activities (1) initiated a transformative climate governance environment characterised by increasing the city's ambitions and by adapting the governance system under the framework of the CEP (transformative capacity), (2) developed a better understanding of the ambitious goals, by outlining a pathway to get there and facilitating the monitoring of the process through the specification of measures (stewarding capacity), (3) demonstrated an awareness for structural drivers of climate change and developed measures to counter them (unlocking capacity) and (4) aligned central stakeholders behind the goal of climate neutrality and mediated their interests and resources in the development of the CEP (orchestrating capacity).

Despite the similarity of these core activities in both cities (ambitious climate goal, development of CEP) Erlangen's response was found to be more pronounced, leading to a stronger development of transformation capacity. This draws attention to the multiplicity of supporting activities, which vary between the two cities. This is particularly apparent, when considering the inclusion of other actors in the development and implementation of the CEP. In Jena, a working group consisting of 42 individuals from the administration, the council, municipal companies and some representatives of the civil society were engaged in the development of the CEP, supported by an online platform for citizen participation. The responsibilities for the implementation of the 73 measures included in the CEP are

distributed among local government actors. In contrast, in Erlangen the development of the CEP was coordinated by a steering committee (including administration and council representatives) and a more elaborated participatory process was conducted. A citizen council and a stakeholder group were initiated to mediate the interests of council representatives, the general public and other important stakeholders like local institutions and private companies. Furthermore, with the creation of the city contract the local government launched an initiative to distribute the responsibilities for the implementation of the plan beyond the local government. These different approaches develop the city's orchestrating capacity to a different degree, leaving Erlangen better prepared to orchestrate a potential SUT.

This thesis contributes to current research by conceptualising CEDs as governance instruments aimed at facilitating the SUT through the transformation of local climate governance and proposing a new approach to measure their success. Thus, it aims to extend the literature on the implementation of CEDs, going beyond current research literature, which mainly focuses on the development of CEPs. In an effort to shed light on the "congruence between stated commitments and allocated resources" (Van Der Heijden, 2019, p. 6), it proposes a novel approach of closing the gap between the indeed outcomes of CEDs and the actions they are followed up with. The transformation capacity approach to CEDs, builds upon the integration of existing literature on transformation capacity, urban climate governance and CEDs.

The results are relevant in light of growing criticism towards traditional urban climate governance approaches and demands for more transformative forms of climate governance (e.g. Loorbach, 2020). The analysis demonstrates, in both cities, it was possible to implement a transformative form of climate governance insofar as the intent of the climate governance system was changed with the passing of an ambitious climate goal, and the design of the governance system was adapted with a variety of other climate governance activities (in line with Abson et al., 2017; Krueger et al., 2022). Both processes were initiated bottom-up by local activists. While the implementation was a straightforward linear process by the proactive local government in Erlangen, the local government in Jena first tried to adhere to the established climate governance system. It was only after renewed protest, that the city's ambitions were increased, and a transformative dynamic was introduced.

Furthermore, it highlights the need for an inclusiveness of the transformation processes changing our cities. Concerning the transformative processes following CEDs, Gudde et al. (2021) cautions the importance of maintaining the support of the broad population:

> "The impact of a relatively small popular lobby has achieved a shift in local political ambition. The risk is that while there is a lot of popular support that climate change must be

> addressed [...], it is argued that the wider population will not buy into the necessary action [...]" (p. 10).

Based on this analysis, the local government's response in Erlangen seems better suited to ensure long-term support for transformative changes compared to Jena. In Erlangen, one can observe a more pronounced development of orchestrating through an elaborate participatory process involving a variety of stakeholders in the production and implementation of the CEP, strengthen the legitimacy and support of the process.

What factors contribute to these differing outcomes? The first and probably most apparent factor is the time delay in Jena's CED implementation process. Not only was Jena's declaration passed several months after Erlangen's declaration, the specification of the declaration with a specific and ambitious climate goal was also delayed due the local government's lacking ambitions in the beginning of the process. This is visible also in the extent of relevant measures still in development in Jena (e.g. the local climate protection agency and the climate workshop). While this approach explains the large number of unfinished governance activities, it doesn't explain the missing ambitions of the already implemented activities. For example, the participatory process in Erlangen was much more elaborate and inclusive than in Jena's CEP.

Therefore, a different provision of resources may be an even more relevant driver. The importance of an adequate resource provision for the implementation of the CEDs is mentioned by several authors (see literature review in subsection 2.2.5) and was integrated into the theoretical model (see figure 2.2). The differing financial situation of both jurisdictions was already elaborated in the methodology and raised the expectation, of a lower level of resource investment in the city of Jena. And indeed, evidence was found testifying variations in resource provision. In Erlangen, a report published by the city government mentions a total of 17,5 positions which were newly established in relation to the CEP (Stadt Erlangen, 2023a, p. 20). In Jena, no official data is available, but according to the interview, there are only three more staff members expected until the end of 2024 (excluding the already established position of municipal climate protection coordinator) (Stadt Jena, 2024a). Besides the mere lack of financial resources, also missing political will in Jena (with a mayor from the FDP, compared to a mayor from the SPD) could contribute to the lower investment in climate governance activities. Fuhr et al. (2018) highlight, for example, the importance of "Mayors and other key players with enough political authority to encourage collective action" in facilitating climate action on the local level (p. 1).

The findings of this research come with several limitations. First, the limitation of timing. Multiple authors emphasise the importance of timing, as CEDs are a quite new and still unfolding phenomenon (Davidson et al., 2020; Nissen and Cretney, 2022; Rilling and

Tosun, 2021, e.g.). In this context, Gudde et al. (2021) argue: "The next twelve to eighteen months [after the declaration] will [...] be vital to their success" (p. 10). By considering up to three years after the initial declaration of climate emergency in 2019, this research encompasses a broader time-frame than previous research. This allows important insights into the changes in the local climate governance environment. Nonetheless, the situation is still unfolding and especially the case of Jena shows, that some important governance activities are still in development (e.g. the establishment of the "Klimawerkstatt" or the local climate protection agency). Furthermore, the recent rise of conservative and right-wing parties in Germany (also visible in Jena's 2024 elections mentioned in the beginning of section 4.2) may still hamper the implementation process at a later stage.

Second, the limitation of data availability. This research builds upon the triangulation of various data sources, which could be extended in further research. Despite giving an in-depth view inside the process on the ground, the triangulation of interviews, publicly available documents and newspaper articles could be extended. For example, to better assess the resource provision amidst the implementation process. It was difficult to trace the extent of financial investments and recruitment processes happening in the administration. Here, maybe access to official budget data and additional interviews with the financial officer would help. In this regard, Erlangen was more transparent than Jena due to the release of a first monitoring report.

Additionally, because of the focus on governance activities initiated by the local government, only interview partners within the local government were selected. However, other stakeholders were also involved in these activities, which makes them important sources of information to generate a more complete picture. For example, the interview partner in the administration of Jena argued the institutionalisation of the RTKU led to "good inclusion" of the civil society into local climate governance (Stadt Jena, 2024a). It is unclear, however, how local activists actually perceive the institutionalisation, and whether they agree to this conclusion. Therefore, further research should not only conduct extensive interviews with representatives of the local government, but also involve other relevant stakeholders.

The final limitation is connected to the scope of the research. First, it focuses on the city governments's response to the declaration of climate emergency. This is justified since the local government is holding a pivotal position in urban climate governance, but it is not the only actor. Other actors like local institutions (e.g. universities), companies and the civil society may also respond to the declaration, potentially contributing to the city's transformation capacity. In Jena, for example, the civil society initiated a "climate emergency center" following the example of other cities (Klimazentrum Jena, n.d.). This may equally contribute to the city's ability to orchestrate a SUT. Therefore, further

research should explore, how non-state actors respond to the declaration of climate emergency.

Furthermore, this research is focusing on the transformation of local climate governance as a prerequisite for a SUTs – not the SUT itself. It was mentioned, that most of the measures included in the CEP are either still in development or didn't even start. With the activities analysed in this research, the local government strengthened its ability to realise these measures. However, it will be a matter of future research to assess the actual implementation of the measures, achieved changes in the modal split and the long-term success in reducing GHG emissions. Thus, research in the next years should focus on finding ways to measure the actual transformation of the SETS – beyond the transformation of urban climate governance.

5 Conclusion

In the last decade, local governments around the world declared climate emergency. Usually initiated by local residents or activist groups, these governance instruments aim to transform local climate governance to an "emergency mode" to adequately address climate change and its effects. Doing this, they strive to establish a more facilitative governance environment for a SUT. Despite the proliferation of these CEDs and the high hopes connected to them, research on their effectiveness is still scarce. To fill this gap, the presented thesis suggests a transformation capacity approach to CEDs. Using the cases of Erlangen and Jena in Germany, the approach aims to illuminate (1) how the respective local government implements the CED in the three years following the declaration and (2) to what extent this strengthens the city's ability to transform. To this end, an extensive database was compiled through desktop research and interviews with local officials and subsequently analysed using a deductive content analysis.

The first part of the analysis demonstrated, the implementation processes in both cities are similarly structured by specifying an ambitious climate goal and formulating a pathway on how to reach it – two activities often cited in the literature. However, additionally a variety of supporting activities were identified, which differ partly between the cases: The respective local governments (1) commissioned preparatory studies, (2) established a central coordination within the local government, (3) created or strengthened important committees, (4) established a mandatory climate impact assessment and (5) conducted participatory processes to involve other stakeholders. The second part of the analysis found, both implementation processes established transformative climate governance and strengthened the city's ability to transform. However, especially the more comprehensive participatory process conducted in Erlangen compared to Jena, leaves the city better prepared to conduct a SUT.

The case study analysis demonstrates that CEDs can indeed establish a transformative form of climate governance in the declaring city - bringing them closer to the ideal of a SUT. However, variations in the provided resources and the timing can lead to differences, which leave some cities better prepared than others. The results were generated with two cases exhibiting especially conducive requirements. Both cities are located in Germany, where local governments enjoy a comparatively high level of regulatory autonomy. Furthermore, both cities have a long history of climate governance and a comparatively comfortable financial situation.

Given these similarities, further research should apply this approach to other cases in order to validate its relevance. So far, mandatory climate impact assessments were only identified in a German context (Hirschl and Pfeifer, 2020; Rilling and Tosun, 2021). Therefore, it is unclear how a local government operating in a more restricted regulatory environment implements a CED and to what extent this strengthens the city's ability to transform. Furthermore, subsequent research should be based on a more extensive data collection. Interviews were crucial to assess the conducive effect of climate governance activities on transformation capacity. Therefore, more interviews, if possible also with non-governmental stakeholders, should be conducted. Switching the scope to the response of other actors to the declaration of climate emergency provides, furthermore, a promising path for future research.

Finally, the underlying topic of this thesis was the transformation of local climate governance as a consequence of the declaration of CEDs. This transformation is theorised to facilitate a local SUT. It is, however, up to future research to investigate whether this is enough and if the transformation of the urban system succeeds in the long-term.

Appendix A

Questionnaire used in the semi-structured Interviews with local officials in Erlangen and Jena. The Interviews were conducted in German.

1. Introductory Questions
    a) How would you describe your current position and tasks in [City Name]?
    b) How long have you been working in this position? Were you previously employed by [City Name]?
    c) To what extent were you involved in the passing of the CED and its subsequent implementation process?
    d) What were your thoughts about the CED when it was discussed back in 2019?
2. Resource-Related Questions
    a) Did the city government invest more money into climate protection activities after the CED was passed?
        i. If so, in which activities did the money flow?
        ii. In your opinion: Would the additional money have been invested in these activities even without the CED?
        iii. How high would you estimate the additional investment?
3. Output-Related Questions
    a) What climate governance activities were implemented by [City Name] since the declaration of climate emergency?
        i. Which documents (e.g. plans and strategies) have been published by the city since then in the field of climate and environmental protection?
        ii. What new or more far-reaching climate goals were passed by the city council since then?
        iii. What institutional changes have been made within the city government in relation to climate and environmental protection? (e.g. hiring more

people, setting up a new department, issuing internal guidelines, etc.)

iv. Which processes have been launched that involve stakeholders outside the city government (e.g. citizens, companies, etc.) in relation to climate and environmental protection?

b) Which of these activities would you attribute directly to the resolution?

c) Which of these activities were planned anyway?

4. Concluding Questions

a) What processes, activities, plans and strategies are planned in the near future (1-3 years) in the field of climate and environmental protection by [City Name]?

b) To sum up, would you say that the CED has made a big difference to the local government's climate protection activities?

c) Do you consider the CED to be an effective instrument for intensifying a city's climate protection activities? Why?

Appendix B

Table B1. Overview of capacity development in Erlangen and Jena, Source: own work.

Capacity	Erlangen	Jena
Transformative Capacity	*Initiating* transformative climate governance by passing an ambitious climate goal (climate neutrality by 2030). *Increasing* the visibility of transformative climate governance through launching the "Climate Awakening"-process. *Breaking down* the ambitious climate goal into manageable measures through the "Roadmap: Climate Awakening". *Distributing* responsibilities to implement the measures within the administration through the "Roadmap: Climate Awakening" and among other stakeholders through the city contract.	*Initiating* transformative climate governance by passing an ambitious climate goal (climate neutrality by 2035). *Increasing* the visibility of transformative climate governance through launching the process connected to the KAP. *Breaking down* the ambitious climate goal into manageable measures through the KAP. *Distributing* responsibilities to implement the measures within the administration through the KAP.

Table B1 continued from previous page

Capacity	Erlangen	Jena
Stewarding Capacity	*Generating* a better understanding of potential climate goals and their relation to the goals of Paris Agreement through the development of scenarios in the baseline study and the reports on "Climate-neutral Erlangen: First analyses" and the "Roadmap: Climate Awakening"	*Generating* a better understanding of the consequences of the climate neutrality goal through the development of a climate neutrality scenario in the KAP
	Facilitating communication between the project team and the city council through the establishment of a steering group	*Facilitating* the embeddedness of important committees and strengthening the societal acceptance through adjustments in the KBR and the Committee for Urban Development, Environment, Climate Protection and Sustainability
	Facilitating coordination through the establishment of dedicated department for "Environment and Climate Protection"	*Facilitating* the coordination of climate efforts through the establishment of a dedicated position for municipal climate protection coordination
	Allowing monitoring through the decision on a concrete climate goal (climate neutrality until 2030) and its operationalisation with a residual budget	*Allowing* monitoring through the decision on a concrete climate goal (climate neutrality until 2035)
	Facilitating monitoring by substantiating the goals with concrete measures and a set of indicators to measure their success through the "Roadmap: Climate Awakening"	*Facilitating* monitoring by substantiating the goal with concrete measures through the KAP

Table B1 continued from previous page

Capacity	Erlangen	Jena
Orchestrating Capacity	*Aligning* the members of the city council and the public behind the shared goal of climate neutrality until 2030 *Mediating* the interests of members in the city council through the steering group *Mediating* the interests and resources of other companies, institutions and the citizens through an elaborate participatory process *Incentivising* actors within the local government to implement the CEP through the distribution of responsibilities in the "Roadmap: Climate Awakening" *Incentivising* actors beyond the local government to implement the CEP through the initiation of voluntary commitment in the city contract	*Aligning* the members of the city council behind the shared goal of climate neutrality until 2035 *Mediating* the resources and interests mainly of stakeholders within the local government through the working group *Strengthening* important committees for the mediation between local government and the population through the KBR and the Committee for Urban Development, Environment, Climate Protection and Sustainability *Incentivizing* actors within the local government to implement the CEP through the distribution of responsibilities in the KAP

Table B1 continued from previous page

Capacity	Erlangen	Jena
Unlocking Capacity	*Developing* an awareness of structural drivers of climate change and the need for a SUT through the baseline study *Developing* measures to tackle these structural drivers of climate change through the "Roadmap: Climate Awakening" *Unveiling* structural drivers of climate change in everyday decision-making through the establishment of a mandatory climate impact assessment for council proposals *Weakening* potential resistance to the profound changes through a participatory process involving stakeholders within and beyond the local government	*Developing* an awareness of structural drivers of climate change and the need for a SUT through the KAP *Developing* measures to tackle these structural drivers of climate change through the KAP *Unveiling* structural drivers of climate change in everyday decision-making through the establishment of a mandatory climate impact assessment for council proposals *Weakening* potential resistance to the profound changes through a participatory process involving mainly stakeholders within the local administration

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