Governing Pathways to Decarbonisation: A Case Study of Carbon Neutral Adelaide Partnerships

By

Grace Elizabeth Andrews

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ABBREVIATIONS

BUF: Building Up-grade Finance
C40: C40 Cities Climate Leadership Group
CCCLM: Council of Capital City Lord Mayors
CCP: Climate Change Program
CDP: Carbon Disclosure Project
CNA: Carbon Neutral Adelaide
CNCA: Carbon Neutral Cities Alliance
CoA: City of Adelaide (Council)
COP21: Conference of the Parties (Paris)
GHG: Greenhouse gases
GovSA: Government of South Australia
ICLEI: International Council for Local Environmental Initiatives
NABERS: National Australian Built Environment Ratings System
OECD: Organisation for Economic Cooperation and Developmen**UNFCCC:** United Nations Framework Convention for Climate Change

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DECLARATION

I, Grace Elizabeth Andrews, declare that this thesis does not incorporate without acknowledgment of any material previously submitted for a degree or diploma in any university; and that to the best of my knowledge and belief it does not contain any material previously published or written by another person except where due reference is made in the text.

Signature:

Date: 6 November 2020

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ABSTRACT

Australian cities account for the majority of the country's population and greenhouse gas emissions and are expected to experience the negative impacts of climate change the most severely. However, the economy remains locked into carbon, and the Federal government remains unwilling to implement coordinated and systemic climate policies for reducing carbon emissions to a safer level. As a result, municipal governments are playing a more critical role in urban climate governance with help from state governments and non-state actors to combat climate change from the bottom-up. A political strategy gaining popularity with municipal governments for urban climate governance is the carbon neutral city. Adelaide city, South Australia is one example where an Australian municipality has adopted such a strategy. Here, City leaders have set an ambitious target of being one of the world's first carbon neutral cities by 2025. This research uses Carbon Neutral Adelaide as a case study to critically investigate how municipal governments and non-state actors are effectively or ineffectively governing urban climate change. A conceptual model is used to measure the effectiveness of governing Carbon Neutral Adelaide through three political mechanisms: 1) normalisation, 2) capacity building, and 3) coalition building. A mixed-methods approach was applied to test whether the partnerships and networks created between the City of Adelaide and non-state actors improve the governance of Carbon Neutral Adelaide. Policy documents on Carbon Neutral Adelaide, and seventeen semi-structured interviews with stakeholders across the public sector, private sector, and civil society were collected. Both data sets underwent content and discourse analysis. The results showed that partnerships and climate action networks are assisting the City of Adelaide in providing political leverage and technical support for a low-carbon economy. However, the City of Adelaide has limited capacity and resources for effectively engaging with these partners, and there are many missed opportunities for decarbonising Adelaide collectively. Furthermore, a change in political leadership for local and state governments has stalled the momentum towards carbon neutrality. It is recommended that the City of Adelaide amends its partnership with the Government of South Australia to re-align their goals and set new targets. There is also potential for the City of Adelaide to engage with stakeholders in the private sector and civil society for deliberative and collaborative governance of carbon neutral initiatives.

Key words: urban climate governance, carbon neutral city, low-carbon transitions, multilevel governance, network governance, partnerships, and climate action networks

1. INTRODUCTION

While the physical footprint of cities only takes up 2% of global land area, urban activities are contributing to more than 70% of global greenhouse gas emissions and consuming 78% of the world's energy (Davidson and Gleeson, 2018, p. 231; Hutyra et al., 2014, p. 473; While and Whitehead, 2013, p. 1326). In Australia, the percentage of the population living in urban areas is more than 85% and rising and the per capita carbon emissions is second among OECD countries reaching 16.8 tonnes (Newton et al., 2018, p. 194; Trading Economics, 2020). As one of the driest and warmest countries globally, Australia is especially vulnerable to the effects of climate change (Iping et al., 2019, p. 420). Scientists predict that Australia will experience a decrease in annual rainfall, an increase in extreme weather events, extreme heat, and ocean acidification (Newton, 2009, pp. 131-133). Cities are more likely to be acutely affected by climate change because of their high-density populations and proximity to the coastline, making them more vulnerable to extreme weather events (Newton, 2009, p. 133; Newton et al., 2018, p. 201). Moreover, cities already experience the Urban Heat Island (UHI) effect, which involves localised warming due to the materials and structures used in urban developments that trap in the heat from the sun (Iping et al., 2019, p. 420). Urban climate change impacts will only intensify as urban centres continue to grow and compete for open space (UN Habitat, 2016, p. 7). Due to these vulnerabilities and the number of Australian urban dwellers, all Australian government tiers must prioritise climate mitigation and adaptation strategies at the root of the problem- *cities*.

In the past, global climate governance has been highly centralised, relying on international conventions held by the United Nations Framework Convention for Climate Change (UNFCCC) and national commitments, such as the Paris Agreement, to reduce carbon emissions to a safe level (Gordon, 2013, pp. 288-289). However, these attempts have shown to be politically stalled and mostly ineffective in solitude (Gordon, 2013, p. 288; van der Heijden et al., 2019, p. 366). Consequently, municipalities have been gaining recognition for the crucial role they are playing in climate change responses and the potential they hold to advance climate governance from the bottom-up (Bulkeley, 2010, p. 230; Bulkeley et al., 2012, p. 546; While and Whitehead, 2013, p. 1326). Research on municipal strategies, policies, and implementation measures for climate change governance has been growing since the 1990's (Broto and Bulkeley, 2013, p. 92). Bernstein and Hoffman (2018, p. 192) recognised that over this period approaches

to climate governance has shifted away from multilateral treaty-making to *experimental governance* where multiple actors engage in processes of trial and error for decarbonising the urban environment. One type of experiment in urban climate governance that has become more popular in the last decade is the *carbon neutral city*.

Carbon neutrality has recently become one of the most aggressive strategies for reducing carbon emissions and transitioning to a low-carbon economy within the urban environment (Innovation Network for Communities, 2014). It aims to deeply decarbonise metropolitan Adelaide by transforming the energy, transportation, building, and solid waste sectors and offsetting any remaining emissions through carbon sequestration projects and trading schemes (Innovation Network for Communities, 2014). However, it is still unknown what a carbon neutral city looks like and how it will be achieved, as there are multiple pathways that cities are currently implementing (Tozer and Klenk, 2018, p. 174). The cities that have pledged to become carbon neutral by 2050 or sooner have joined the global Carbon Neutral Cities Alliance (CNCA) and are implementing long-term decarbonisation plans to help them reach this ambitious goal. Nevertheless, in partnership with the business and community sectors, local and state governments are facing many barriers to implementing carbon neutral initiatives that are transformative (Tozer and Klenk, 2018, p. 175). One of the new members of the CNCA, Adelaide in South Australia, appears to be experiencing some of these barriers and is the case study of this project on carbon neutral cities for low-carbon urban transitions.

The research aim is to investigate the political effectiveness of the *Carbon Neutral Adelaide Action Plan 2016-2021* (herein referred to as the *Action Plan*) with a specific focus on the role that partnerships and local government are playing in its implementation. There is a need for this research because the reduction in carbon emissions within Adelaide has recently slowed, resulting in the Government of South Australia (GovSA) pulling away from its partnership with the City of Adelaide (CoA) and questioning the effectiveness of Carbon Neutral Adelaide (CNA) as a strategy for urban climate governance (Siebert, 2018). Additionally, past research attempts to measure the effectiveness of governing urban climate change initiatives fail to account for the complexity of the political and social context. Instead, they typically involve comparing calculated greenhouse gas emissions with set targets or surface-level desktop reviews of policy initiatives (Tozer, 2020, p. 2). The *Action Plan* identifies a partnership framework as its foundation, recognising the importance of involving the community in decision-making, priority

setting, and implementation. Partnerships are vital for producing shared normative beliefs, encouraging community action, knowledge sharing, and capacity building (Glasbergen et al., 2007, p. 4; Wolfram et al., 2019, p. 442). Therefore, it is the hypothesis that Adelaide has slowed progress towards carbon neutrality because of poorly governed partnerships and networks, inhibiting the scaling-up and entrenchment of low-carbon living.

On a larger scale, this research will contribute to the present debates on urban climate change and the importance of multilevel governance to produce inclusive and transformative policies for environmental sustainability. On a smaller scale, it will highlight the challenges that the CoA and its partners face when attempting to become carbon neutral while also identifying opportunities to overcome these challenges. The carbon neutral city is yet to be achieved, and there has been little research on how cities are attempting to make this transition from a political perspective, especially for Australian cities. Understanding Adelaide's current sociopolitical state five years into the *Carbon Neutral Adelaide Strategy 2015-2025* will help inform the government on which political mechanisms have been successful and have failed at catalysing a low-carbon transition. In doing so, future decision-making on environmental policy development and implementation can improve.

Research Question:

How effective are local government partnerships transitioning to a carbon neutral city: A case study of Carbon Neutral Adelaide?

Research Aims:

1. To assess the effectiveness of the Carbon Neutral Adelaide partnerships and governance initiatives
2. To determine the barriers and enablers that the City of Adelaide and partners are experiencing when transitioning to a carbon neutral city
3. To identify the role that partnerships and climate action networks play in urban climate governance
4. To discover Adelaide’s trajectory towards decarbonisation
5. To explore policy alternatives that can overcome barriers to low-carbon urban transitions

This research question and aims were shaped by literature on low-carbon transitions, urban climate governance, network governance, partnerships, and carbon neutral cities and are synthesised in the proceeding Chapter.

2. LITERATURE REVIEW

2.1 INTRODUCTION

There has been an extensive and growing amount of literature since the 1990's on what researchers call *urban climate governance* (Bulkeley et al., 2012, p. 546; van der Heijden et al., 2019, p. 365). Anguelovski and Carmin (2011, p. 169) define urban climate governance as "the ways in which public, private, and civil society actors and institutions articulate climate goals, exercise influence and authority, and manage urban climate planning and implementation processes." Research in this topic broadly aims to answer how, why, and to what degree of success cities are governing climate change and whether local governments can effectively implement climate policies that can scale-up national and global agendas (Bulkeley et al., 2012, p. 547). By answering these questions, social scientists can gain a better understanding as to why there is a growing gap between the rhetoric and the reality in cities, thus acting as agents of change for global climate governance (Bulkeley et al., 2012, p. 547; van der Heijden et al., 2019, p. 366). Most of the research on this topic uses the method of case studies of various climate experiments that are taking place in cities around the world.

Carbon Neutral Adelaide (CNA) is an excellent case study of a urban climate change experiment. It appears to have a gap between its rhetoric and its practice, and heavily relies on partnerships between local and non-state actors for its implementation. The *Action Plan* is designed to harness these partnerships to ensure deep cuts in emissions over a short time period (Government of South Australia and City of Adelaide, 2016, p. 15). While the partnership framework for this ambitious initiative promises good governance, Adelaide has not seen the deep cuts in emissions needed for carbon neutrality (Richards, 2020). This research project will clarify why the *Action Plan* is not showing the expected results by investigating the implementation barriers that the City of Adelaide (CoA), the Government of South Australia (GovSA), and non-state actors are experiencing.

The literature review covers the topics of urban climate policies, multilevel governance, network governance, and partnerships necessary for a city-wide transition to carbon neutrality. The order of the review will begin with *Section 2.2* on the history of low-carbon transitions for urban climate governance in the Australian context. Afterward, *Section 2.3* will discuss the multilevel governance framework and how it has shaped the research aims. Then, *Sections 2.4* and *2.5* will cover network governance and partnerships for effective urban climate governance.

Section 2.6 provides details and case studies of carbon neutral cities. Next, the case study CNA will be further explained in *Section 2.7*. The review will finish with a description of the conceptual framework of this research in *Section 2.8* and a conclusion in *Section 2.9*.

2.2 AUSTRALIAN CLIMATE GOVERNANCE FOR LOW-CARBON TRANSITIONS

The key objective of urban climate governance is to understand the pathways, policies, programs, and practices for low-carbon transitions (McGuirk et al., 2014a, p. 145). According to McGuirk et al. (2014a, pp.145-146), low-carbon transitions involve "social transformation through more collectivised, cooperative responses." Additionally, a low-carbon transition means a radical reduction in greenhouse gas (GHG) emissions, and it occurs when a new socio-technical regime has successfully replaced the dominant regime (Khan, 2013, p. 135). Therefore, low-carbon urban transitions require a long-term, multilevel governance approach that firmly embeds strategic climate policies into local, regional, and national planning (Khan, 2013, p. 133; Moloney and Horne, 2015, p. 2439). For some nations, this transition has been relatively smooth and successful. However, for Australia, the political and economic context has made a multilevel governance approach to a low-carbon transition challenging. Australia has historically been heavily dependent on fossil fuels for energy use and economic growth, leading to a high emissions lifestyle embedded into the urban environment (McGuirk et al., 2014a, p. 140). Furthermore, national climate change responses have been incremental and incoherent, leading to State governments taking the leading role in regulating climate policies, and local governments becoming active in transnational climate networks and strategic urban policy-making (McGuirk et al., 2014a, p. 140).

Urban climate governance research in Australia has been growing in recent years but remains sparse and at surface level in most instances. It often involves case studies of Melbourne and Sydney (Davidson and Gleeson, 2018; McGuirk et al., 2015; Moloney and Horne, 2015), or nation-wide desktop policy audits for its methodology (Davidson and Arman, 2014; McGuirk et al., 2014a; McGuirk et al., 2014b; Newton and Newman, 2013). There is a consensus among the literature that the disconnect between levels of government and its policies are inhibiting coordinated and systematic low-carbon transitions in the city. The next few Sections will provide details on the themes and conclusions that have been identified in this initial review of low-carbon transitions for urban climate governance.

2.3 MULTILEVEL GOVERNANCE

2.3.1 Historical Background

In the 1990's, several pioneering cities saw the potential danger of climate change, and they began taking action at the local level, while international and national attempts to do so were slow and ineffective (van der Heijden, 2019, p. 3). These actions focused on reducing carbon emissions from urban activities, developing innovative technology, and lobbying for climate policies (Bulkeley and Betsill, 2013, p. 139). As this grassroots movement grew, it became commonly understood that municipal governments hold the solutions to sustainable development (Bulkeley and Betsill, 2013, p. 137). Municipalities are responsible for governing the built environment, transportation system, energy sector, and water and waste management that are the largest contributors to carbon emissions; therefore, it was logical that they are responsible for governing these processes sustainably (Bulkeley et al., 2012, p. 546; van der Heijden et al., 2019, p. 366). It is also argued that international and national agencies cannot account for the uncertainties of climate change or the complexities of various socio-economic contexts. This has led to some federal governments (e.g. Australia, Canada, and the U.S.) becoming less involved in climate change action (Bulkeley and Betsill, 2013, p. 298; Bulkeley et al., 2012, p. 545; Gordon, 2013). However, as municipalities attempted to battle climate change without federal support, the limits of their institutional capacity and political economy to do so became evident (Bulkeley and Betsill, 2013, p. 140). This over-reliance on local government to decarbonise the urban environment has led to the gap between the rhetoric of cities as the newfound hope for climate change responses and the reality of governing urban climate change in practice (Bulkeley and Betsill, 2013, p. 140; van der Heijden et al., 2019, p. 366; van der Heijden, 2019, pp. 2-3).

2.3.2 Vertical and Horizontal Governance

This former *localism* framework has recently shifted to one of *multilevel governance*, which accounts for the relationships between local and global levels of government (vertical coordination), and those between departments, agencies, and organisations (horizontal coordination) (see Figure 1 and Bulkeley and Betsill, 2013, p. 137; van der Heijden, 2019, pp. 4-5). Hooghe and Marks (2002, p. 8) define vertical and horizontal coordination as *Type 1* and

Type 2 multilevel governance. *Type 1* is federalism, where a small number of jurisdictions exist at different tiers with non-overlapping, durable boundaries (***blue***) (Hooghe and Marks, 2002, p. 9). *Type 2* has a more polycentric structure where there are many task-specific jurisdictions whose boundaries overlap and are flexible depending on citizen preferences (***gold***) (Hooghe and Marks, 2002, p. 11).

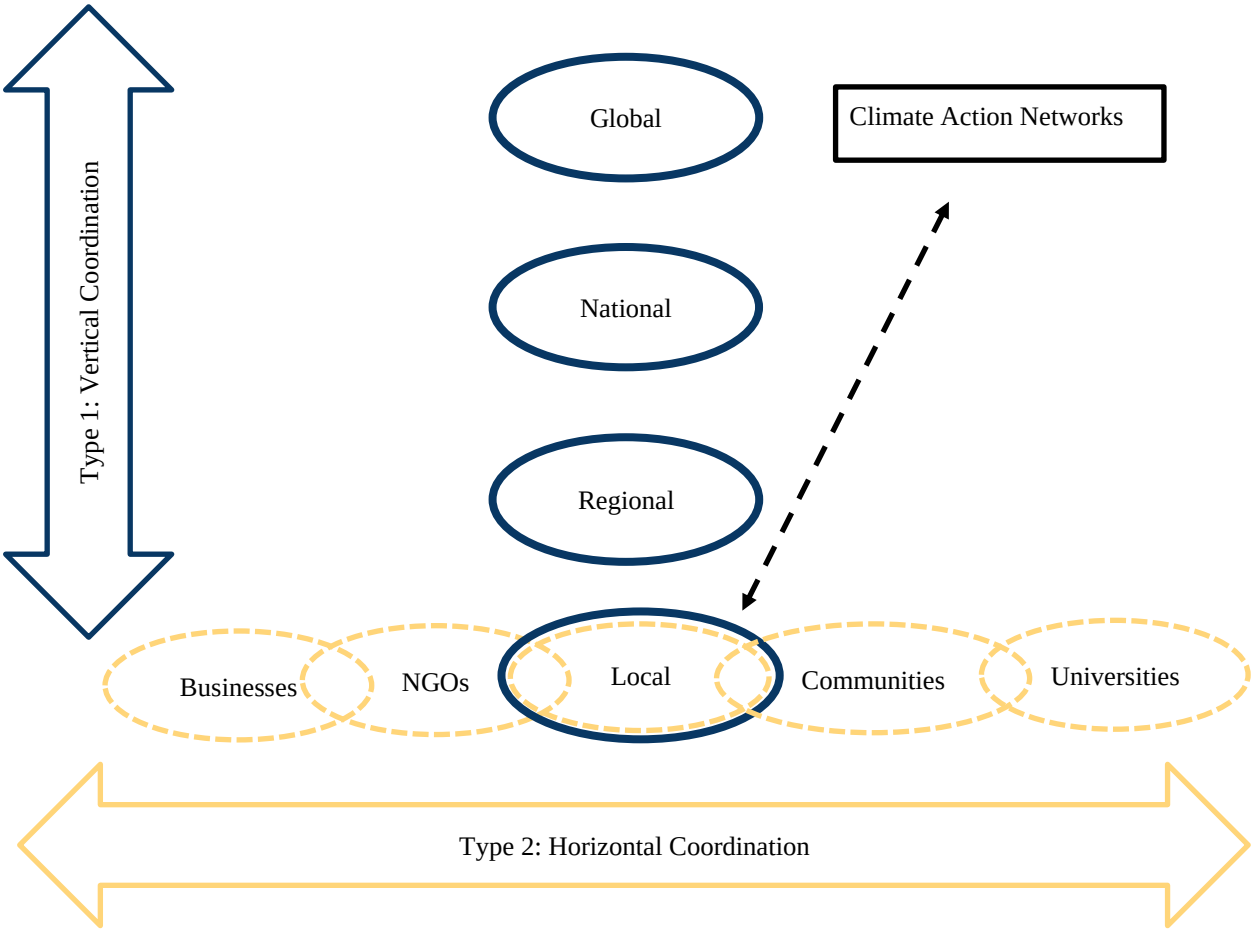

Figure 1: Multilevel governance framework- horizontal and vertical coordination

2.3.3 Significance

As much of the more recent studies on urban climate governance has recognised (Bernstein and Hoffmann, 2018; Bulkeley and Betsill, 2013; Gordon, 2013; McGuirk et al., 2015; van der Heijden et al., 2019), applying a multilevel governance framework will ensure a holistic analysis of whether policy attempts to develop sustainable cities are or are not successful. Local governments are interdependent on the spheres of horizontal and vertical

authority and should not be studied in isolation (van der Heijden et al., 2019, p. 368). Moreover, multilevel governance is inclusive of the diversity of urban actors and governments involved in the decision-making and implementation of climate policies (McGuirk et al., 2014a, p. 141). For example, Broto and Bulkeley's (2013, p. 99) analysis of 627 climate experiments across 100 cities and concluded that 66% of the experiments were led by local government, 10% by other governments, 15% by the private sector, and 9% by civil society (see ***Figure 2***).

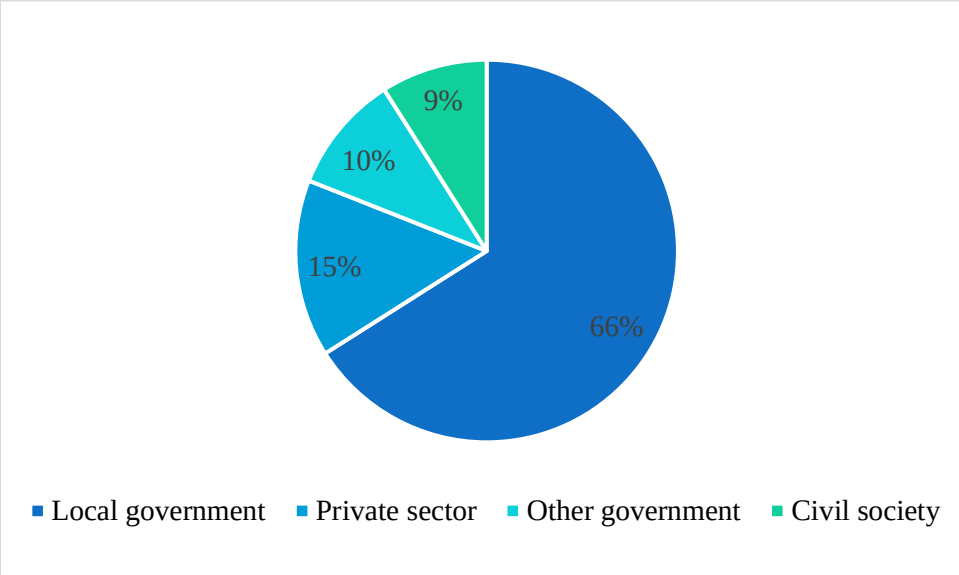

Figure 2: Distribution of urban actors leading urban climate experiments (adapted from Broto and Bulkeley, 2013, p. 99)

Although this research demonstrates diversity in urban actors involved in urban climate governance, local government is mostly responsible for implementing such initiatives. Van Der Heijden et al. (2019, p. 370) found that local governments are in the best position to translate the requirements of global and national authorities, and to motivate businesses and communities to take climate action. Local government is the keystone actor for coordinating urban climate governance initiatives across the multilevel governance framework and is doing so even more directly at the global level through voluntary climate action networks (see ***Figure 1***). However, according to an Australian study by McGuirk et al. (2014b, p. 2719), "urban local government capacity has been limited by inadequate cooperation and coordination with state government and by both federal and state reluctance, to date, to align climate policy with city development issues." In response to this lack of vertical coordination and capacity, local governments are

expanding their horizontal spheres of governance via partnerships with businesses, community groups, and climate action networks (Bulkeley and Betsill, 2013, p. 140; McGuirk et al., 2014b, p. 2719).

These conclusions are in align with the current situation in South Australia, where the CoA holds much of the responsibility for governing carbon emissions within metropolitan Adelaide. At the same time, State and Federal efforts appear to be inconsistent and marginal. However, the CoA lacks the institutional and financial capacity for providing the services needed for a city-wide low-carbon transition and has partnered with the private sector and the community in the hopes of overcoming these inefficiencies. While both vertical and horizontal levels of governing will be considered, due to the temporal and spatial constraints, this research will focus on urban actors across the *horizontal* spheres to gain an understanding as to how the *Action Plan* is being governed in practice. These horizontal spheres of authority interact at the local and global level through *networks*, which will be explained in the following Section (Bulkeley and Betsill, 2013, p. 143).

2.4 NETWORK GOVERNANCE

Network governance is becoming increasingly important for effective local climate action and low-carbon transitions (Khan, 2013, p.134). It has the potential to take some of the pressure off local governments as they form interdependencies with the private sector for solving complex societal problems (Khan, 2013, p. 134). Khan (2013, p. 134) defines network governance as "a shift from traditional hierarchical governance forms where the State is the regulator, to looser forms of governance where private actors such as business and NGOs increasingly participate in policymaking." This shift can be seen when reviewing urban climate action networks that attempt to facilitate collaborative urban climate governance by connecting municipalities globally. This Section will first discuss the history of urban climate action networks, followed by a review of the opportunities and limitations of network governance for urban climate action.

2.4.1 Historical Background

In the early 1990's, the first phase of action networks began to emerge through the International Council for Local Environmental Initiatives (ICLEI), Climate Alliance, and energie-cités (Bulkeley and Betsill, 2013, p. 139; Zeppel, 2013, p. 217). In the beginning, climate

action networks were largely voluntary-based and marginal in scale as they only involved the pioneering cities of North America and Europe (Bulkeley et al., 2012, p. 547). Though soon after, participation in climate action expanded to include cities in Asia, Australia, and Latin America, as they took a self-governing approach to reduce emission levels within their municipalities (Bulkeley and Betsill, 2013, p. 139).

While some cities were able to overcome the challenges of institutional capacity and the political economy of climate change responses, other cities struggled to do so, resulting in the second phase of urban responses known as "strategic urbanism" (Bulkeley and Betsill, 2013, p. 140). During this phase, a more locally politicised and diverse group of action networks were developing, including C40, 100 Resilient Cities, CCP, Transition Towns, and CNCA (Bulkeley, 2010, pp. 232-233; Davidson and Gleeson, 2018, p. 235). These networks have provided the opportunities for new public-private partnerships to form as businesses and non-government organisations are getting more involved in forming and implementing climate policies at the local level (Bulkeley, 2010, p. 232)

2.4.2 Climate Action Networks

More recently, climate action networks have been increasing in membership numbers and gaining popularity with local authorities worldwide as they provide a voluntary, cooperative space for policy coordination and knowledge sharing (Harman et al., 2015, p. 76). According to Gordon (2013, p. 292), the two main functions of climate action networks are improving local government capacity and increasing a collective voice throughout levels of government. Additionally, climate action networks can be the missing link between local and global climate change responses. They lobby and advocate for local climate change policies attempting to scale up to national agendas and international treaties (Gordon, 2013, p. 289). While the pioneering cities of North America and Europe founded many of these climate action networks, Australian cities are recognising the importance of becoming a member to improve city-to-city collaboration, advocacy, and best practices for urban climate governance (Harman et al., 2015, p. 76).

2.4.3 Opportunities and Limitations

Although these climate action networks can create many opportunities for decarbonising cities, there are also some concerns about their capacity to deliver effective outcomes. For instance, Davidson and Gleeson (2018) assessed two climate action networks and determined that Australia's distributed governance system is hindering a city-wide low-carbon transition. Though, Davison and Gleeson (2018, p. 239) remain optimistic that climate action networks can help climate policies scaling-up to overcome the distributed governance dilemma and facilitate city-wide climate action. However, other researchers remain skeptical (Gordon, 2013; Khan, 2013; van der Heijden, 2016).

Gordon (2013) identifies several limitations of action networks in his analysis of C40 Cities. The first of these limitations is autonomy, as their voluntary nature means that urban actors can remain inactive or remove themselves from the network at any time without penalty (Gordon, 2013, p. 297). Additionally, coordinated scaling is often difficult as the knowledge generated can lack transferability, and the authority of municipal governments has a short reach (Gordon, 2013, p. 297; van der Heijden, 2016, p. 6).

Gordon (2013, p. 297) finds that the second limitation is they only show successful, innovative policy activity in a small set of pioneering cities, while the remaining member cities are unengaged as the networks are voluntary and lack incentives to motivate wider action. This idea is echoed by Khan (2013, p. 138), who states that, “there is a risk that elite groups dominate networks leading instead to a concentration of power and influence.” In contrast, networks that allow open participation (e.g. CitySwitch Sydney and Green Office Challenge Chicago) can share the knowledge accepted by a broader range of stakeholders (van der Heijden, 2016, p. 6). The lesson learned from this analysis is that too strong a focus on leadership for local action networks can results in challenges of scaling-up by creating knowledge that is not widely accepted and can intimidate participation from groups that do not see themselves as climate leaders (van der Heijden, 2016, p. 6).

The final potential limitation of network governance for climate action is the gap in implementation, as municipal networks do not possess the regulatory authority or financial capacity that is needed to ensure effective implementation of climate change initiatives (Gordon, 2013, p. 297; Khan, 2013, p. 134). By interviewing local politicians and reviewing the city of Växjö’s climate action strategies, Khan (Khan, 2013, p. 137) discovered that policy

implementation networks are most effective when business conditions are favorable (e.g. monetary incentives). However, when the option to protect the environment does not have a local economic interest, it is more difficult to see change, resulting in a weakened municipal strategy (Khan, 2013, p. 137).

Furthermore, in Gordon (2013, p. 298) case study of Canada, he highlighted that transnational climate action networks, such as C40, do not have the enforcement or funding needed to regulate climate actions due to the Federal government's hands-off approach. Australia's Federal government currently has a similar hands-off approach, relying on local urban actors and climate action networks that lack the regulatory and financial capacity to develop coherent political strategies. It appears that the scaling issue and the distribution of the government system are limiting Australia's capacity to govern climate actions that are coordinated and transformative.

The limitations of climate action networks seem challenging and can inhibit a low-carbon transition of the urban environment. However, this is not to downplay the opportunities and potential they hold for expanding the actors involved in climate policy formation and implementation, scaling-up urban climate actions, and stimulating social innovation (Khan, 2013, pp. 135-136).

2.5 PARTNERSHIPS AND CO-PRODUCTION

The self-governing and non-hierarchical nature of network governance means that it is dependent on connections between the public and private sector through practices of co-production, partnerships, and stakeholder engagement (Khan, 2013, p. 134; Prestwood et al., 2018, p. 503). According to an OECD report, co-production is "a way of planning, designing, delivering and evaluating public services which draw on direct input from citizens, service users and civil society organisations" (OECD, 2011, p. 32). Co-production fits within the new public governance paradigm that calls for policy formation and implementation that involves multiple institutional forms and stakeholders for society's collective interest (Cinquini et al., 2017, p. 1).

The definition of partnerships by Glasbergen et al. (2007, p. 2) was chosen for this research and states, "collaborative arrangements in which actors from two or more spheres of society (state, market, and civil society) are involved in a non-hierarchical process through which these actors strive for a sustainability goal." Furthermore, Glasbergen et al. (2007, pp. 4-5) highlight five key components of an idealistic partnership paradigm for sustainable development:

1. Stakeholders from the public sector, private sector, and civil society have an interest in sustainable development
2. Constructive dialogue among these stakeholders is absent of hierarchy and authority
3. Dialogue can produce a shared normative belief that provides a value-based rationale for collaborative action
4. Collaborative action based on voluntarism, joint resource commitment, and shared responsibility of all actors can serve public and private interests
5. Collective action can use market mechanisms to promote sustainable practices through the leverage of private-sector investments

Both partnerships and co-production are essential for city-wide engagement of climate change policies and can effectively identify co-benefits and tradeoffs (Prestwood et al., 2018, p. 501). The *Action Plan* identifies partnerships and community engagement as critical for governing a carbon neutral city and is the unique scope of this research.

2.5.1 Significance

It is appropriate to focus on partnerships and co-production for research in climate governance, as nearly half of urban climate change experiments include some form of a partnership across the vertical or horizontal spheres of governance (Broto and Bulkeley, 2013, p. 100). Using Broto and Bulkeley's (2013) framework for measuring climate change experiments, McGuirk et al. (2015, p. 40) conducted an audit of 637 local government carbon reduction initiatives across Australia and found 41% of local government initiatives were in partnerships (see ***Table 1*** and McGuirk et al., 2015, p. 43). Hence, local governments are reshaping the "political landscape" of climate governance by experimenting with new institutional partnerships that diversify the roles of urban actors (McGuirk et al., 2015, p. 43).

Table 1: Partnerships in local carbon reduction initiatives in Australia (adapted from McGuirk et al., 2015, p. 43)

Partnerships in Local Government Carbon Reduction Initiatives	Number of Initiatives	Percentage of Initiatives
Total initiatives	637	100%
No partners	324	51%
Partners- Federal Government	33	5%
Partners- State Government	121	19%
Partners- Local Government	175	27%
Partners- Non-governmental Organisations	30	5%
Partners- Private	152	24%

2.5.2 Opportunities and Limitations of Partnerships in Governance

Partnerships as a practice of co-production and good governance is not a new concept. While there are several governance mechanisms for decarbonisation initiatives (i.e. regulation, market, enabling, and provision), partnerships fall under *enabling*, which is by far the most commonly used by Australian local governments (Khan, 2013, p. 137; McGuirk et al., 2015, p. 41). Broto and Bulkeley (2013, p. 95) explain that governing through enabling uses soft and voluntary policy tools such as information and resource provision, economic incentives, and *partnerships*. Furthermore, Glasbergen et al. (2007, pp. 239-240) argues that multi-stakeholder partnerships are becoming one of the superlative solutions to the ineffective treaties and gridlocked intergovernmental debates on governing sustainable development. They can fill deficits in implementation and regulation and bring together key stakeholders across civil society, government, and the business sector (Glasbergen et al., 2007, pp. 239-240). Furthermore, it is agreed upon by Broto and Bulkeley (2013, p. 100), Evans et al. (2005, pp. 29-30), and Harman et al. (2015, p. 77) that partnerships are a vital tool for capacity building. Lastly, through an analysis of partnerships between State authorities and private development companies, Taylor and Harman (2016, p. 935) identified three benefits of partnering: 1) procedural efficiencies 2) capacity to leverage diverse skills and expertise and 3) de-risking of commercial competition. In summary, partnerships are beneficial political instruments that can help local governments engage multi-stakeholders in decision-making, enable sustainable

choices, implement climate change policies, and build capacity for effective urban climate governance.

Despite this perceived consensus, there are several challenges and criticisms found in the literature. For instance, Glasbergen et al. (2007, p. 239) note that increasing participation can be problematic as its voluntary nature can favor powerful actors leading to "big business" and privatising the government. Moreover, some partnerships cannot gain accountability and legitimacy (Evans et al., 2005, p. 30; Glasbergen et al., 2007, p. 239). For example, accountability can be challenging as the networks that partnerships function within are informal and unregulated, causing measures and standards for reducing carbon emissions to go unchecked (Khan, 2013). Lastly, in Taylor and Harman's (2016, p. 936) case study analysis they discovered that partnerships can de-risk a project in some scenarios, but in others, it can create an imbalance in shared risks due to blurred lines between the public and private sector leading to ambiguity. Although these challenges that partnerships are facing seem impassable, with the right amount of trust, mutuality, and organisational identity, it is possible to form successful partnerships that can gain a collaborative advantage in governing climate change (Brinkerhoff, 2002, p. 218; Taylor and Harman, 2016, p. 929).

2.5.3 Components of an Effective Partnership

Trust is an essential component for creating synergies as it decreases the amount of risk and vulnerability involved in going into a partnership agreement (Glasbergen et al., 2007, p. 8). Partnerships for sustainability are formed in a voluntary nature when two parties strike a balance between opportunities and risk based on their initial trust and the broader network they operate within (Glasbergen et al., 2007, p. 7). Equally critical, *mutuality* refers to horizontal coordination and accountability for making joint decisions that seek to maximize benefits. However, it depends on having an agreed purpose, similar values, and mutual trust between both partners (Brinkerhoff, 2002, p. 217). The last component is the maintenance of *organisational identity*, which Brinkerhoff (2002, p. 217) explains is "the extent to which an organisation remains consistent, committed, accountable, and responsive to its mission, core values, and constituencies." A partnership that can maintain trust, mutuality, and organisational identity over its lifetime can generate *collaborative advantage*, thus attaining a goal (i.e. a carbon neutral city) that could not have been if the parties were acting independently (Glasbergen et al., 2007, p. 7).

However, much of the literature on partnerships tend to focus on the added values they give by comparing forms of governance instead of on their contributions to co-producing climate change policies (Glasbergen et al., 2007, p. 9; Harman et al., 2015; Koppenjan and Enserink, 2009). Additionally, this idea that partnerships will result in a collaborative advantage for urban climate governance is rarely measured and often only discussed as rhetoric (Brinkerhoff, 2002, p. 215). Nevertheless, there are some examples of partnerships in work for governing urban low-carbon transitions that are applicable.

2.5.4 Relevant Case Studies

Returning to Khan's (2013, pp. 136-138) case study on Växjö, Sweden, the local council decided to set a long-term goal of becoming a fossil-fuel-free city. However, the council did not come to this decision alone. They sought input from an environmental NGO (the Swedish Society for Natural Conservation (SSNC)), civil servants, businesses, and university staff. Through this network, members from the council formed a close partnership with SSNC that actively participated in open dialogue leading to the ambitious policy goal of a fossil-fuel-free city (Khan, 2013, p. 136). However, this case study is in the context of the Swedish governance system and not as applicable to Adelaide. Case studies in the Australian context are more limited, but one good example can be found in Taylor and Harman (2016).

Taylor and Harman (2016, pp. 931-932) conducted a qualitative analysis using interviews with stakeholders involved in four public-private partnerships (PPPs). The partnerships are between private developers and State government land organisations. This research was successful in its aims to identify the benefits, risks, and limitations of PPPs for governing climate adaptation mechanisms for major development projects (Taylor and Harman, 2016, pp. 935-936). Moreover, they identified that partnerships can enable adaptation, joint problem solving, and institutional co-production (Taylor and Harman, 2016, p. 941). It was also discovered that the achievements of these PPPs are dependent on the involvement of an active State government as they have the financial and institutional capacity to address the risks that are involved (Taylor and Harman, 2016, p. 940). This case study has limited applicability as it focuses on partnerships between the State government and the private sector, despite municipal governments typically being responsible for the long-term maintenance of climate risks and local partnerships for climate action (Taylor and Harman, 2016, p. 938). In contrast, McGuirk et al.'s (2015) case

study focuses on climate mitigation through a local government experiment called *Treading Lightly*.

Treading Lightly is a carbon reduction initiative that was initiated through partnerships between five local governments in western Sydney (McGuirk et al., 2015, p. 44). It focuses on behaviour change for reducing the carbon footprint of the urban household by providing educational workshops, bringing a broader range of community groups together for coordinated climate actions (McGuirk et al., 2015, p. 44, 47). *Treading Lightly* has been successful in building a carbon-aware community because of the participatory, enabling nature of the governing practices that the local governments implemented in partnership. Although behaviour change is a critical factor in building a climate-resilient city, other carbon-emitting processes also need to be considered and it is unclear how experiments like *Treading Lightly* can grow to govern a city-wide low carbon transition or be transferred to other cities. The carbon neutral city is an experiment that attempts to go beyond behavioural changes for a low-carbon transition and will be discussed in the next Section.

2.6 CARBON NEUTRAL CITIES

2.6.1 Imagining a Carbon Neutral City

A carbon neutral city is an on-going experiment that can deeply decarbonise the urban environment for a low-carbon transition that is systemic. The Carbon Neutral Cities Alliance (CNCA) was formed in 2014 when the leading cities in climate action came together to create a network that facilitates city-to-city collaboration, exchange of best practices, and policy advocacy for cities aspiring for carbon neutrality (Innovation Network for Communities, 2014, p. ii). However, the concept is still in its infancy, and research on how cities are transforming to carbon neutrality is subsequently limited. For a city to receive carbon neutral status (i.e. net-zero emissions), it would mean "reducing emissions to the lowest levels and then offsetting/sequestering any remaining emissions through certifiable processes" (Prestwood et al., 2018, p. 505). Carbon neutrality is an ambitious goal, and the title of the 'first carbon neutral city' is yet to be claimed. The CNCA currently has 22 member cities that all follow a similar framework; nevertheless, their pathways are all unique, creating multiple storylines of how a carbon neutral city is imagined.

Kenis and Lievens (2017, p. 1762) explore the process of imagining a carbon neutral city through a case study of Leuven, Belgium aiming to become carbon neutral by 2030. It is recognised that a city is a part of a complex metabolism of inputs and outputs of materials, and it is important to define which of these are included in the city's emissions to avoid contestation over the authenticity of carbon neutral status (Kenis and Lievens, 2017, p. 1767). Similarly, Tozer and Klenk (2018, p. 174) performed an analysis of the socio-technical imaginaries emerging from the 17 founding cities of the CNCA to identify the most common storylines of carbon neutrality for the built environment. The five main storylines highlighted are;

1. The diverse meanings of carbon neutrality
2. The new economy of carbon control
3. The city is a laboratory
4. Technological fixes and the modern city, and
5. Reframing what it means to be a 'good' urban citizen (Tozer and Klenk, 2018).

This study determined that carbon neutrality can be a flexible term and takes various pathways as it materialises across multiple scales and networks (Tozer and Klenk, 2018, p. 179). While this diversity in socio-technical imaginaries can be ambiguous, it also allows coalitions like CNCA to share innovations and coordinate actions between member cities as they interchange amongst these storylines and experiment with different climate policies. However, Tozer and Klenk (2018, p. 179) caution the possibility of the imagined carbon neutral city further embedding fossil-fuel energy in different ways and downplaying the challenges of transitioning to a low-carbon economy. Transforming a city to carbon neutral is a complex, wicked problem as it requires reforming the economic, social, and political systems. Therefore, research on the execution of this transformation process helps understand how carbon lock-in can be avoided and which government actions are producing radical changes.

2.6.2 Current Research on Emerging Carbon Neutral Cities

Research on carbon neutral cities thus far is scarce, and it most frequently uses case studies of progressed European cities (Laine et al., 2020; Madsen and Hansen, 2019) or on the 17 founding member cities of the CNCA across North America, Europe, and Australia (Tozer and Klenk, 2018; Tozer and Klenk, 2019). The dominant methods within this research are policy document analysis and stakeholder interviews to understand how the cities are being imagined

and how they are experienced. Additionally, most of these case studies have chosen to narrow its scope by selecting one sector of the carbon-emitting process to focus on, such as the built environment (Tozer and Klenk, 2018; Tozer and Klenk, 2019), or energy (Laine et al., 2020; Madsen and Hansen, 2019).

For instance, Madsen and Hansen (2019, pp. 283-287) conducted a desktop study using secondary sources alongside fourteen semi-structured interviews with urban actors to understand the advantages and disadvantages that two city governments are facing when implementing renewable energy initiatives for carbon neutrality (i.e. CPH 2025 Climate Plan in Copenhagen and ProjectZero in Sønderborg). In a similar context, Laine et al. (2020, p. 3) analysed the city of Vantaa, Finland, which has a goal of becoming carbon neutral by 2030, with a focus on carbon accounting and the energy sector. They used a mixed-methods approach involving a literature review on government documents related to carbon neutrality actions followed by validating these actions through interviews with the head managers of energy-related processes (Laine et al., 2020, p. 5). In contrast to these singular case studies, Tozer and Klenk (2019) produced a large scale analysis investigating the political instruments and mechanisms of the built environment for carbon neutrality by performing a discourse analysis of key government documents of the 17 founding cities of the CNCA.

Though the methods for measuring the governance of carbon neutral cities are similar, the variety in each case study's scope and geographical and political contexts has led to multiple conclusions. For instance, Madsen and Hansen's (2019, p. 293) study showed that Copenhagen and Sønderborg's municipal governments lack authority and that stakeholder conflict has inhibited sustainability goals. Additionally, there was little evidence of the experiments resulting in institutional change within either city (Madsen and Hansen, 2019, p. 293). Tozer and Klenk (2019, p. 552) agree with Kenis and Lievens (2017, p. 1774) that carbon neutral governing instruments are being depoliticised largely due to the limitations of local government and the expansion of stakeholder involvement. In contrast, Laine et al. (2020, p. 11) discovered that in Vantaa it must be the responsibility of the central government, the energy sector, and the real estate sector to create an authentic carbon neutral built environment that is inclusive of the private sector. Lastly, Tozer (2020, p. 9) learned that making energy changes to existing buildings has been more challenging, and secondly, a lack of political momentum is limiting effective decarbonisation.

2.6.3 Limitations

While this selection of literature on carbon neutral cities has helped illuminate the challenges of governing a carbon neutral city within these select cities, several limitations are necessary to highlight. First, research by Madsen and Hansen (2019, p. 291) and Laine et al. (2020, p. 6) were both limited as the interviews involved only municipal government authorities and department heads, excluding stakeholders from the wider Danish and Finish communities, such as civil society members or the private sector. However, Madsen and Hansen (2019, p. 296) recognised this limitation and suggested that further research should consider how the broader context of the city matters for an experiment's success or failure and whether climate action networks can help build institutional capacity between cities. Second, by focusing on initiatives within the energy sector or built environment instead of on all carbon-emitting activities within and around the city, most of this research has restricted its ability to gain a holistic understanding of a city-wide low carbon transition. Third, and the most glaring gap in this literature is the absence of case studies for Australian cities, where the effects of climate change are arguably being felt most severely among developed nations, and action at the national level is paltry at best. The exception to this is Tozer and Klenk (2019) because Melbourne and Sydney are two of the founding members of the CNCA; however, since their study made general conclusions for all 17 cities, it is difficult to understand the specific challenges Melbourne and Sydney are experiencing.

As a result of these limitations, there is a need to investigate the effectiveness of carbon neutral policy governance in Australian cities, using methods that can capture all the processes and stakeholders involved in decarbonisation. The *Carbon Neutral Adelaide Action Plan 2016-2021* is a policy document that has not been included in any carbon neutral studies. Additionally, few studies have attempted to measure a carbon neutral city's political effectiveness through the scope of partnerships and network governance. It would be beneficial to understand how a smaller city like Adelaide is progressing and whether the trajectory is heading towards a legitimate carbon neutral city.

2.7 CASE STUDY: CARBON NEUTRAL ADELAIDE

Adelaide is the fifth-largest capital city of South Australia, and the Greater metropolitan area is home to 1.3 million people, which is 75% of the state's population (see ***Figure 3*** and Government of South Australia and City of Adelaide, 2016, p. 9). The city centre is a one square

mile area surrounded by parklands on the coast of the St. Vincent Gulf - the only city in a park in the world (see ***Figure 3*** and Government of South Australia, 2020). Adelaide is known as one of the most clean, green, and liveable cities in the world and is best known for its diverse culture and food and wine industry (Government of South Australia, 2020; The Economist Intelligence Unit, 2018). To maintain this reputation, in 2015 the Premier at the time (Jay Weatherhill) and the Lord Mayor of the CoA (Martin Haese) signed two international network agreements (i.e. the Compact of Mayors by Council and the Compact of States and Regions) and a Sector Agreement to make Adelaide the first carbon neutral city in the world (City of Adelaide, 2015, p. 8). This would mean net zero emissions from the local government area including the CBD, North Adelaide, and the Adelaide Parklands (see ***Figure 4***) by making deep cuts in GHG emissions and then offsetting any remaining emissions through sequestration projects and purchasing carbon credits (Government of South Australia and City of Adelaide, 2016, p. 9). As a result, in 2015, the *Carbon Neutral Strategy 2015-2025* was developed to provide the context of carbon neutrality and the outcomes it would provide to Adelaide (City of Adelaide, 2015). Shortly after, the first *Action Plan* was released and included a total of 104 actions that would put Adelaide on a trajectory to carbon neutrality by 2025.

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Figure 3: The Greater metropolitan Adelaide, South Australia demographics (adapted from Government of South Australia and City of Adelaide, 2016, p. 9)

Image removed due to copyright restriction.

Figure 4: Adelaide local government boundary for carbon neutrality (adapted from Government of South Australia and City of Adelaide, 2016, p. 8)

The *Action Plan* is a roadmap that identifies both the quantitative measures and political mechanisms needed for Adelaide to become carbon neutral. Quantitatively, emissions would need to decrease by 65% from 2007 levels across the energy, transport, and waste and water industries (Government of South Australia and City of Adelaide, 2016, p. 13). This would leave a remaining 421,174 kilotonnes CO_2 that would need to be offset to attain net-zero emissions (Government of South Australia and City of Adelaide, 2016, p. 13). To do this, the *Action Plan* has allocated a set of strategies and actions to five pathways:

1. Energy-efficient built form
2. Zero-emission transport
3. Towards 100% renewable energy
4. Reduce emissions from waste and water, and
5. Offset carbon emissions (see ***Figure 5*** and Government of South Australia and City of Adelaide, 2016, p. 19).

In terms of the political mechanisms, a set of actions are also established for how these pathways will be implemented and measured through good governance and partnerships with international networks, the community, and the private sector (see blue box in ***Figure 5*** and Government of South Australia and City of Adelaide, 2016, p. 19).

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Figure 5: Action plan framework for Carbon Neutral Adelaide (adapted from Government of South Australia and City of Adelaide, 2016, p. 19)

Instead of limiting this research to one of the pathways to carbon neutrality, it has been decided that investigating the political effectiveness of the partnerships and governance initiatives that oversee all pathways would lead to more comprehensive results. The *Action Plan* explains that delivering CNA initiatives will be through partnerships between the GovSA, the CoA, and a wide range of stakeholders in the private sector and the community "to build

capacity, identify and address barriers, provide a competitive advantage, and improve access to resources and expertise" (Government of South Australia and City of Adelaide, 2016, p. 15). The expected outcomes and types of partners for CNA can be found in ***Table 2***, highlighting the important role that businesses and the community will play (Government of South Australia and City of Adelaide, 2016, p. 15). Furthermore, a significant action for delivering in partnerships is to "actively support the community through the establishment of the CNA Partnerships initiative by early 2017" (Government of South Australia and City of Adelaide, 2016, p. 17).

Table 2: Carbon Neutral Adelaide Partnerships Framework (adapted from Government of South Australia and City of Adelaide, 2016, pp. 15-16)

Partnership Type	**Commitment**	**Expected Outcomes (across all partners)**
Ambassador	Organisations and individuals demonstrate leadership by committing to carbon neutrality for their own operations or in some other significant way	1. Adelaide is a showcase city for world-leading practices, technologies, and services that grow the green economy and reduce carbon emissions 2. There is broad community ownership, active participation, and investment in carbon neutral initiatives 3. The community feels well-informed and supported to take action. 4. A supportive environment for the early adoption of great ideas and technologies is created. 5. Businesses, households and other partners are making substantial contributions to emissions reduction in the city 6. Opportunities are created and fostered for businesses to grow and prosper from the low carbon economy 7. Share knowledge and celebrate our achievements
Building	Owners of households, commercial building, and industrial and residential buildings within the city are committed to deeply reducing their emissions	
Transport	Organisations that influence or provide low-carbon transportation and take actions to reduce their emissions	
Technology	Organisations that pursue innovation and community uptake of technologies or services that reduce emissions	
Infrastructure	Organisation that own or maintain infrastructure or supporting services that are needed for reaching carbon neutrality and are taking action to reduce emissions in these processes	
Knowledge	Organisations that distribute knowledge, educate the community or produce datasets needed for demonstrating carbon neutrality	

In addition to the partnership framework, the *Action Plan* also identifies the need to provide overarching governance and support for delivering low-carbon services (Government of South Australia and City of Adelaide, 2016, p. 45). To do so, the CoA and the GovSA promise to publish inventory of Adelaide's GHG emissions and comply with the membership requirements

of international agreements, reporting frameworks, and partnerships (Government of South Australia and City of Adelaide, 2016, p. 45). The GovSA and the CoA (2016, p. 45) are members of several climate action networks to demonstrate their commitment to and leadership in reducing carbon emissions. A list and description of these networks can be found in ***Table 3***.

Table 3: Adelaide climate action network memberships and partners

Climate Action Network	Description
Global Compact of States and Regions	A comprehensive account and report of state and regional climate actions that summarises data from 125 states and 35 countries. The reports are created from Annual Disclosures of climate actions, targets, and progress to The Climate Group and CDP (ICLEI, 2015).
Global Covenant of Mayors for Climate and Energy	The largest global alliance for leadership in city climate action. Over 10,000 cities and local governments have committed to work towards a resilient, low-carbon society (Global Covenant of Mayors for Climate and Energy, 2020).
Regions Adapt	A partnership among regional leaders, councils, Local Government Associations, Regional Development Australia, and Government of South Australia to develop and implement regional climate change adaptation plans (Department for Environment and Water, 2020).
The Climate Group	Powers networks and coalitions of governments and organisations committed to limit emissions 80-95% below 1990 levels by 2050 to keep global warming below 2° C by the end of the century. Follows three key workstreams: pathways, policy action, and transparency. Annually discloses climate actions, targets and progress of member states and regions (The Climate Group, 2020).
Carbon Disclosure Project (CDP)	Manages the global environmental disclosure system and supports thousands of companies, cities, states and regions to measure their risks and opportunities on climate change (Carbon Disclosure Project, 2020).
Carbon Neutral Cities Alliance	A collaboration of leading global cities aiming for carbon neutrality by 2050 through the most aggressive GHG reduction targets (Carbon Neutral Cities Alliance, 2020)
Climate Neutral Now	A UNFCCC initiative to achieve a carbon neutral world by 2050 and to showcase climate action around the world (United Nations Climate Change, 2020).

The discourse of the partnership and governance framework of the *Action Plan* sounds promising, and if all actions are completed on time, there is a good chance Adelaide will be carbon neutral by 2025. However, since the release of the *Action Plan* there has been incremental progress, as the status report from July 2019 has revealed that only 18 of the 104 actions have been completed (Government of South Australia and City of Adelaide, 2019). Even more concerning is that Adelaide has only reduced its emission by 15% since 2007 levels, with the majority of this from the energy sector, while emissions from the transport sector have continued to increase (Government of South Australia and City of Adelaide, 2019, p. 5; Siebert, 2018). It

also appears that the largest drop in emissions was between 2007 and 2015, but since then, levels have been steady if not on the rise (see ***Figure 6*** and Richards, 2020). This is not the deep cuts in emissions that are required for carbon neutrality, and other cities have been more successful at making these cuts, such as, Melbourne (54% between 2011-2018) and Copenhagen (42% since 2005) (Richards, 2020).

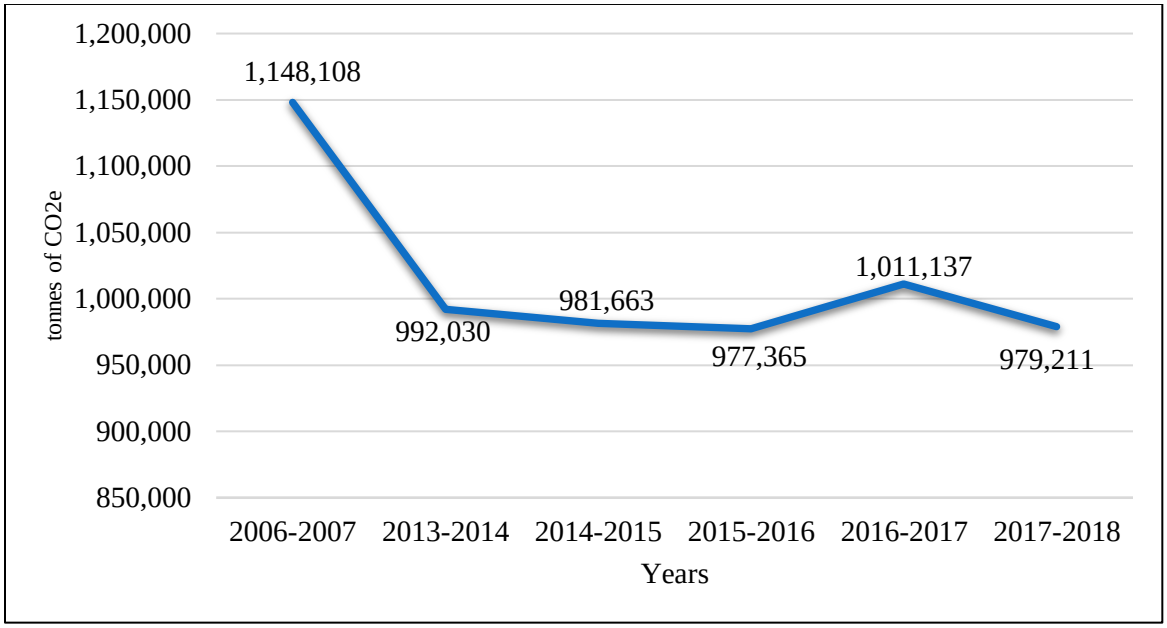

Figure 6: Adelaide's greenhouse gas emissions since 2007 measured in tonnes of CO2 (adapted from Richards, 2020)

In addition to measuring Adelaide's carbon emission levels, it is also important to understand the political climate and how it has potentially slowed Adelaide's progress towards carbon neutrality. For instance, in 2017, the CoA announced that they were adjusting the original goal of becoming 'the first carbon neutral city' by 2025 to the less ambitious 'one of the first carbon neutral cities' which could take decades (Siebert, 2017). Despite this concern with the timeframe, the CoA was steadily progressing towards carbon neutrality and had launched many new low-carbon initiatives. However, in 2018 there was an election at the local and state levels, resulting in the original political leaders and signatories of the *Carbon Neutral Adelaide Strategy 2015-2025* being removed from office, and the political party leading the GovSA changed from Labour to Liberal (Siebert, 2018). Both the slow progress in emission reduction and the new State government led to a review of the effectiveness of the *Carbon Neutral Strategy 2015-2025* for delivering sustainable outcomes (Siebert, 2018). As a result of this review, and Adelaide's appearance of falling further behind in the race to carbon neutrality, the CoA and the GovSA are

now attempting to modify this revised goal even further to simply becoming "a carbon neutral city, where sustainability is core" (Richards, 2020).

Adelaide is a beautiful, prosperous mid-sized city with incredible potential for being the first, or one of the first, carbon neutral cities. Yet, it is uncertain if it can overcome the current political inconsistencies and dependency on high carbon emitting activities to restore this once ambitious goal of being a global climate leader in urban climate change. This research is critical as it is attempting to understand and measure the political effectiveness of CNA to inform the stakeholders and decision-makers on what needs to change for Adelaide to become carbon neutral.

2.8 CONCEPTUAL FRAMEWORK

As this literature review has identified, experimental urban climate governance is taking many different shapes, and each experiment is highly complex due to the conflicting and in flux social, political, and economic dynamics that it is situated within. Bernstein and Hoffmann (2018) designed a dynamic framework to account for this complexity, as it measures the political mechanisms needed for effective decarbonisation and identifies the trajectory that will result from the presence or absence of these mechanisms. The framework explains that, "the political challenge of decarbonisation is to disrupt the interdependent, overlapping, reinforcing dynamics that lead to the continuing use of fossil energy across scales" (Bernstein and Hoffmann, 2018, p. 194). They argue that political factors of carbon lock-in are found across all vertical levels of governance, markets, and institutions, which means this single framework can be used for various cases (Bernstein and Hoffmann, 2018, pp. 194-195). Furthermore, this framework recognises the interdependencies between levels of government and the need to connect decarbonisation initiatives from the local to the global for a systemic transformation (Bernstein and Hoffmann, 2018, p. 195). For these reasons, this framework was selected for the analysis of the CNA experiment, as it traverses through multiple jurisdictions and is highly politicised.

The framework is designed to analyse a climate experiment that is attempting to disrupt carbon lock-in in a targeted area (i.e. CNA for metropolitan Adelaide) and whether it is changing the current trajectory. The three trajectories Bernstein and Hoffmann (2018, p. 195) determine a city can be on are 1) *reinforcing carbon lock-in*, 2) *improvement in carbon lock-in*, or 3) *decarbonisation*. The interference of the experiment can change the trajectory through three political mechanisms 1) *capacity building*, 2) *coalition building*, and 3) *normalisation*

(Bernstein and Hoffmann, 2018, p. 195). A description of these political mechanisms can be found in ***Table 4***. This framework is also appropriate for the scope of this case study because capacity building accounts for partnerships and co-governance of the *Action Plan*, and coalition building considers the role of climate action networks. The manifestation of these political mechanisms determines whether carbon neutral initiatives will result in a system effect of *scaling up* or *entrenchment* by Adelaide. For example, scaling up can happen more directly as the *Action Plan* expands and diffuses across sectors and jurisdictions, or more indirectly, by influencing the development of new legislation (Bernstein and Hoffmann, 2018, p. 195). To clarify, the feedback between the three political mechanisms and the two system effects is where observable changes in trajectories are seen; however, there is a chance that the feedback is negative, and the experiment further locks-in carbon (Bernstein and Hoffmann, 2018, p. 203). An illustration of what this dynamic framework looks like and how it functions for this case study can be found in ***Figure 7***.

Table 4: Political mechanisms for decarbonisation(adapted from Bernstein and Hoffmann, 2018, pp. 198-201)

Political Mechanisms	Description	Example
Normalisation	A shift in public policies and interests that create change in behaviour, norms, and values at both niche and landscape levels that is often mediated by local politics and institutions	A green practice, such as recycling and composting, is encouraged and the community is well-educated on it to the point that local governments start providing multiple bins for green waste, glass, metals, and plastics
Capacity Building	To take decarbonisation action through altering material, institutional, or cognitive capacities by providing direct funding, education and training, technical assistance, or co-governance through public-private partnerships	A high green-star rated building owned by a non-for-profit offers tours of the building design and energy efficient technology to local community groups as a demonstration project
Coalition Building	Forming alliances that support political and economic activity for decarbonisation and empower actors to take climate action	Local government provides rewards and recognition to the businesses who demonstrate best decarbonisation practices and innovations, encouraging others to join the movement

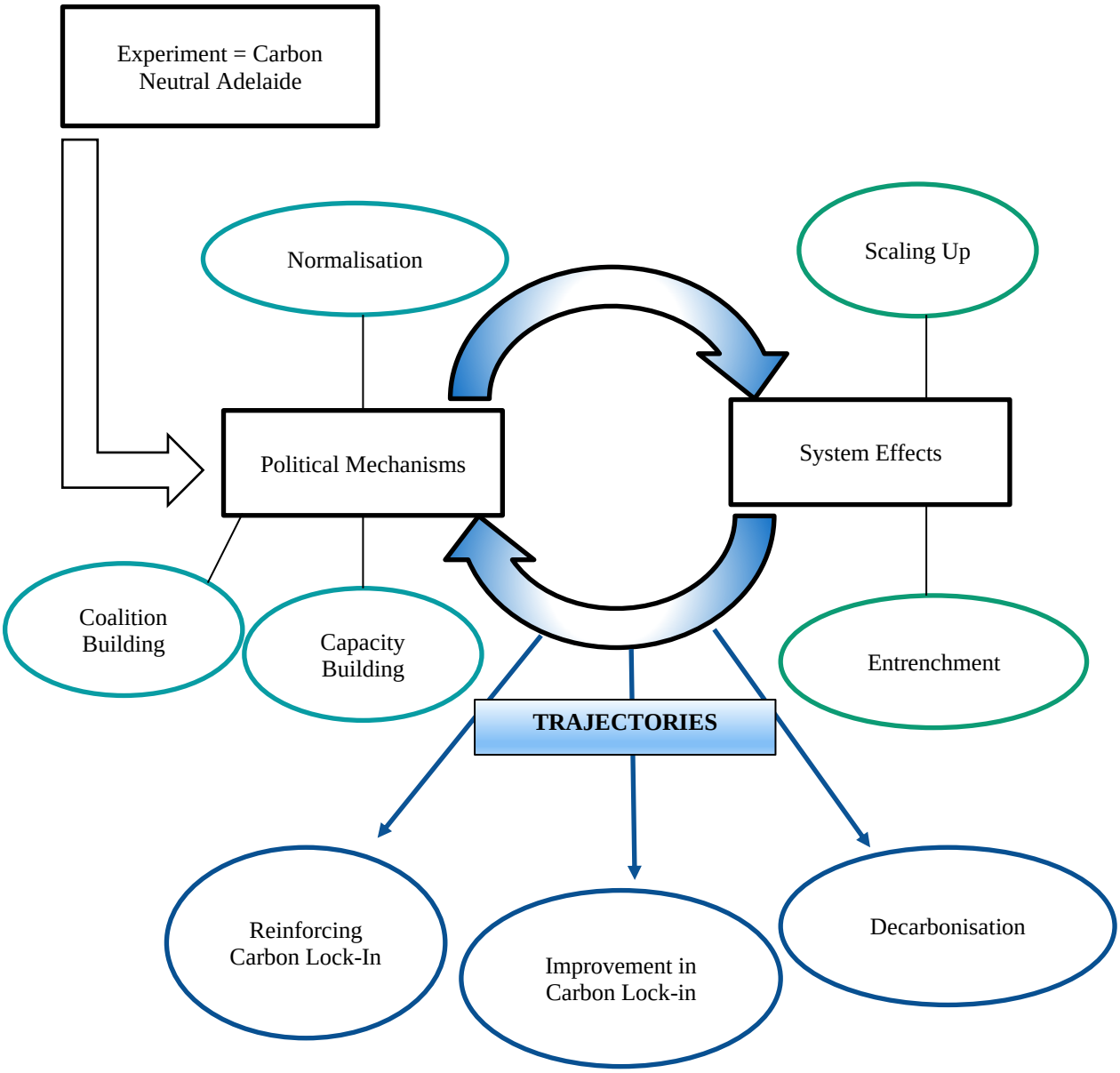

Figure 7: Pathways to decarbonisation for a climate governance experiment framework (adapted from Bernstein and Hoffmann, 2018, p. 196)

To assist in the analysis using this framework, van der Ven et al. (2017, pp. 8-10) provides details on the types of scaling and entrenchment system effects that can result from the interference of an experiment like CNA. The types of scaling include *simple*, *self-organised*, *cross-over*, or *modular*, and the types of entrenchment are *lock-in*, *self-reinforcing*, *positive feedback*, or *indirect* (see ***Table 5***). For simplicity, the components of the three political mechanisms are analysed separately for the two system effects, though in practice they overlap and interact frequently. By following this framework, this research will go beyond the traditional quantification of greenhouse gas emissions for climate mitigation and instead capture the overall

potential that the CNA experiment has for catalysing a systemic and genuine shift to a low-carbon economy (van der Ven et al., 2017, p. 10).

Table 5: Types of scaling and entrenchment and their indicators (adapted from van der Ven et al., 2017, p. 10)

Type of Scaling	Occurs when the experiment…	Type of Entrenchment	Occurs when the experiment…
Simple	Expands the geographic scope, attracts more members to the governance networks, or accumulate more resources	Lock-in	Has rationality that gives it immediate durability or stickiness
Self-organised	Opens up political and economic space for another experiment	Self-reinforcing	The cost of reversing it and the benefits of continuing increases overtime
Cross-over	Stimulates action in more conventional governance processes (e.g. it causes a change in public policy)	Positive feedback	Reinforces the decisions of the original target population by new members deciding to join
Modular	Is replicated on a different scale or in a different geographic context (policy diffusion)	Indirect	Is amplified and expanded in indirect and unexpected ways

2.9 CONCLUSION

To summarise, additional research is required to understand how Australian municipalities can be the vehicles for driving coordinated climate action, and successfully implement environmental policies that can scale-up and become embedded into state, national and global climate agendas. Adelaide, South Australia, has put itself on the global stage in climate action and renewable energy through its ambitious *Carbon Neutral Strategy 2015-2025*. However, the current numbers in carbon emissions and slowed progress in actions towards this goal are concerning. Further research is needed to understand Adelaide's current political context and how this may affect the implementation and progress of the *Action Plan* moving forward. This research includes all types of urban actors and networks involved in CNA to gain a comprehensive understanding of the limitations and opportunities for future decision-making and implementation of the actions. Doing so, will make a salient contribution to urban climate

governance research and, more specifically, to studies on carbon neutral cities in Australia that are currently missing.

3. METHODS

3.1 INTRODUCTION

Many studies in urban climate governance are limited because they test the effectiveness of climate mitigation strategies by quantifying the greenhouse gases (GHG) emitted from a specific area and comparing them to the reduction targets set by transnational organisations (Kennedy et al., 2012; Laine et al., 2020; Reckien et al., 2014; Tozer, 2020, p. 2). Although these calculations are essential for emissions accounting and predicting climate change trends, the numbers cannot answer the *how* and *why* of governing politicised climate change strategies. Bernstein and Hoffmann (2018, p. 203) explain that the methods for analysing scaling and entrenchment processes and developing a pathway narrative need "careful qualitative analysis of individual interventions." This first requires a close examination of the actions and goals related to the decarbonisation experiment, followed by an analysis of how these actions contribute to the political mechanisms for scaling and entrenching the targeted system (Bernstein and Hoffmann, 2018, p. 203). The analysis requires "data gleaned from intervention documents, media reports, and where appropriate and possible, interviews with intervention participants and actors that interact with the intervention activities" (Bernstein and Hoffmann, 2018, p. 204). As a result, a mixed methodology approach was applied to this case study of Carbon Neutral Adelaide (CNA), involving a content and discourse analysis of relevant policy documents and transcripts from semi-structured interviews with stakeholders across the horizontal spheres of governance (see *Section 2.3.2*).

3.2 ETHICAL CONSIDERATIONS

The interview process for this research requires personal opinions and viewpoints on the governance of the *Action Plan* to be collected and, therefore, required ethical approval from the Flinders University Social and Behavioural Research Ethics Committee (SBREC). The ethics application was submitted to the SBREC and was granted final approval on 19 June 2020, allowing data collection to commence. To ensure the research follows ethical guidelines, a Letter of Introduction, a Participation Information Sheet, and a Consent Form to be signed by participants were developed and provided to each potential Respondent when initially contacted. The Consent Form emphasises that all recorded conversations and information from the respondents will remain anonymous. It should be noted that the data collection stage was during the peak of the COVID-19 pandemic, which may have influenced the Respondent's current

views on climate change. The pandemic also caused in-person interviews to be a potential health concern. Therefore, prospective interview respondents were given the option to speak in-person or via video conference software such as Zoom or Microsoft Teams, depending on their preference. The confidentiality that the Consent Form affirmed, alongside the flexibility in modes of communication, ensured that the respondents felt comfortable and could speak freely about their experiences without any repercussions.

3.3 MIXED METHODOLOGY

This research uses a mixed methodology that includes a quantitative and qualitative content and discourse analysis of policy documents and interview transcripts to understand the wider context of how CNA is governed in practice against the rhetoric. Scholars have debated the relationship between quantitative and qualitative social science research for decades (Hay, 2010, p. 15). Generally, quantitative research allows for comparing two structures against each other more broadly, while qualitative research can understand the unique meanings and perspectives that a specific group in society experiences (Walter, 2014, p. 225). Quantitative and qualitative research both have limitations. Quantitative research is criticised for being limited to 'big picture' issues and a highly technical analysis that cannot account for the values and beliefs of the social world (Hay, 2010, p. 16; Walter, 2014, p. 119). While qualitative research is scrutinised for its high subjectivity and inability to be generalised or replicated (Hay, 2010, pp. 16-17). Mixed methods is the best practice for avoiding the limitations of quantitative and qualitative research and it is attractive because it allows for nuanced and holistic understandings of the topic being examined that would not have amounted if a singular approach was applied (Hay, 2010; Creswell, 2008).

As discussed in *Section 2.6.2*, research on emerging carbon neutral cities often involves a single case study using methods of policy document analysis and in-depth interviews to gain a closer understanding of how cities are attempting to decarbonise. A case study is a powerful methodological vehicle in social science research because it can help understand the practical aspects of an event or a place while also developing a generalisable and transferable theory (Hay, 2010, p. 95). Specifically, by closely observing and analysing the case study of CNA, cities in similar situations across Australia and the world can relate to the challenges of governing a low-carbon transition and potentially learn new ways of overcoming these challenges.

Krippendorff (1980, p. 21) defines content analysis as "a research technique for making replicable and valid inferences from data to their context." Content analysis is beneficial because it allows researchers to analyse a wide range of textual data sets, including policy documents and interview transcripts. Moreover, content analysis quantifies and organises large bodies of text into conceptual categories to identify relationships between the themes found in the policy documents and the speech of their producers to derive meaning within the wider societal context (Julien, 2008, p. 121; Walter, 2014, p. 578). Equally important, content analysis is flexible and can be adapted to both data sets using the themes of the framework identified in *Section 2.7* (Julien, 2008, p. 121; Walter, 2014, p. 258). Due to the quantitative nature of content analysis and the dynamic framework detailed by Bernstein and Hoffmann (2018), this research method can be replicated and generalised for other cities implementing decarbonisation policies. However, to use content analysis independently would result in overlooking the inconsistencies in power relations and the social context that the *Action Plan* is situated within. Therefore, content analysis is the starting point for Foucauldian-inspired discourse analysis (Hay, 2010, p. 218).

Discourse analysis is the final component of this mixed methodology, and it can be conducted in various modes depending on the discipline and nature of the research question. For this study, a social constructionist approach developed by the French philosopher Foucault is applied because of its ability to uncover the political mechanisms that influence the attitudes and practices of the wider societal context (Hay, 2010, p. 218). Sharp and Richardson (2001, p. 195) who have interpreted Foucault's work define discourse as "a complex entity that extends into the realms of ideology, strategy, language and practice, and is shaped by the relations between power and knowledge." According to Foucault, discourse analysis investigates the "rules and structures that govern and maintain the production of written, oral, or visual texts" to find *regimes of truth* (Hay, 2010, p. 374; Walter, 2014, p. 275). Additional benefits of discourse analysis include its ability to provide nuanced insights into the development and implementation of policy documents, identify the ways power is employed in a social context, and enable a political critique of government decision-making processes (Walter, 2014, p. 272). By using discourse analysis alongside content analysis, a meaningful understanding of how the City of Adelaide (CoA) and the Government of South Australia (GovSA) are representing their actions

in the form of political text, and how these actions are influencing the attitudes and practices of the wider community is developed.

3.4 POLICY DOCUMENT SELECTION AND INTERVIEW DESIGN

Two genres of text were selected for content and discourse analysis including policy documents published by the CoA and the GovSA and interview transcripts derived from three stakeholder groups (i.e. private sector, public sector, and civil society). The main policy document under investigation is the *Carbon Neutral Adelaide Action Plan 2016-2021*. This document was selected because it is the leading climate change mitigation framework for Adelaide and is pushing for a shift in environmental policy discourse towards carbon neutrality. Furthermore, it is appropriate timing as it is near the end of the five years that these actions were meant to be completed. Two additional supporting documents were also analysed, titled the *Carbon Neutral Strategy 2015-2025* and the *Carbon Neutral Adelaide Status Report July 2019*. The *Carbon Neutral Strategy 2015-2025* is the umbrella document to the *Action Plan* and justifies Adelaide's aim to be the world's first carbon neutral city. The *Carbon Neutral Adelaide Status Report* is a more recently published document that demonstrates the progress of the *Action Plan*. Together, these three documents provide insight into the political leaders' discourse to communicate with their audience - the North Adelaide and Adelaide CBD community.

The content analysis of the policy documents assisted in the construction of the interview questions. Interviewing is an excellent mode for analysis as it allows social scientists to test theories and expose causal mechanisms to make sense of political phenomena (Mosley, 2013, p. 2). Unlike other empirical tools, such as surveys, interviews can allow for further probing of the respondents by using open-ended and follow-up questions to gain a deeper understanding of their experiences that is not always possible when using other data forms (Mosley, 2013, p. 6; Walter, 2014). A limitation of interviewing that may cause criticism is that it can only gain a small group of people's experiences and cannot make generalisations about the wider population (Walter, 2014, p. 245). However, because the CoA, with the help of a small set of elite businesses and organisations, are mostly governing the *Action Plan*, it is better to gain an in-depth understanding of the political mechanisms through their experiences than from members of the broader population. Types of interviewing can range from structured, semi-structured, or unstructured (Hay, 2010, p. 102). For this research, semi-structured interviewing was selected because it uses guided questions closely related to the research question and aims, while also allowing for

flexibility in the questioning process depending on the position and character of the respondent (Hay, 2010, p. 110). An interview guide using open-ended and follow-up questions was developed for each targeted stakeholder group and is provided in *Appendix 1*.

3.5 DATA COLLECTION

For the first stage of data collection, policy documents written and published by the CoA and the GovSA surrounding the CNA initiative were selected for analysis (see ***Table 6***). The *Action Plan* is the focus of the research as it holds the most content (52 pages) about *how* Adelaide will transition to carbon neutrality. After closely analysing the policy documents, it was evident that its authors call for an alliance with local businesses and the community for the co-production and governance of carbon neutral initiatives, which is why this research investigates multiple stakeholder groups at the local level.

Table 6: Selected government policy documents

Policy Document	Length (page numbers)	Producers
Carbon Neutral Strategy 2015-2025 Adelaide, South Australia	17	City of Adelaide
Carbon Neutral Adelaide Action Plan 2016-2021	52	City of Adelaide and Government of South Australia
Carbon Neutral Adelaide Status Report July 2019	28	City of Adelaide and Government of South Australia

Potential respondents for the interviews were selected because of their direct involvement in developing or implementing the *Action Plan*. Three different stakeholder groups were identified for this research: 1) the private sector, 2) the public sector, and 3) civil society (see ***Table 7***) to ensure a holistic understanding of the partnerships and networks that are involved in governing CNA. The private sector and civil society groups included businesses and not-for-profit organisations, respectively, that have partnered with the CoA and the GovSA under the CNA banner. The public sector comprises the internal stakeholders who work for the CoA and have made contributions to the development and implementation of the *Action Plan.* To ensure views from one stakeholder group do not dominate the others, a nearly equal number of interviews from each group were conducted. However, throughout the data collection process, it was discovered that many of the stakeholders have experience in multiple sectors, slightly blurring

the boundaries between the groups. Respondents were categorised based on the role they held with the most experiences related to CNA, and most of the questions were targeted to that particular role for simplification of the results.

The CNA Partnership Directory is a public website created by the CoA and the GovSA and was the main source for finding potential interview respondents. The Partnership Directory was used to find and contact local businesses and organisations believed to be playing a key role in implementing carbon neutral initiatives and categorised them by stakeholder groups while being mindful to gain a breadth of views (see ***Table 7***). For the public sector, government websites were used to identify councilors, sustainability officers, and planning officers who would potentially have insights into the governance and partnerships of the *Action Plan*. A list of potential interview respondents and their e-mail addresses was created and initially included eleven businesses, fourteen organisations and community groups, and twenty-one local government workers. It was anticipated that at least 3-5 people from each category would agree to be interviewed to ensure a sufficient amount of representation and data for analysis. Additionally, *snowball sampling* (i.e. asking participating Respondents to suggest other potential Respondents for the research) was also applied because finding the local government stakeholders most closely associated with the CNA initiative proved to be difficult (Walter, 2014, p. 111).

Once receiving ethics approval in late June 2020, three to four potential respondents per week were contacted for interview participation. The contact e-mail included a short introduction to the research and why their participation would be useful, with the Letter of Introduction, Consent Form, and Participation Information Sheet attached for more details. Interviews were conducted from 29 June 2020 to 8 September 2020 and resulted in seventeen Respondents with five from the private sector, six from the public sector, and six from civil society groups (see ***Table 7***). The interviews' average time was 45 minutes, warranting that the responses were meaningful and provided details on the stakeholders' experiences (Brinkmann, 2014, p. 283). This was a respectable outcome that provided a sufficient amount of evidence for addressing the research aims. Five of the seventeen interviews were conducted over Zoom. The rest were conducted face-to-face in locations convenient for both the researcher and the Respondent, including the respondent's work or office space, a nearby coffee shop or library, and the Flinders University meeting rooms. The interviews were recorded using a Phillips Voice Tracer audio

recorder and the Apple Voice Memos application on the researcher's mobile device. The third interview that was conducted had some technical difficulties, and the recording file was damaged. However, the researcher's notes, as well as the respondent's notes from the interview, were documented and included in the data set. The following Section will explicate how the two data sets - the policy documents and the seventeen interviews- were processed and analysed.

Table 7: Interviewing results by stakeholder group

Stakeholder Groups	**Respondents**	**Services**	**Examples**
Private Sector	Respondent 1 Respondent 4 Respondent 5 Respondent 11 Respondent 13 **Total: 5**	• Transport solutions • Energy systems and solutions • Engineering services • Sustainability and carbon consultancy • Architecture, design, landscaping, construction • Waste solutions and circular economy	• Energy companies • Environmental consultancies • Private transport companies • Sustainable building companies
Public Sector	Respondent 6 Respondent 9 Respondent 10 Respondent 14 Respondent 16 Respondent 17 **Total: 6**	• Policy planning, development and implementation • Overarching governance and decision-making • Managing partnerships • Providing funding, support, and leadership	• Councilors • Lord Mayors • Planning and sustainability officers • CNA team members
Civil Society	Respondent 2 Respondent 3 Respondent 7 Respondent 8 Respondent 12 Respondent 15 **Total: 6**	• Associations and advocacy • Real state and property • Education and awareness	• Community groups • Non-profit organisations • Residents

3.6 DATA ANALYSIS

Content and discourse analysis were applied to both types of data sets with the qualitative research software NVIVO. The first step involved content analysis of three policy documents. The codebook that was developed and followed was based on the description of the three political mechanisms found in the model by Bernstein and Hoffmann (2018) (see ***Table 8***). Sentences and paragraphs in the documents were identified and organised based on their representation of the codes. The results were quantified and put into a table in order of most frequent to least frequent for each theme.

Audio files from the seventeen interviews were manually transcribed verbatim, and notes from the interview were also copied and attached to the audio files for reference. The transcriptions were categorised using the same codebook as the policy documents for easy comparison. After coding and categorising both the policy documents and the transcripts by themes, they were qualitatively analysed. The analysis was interpretative and subjective as the researcher deciphered hidden meanings and truths that might explain what the wider society understands carbon neutrality to be. Inconsistencies and consensus within the discourse were detected, along with barriers and enablers to decarbonising Adelaide by comparing the policy documents against the interviews. Bernstein and Hoffmann's (2018) model was followed closely to categorise and summarise the data. As a result, relationships between the themes were conceptualised to determine if the *Action Plan* is being governed by local urban actors and networks in the way the document says it should be, and if Adelaide is on a trajectory towards decarbonisation, improving in carbon lock-in, or reinforcing carbon lock-in.

Table 8: Codebook for analysis (Bernstein and Hoffmann, 2018; Government of South Australia and City of Adelaide, 2016; Government of South Australia and City of Adelaide, 2019)

Themes	Codes	Examples from the policy documents
Normalisation	Entrepreneurs	"Organisations and individuals that share the aspiration and demonstrate leadership by committing to carbon neutrality for their own operations and/or in some other significant way" (2016, p. 16)
	Practices	"Increasing routine building construction and planning inspections for thermal performance, energy efficiency and sustainability" (2016, p. 23)
	Behavioural Change	"This trend is also seen in the residential sector, where electricity consumption has also been declining, due to factors such as solar photovoltaic installations, behaviour changes in response to electricity price increases, and energy efficiency initiatives" (2016, p. 21)
	Standards and regulations	"Fundamental policy levers for energy efficiency in new buildings and major refurbishments are established at the national level, particularly the mandatory minimum energy performance standards in the National Construction Code" (2016, p. 21)
Capacity Building	Direct funding	"Since 2007, the Australian and South Australian Governments have invested $2.6 billion to revitalise the public transport network, including extending light rail (tram) through the city, and upgrading and electrifying the Adelaide Metro rail system" (2016, p. 27)
	Technology and innovation	"Adelaide will be a showcase for the uptake of renewable and clean technologies and for embracing the economic opportunities of responding to climate change" (2016, p. 7)
	Education, training, and knowledge sharing	"Support and encourage application of the Better Practice Guide - Waste Management for Residential and Mixed Use Developments in new and existing developments." (2016, p. 39)
	Partnerships and Co-governance	"The pathways are supported by two overarching themes: partnerships and governance. The action plan includes 104 actions to be delivered by the CoA and the Government in partnership with business and community" (2019, p. 3)
	Leadership	"This Plan will ensure that we continue to be leaders in tackling climate change and that – as "early movers" – we capitalise on the enormous investment, employment and other opportunities arising in this dynamic field of public policy" (2016, p. 5)
Coalition Building	Market forces	"Improving energy efficiency and switching to renewable energy are complementary policy measures that will deliver significant cuts in emissions and financial savings to the community" (2016, p. 21)
	Climate action networks	"Participate in industry development, leadership and knowledge sharing networks including the States and Regions Alliance, CDP, CNCA, Climate Neutral Now, and the Sister City Program" (2016, p. 17)
	Social movements	"Transformational approaches will be needed that go beyond conventional thinking. This will require decisive and ambitious action that will substantially enhance the way we live, work and socialise in the city" (2016, p. 8)
	Programs	"The CitySwitch Green Office program provides a network of support and practical resources to assist businesses to successfully implement sustainability initiatives" (2019, p. 7)

3.7 CONCLUSION

Adopting an empirical, mixed-methods approach to this study has enabled a nuanced and comprehensive understanding of how effectively local government and the partnerships and networks are governing the transition to a carbon neutral city. The quantitative analysis supports and justifies the qualitative analysis, providing a balance of structure and replicability with a meaningful explanation of social actions in their unique context. It is the expectation that analysing CNA from various stakeholder viewpoints will result in findings that are valid and enlightening, as recent studies on carbon neutral cities have found holistic and meaningful results using mixed-methods (Tozer and Klenk, 2018; Tozer and Klenk, 2019; Laine et al., 2020; Madsen and Hansen, 2019).

4. DISCUSSION

4.1 INTRODUCTION

In this Chapter, the results of the content and discourse analysis of the policy documents and the stakeholder interviews are analysed and discussed. The City of Adelaide (CoA) and the Government of South Australia (GovSA) with the help of partners have been successful in using the three political mechanisms to decarbonise the energy sector, offset carbon emissions, and build political support for Carbon Neutral Adelaide (CNA). However, there remains an enormous amount of work to reach net-zero emissions as there are barriers to decarbonising the transportation system and the built environment. The Sections of this Chapter are organised by the three political mechanisms for decarbonisation (i.e. Normalisation, Capacity Building, and Coalition Building), and by the five research aims listed in *Chapter 1*. First, *Section 4.2* covers *normalisation* by providing details on the content analysis of the policy documents (*Aim 1*), identifying the barriers and enablers that the interviews revealed (*Aim 2*), and discussing the role of the partners in governing the *Action Plan* (*Aim 3*). The same structure of *Section 4.2* is followed in *Section 4.3 Capacity Building* and *Section 4.4 Coalition Building*. Afterward, *Section 4.5* provides a summary of the findings and an exploration of Adelaide's trajectory to address *Aim 4.* Lastly, recommendations for how the current policies could be improved going forward (*Aim 5*) are considered in *Section 4.6*.

4.2 NORMALISATION

CNA aims to create a low-carbon transition that will transform Adelaide into a sustainable and liveable city that attracts businesses and visitors from all over the world. However, to create this transition, low-carbon practices need to be normalised until they are preferred over those producing large amounts of carbon into the atmosphere (Bernstein and Hoffmann, 2018, p. 198). Additionally, normalisation as a political mechanism means a shift in the public's interests and understanding of 'good' governance for climate action (Tozer, 2020, p. 3). While some carbon-neutral practices and behaviours have been successfully taken up and normalised, others have yet to gain traction, and it is uncertain if the broader community understands their role in this transition.

4.2.1 Analysis of Policy Documents

The three policy documents (see ***Table 6*** in *Section 3.5*) were categorised based on predetermined themes for normalisation influenced by the model created by Bernstein and Hoffman (2018). The themes include practices, standards and regulations, climate entrepreneurs, and behavioural change, and the frequency of their references are listed in ***Table 9***.

For normalising low-carbon living, the CoA and GovSA most frequently talk about changing the common *practices* of urban planning to be more sustainable. They mainly discuss tree planting and urban greening, zero-emissions public transport, increasing recycling and organics collection services, and managing carbon emissions levels through disclosure agreements and offsetting measures. The authors of the *Action Plan* recognise that offsetting emissions is necessary for a carbon neutral city, but say that they will "prioritise direct emissions reduction activities over offsets, and prefer offset projects based in South Australia and Australia" (Government of South Australia and City of Adelaide, 2016, p. 42).

In addition to practices, the policy documents also mention several *standards and regulations* that will help stimulate changes in how Adelaide functions and is built. The *Action Plan* says it will either use existing regulations or introduce new standards to decrease emissions from the built environment, plant manufacturing, and motor vehicle use (Government of South Australia and City of Adelaide, 2016). Several of the legislation and standards that are mentioned include:

1. **National Australian Built Environment Ratings System (NABERS)**: gives buildings a 1-6 star-rating of its energy efficiency
2. **National Construction Code**: controls the minimum energy performance standard for new developments
3. **Fleet Average Fuel Efficiency Standards**: to incentivize electric vehicles and align them with vehicle purchasing policies of state and local governments
4. **National Carbon Offsets Standard (NCOS)**: to ensure offsetting measures are genuine and credible

Furthermore, the CoA and the GovSA are highlighting the achievements of *climate entrepreneurs* in Adelaide, hopeful that other businesses and individuals will see the benefits of decarbonising and follow their lead. For instance, the *Status Report* talks about the CNA Partners award that was in 2017 to celebrate and recognise the partners that have made the largest

contributions to reducing carbon emissions (Government of South Australia and City of Adelaide, 2019, p. 12).

Lastly, a carbon-neutral city will not be possible unless the community - the consumers - change their *behaviours*. The government plans to stimulate behavioural change through education and engagement programs about walking, cycling, public transport alternatives, energy-efficient technology, and sustainable waste management. To illustrate this, the *Action Plan* states that the CoA and GovSA will attempt to create a zero-emissions transport system by,

> providing safe, convenient and comfortable streets that incorporate more trees and bike lanes, coupled with community engagement programs that encourage people to walk and cycle…[and]… the uptake of low and zero-emission vehicles, expanding the tram network and completing electrification of the rail network (Government of South Australia and City of Adelaide, 2016, p. 27).

In the proceeding Sections, the discourse of normalising carbon neutrality found in the policy documents is compared against the findings from the interviews to further address research *Aim 1*.

Table 9: Coding results of normalisation in policy documents

Political Mechanisms	Themes	Number of References
Normalisation	Practices	34
	Standards and Regulations	24
	Entrepreneurs	17
	Behavioural Change	14

4.2.3 Enablers

One practice that has become well entrenched in Adelaide is solar and wind energy for powering the built environment. As the policy documents suggest, South Australia is leading in renewable energy, and the Respondents agree that the power grid will only continue to become clean moving forward (R6, R11, R14, and R16). In support, a stakeholder from the private sector remarked:

> Renewable energy is just the future of South Australia, whether people want to admit it or not. There might be some natural gas, but the State Government wants to get off natural gas anyway. It might be a 20-year thing, but the grid here is as green as it gets (R11).

This quote acknowledges that renewable resources are becoming the preferred source of energy across South Australia. The political advocacy created a shift in societal norms where the community now understands renewable energy to be 'better' than the alternative - fossil-fuels (Bernstein and Hoffmann, 2018, p. 198).

Similar to the energy sector, the CoA aims to facilitate a shift in modes of transportation to decrease emissions from combustion engine vehicles. They are encouraging fleet managers and community members to purchase electric vehicles and have installed 42 electric vehicle charging stations throughout Adelaide (R16). A stakeholder from the public sector explains how this is enabling electric vehicle uptake:

> The reason we put charging networks in as the City Council was to signal that we know change is coming and that we are ready when you buy [electric vehicles]... It takes away one of the worries of 'oh, will I be able to charge it?'…You tend to support and encourage and show and tell people when things are being done differently (R17).

Although the CoA expects this norm change and is preparing for it, electric vehicle uptake is yet to be scaled up, with combustion engine vehicles remaining the preferred mode of transport.

An audit of 435 Australian local government behavioural change initiatives by McGuirk et al. (2015, p. 44) found that most behavioural change initiatives in Australia do not focus on new and transformative technologies but instead on processes that aim to get urban dwellers to understand and take responsibility for their carbon emissions (McGuirk et al., 2014a, p. 142). These findings contrast with how Adelaide is governing behavioural change for carbon neutrality. A stakeholder from the CoA explains how establishing a grid that is powered by renewables will remove the need to change consumption habits:

> You can spend a lot of time and effort on behaviour… you can do a certain amount with energy efficiency and behaviour change. But if your entire grid becomes decarbonised, then you are not having to keep pushing and encouraging and cohering… people into switching off [their] light…it just takes the pain out of achieving the same outcome if you do it at a much larger scale (R6).

This quote supports the idea that governing climate change is simplified by focusing more on wide-scale technological fixes and less on educating the public on how to change their behaviours. Pushing to have Adelaide run on 100% renewable energy and electric vehicles enables a transformative shift that will significantly reduce urban carbon emissions if fulfilled.

However, it is a concern that the CoA's behavioural change initiatives prioritise technology and innovation over educating society on practices that would change the way they feel, think, and act towards the environment (see *Section 4.2.4*).

While more change may be needed to increase the energy efficiency within households, the standard set by NABERS has been a beneficial tool for increasing energy efficiency of office buildings. A stakeholder from the public sector who has worked closely with the green office program CitySwitch, explains its benefits for decarbonisation:

> If you are an office-based business, then CitySwitch is your pathway to addressing your emissions… CitySwitch has this measurement component where every year they are all required to fill in their annual report. They are meant to quantify any energy savings that they have made, and they specifically use the NABERS rating scheme… Its strength is it puts together this national, accumulative total of energy saved… But it was all about voluntary action, showing…the market in the property sector that this is something that people really care about" (R17).

The CitySwitch program with the NABERS rating scheme has been successful in decarbonising office spaces within the city. This finding is supported by van der Heijden (2016, p. 4) study that claimed that members of the CitySwitch program must maintain a 4-star NABERS rating, holding tenants and building owners accountable for their energy consumption.

Furthermore, a commonly used political instrument in urban climate governance is climate entrepreneurs or champions who work to bring people together towards a common goal (Broto and Bulkeley, 2013; Khan, 2013; van der Heijden, 2019). The CoA has successfully identified climate entrepreneurs in its network of sustainable businesses with the intent that they will showcase their leadership in sustainability and teach other businesses and community members carbon neutral practices. In support, after a few environmental consultants were interviewed, it became evident that they are active climate entrepreneurs and are improving the corporate social responsibility for climate change risk. One of the consultants talked about how they are instilling sustainability into businesses and the community:

> [We see] regular requests from really large lists of companies wanting to do climate risks assessments, carbon strategy work, science-based target work… We are all about how to have an impact through sustainability… [We] also see businesses as a force of good so we are a B-corporation… We have got six key [sustainability] themes that we focus on at

> the moment. One is carbon climate resilience…another is lifecycle assessment and safer economies… sustainability strategy which is really traditional strategies for corporate surrounding… social sustainability…sustainability leadership area….and then also…built environment and sustainability plantation (R5).

This concept is also supported by another climate entrepreneur in the private sector who describes how they go about setting carbon neutral targets for buildings and businesses:

> Another component…that is coming up a bit more is carbon neutral organisations, as well as carbon neutral buildings. So [we are] trying to figure out ways that buildings are not only energy-efficient, but eventually the developers or owners of it will understand how much energy the building might consume…[and]… trying to figure out what their carbon emissions as a collective organisation might actually be and figuring out ways that you can reduce that, as well as offset whatever you cannot… We have outlined carbon neutral roadmaps or pathways for various councils, as well as various businesses… (R11).

Having a sustainability pillar in the framework of a business is experiencing modular scaling with the help of climate entrepreneurs and having positive feedback for carbon neutrality. Despite the increased uptake of renewable energy and carbon neutral practices in the business sector, the CoA is also experiencing challenges to normalising low-carbon living.

4.2.4 Barriers

While switching to renewable energy has shown significant progress in reducing greenhouse gas emissions for the city, the 'energy equation' is only one of the five pathways to carbon neutrality, with the other four pathways not experiencing an equivalent rate in reduction. In 2015, 35% of Adelaide's greenhouse gas emissions were from the transport sector, the second largest after energy (Government of South Australia and City of Adelaide, 2016, p. 27). Thus, creating a zero-emissions transport system is a high priority for the CoA and the GovSA as this would result in deep cuts in GHG emissions. Unfortunately, a zero-emissions transport system is far from becoming a reality. It is a consensus among nearly all of the Respondents that the transport sector is one of the largest barriers Adelaide is facing for carbon neutrality (R1, R2, R4, R5, R9, R10 R11, R14, R16, and R17). In support, an employee of the CoA describes the cultural norm in Adelaide for driving a car instead of using public transport:

> People have this mindset that I want to get out of my car and walk into the shop, and when I go to work I want to be able to get a carpark and I do not really want to have pay much money for it. That is a uniquely Adelaide thing, particularly if one compares it to cities like Melbourne and Sydney… where people do not do that, they take public transport (R9).

Congruently with the energy grid, the CoA is anticipating that electric vehicles will be the next low-carbon technology to be entrenched, avoiding the challenge of changing people's behaviours to using other transportation modes such as cycling or walking. This idea is confirmed by a public sector stakeholder who states:

> Electrification of our grid is going quickly, and that is great, which is why for all other reasons, different modes of transport other than vehicles, [like] walking, cycling, etc. is much better for you. So there are certainly other co-benefits of that. But if we are not changing as a society, then at least electrification of public transport and private vehicles provides health benefits in terms of reduced fumes, obviously reduced carbon emissions as well (R16).

Indeed, Adelaide is not changing as a society when it comes to transportation. In addition to the cultural ties to driving a personal vehicle, the stakeholders also verify that there is a stigma around riding a bike, discouraging the CoA to develop new bikeways (R1, R9, R10, R11, and R17). The uptake of electric vehicles and electric public transport would remove the difficulties of behavioural change while also making a deep cut in urban carbon emissions. Unfortunately, this is not yet the case. Another representative from the local government explains that, "we are .15 of 1%, so a fifteenth of 1% of all cars say this week in Australia will be electric vehicles… our EV is very low… it is crazy low" (R14). Even though electric vehicle uptake is deficient, the CoA believes this will change in the future when the price of electric vehicles drops in 3-5 years (R14). However, until then, there needs to be more effective governing around behavioural changes to shift the way society thinks about the environment and understands the benefits of having an electric vehicle.

In addition to the transportation system, offsetting emissions to attain carbon neutrality has become an area of conflict among stakeholders. There is a concern that the CoA is not keeping their word about "prioritising direct emissions reduction activities over offsets", and offsetting is becoming a more common practice than more concrete forms of decarbonisation

(Government of South Australia and City of Adelaide, 2016, p. 42). An environmental consultant from the private sector describes this debate in the following statement:

> I do not want to put a big dampener on it. There are parts of carbon offsets that I really agree with, and there are other parts that I really do not… Because there are some aspects of it where it might be a farce trading scheme. But at other times, it has created a pipeline for investment for more environmentally responsible business practices (R11).

Furthermore, Respondent 7 believes it is "a cop-out…to avoid having to bite the bullet and address the problem that you are actually creating" (R7). It is a concern that urban greening and planting trees will become entrenched instead of the more direct and authentic pathways to reducing carbon emissions. A representative from the CoA stresses their concern:

> In fact, it was the Lord Mayor… saying 'well you know, can we just get away from these words carbon neutral and get in there and plant more trees.' So there is… a substantial shift away from adopting measures that reduce carbon footprint in everything we do, to one in which it is suggested now that greening is a good substitute, using recycled water is a good substitute, having a look at our waste policy is a good substitute. None of those things represent substantial change (R10).

This is a worrying statement as it suggests that the sustainability practices that are necessary to make deep cuts in emissions from the city are given a lower priority than the shallow, and often greenwashed practices such as tree-planting (Szili and Rofe, 2007). Such actions rarely change the way people behave and think about the environment and negates the importance of wider institutional reform (Szili and Rofe, 2007). In comparison, Burch (2010, p. 7581) studied climate change policies for three Canadian cities and discovered that contextual barriers such as conflicting priorities and the resistance to public change prevent municipal governments from committing to action on climate change that is significant. If the CoA and the GovSA do not remain committed to their promises and fail to provide the infrastructure, support, and leadership that the community needs to practice low-carbon living, then achieving a carbon neutral city will continue to slip further from reality.

Another barrier to normalising carbon neutrality is low minimum standards and a lack of regulations by the State and Federal governments that support the ambitions of a carbon neutral city. Regulations and standards at the regional and national levels for low-carbon living need to be in-line with those of the CoA to become normalised within the North Adelaide and the CBD.

For instance, McGuirk et al. (2015; 2014a) demonstrate that local governments dominate climate change responses in the Australian context, but Federal and State governments often fail to see them as legitimate partners or align their climate policies with city development issues. Furthermore, a study by van der Heijden (2019, p. 4) found that it is the role of the regional and legal framework to provide oversight and enforcement of urban climate interventions. It appears that the CoA is limited in their autonomy and most of the power for regulating climate change action lies with the State and the Federal governments. The built environment is a good example of this unequal distribution of power. In support, a stakeholder from the city planning department explains that,

> we can recommend changes to policy, but that has to go through an extensive consultation process, community and State government. At the moment, we are chained to a new planning system entirely…we can influence that, but at the end of the day we will not be in control of exactly what that policy says (R6).

This statement is supported by van der Heijden et al. (2019, p. 367) who explains that Australian municipalities only have "soft power" to influence state-level decision-making, while State and Federal policies provide the resources and legitimacy for cities to take climate action. While it is still possible to go above the minimum standards and choose more sustainable practices when developing, this is a voluntary and often costly option for the client and is rarely chosen (R2, R6, and R15).

Another example of regulation at the Federal level that inhibits a low-carbon transition are vehicle emission standards. Although stakeholders at the local level advocate for a reduction in emissions from cars (R16 and R17), this is regulated at the Federal level, creating a barrier to reducing transport emissions for a heavily car-dependent city. An employee of the public sector expresses their frustration with a lack of national leadership:

> We do not have any control of stamp duty, really important, import duties, or emission standards, which we have the lowest emissions standards in the OECD. So we are importing the dirtiest vehicles… We need to actually have that leadership at a Federal government level as well, which I think in the past has been beholden to the fact that we had vehicle manufacturing in Australia with Holden and Ford and Mitsubishi, whereas that whole sector has closed down now. So there is a real opportunity for that to change,

> but there needs to be political will for that to occur. So that is absolutely challenging (R16).

It is crucial to have the political commitment for decarbonising carbon at all tiers of government, or else there is the risk of locking in high carbon-emitting urban activities (Bernstein and Hoffmann, 2018, p. 194). From this evidence, it is clear that there has not been a shift in public policies and standards due to the CNA intervention. Though it appears the CoA is facing many barriers to normalising decarbonisation practices, CNA partners are playing an important role in overcoming some of these.

4.2.5 Role of Partners

Partners of CNA provide decarbonisation services to businesses and the community and bring awareness to carbon neutrality to support the CoA's political agenda. A majority of these partners are from the energy sector, further endorsing Adelaide as a leader in this industry (R16). For instance, Respondent 4 from one of these energy companies explains how they engage their customers on carbon neutral strategies:

> I was working on…getting sustainability into some of these businesses. Energy efficiency does not always align with sustainability, right? It is going to save you money, but if you can get one very keen person who has some influence, then you can make a road in. For [us]…one of the bigger wineries had a very keen person, so then we actually ended up doing sustainability education with that group to work on heading towards a carbon neutral plan with them. That was a massive win for us, but it started with we have done the energy efficiency, you've actually saved some money, and they are happy with the results (R4).

This quote exemplifies how partners in the energy sector are assisting the CoA by encouraging carbon neutral practices. However, the Respondent does emphasise that it is a challenge to find in-roads with customers to make changes beyond energy efficiency because these usually have upfront costs (R4).

Some of CNA's transport partners are attempting to provide affordable, alternative modes of transport within the CBD, such as bike taxis and e-scooters, that the CoA has failed to prioritise. One business owner explains why changing the way urban dwellers travel is important for CNA:

> We just launched a free, self-guided bike tour. So you can get onto the website, and you can soon see 52 rides all around SA, and the initiative there is to get people who have bought bikes during COVID-19 to be using those bikes and it is completely free. We are not charging people. The philosophy behind that is if more people ride bikes, then there is less people in cars. That goes back to our fundamental reason for existing, which is to reduce car use…We do a community ride every Tuesday… It's about discovery, it goes beyond the borders of what our company actually is (R1).

Although there are businesses like this who are trying to normalise cycling, there is still conflict over it in Adelaide, and unfortunately, personal car use is by far the dominant practice.

The audit on behavioural change initiatives in Australia conducted by McGuirk et al. (2014a, p. 143) discovered that local governments more often partner with businesses than with non-government organisations to assist in the implementation process. However, this research found that partnerships with civil society groups are mainly providing these services. In support, the Adelaide Sustainability Centre works in partnership with the CoA for leading behavioural change programs and building broad community commitment to carbon neutrality (R3). Additionally, a convener of a sustainability community group explained their role in creating behavioural changes in the home:

> The overarching intent is for people to reduce their environmental impact individually and as a community, to consider issues like resource depletion… energy, waste, transport and what you can do at home and what you can do by combining with other people. The groups had tended across the metropolitan area of which there is only a few now… There is only about half a dozen groups that are still active (R7).

Community centres and groups within and around Adelaide continue to run meetings, events, and workshops around sustainability to educate the public on what they can be doing to reduce their carbon footprints. Though according to the stakeholders in civil society, participation is dwindling, and they are restricted by a lack of resources, support, and institutional capacity that would allow them to reach a broader audience (R2, R3, and R7). Without the necessary resources, these stakeholders cannot "drive the change required and lift it up into a genuine vehicle for change" (R3). Partnerships are also excellent tools for capacity building, which is the next political mechanism that is discussed.

4.3 CAPACITY BUILDING

According to Bernstein and Cashore (2012, p. 593), an intervention such as CNA should seek to build capacity through direct funding, education and training, technical assistance, and co-governance through partnerships. For instance, pilot projects, demonstrations, and research can become a means of learning new ideas and sharing knowledge among other stakeholders and cities (Bernstein and Hoffmann, 2018, p. 199). In this Section, the variety of political instruments the CoA and the GovSA are using in an attempt to build capacity for governing CNA is examined.

4.3.1 Analysis of Policy Documents

Themes for capacity building were commonly found throughout the policy documents and are summarised in ***Table 10*** below. The most frequently referenced theme is *leadership*. The CoA and the GovSA repeatedly claim that they are leaders in climate change action at the national and global levels. For instance, the *Action Plan* states that "positioning Adelaide to achieve carbon neutrality will strengthen South Australia's already prominent national and international leadership on climate change" (Government of South Australia and City of Adelaide, 2016, p. 7). In addition to leading on the national and global stages, the documents also explain how they will lead by example by reducing emissions within the council's operations.

The documents also consistently mention the need for *partnerships* across the private sector and civil society to assist in the decision-making and *co-governance* of carbon neutral initiatives. To illustrate, the *Action Plan* states that it "identifies a partnership framework as the foundation to CNA, to involve the community in decision-making, priority setting and implementation of this challenging endeavour" (Government of South Australia and City of Adelaide, 2016, p. 8). More detail on this partnership framework is provided in *Section 2.7.*

Equally important for capacity building is for the public sector to provide *education and training* programs that teach the residents about carbon neutral practices and create a space for knowledge sharing among the partners and the wider community. The CoA is also planning to utilise local universities, the Education department, and research centres to improve and disseminate information on the best low-carbon practices and technologies. The rhetoric on

technology explains that investing in the up-take of innovative, clean, low-carbon technology will grow the economy while also making deep cuts in carbon emissions within Adelaide.

Lastly, capacity building is dependent on the amount of *direct funding* that the governing bodies can possess for carrying out regulating and implementation processes. The policy documents mention the amount of money and resources they will invest in low-carbon practices. For example, they claim to have put $12 million towards the infrastructure of two bikeways and installed 49 electric vehicle charged stations throughout Adelaide. Similar to normalisation, the CoA and its partners are experiencing both enablers and barriers to capacity building.

Table 10: Coding results of capacity building in policy documents

Political Mechanisms	**Themes**	**Number of References**
Capacity Building	Leadership	48
	Partnerships and Co-governance	33
	Education, training, and knowledge sharing	31
	Technology and innovation	30
	Direct funding	28

4.3.2 Enablers

As part of the CNA initiative, the CoA have worked towards operating internally on 100% renewable energy to demonstrate its leadership in innovation and climate change action. These efforts look to be on track in 2020 with an announcement that the CoA will be the first local government in South Australia to be powered by renewable energy, meaning "all council-owned infrastructure and buildings – including street lights, libraries, community centres and Town Hall – will be powered by 100 per cent renewable energy from July"(Richards, 2020). The Respondents agree that reaching this goal demonstrates their leadership in renewable energy and climate change action (R1, R4, R9, R14, and R16). A stakeholder from the public sector describes what it means to achieve this goal:

> Council has adopted the 100% renewables for its own operations and that is a significant change. It is the equivalent of taking thousands of cars off the road. [It is] a really positive win and something… that does help in terms of decarbonising the city (R9).

Demonstrating leadership in climate mitigation at the local government level is a powerful tool for building capacity as it shows the State and Federal governments that they are critical players in responses to climate change (McGuirk et al., 2014b). Thus, Adelaide is a showcase for the community and the State and Federal governments to see the savings in cost, energy, and carbon emissions from switching to renewable energy.

There is evidence that at the *Carbon Neutral Strategy* launch in 2015, the CoA and the GovSA were recognised as a leader in renewable energy, and their close partnership was unique and commended by other nations (R14 and R16). More specifically, the Lord Mayor of Adelaide signed the Global Covenant of Mayors, and the Premier of South Australia signed the Global Covenant of States and Regions before they both attended and presented at the Conference of the Parties (COP21) in Paris. One of the Respondents explains the significance of having both the CoA and the GovSA sign these agreements to reduce their GHG:

> We were not the first City and State to sign those two instruments, but we are one of the very few in the world to both sign those instruments. But if you look at climate and politics around the world, you will often get an outcome whereby the State or the Provisional government is absolutely dedicated to it, but the city is not, and then vice versa (R14).

The relationship between the CoA and the GovSA was strong leading up to and during the development of the *Carbon Neutral Strategy* and the *Action Plan*. They both saw the potential Adelaide and South Australia has for being a global leader in the low-carbon economy (R14 and R16). In contrast, research in other states such as New South Wales and Victoria found that there is a disconnect between the local and State governments, which is inhibiting cooperative and coordinated climate change action (McGuirk et al., 2015; McGuirk et al., 2014b; Davidson and Gleeson, 2018).

Furthermore, several Respondents believe that the partnership has remained strong for staying committed to CNA. In support, a stakeholder form the public sector explains:

> In mid-January, [the GovSA] announced the interim target of 50% [reduction in carbon emissions from 2005 levels]-which is a stretch for 2030- as an interim target towards carbon neutrality or net-zero by 2050… We are the only state or territory in Australia to do that. Every other state and territory has a net-zero position, but they do not have an

> interim target, and if they do it is later than 2030. So from an ambition perspective, it is pretty good.... they now have created their own goals (R14).

From this statement, it seems that Adelaide and South Australia are remaining leaders in climate change action at a national level. Another Respondent optimistically describes the current relationship between the GovSA and the CoA:

> It is important that our issues profile will be slightly different than the rest of the State, which has…land-use change, forestry, agriculture... We do still work closely with them, but we are at that point in the review of where to next? We do not know because we are both doing it… I would say that the partnership is still here and alive, maybe it does not have the energy it had right at the beginning, but I think when you have the new [Action Plan] again, I think there is renewed energy because you know where you are going (R16).

This quote intimates that the current condition of CNA and the GovSA's environmental policies are unstable as the new political leaders work to review what has been completed, and what they plan to do moving forward (14). However, the Respondent remains optimistic that the partnership remains close. Having this vertical coordination between the CoA and GovSA is essential for effectively transforming and decarbonising Adelaide (Bulkeley and Betsill, 2013; van der Heijden, 2019). However, a lack of consensus remains among the Respondents as to whether the CoA and the GovSA are maintaining its partnership and leadership for CNA (see *Section 4.3.3*).

To improve the awareness around CNA throughout the community, the CoA is providing educational programs and resources that are readily available to the public. Even in the midst of the COVID-19 pandemic, public sector stakeholders continued to engage with the wider community:

> This year I held three webinars... [mostly] for the business communities... we did one on energy efficiency, we did one on solar intra-strata- like shared solar, and we are doing one next week on offsetting (R17).

According to the respondents, the webinars aim to provide information to the business sector and create a space for the CNA partners to share their knowledge and expertise in low-carbon practices (R16 and R17). In addition to these webinars, the CoA and the GovSA have also held several trials for new low-carbon technologies. For instance, to encourage electric vehicle

purchases by fleet managers the CoA organised a come-and-try day to "not just come-and-try electric vehicles, [but to] actually come and learn about how it could be important for your fleets" (R16). The Respondent further explains,

> we brought fleet managers together with electric vehicle companies so they could actually talk more deeply about the opportunities, and we brought someone from fleet managers Australia to really help fleet managers understand what… it would mean for them, in terms of nitty-gritty depreciation or turn over (R16).

Educating businesses and the community on the benefits of low-carbon technology, such as electric vehicles, and demonstrating how it functions as a product, is an effective tool for capacity building (Bernstein and Hoffmann, 2018; McGuirk et al., 2014a; Tozer, 2020). However, the uptake of electric vehicles in South Australia remains low (R14), and it is unclear if these trials have been adequate.

Another challenge for local governments in gaining access to funding for sustainability initiatives are the restrictions in bidding and procurement processes as well as the short budgetary cycle that does not allow for long-term planning (Burch, 2010, p. 7579; van der Heijden, 2019, p. 4). As a result, cities have to find more creative ways to finance their climate change agendas and are ultimately dependent on financial support from the State and Federal governments (van der Heijden, 2019, p. 4). A good model of this case is the investments in renewable energy. According to the policy documents, the Sustainability Incentives Scheme is co-funded by the CoA and the GovSA. It provides rebates to residents, businesses, and schools who invest in energy-saving technology such as solar PV panels, solar hot water systems, and electric vehicle charging points (Government of South Australia and City of Adelaide, 2016, p. 35). The Sustainability Incentive Scheme has been the main driver in decarbonising South Australia's energy sector and would not have been possible without the GovSA's funding and political will. A stakeholder from the public sector confirms this claim, stating:

> The biggest drop in emissions for the way the city does its [carbon emissions] counting, I think we go back 15 years now, we go from 2007 [emissions] to 2019 [emissions], is in electricity. That is due to the fact that there was a really big push of investment for renewables in the State…They have actually opened up the renewable energy investment and built it from nothing to what it is now in like 10 years (R17).

In support, Respondent 14 remarked that "truth be told, the City of Adelaide did not really do a lot for [renewable resources] to happen. It was the State's energy we were climbing off the back of" (R14). While the CoA sets a specific portion of their budget aside for sustainability initiatives (R14), they are limited in their capacity for making systemic transformations in the high-emitting energy and transportation sectors.

Another example of the GovSA providing financial incentives for decarbonisation actions is Building Upgrade Finance (BUF). The GovSA committed $1.9 million towards BUF, which allows building owners to apply for a commercial loan to improve their buildings' energy and water efficiency (Government of South Australia and City of Adelaide, 2016, p. 25). A local stakeholder describes the benefits of BUF for the energy sector:

> [We were] very focused on BUF... It is a different way of financing. If the loan is to do with a sustainable up-grade to the building, you can get the finance attached to the building itself. So if you… sell the building that loan goes with it…That is one of the other things that…[we]…would promote because it is a dual benefit, if you went into a business and could suggest some upgrades… you could say, well this is a way of financing it (R4).

BUF has been a useful capacity building tool for local stakeholders in the energy sector helping decarbonise the built environment.

These economic instruments for investing in low-carbon technology have been successful because of State funding and regulations at the vertical level and implementation and governance by the CoA and its partners at the horizontal level. This finding is supported by the literature that finds multilevel governance essential for effective urban climate governance (Bernstein and Hoffmann, 2018; Bulkeley and Betsill, 2013; Gordon, 2013; McGuirk et al., 2015; van der Heijden et al., 2019). However, the close partnership between the GovSA and CoA that have made these achievements possible shows signs of disengagement, jeopardising future decarbonisation projects for Adelaide.

4.3.3 Barriers

Research in urban climate governance indicated that municipal governments, with the help from partners in the private sector and civil society, are becoming more involved in urban climate change responses with the confidence that they are better suited than regional and

national regimes for reconfiguring the socio-technical structures of the urban environment (Bulkeley, 2010; Bulkeley et al., 2012; van der Heijden et al., 2019). However, it has been recognised that by Davidson and Gleeson (2018), van der Heijden et al. (2019), and McGuirk et al. (2014a) that Australian State governments hold more power and autonomy for major planning and infrastructure projects, service delivery, and direct funding causing a 'governance deficit' at the municipal level. These previous studies are congruent with what South Australia is experiencing where the political context within which Adelaide is embedded at times limits its capacity to implement and regulate carbon neutral initiatives that would facilitate a city-wide transformation. In support, a stakeholder from the public sector describes the complexity of multilevel governance the CoA is experiencing for carbon neutrality:

> It probably comes down to a lack of political will. Public servants and Council employees can only do what they are authorised to do, either by legislation or by the elect members. Also, there are only certain things that government does [that] has a certain remit for things and whilst local government has a higher degree of control over its own emissions…[and]... it can provide levers and encouragement to the private sector and to State government and Federal government to do similarly, it has no ability to govern outside of its own remit (R6).

This concept is also supported by another Respondent who says, "partnerships between governments are really important in this space. In fact it is very hard to do anything unless you have partnerships with other levels of government" (R14). Additionally, a third stakeholder from the public sector stresses the need for multilevel governance when asked about the barriers to CNA, claiming:

> …climate change deniers who are members of the City of Adelaide Council, a Lord Mayor who is prepared to abrogate that leadership role and carbon footprint reduction, and exacerbated by a State government that does not have the same commitment as the previous State government. With local and state governments in lock-step on carbon neutrality, the outcomes are significantly better (R10).

From this evidence and support from the literature (see Burch, 2010; Davidson and Gleeson, 2018; van der Heijden, 2019), it is clear that a recent lack of leadership at the local level combined with a dejected State government is inhibiting a coordinated transition to carbon neutrality.

While some Respondents feel confident that the CoA and the GovSA will continue making progress towards carbon neutrality in partnership (R14, R16 and R17), other Respondents feel that there is currently a lack of political will for prioritising CNA and the partnership between the CoA and the GovSA has been weakened, further stalling progress in decarbonisation (R2, R4, R5, R10, R14, and R16). To illustrate this, a stakeholder in the public sector discusses the current relationship between the CoA and the GovSA:

> Now we have no dialogue at all with the State government as we were having about things like traffic movements in and out of the city… We have ceased the dialogue that we had on encouraging other forms on par for buses and other public transport that would significantly reduce the city's carbon footprint (R10).

Comparably another Respondent confirms that the election in 2018 disrupted the dialogue between the CoA and the GovSa on electric vehicle purchasing:

> We got very, very close to delivering a whole suite of policies with the State government to incentivise South Australians to increase the uptake of electric vehicles. We got so close and [with] the looming election I knew that the window was shrinking by the day so we were pushing pretty hard... We went into election mode…So we did not get it there [in time] (R14).

Moreover, a stakeholder from a civil society group expresses their concern that the partnership is absent:

> Initially… when [CNA] started the State Government were really supportive, but I think they have completely decoupled themselves from it now…Which is a shame, because I cannot see any great benefit from decoupling themselves from it… It is a relatively small team on the Adelaide City Council and…I am sure [they] work very hard with the resources they have. It would probably be good if the State government were more supportive again (R2).

These findings are in parallel to what previous Australian studies on urban climate action have found. That is, supporting regulations for climate change at the State and Federal level is necessary for a low-carbon urban transition, but governance from the top-down is inconsistent and ad hoc (Bulkeley and Betsill, 2013; Davidson and Arman, 2014; Davidson and Gleeson, 2018; McGuirk et al., 2015; Moloney and Horne, 2015).

As Bulkeley (2013) and Kern and Alber (2009) have identified, often municipal governments that adopt systematic GHG reduction targets fail to do so because they cannot cut across multiple jurisdictions or coordinate with higher levels of government for a city-wide transition. As a result, municipalities "prefer to implement no-regret measures on a case-by-case basis" (Kern and Alber, 2009, p. 173). As Adelaide's target of becoming carbon neutral by 2025 becomes more unlikely, there is concern among the stakeholders that it will become another failed climate change policy (R6, R7, R9, and R10). More specifically, a member of the civil society group expresses their apprehensions about the *Action Plan*:

> I have spent my whole working life in the public service. So I am well aware of how bureaucracies can explain away failed initiatives by saying 'still a work in progress' or 'we have achieved this' and you look at it and you think that's actually not an achievement that's just business as usual… I mean I [have] heard some really good things from some of the city councillors, but I am not convinced that the city council as a whole is fully committed to driving a strong environmental agenda and a carbon neutral agenda at the moment (R7).

This view is supported by a stakeholder currently working for the CoA who firmly believes that the current local government is restricting significant progress in decarbonising Adelaide:

> The organisation's achievements thus far, all of them, have been from that period 2014-18, not subsequent to November 2018… Haese, as you know, left in 2018 and a new Lord Mayor was elected, and a new majority here in council. In that intervening period, that is from November 2018-August 2020, I think most of the CNA initiatives have been watered down or certainly not applied in the same way as they were previously… (R10).

These sentiments are supported by van der Heijden (2019, p. 5), who found that cities are more likely to engage with climate action when its Mayor is a "vocal, charismatic, and experienced" political leader. Thus, a change in leadership could be a contributor to the deceleration towards CNA. Additionally, another Respondent from the public sector expresses their concerns that Adelaide will not reach carbon neutrality as originally planned:

> We will not get there, and we are at risk of not being one of the world's first, we are not even going to be in the running really as a significant player in that. We will be beaten to it by a range of other cities… I think the goal is too modest…why are we not aspiring to be the first and how do you measure if you are *one* of the world's first?... (R9).

Even more concerning is that the current Lord Mayor is attempting to pull away from the words 'carbon neutral' to disguise the CoA failures in reaching net zero emissions. This is supported by a Respondent who says,

> it is the Lord Mayor to whom the CEOs report to, and the Lord Mayor is…beholden to that conservative faction. So the messages keep coming back to the administration 'this is not an important priority, this is not a priority'… In fact, it was the Lord Mayor…she was the one who was saying 'well you know, can we just get away from these words carbon neutral and get in there and plant more trees' (R10).

These excerpts demonstrate that CNA is not being governed as effectively as when it was first launched. There is fear that Adelaide will not continue to be seen as a global leader in climate change action and the low-carbon economy.

Another barrier to capacity building that several Respondents acknowledged (R7, R8, R9, and R10) is that the CoA and the GovSA remain locked into carbon in certain areas, contradicting the principles of carbon neutrality. For example, to help boost the economy coming out of the COVID-19 pandemic, the CoA is promoting a 'driver's month' to encourage people to take their cars into the CBD to shop (Boisvert, 2020). A stakeholder from civil society expresses their frustrations with this new initiative from the CoA:

> They have passed a motion at the City Council to have a drive into the city month coming up later this year…to encourage more people to drive their cars into the city for shopping… Which is totally the wrong thing to do and totally against all of the important transport and energy initiatives that they have put in the carbon neutral plan (R7).

Despite the significant progress South Australia has made in converting to renewable energy, there remains a dependence on fossil-fuels (R8 and R9). A Respondent from the public sector confirms this, claiming that "the previous government put a lot of money into renewable energy and giant battery storage…But there is still huge reliance on oil and gas as a part of our energy…" (R9). They continue to highlight this problematic entrenchment citing international sporting events such as the Tour Down Under being "sponsored by Santos a fossil-fuel company" (R9).

A third example of carbon lock-in is the failure of the CoA and the GovSA to upgrade the machinery and equipment used at plants to be more energy efficient as they had promised to do in the *Action Plan*. A representative from the CoA confirms this, remarking, "[with] regard to

plants and equipment which are [mostly fuelled by] gas, as in liquified gas or petrol guzzlers, there is now a view that we do not worry about it and they are expensive pieces of machinery to replace so we are not going to bother" (R10).

Although progress is being made in decarbonising Adelaide, carbon continues to be promoted and locked in by the government. This is analogous to the challenge to decarbonisation that Bernstein and Hoffman (2018, p. 194) identified, claiming that interventions need to disrupt the interdependent and overlapping economic, political, and cultural dynamics that reinforce carbon lock-in. Thus, carbon lock-in at the national and regional levels can reinforce carbon lock-in at the municipal level and vice versa (Bernstein and Hoffmann, 2018, p. 194).

The last barrier to building capacity for governing CNA is the CoA's lack of funding and resources. As established in *Section 4.3.2,* State funding for the Sustainability Incentive Scheme and the BUF program has enabled decarbonisation of the energy sector. However, this is not the case for the transportation sector, where infrastructure and funding for bikeways and electric vehicle uptake are debated across jurisdictions. There is a concern amongst stakeholders that this conflict has stalled actions to decarbonise Adelaide (R8, R9, R10, and R14). During an interview with a stakeholder from the public sector, it was admitted that a limited budget is indeed creating a barrier to carbon neutrality:

> To be fair I think…council's focus on environmental initiatives is significant. It is done a lot over several budgets now, [but] I think the problem [is that] we have not seen the State government or the Federal government [invest]…For instance, you look at the bus network and the electrification issue that would be costly, but…if you are serious about being carbon neutral you would do it…The tram network which is not finished, you would invest in that because again that is in-line with carbon neutrality (R9).

Equally, a stakeholder from a sustainable community group argues that,

> the State government is focused on… building roads…on making them bigger and wider for more cars. We [must] stop that. We [must] change that thinking and make it safer for bicycles, increase the public transport frequency and affordability…That mindset is there, but very diminished compared to the adoration of the 'car God'…Those sorts of government [transportation] policies are really going against what we need to be doing (R8).

Similar case studies on urban climate change experiments (see Burch, 2010; Madsen and Hansen, 2019; Moloney and Horne, 2015) report that large infrastructure projects related to transport extend beyond the boundaries of the CBD and are regulated by State and National authorities, which can limit the autonomy of municipal governments and cause policy disconnect.

In contrast to these statements about a lack of State funding and action being the barrier to decarbonising the transport sector, a different scenario is outlined by a public sector stakeholder where State funding for bike infrastructure is there, but the CoA has not prioritised this development:

> On really practical levels…we could encourage alternative forms of transport, and this is a level at which council could reasonably be expected to be active, we have pretty much stopped in our tracks. We negotiated a funding agreement with the State government, which was for… $14 million to construct north-south east-west bikeways during the previous term of council. The government paid the money. We have not completed the north-south bikeway, the current conservative controlled council has stopped all work on that… Yet, the State government funding is sitting in an account at council, the remaining $5 million, doing nothing (R10).

The politics and conflicting interest around budgetary cycles causing stalled government action is not unique to Adelaide (see Bernstein and Hoffmann, 2018; Burch, 2010; McGuirk et al., 2015; van der Heijden, 2019). Larger infrastructure projects such as these transportation examples require co-funding and coordination between the CoA and the GovSA, which is currently piecemeal.

In addition to a lack of funding for larger infrastructure projects, this research also found the CoA to have limited resources for governing the CNA partnership program. For instance, it appears that the CNA team is limited in their ability to network within the community and often rely on other departments and businesses to provide this service. As a Respondent from the public sector explains,

> [with] the team [and] the resources available, we started with business because it is achievable. It would have been nice to do a lot more in community education, but what we try to do is basically leverage... I mean there are a lot of people in this space… So we

> just try to use the way Council already talks to its residents and its visitors and try to add pathways for them to learn about carbon neutrality and reducing emissions (R17).

This quote acknowledges that the CoA has limited capacity and resources for implementing education initiatives for CNA and leans on the businesses and organisations that are in the sustainability space for providing these services. Furthermore, many Respondents from the CNA partnership program confirm that the CoA has limited resources when it comes to governing the network (R1, R2, R3, R4, R12, and R13). To demonstrate, a stakeholder from the business sector said:

> The issue with all of this is the bigger picture of it is nice, and it works, but it is very passive because there is not the budget... if you had one person who could…[be] actively promoting this stuff all the time... but there is just not the capacity for that… if you wanted to extend the program you need to have the budget for it and it is not there (R4).

Likewise, another partner from the public sector admits that:

> The [CNA] team is really fantastic and they are doing an enormous amount of work on a shoestring… There are not a lot of resources for developing training or really fundamental deep interactions between the network members. They are doing a really great job with [practically] zero resources… (R13).

It is evident that the CoA is pursuing the strategies of the *Action Plan*. However, a limited amount of support, commitment, and funding from other levels of government is inhibiting more meaningful connections with CNA partners for co-production. The CNA partnership program has the potential to build capacity for the CoA if facilitated effectively. Unfortunately, there is marginal evidence of this as the next Section explains.

4.3.4 Role of Partners

As the literature on urban climate governance has confirmed, partnerships between the public sector and businesses and organisations are becoming a standard instrument for building capacity, especially at the local level (Bulkeley and Betsill, 2013; McGuirk et al., 2015; Broto and Bulkeley, 2013; Taylor and Harman, 2016; Glasbergen et al., 2007). Constructive dialogue between partners can lead to broader stakeholder engagement, collaborative action, and pooled resources for delivering public services for sustainability (Glasbergen et al., 2007, p. 5). The policy documents recognise the importance of involving partners in the business sector and the

community in the development and implementation of the *Action Plan* in order to "build capacity, identify and address barriers, provide a competitive advantage, and improve access to resources and expertise" (Government of South Australia and City of Adelaide, 2016, p. 15). However, when the partners were asked whether the CoA had any expectations of them to implement low-carbon initiatives, participate in decision-making, or collaborate with other businesses on low-carbon strategies, it was unanimous that these were not the conditions of the agreement.

The partners explain that joining the program did not have many requirements and the process involved filling out paperwork on what the business or organisation is doing to reduce their carbon emissions and why they support the CNA initiative (R1, R2, R4, and R13). In return, the CoA listed their establishment and logo in the CNA Partners Directory. To demonstrate this, a Respondent from the private sector describes this process and their disappointment with its simplicity:

> That is where I am perhaps a little bit critical of the network because the expectations were extraordinarily minimalistic… I found it a little bit empty, there was not much expectation put on us. We just had to send through a logo and say that we are happy… there was no pushback on us to say [we] actually have to do [some]thing, or any real tools…We want our logo to be there because we want people to see that businesses are behind this, but there is not that much to get behind… So when we signed up, they were trying to pull people in quickly for the launch... It was 'here is some paperwork, send us your logo, and we will get you on the website' (R13).

Furthermore, the partners have not been engaged to participate in discussions on policy setting or decision-making with the CoA (R1, R2, R4, R5, R11, R12 and R13). In support, a stakeholder from the private sector said, "I've never felt like it is an opportunity to contribute to the policy discussion, and to be honest with you, I would not have expected that" (R5). In addition to the CoA failing to involve their partners in decision-making, there is also a lack of facilitation and dialogue within the network of partners which is inhibiting business-to-business collaboration.

To illustrate, a stakeholder from the business sector describes the potential for more connections between partners that is currently absent:

> I think what the Adelaide City Council did really well is that they pulled us all into a room and said 'you guys are great, you are all carbon neutral people now get along', but it would have been cool if there would have been more instigation or workshop type environments (R1).

In support, another quote from a private sector stakeholder denied collaboration with other stakeholders in this partnership, claiming:

> …in terms of partner-to-partner I do not think that has actually happened…In terms of collaborating I do not think that is a main focus of [the CoA]. Sorry, maybe it is, but it is not necessarily facilitated… (R11).

Despite the lack of evidence from the partners themselves that the CNA partnership program has facilitated business-to-business connection, this is said to be one of its central objectives according to a stakeholder from the public sector:

> Part of the intention of that partnership… was really to provide a business-to-business connection. So if people are actually working in the low-carbon economy, then they might note that another business is and if you are having some networking events or some communications… [Its] raising the awareness of what others are doing [and] you start to have more of those fluid, informal relationships get built and they can turn into more formalised type relationships and opportunities" (R16).

As research in partnerships have found (Glasbergen et al., 2007; Prestwood et al., 2018; Taylor and Harman, 2016), maintaining dialogue and open communication between the stakeholders is necessary for alleviating risk and building political support for climate change action. However, the lack of dialogue and facilitation of the partnership program by the CoA is leading to missed opportunities for businesses to work together to solve the problems of decarbonising Adelaide. Though, this does not deny business-to-business connections as absent among the businesses, as stakeholders talk about partnerships they have formed independently before the partnership program was created (R1, R2, R5, and R12). A more coordinated effort by the CoA could yield better outcomes towards real reform.

In comparison, there is a missed opportunity for adopting innovative ideas and technologies from the partners. For example, a stakeholder from the public sector admits that the partners could be engaged more often for research and development in low-carbon solutions:

> We are not linking in with universities enough. We are not capitalising on the circular economy enough… There are great R and D that comes out of universities in the states and I do not think that local and state governments tap into that enough... I think that is a missed opportunity (R14).

The partners provide a range of low-carbon services, expertise, and research opportunities to the CoA and the community. However, the CoA has not fully harnessed the power and capacity that the partnership program holds for governing the pathways to decarbonisation. To get multiple partners and stakeholders working together as a cohesive unit towards a sustainability project is challenging and requires a large amount of time and resources that the current City Council is not providing. A stakeholder from the private sector describes this challenge:

> As a consultant, you work heaps on projects where…both [partners are] like 'yes we are going to do this, we are going to make great engagements, and we are getting our science in place to know what our targets are.' Then, often you see them stumble as they move forward because it takes a lot of human resources to keep it going…It is really hard working in the circular economy/carbon neutrality space because you are trying to work on projects that change entire systems… We are really working on projects that are a bit more transformative and by their nature involve several partners. So that is always really tough because you [must] get all the partners involved… you have to get them all moving in the same direction at the same time… That is a very tricky skill… if there is any real potential for the CNA network, it is to be able to do things like that. So I have not seen any ambition to really do that (R13).

While it is disappointing to discover the missed opportunities and failed engagement between the partners and the CoA, this does not imply that the partners have not been playing a role in building capacity for decarbonisation. In fact, there is data to support that the partners have been beneficial for demonstrating and educating the community on carbon neutral practices. For instance, on occasion, the CoA has invited the ambassadors of the CNA partnership program to speak at events and share what they are doing to maintain or achieve carbon neutrality. In support, a stakeholder from the public sector explains this event:

> Last year we got some of the people that were aware… [and] really taking on that whole carbon neutral certified route. United Communities are really the biggest. They are our official ambassador, and they do their certification process every year, and they get their

> offsets… United Communities and Sky City, which are casino owners and operators, [and] are also very serious about climate change.... and then a very small company here called Dsquared as well. So the idea is you get leaders in a space in front of other people, and they can explain what they did and why (R17).

Similarly, a partner from civil society explains how they demonstrate low-carbon technology within their residential community with the wider community and the CoA:

> Part of our reduction of carbon emissions was to really look at updating and upgrading green technologies around the community… We run the tours so the wider community can have access to seeing how it works…So we have also been used as a demonstration for other things. For example, the Adelaide City Council has come to us for a number of times when it is wanting to look at things like recycling and composting, and we have allowed them to do studies, surveys… to prove models and concepts (R15).

As these quotes demonstrate, it is a valuable political strategy for the CoA to use its partners to share knowledge and expertise around carbon neutral practices with other businesses and community members. Demonstration as a governing tool for urban climate governance is also highlighted by McGuirk et al. (2014a, p. 143) who explains that it can reach a wider audience that can take this newly learned skill and put it into practice.

Furthermore, the partners are helping the CoA by educating and sharing knowledge on carbon neutral practices. One of the partners from the business sector explains how they educate their clients and engage with the community:

> We do a community engagement process. We identify key stakeholder groups, and we work with a client like Council, and say, we want to engage them around a certain activity… So it might be around energy efficiency measures, just generally understanding climate change impacts, what adaptation means…an awareness raising session, or sometimes it's actually making an input into strategies that are actually being developed (R5).

In summary, the CoA has not been facilitating partnership dialogue and collaboration, engaging the partners in decision-making, or effectively using their research and expertise to improve their capacity for implementing the *Action Plan*. However, the partners have continued to provide capacity building services such as technical support through demonstrations and sharing their knowledge and expertise with the community. Since there are limited expectations

of the partners from the CoA and a lack of co-governance, it is clear that the CNA partnership program is less a partnership by definition and more a coalition of low-carbon industries (see *Section 4.4.4*).

4.4 COALITION BUILDING

Coalition building is the third and final political mechanism used in Bernstein and Hoffmann's (2018) model to measure political interventions for decarbonisation. In this context, coalitions can form for the economic and political support of CNA (Bernstein and Hoffmann, 2018, p. 200). Coalition building can "catalyse these coalitions by identifying and linking 'winners' in the move toward decarbonisation and neutralising losers…[by]… empowering actors who have an interest in climate change, building constituencies either through creating or altering incentives or by active social movement building, and utilising larger market forces" (Bernstein and Hoffmann, 2018, p. 200). As discussed in *Section 2.4*, climate action networks form alliances with municipalities to improve the governance of climate change policies. In this Section, the networks and alliances forming to support CNA are critically analysed.

4.4.1 Analysis of Policy Documents

There are four themes for coalition building used to categorise the data, including market forces, social movements, programs, and climate action networks (see ***Table 11***). *Market forces* was the theme most frequently found and is a powerful tool that can quickly change urban dwellers' purchasing choices. Evidence of this is found in the *Action Plan*, stating, "improving energy efficiency and switching to renewable energy are complementary policy measures that will deliver significant cuts in emissions and financial savings to the community" (Government of South Australia and City of Adelaide, 2016, p. 21).

The second theme for coalition building is creating a *social movement*, which means bringing enough people together working towards carbon neutrality that a transformative shift in society occurs. The CoA believes there is strong civic support and a sense of pride behind CNA and aims to scale this up for a collective effort to enhance and transform Adelaide (Government of South Australia and City of Adelaide, 2016, p. 15). For instance, the *Action Plan* states that "involving the whole community in decision-making and implementation of activities will build community ownership and commitment to create a more sustainable, creative and liveable city" (Government of South Australia and City of Adelaide, 2016, p. 15).

Another way of creating coalitions around low-carbon living is through *programs*. The policy documents mention several programs such as the CitySwitch Green Office, TravelSmart households, Carbon Neutral Schools, and the Carbon Neutral Partnerships. This study focuses on the CNA partnership program for coalition building (see *Section 4.4.4*).

Lastly, the policy documents discuss the multiple *climate action networks* that the CoA and the GovSA are members of and how they will assist them in measuring and reporting their greenhouse gas emissions and hold them accountable at an international level. A list and description of these networks are provided in *Section 2.7*. The next two Sections will discuss the enablers and barriers to building coalitions that the interviews exposed.

Table 11: Coding results of coalition building in policy documents

Political Mechanisms	Themes	Number of References
Coalition Building	Market forces	40
	Social movements	25
	Programs	16
	Climate action networks	11

4.4.2 Enablers

Sustainability, climate change adaptation and mitigation, and GHG accounting are becoming beneficial practices in the market place as investors and consumers are starting to favour environmentally conscientious businesses over those that are not (R5, R11, R12, R14, and R16). This argument is well represented by a statement made by a stakeholder in the private sector who remarked:

> I think the… fascinating driver at the moment is the corporate sector coming in over the top of everything the government is doing and is starting to drive a lot more actions. As we see… regular requests from really large lists of companies wanting to do climate risk assessments, carbon strategy work, science-based target work. That was not happening going back 3-4 years ago… (R5).

One motivation for businesses to develop carbon strategies is because their investors demand it. In support, Respondent 11 from the private sector explains:

> That is where stakeholders and investors become a big thing because if these big corporations actually have to report to their investors about what they are doing about

> climate change... that becomes very, very worthwhile… because some of these investors…might [say]… I am taking my money out and putting it elsewhere because this is going to be a ticking bomb. It is already happening, money always talks… (R11).

Big businesses and international investors are incredibly influential, more so than government at times, and "when you have momentum like that, it is an enormous trajectory that is almost irreversible" (R14). In this sense CNA has become a brand name for a green, liveable and prosperous place, attracting investment and businesses of renewable energy, as well as visitors from around the world (R9, R12, and R16; see also Szili and Rofe, 2007). For example, a Respondent from the public sector discusses how Adelaide has created a competitive advantage in renewable energy:

> We have moved out of providing incentives for solar on households because [with] the economic stack-up, they should just be able to do it now. We do still provide incentives for solar…for non-for-profits or commercial businesses… So… considering where the gaps are, where the barriers are, but also where the new technology is and what can we do to incentivise it so that those... businesses of the new…low-carbon economy are established in South Australia, established in Adelaide [has been critical]. As a result, we have seen energy storage companies come and establish in South Australia... which makes sense (R16).

By incentivising low-carbon technology uptake through rebates and feed-in tariffs, the CoA is establishing a coalition of winners that encourages others to make the same choice. It is making more economic sense to choose renewable energy, which has been a big win for CNA and it is the belief that the next win will be electric vehicles (R4, R14, and R16). A stakeholder from the public sector justifies this belief claiming,

> most people believe that this [electric vehicle uptake] should be done by the market. I am suggesting that there will be price parity on electric vehicles by 2025… All of the research says that when that is the case, the sale of electric vehicles will go through the roof (R14).

The literature on low-carbon urban transitions supports these findings (see Khan, 2013; McGuirk et al., 2014a; Tozer and Klenk, 2019; While et al., 2010). They recognise that incentives and rewards are commonly political instruments for “the recasting of technological, market and

accumulation models to enhance the legitimacy of a low carbon economy" (McGuirk et al., 2014a, p. 145).

The second enabler to coalition building this research found is transnational climate action networks that help Adelaide account for its emissions, share information, and find financial opportunities. Congruently, the literature on climate action networks (see *Section 2.4*) has discovered, municipal governments are becoming more involved with climate action networks that help receive best practices methods, advocate and lobby for national climate change policies, and enhance the voice of the city (Bulkeley and Betsill, 2013, p. 140; Gordon, 2013, p. 293; Harman et al., 2015, p. 76; Zeppel, 2013, p. 217). According to several of the respondents (R13, R14, R16, and R17), the CNCA has been a beneficial network for Adelaide. In support, stakeholder from the public sector explains the benefits of CNCA:

> It is all about people at my level… coming together to learn from each other and share what we know, what we have learned, actually do things in collaboration. We work with the City of Sydney and the City of Melbourne because they are [also] in our region…We meet with [CNCA] each year face-to-face… For example, one of the issues I took to Boulder and I spoke about was around city inventories. So how we are accounting for our GHG emissions… that there are options for different methods…Other things… [CNCA] also put in funding for [carbon neutral] initiatives... So there has been in the order of hundreds of thousands of dollars available… that you can put in ideas for, and it is like the game-changers fund. (R16).

Similarly, a stakeholder from the private sector who attended a climate action network event in Melbourne describes the excitement that bringing municipal climate leaders together creates:

> It was pretty amazing to see cities working together and feeding off each other's plans, really getting perspective on how this has been treated in other cities. That was really good to see because I think we can be really insular in Australia… Being able to talk person-to-person at this level with someone that was implementing this stuff in a different environment, different context... is invaluable (R13).

In addition to opening up forums among the leading cities in climate change action, climate action networks are also holding Adelaide accountable for tracking its emissions. Respondent 16 from the public sector explains this process:

> [We are a member of] the Global Covenant of Mayors for climate and energy… and basically our responsibilities through that is to annually report our emissions… through the Climate Disclosure Project platform… We disclose it for what we do with the community and for ourselves… That is reported in a transparent way and I am very pleased to say that we got an A-plus rating in terms of our transparency and…disclosure… So that is a really good tool, a good membership, in terms of having a consistent approach (R16).

Thus, climate action networks at the transnational level are now working directly with local governments to help them disclose their emissions and keep them accountable for decarbonising, as well as providing valuable networking opportunities.

There is also evidence of climate action networks at the national level that enable Australian cities to collaborate on climate change policies and actions. For example, the Council of Capital City Lord Mayors (CCCLM) is mentioned by several Respondents as a platform for discussion on climate change (R6, R14, and R16). A stakeholder in the public sector describes the role of the network for climate change:

> "The…CCCLM, the sustainability agenda is quite strong. Basically that is where the Lord Mayors of Adelaide, Melbourne, Sydney, Brisbane, Hobart, Darwin, and Perth would meet several times a year. It is quite structured where they craft almost joint policy" (R14).

It is imperative that the capital cities across Australia continue to collaborate on climate change strategies and maintain memberships with transnational climate action networks, as this can cause policy diffusion and coordination from the bottom-up (Gordon, 2013, p. 293; Schreurs, 2008, p. 344). In addition to networking at the national and transnational level through CCCLM, Global Covenant of Mayors for climate and energy, and CNCA, the CoA is also networking at the local level through the CNA Partnership Program. This is further discussed in *Section 4.4.4* after the barriers to coalition building are addressed.

4.4.3 Barriers

The partnership between the CoA and the GovSA with assistance from the private sector and the market has locked-in renewable energy across South Australia. However, this has been possible because of the immediate return on investment that residents experienced after they

switched to solar energy. Unfortunately, when low-carbon alternatives require high up-front costs, they become less attractive to businesses and the community, which inhibits the transition to a carbon neutral city (R4, R5, R7, R11, R12, R13, and R15). This barrier is emphasised by a stakeholder in civil society who was asked about any challenges or resistance to living more sustainably:

> I think there is…not so much the resistance, but what is the return on investments, the economic argument for doing it. I think that is always the challenge with anything around sustainability. There are some things you can put in and quite quickly save money, but there are other things that… it might actually cost you money… So I think that is probably a stumbling block for a lot of things that are related to… carbon neutrality (R12).

Likewise, a stakeholder in the private sector expresses the need for incentives to get businesses on board:

> Many businesses are already so 'strapped', they do not have time and money to actually spend on doing extra [environmental] stuff. They are just trying to stay afloat… If it is not going to directly benefit that, then they are not going to spend the time doing it. That is the reality. There [must] be a keen incentive for them to want to do it (R4).

McGuirk et al. (2014a, p. 144) found that public-private partnerships mainly drive transition initiatives for low-carbon economies with a strong State presence and assistance from local and Federal governments. Therefore, "all levels of government are engaged as important partners" for incentivising and facilitating a socio-technical low-carbon transition (McGuirk et al., 2014a, p. 144).

However, there remains a lack of Federal and State support and regulations for initiatives like CNA, attempting to make a significant transition. For instance, a stakeholder from the private sector explains how the absence of a national emissions trading scheme is restricting the transition to a low-carbon economy:

> … I suppose we are at a point where without having carbon pricing in place at a national level means that the incentive is not there, where as soon as we get carbon pricing coming in, that changes the game in terms of the whole business case (R5).

The Australian Federal government's failure to approve an emissions trading scheme has created a barrier to coordinated, multi-level climate governance and market incentives that would

catalyse decarbonisation for cities (McGuirk et al., 2014b). This argument is also supported by a statement made by Respondent 16 from the public sector:

> What we do need is… governments at every level to be in lock-step to drive down emissions… We actually already know our businesses are. You have got… all [these financial institutions] saying that we need to consider climate risks and that includes transitioning to a low-carbon economy… You cannot send a stronger signal than… the market is sending… But our regulating bodies have not shifted the economy and put in place the things that need to be put in place… there is much more to be done (R16).

Without the State and Federal support to provide incentives to switch to low-carbon solutions, such as electric vehicles or an emissions trading scheme, the chance of seeing a city-wide low carbon transition becomes less likely.

The second barrier to coalition building for decarbonising Adelaide identified by the Respondents is the difficulty to reach the wider community and convince them to reduce their carbon footprint. Some Respondents believe there is a raised awareness of carbon neutrality within the community (R5, R12, R16, and R17) and that "the size of our city means that we can connect and…work together, and…have a shared vision that perhaps is easier to communicate in Adelaide versus much, much larger cities" (R12). However, there is more evidence to support the idea that Adelaide's size is also a disadvantage for creating economies of scale (R12) and that there is a disconnect between the sustainability networks and the rest of the Adelaide community that continues to operate business-as-usual (R2, R3, R4, and R7). Respondent 15 from the civil society stakeholder group illustrates this barrier:

> It gets difficult in a small place like Adelaide because of the financial modeling for business. The incentives are not quite the same… It is the economic imperative that will always win. It is harder on a smaller scale. Getting businesses to thrive in a smaller city is harder, it does come down to economic choice (R15).

This quote demonstrates that although there is reasonable support for CNA if the benefits of decarbonising do not outweigh the costs, the businesses in the CBD are less likely to assent because they cannot see the competitive advantage it would give them. Nevertheless, even more challenging than getting businesses to shift their models towards carbon neutral practices is getting individuals and residents to feel included in this social movement. In support,

Respondent 12 from a civil society organisation expresses their concern that CNA targets businesses more so than residents:

> If you have targets around carbon neutrality, you have obviously got businesses and organisations that are within the city boundary, but you have also got people living here. So what is their role in this?... I am just wondering if the people in the city connect with it or they see it as a business thing... or the council is achieving it in terms of road services or whatever it might be that they are implementing… How do residents living in the city not only contribute to carbon neutrality, but also be proud about what has been achieved as well? (R12).

Furthermore, several respondents identify that Adelaide has a close-nit sustainability network of passionate people. However, to recruit new members into the network and excite them about environmentally friendly practices is always a challenge. A stakeholder from a non-profit organisation stated:

> I think a lot of the people we come across are preaching to the converted. They come to our events because they already really want to be as sustainable as possible. So I think sometimes reaching out beyond our bubble is difficult (R2).

In parallel to this, another Respondent from the private sector said:

> When you then try to start influencing the greater, wider public, our conversation is always 'how do we convince the people that are not in the room to be in the room?' In all of these sustainability circles, [we find] that we… speak to the same people all the time, so how do you actually get a new audience in? (R4)

It is a concern that the transition to a carbon neutral city is depending more heavily on technological fixes and the business sector and forgetting the importance of bringing individuals together to feel responsible for taking action in their daily practices. In parallel to these findings, Moloney and Horne (2015, p. 2450) caution that "while some efficiency gains will be achieved through technical measures, social change framed in this way, will ignore the multitude of ways that unsustainable practices and patterns of development can continue business-as-usual" (Moloney and Horne, 2015, p. 2450). As the CoA and the GovSA have claimed in the policy documents, CNA is not only a task for government agencies and partners, but for the whole community to participate in for a systemic transition (Government of South Australia and City of

Adelaide, 2016, p. 15). However, there is minimal evidence from the stakeholders that the wider community is changing its daily practices to support the CNA movement.

4.4.4 Role of Partners

It is discovered that the purpose of the CNA partnership program is not to form legitimate partnerships that can build capacity for the CoA, but for building political support for the CNA initiative (R1, R4, R5, R9, R10, R11, R16, and R17). In support, a stakeholder from the public sector revealed that the discourse of 'partners' is misleading:

> It is a bit confusing as well because we use 'partners' in two ways. State Government and City Council [are in] a partnership that forms a joint plan that we both adopt, but then we call the partners 'partners' as well…It is just we use the same word, but it's kind of two different things… Being CNA partners we could call them network members... That would be a great thing to start working on. I would like to see whether there is room, the idea of that collectively you actually do track and drive down emissions together in joint projects...[that is] something to look at (R17).

In parallel, a Respondent from the private sector explains the purpose of the partnership program:

> The main thing that the City of Adelaide wanted to showcase was…a critical mass of organisations that span across non-for-profits, to small businesses, to major corporations, that align with the city and the State government wanting to…become known as a carbon neutral city and state... The reason that is really essential is because if the City of Adelaide cannot showcase that there are a lot of [accepting] stakeholders, then there is no political leverage…because if we have over 100 signatories to the CNA program that quickly shows that there is a critical mass of organisations that want this (R11).

These quotes confirm that the partnership program functions as a coalition building tool for political leverage instead of a capacity building tool for co-governance. This finding is analogous to McGuirk et al. (2014a, p. 145), who found that urban climate governance initiatives for advocacy often involve partnerships in the form of climate action networks. However, in this context, "partnership… is largely about gathering momentum and scale, forging a political constituency behind a preferred issue framing or policy approach, rather than drawing in additional capabilities and capacities" (McGuirk et al., 2014a, p. 145).

Another indicator that the partnership program is a coalition of low-carbon industries is the annual awards ceremony that the CoA holds. By interviewing stakeholders in the partnership program it became clear that the annual awards have been beneficial for identifying the 'winners' in taking decarbonisation action (Bernstein and Hoffmann, 2018, p. 200). One partner describes the awards stating,

> I think probably one of the best initiatives there has been [is] the annual awards that they run. I remember going to the first one and thinking my goodness, there are a lot of people who are serious. It is one thing to have this partnership program but it is another thing to see all the different groups come together and I think that is probably one of the greatest opportunities and a chance to see who is leading… (R5).

It gives businesses something to compete for and a market advantage by demonstrating leadership in climate change action to their investors and customers (R11 and R14). Additionally, a stakeholder from the public sector explains how the partnership program has become a network of like-minded people, claiming,

> it is a whole lot of businesses saying we are the services of the future when you talk about the low-carbon economy, that is us. We are growing. We are making new products and services. It is the opposite of the idea that dealing with climate change means shrinking the economy... that is why you have awards… (R17).

However, as the literature warns, oftentimes action networks in sustainability can form a group of elites that make it challenging to include businesses and organisations that do not have the expertise in low-carbon practices (Khan, 2013, p. 138; van der Heijden, 2016, p. 6). A stakeholder from the CoA was asked how new partners are joining the program:

> …to become a partner, you have to demonstrate that you are reducing emissions… In terms of what they are doing, we were not asking for inventories or anything like that, but what are you actually doing within your organisation to reduce emissions, and if you are a business, what is your actual offering as a service to help others reduce emissions (R16).

It is a concern that businesses and organisations have to demonstrate leadership in decarbonisation practices to become a partner because this can inhibit broader scaling of the network. In support, Respondent 17 from the public sector explained the current rate at which new partners are invited into the program:

> We do that a little bit 1-to-1 now when we see people doing activities that fit with leading edge practice…In the beginning it was more effort, more like a traditional drive with the marketing but we made the decision [that] the one thing that you can only get if you are a partner is entering into an award, which shows that this is a select group of leaders… We are not just general marketing for membership... I quite like it that way. So we have been [adding] about one a month for… about the past year (R17).

Results from van der Heijden (2016) found that while networks of elite groups will provide a higher quality of expertise and achieve more meaningful cuts in emissions, networks with open participation will reach a broader range of stakeholders and increase awareness that is needed for a city-wide transformation. It would be beneficial for the CoA to expand the partnership program to scale-up its decarbonisation efforts.

Despite the partnership program not scaling out, network leaders are playing an essential role in spreading the word about CNA and showcasing a low-carbon economy. For example, a partner in the business sector explains their role in supporting the CNA initiative:

> Organisations that do not really put sustainability at a high focus, they might not know how to approach [carbon neutrality]. So that is what we might try to bring to the table…As an ambassador and a partner of the program, that is what we try to do, try to make other organisations, especially South Australia, aware of this program (R11).

Likewise, a partner from a non-profit organisation describes their role as a CNA partner:

> We see our role in the partnership as an amplifying role… we believe very strongly that carbon neutrality is important, and it is important for Adelaide, and it is important for the entire state, not just the CBD and the City Council area. We see our role as raising opportunities where we can talk about… what is being done, and where there can be improvements (R12).

Business partners and organisations are persistently incorporating CNA into their sustainability work to build the political support needed for keeping the initiative alive. However, it is a concern that not enough businesses, organisations, and individuals are enlisting as this affects the more recent inaction by the CoA and GovSA. Evidence of this concern is highlighted by a response from a stakeholder in the public sector:

> The partnership program came later, and it always seemed like an adjunct to the initiatives of the city. So, it was a way of spreading the word and encouraging

organisations to follow the city as a leader. Now, it has become a bit of an excuse. That is to say, 'well, if we do not have buy-in from everybody else, then what do we do?' (R10).

The CNA partnership program has been a helpful tool for coalition building at the local level. When the program was launched there was more excitement, communication, and impetus to act on carbon neutrality (R13 and R16). However, at present, activities among partners are more passive than active (R4). For the CoA to continue to build momentum and support for CNA it needs to reach a broader audience by inviting more businesses and individuals into the carbon neutral circle.

Thus far, this Chapter has critically analysed the policy document's content and compared it against the responses from the stakeholder interviews for each of the three political mechanisms to address research aims 1, 2, and 3. A summary of the findings and the current trajectory Adelaide is on towards decarbonisation is presented in the next Section.

4.5 SUMMARY OF RESULTS AND ADELAIDE'S TRAJECTORY

The Respondents have illuminated both the enablers and barriers they are experiencing when implementing the actions for CNA. A summary of these results are provided in ***Table 12.*** To address research *Aim 4*, the results of this study were applied to Bernstein and Hoffmann's (2018) model to determine Adelaide's trajectory. Determining Adelaide's trajectory requires forward theorising and a close examination of feedback between system effects and the political mechanisms (see ***Figure 8*** and Bernstein and Hoffmann, 2018, p. 206). While some political mechanisms have positive feedback for CNA, others have been unsuccessful in disrupting carbon lock-in. For instance, market forces and political leadership have led to the entrenchment and simple scaling of renewable energy across the state, while a lack of political coordination and regulations for low-carbon transport is enabling carbon lock-in. The Respondents were asked whether they believed Adelaide would become carbon neutral in the near future to assist in forward theorising. It is evident from their responses that there is more work to be done if Adelaide should continue to decarbonise at a city-wide scale (R7, R8, R9, R14, and R16). A Respondent from the public sector expresses his concerns for CNA:

> But five years on when we only have five years left of the plan, I mean we are not going to be one of the world's first carbon neutral cities unless we do something radical in the next five years … It can be done, but we need to do some significant work in the next five years in the transport space… in order to achieve that (R9).

Additionally, Respondent 16 from the public sector was questioned about Adelaide's progress in decarbonising, responding:

> I do not think we are tracking fast enough. If you look at what global emissions are doing and Australia's emissions are doing. We are not doing what we need to be (R16).

Table 12: Enablers and barriers to decarbonising Adelaide

Political Mechanism	Enablers and Barriers to Decarbonisation
Normalisation	**Enablers**
	Incentives for renewable energy is putting Adelaide towards a 100% renewable grid
	Installing electric vehicle charging stations to encourage electric vehicle purchasing
	New buildings and CitySwitch members are required to meet a minimum NABERS rating
	Climate entrepreneurs are leading the transition to a low-carbon economy
	Civil society partners are running behavioural change programs and forming sustainable communities in support of CNA
	Barriers
	Unsustainable behaviours (i.e. personal petrol car use) remains the cultural norm across society
	A lack of political will to take action and invest in low-carbon transport options
	Carbon offsetting (e.g. tree planting) is becoming entrenched instead of direct carbon reduction actions
	The CoA has limited power and autonomy, State and Federal governments are the regulators of standards and legislation for climate change action
Capacity Building	**Enablers**
	The CoA is leading by example and is now running on 100% renewable energy
	The CoA and the GovSA have shown leadership at the global level by co-signing the Global Covenant of Climate and Energy and speaking at the Paris COP21
	The CoA is demonstrating and educating the community about low-carbon technology and practices through events, trials, newsletters, and webinars
	The CoA and the GovSA have been able to co-fund decarbonisation programs such as BUF and the Sustainability Incentive Scheme
	Barriers
	The CoA has limited capacity and depend on the GovSA for political support, funding and regulation
	A weakened partnership between the CoA and the GovSA due to a change in leadership and agendas
	A lack of political will for CNA is resulting in business-as-usual
	The CoA and the GovSA remain locked into carbon and fossil fuel companies
	A lack of funding and resources at the local level to fully implement the *Action Plan*
	The partnership program is ineffective for building capacity for cohesive climate action
Coalition Building	**Enablers**
	Stakeholders and investors are shifting the market towards a low-carbon economy by doing business with those that are considering climate change risk and taking action
	Government incentives (e.g. rebates and feed-in tariffs) are building an alliance of winners who invest in renewable energy
	Transnational climate action networks are providing Adelaide with political and economic support, and a platform for sharing knowledge and ideas around carbon neutrality
	The partnership program is a local climate action network that advocates for CNA
	Barriers
	Resistance to low-carbon practices when there are up-front costs and a lack of incentives
	No national emissions trading scheme or legislation that support the transition to a low-carbon economy
	Members of the social movement for CNA remains the minority group and a lack of pride and responsibility for this ambitious goal
	The partnership program is a group of elites and climate leaders, it is not attempting to bring in more members or scale out for a systemic transition

Although it is the goal to be one of the world's first carbon neutral cities by 2025, the Respondents also agree that attaining this goal is not the measurement of success (R5, R7, R8, R10, R12, R13, and R15). For example, a stakeholder from the private sector responded with:

> I do not think it is necessarily a problem that they do not make it. I think it is really important that cities can come out and put an ambitious target on the table, and that takes a lot of guts… I do not think they will necessarily make it, but I think it is really cool that they came out and said it, and that has its own value as well (R13).

It is useful as a climate mitigation policy because progress can easily be measured and compared with other cities. However, it is extremely challenging and complex to become a carbon neutral city. With the current rate in carbon reduction and stalled political action, it appears unlikely that Adelaide will have net zero emissions by 2025 unless more meaningful, transformative changes are made in the next five years (R5, R7, R8, R9, R10, R12, and R13).

Nevertheless, the Respondents remain optimistic that Adelaide will continue to decarbonise moving forward as long as the political will and leadership are improved (R4, R5, R6, R12, R14, R16, and R17). In support, Respondent 12 commented on the difficulty of carbon neutrality, claiming:

> It is going to take an enormous amount of commitment and political will and the businesses, community organisations, and other organisations, and governments at the local level and the State level working in unison. So there is no doubt it is going to be challenging (R12).

Likewise, another response stated:

> I would be extraordinarily surprised if that [could] be achieved by 2025, but I do not see any reason why it could not be. I think it is possible, but it is going to need a lot of work and a lot of drive by some key leaders to make it happen.

In conclusion, Adelaide has shown significant effort and progress in decarbonising the energy sector through normalisation and capacity building and establishing a growing low-carbon economy through coalition building, giving it a competitive edge at a national and global level. Furthermore, coalition building through memberships with national and transnational climate action networks are further reinforcing Adelaide as a green and liveable city. However, since the change in governments in 2018, there has been a lack of political leadership and social change that has negatively affected CNA. Additionally, the government remains locked into

carbon for economic growth and political support, which is further obstructing the pathway to decarbonisation. The transport sector is also a large contributor to Adelaide's carbon emission and is on an upward trend (R14 and Siebert, 2018). From these conclusions it is determined that Adelaide is *improving in carbon lock-in* (see ***Figure* 8**). This is not to say that Adelaide's trajectory cannot change to *decarbonisation* if the CoA and the GovSA completely decouple from fossil-fuels, successfully switch to a low-carbon transportation system, and normalise carbon neutrality throughout the community. Recommendations for how this shift in trajectories can occur are discussed in the proceeding Section.

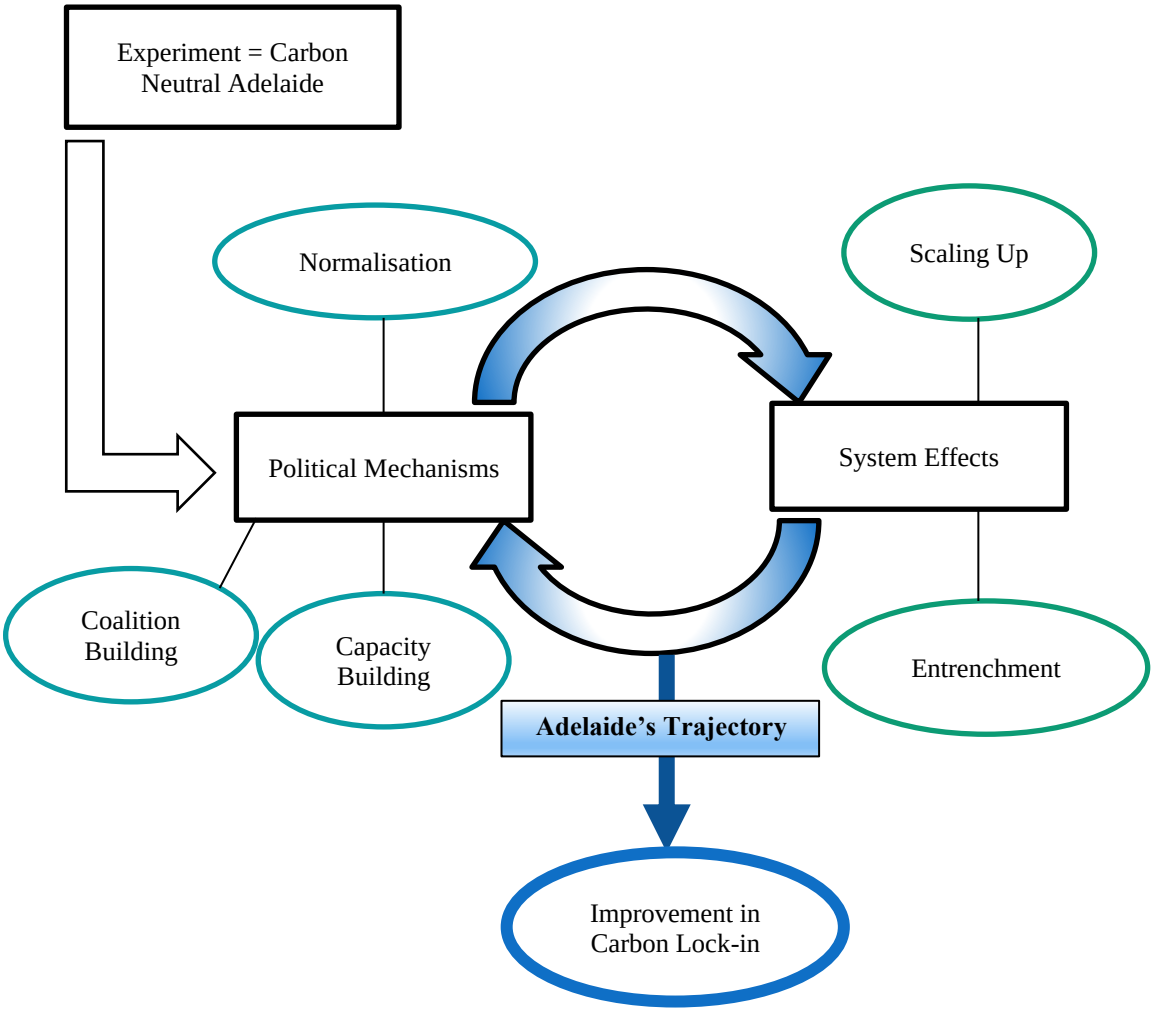

Figure 8: Adelaide's trajectory towards decarbonisation

4.6 RECOMMENDATIONS

The Respondents were asked about their recommendations for improving the current *Action Plan* to address the major barriers to decarbonising Adelaide and the fifth and final research aim. Additionally, literature covering carbon neutral cities, partnerships, transformative change, and participatory collaborative governance have been reviewed in search of solutions.

Several Respondents recommended more rigorous regulations and standards to limit high carbon-emitting activities within Adelaide (R1, R8, and R15). For instance, a Respondent from the civil society explains why regulations are necessary for coordinated urban climate governance:

> [We need] ongoing focus on the infrastructures that improve the ability for ordinary people to live right in a carbon neutral sense. I would like to see… all those regulatory frameworks align with carbon neutrality, so housing requirements, building requirements, local planning requirements… I would love to see continued incentives for business to progress at the high-end, but I would also like to see regulation frameworks help the bottom-end (R15).

The literature on urban climate governance confirms that although local governments are playing a major role in urban climate action, they require legislative and regulatory support from regional and national governments to achieve meaningful results (Bulkeley and Betsill, 2013, p. 144; van der Heijden, 2019, p. 4; While et al., 2010).

In comparison, it is necessary for the CoA and the GovSA to completely decouple from fossil-fuels to effectively disrupt carbon lock-in because "the politics of carbon lock-in and its disruption in transnational city networks are connected to the politics of carbon lock-in and its disruption in provinces and nation-states" (Bernstein and Hoffmann, 2018, p. 195). Thus, in Australia, where climate change action is mainly driven from the bottom-up (McGuirk et al., 2015, p. 41), disrupting carbon lock-in within the CoA and the GovSA can scale-out and have knock-on effects on national and global agendas. A respondent from civil society recognises the importance of disrupting carbon lock-in:

> They have to declare that they are heading towards a fossil-fuel-free society. They have to just declare that and say 'Santos, times up' and we have to transition and just ban all unconventional gas… (R8).

Suppose the CoA and the GovSA make this declaration. In that case, it sends a strong signal to the market, the community, and the Federal government that they are serious about becoming carbon neutral. In addition to unconventional gas, it is also necessary for Adelaide to decarbonise the transportation system.

Adelaide's transportation system remains a large contributor to its carbon emissions as public transportation patronage is low, and personal car use is culturally preferred. A Respondent from the public sector makes a germane recommendation for overcoming this large barrier to decarbonising, stating:

> We have a remarkably high rate of individual vehicle ownership and a comparatively low rate of public transport use. Then we have a low uptake of EVs. So gosh, what is the best way to beat congestion, what is the best way to reduce carbon emissions? Well, electric trains and hydrogen buses. Put people on public transport, and you will do both (R14).

Transitioning public transportation to electric and hydrogen would require a significant amount of political will and investment. However, if Adelaide aspires to be one of the world's first carbon neutral cities, then these are the investments that need to take priority over road construction.

As this research has found, Adelaide heavily depends on technological fixes over community education and engagement that would create a shift in societal norms and behaviours. Behavioural change is also important because it reduces carbon at the individual level by encouraging urban dwellers to take responsibility for their carbon footprints (McGuirk et al., 2014a, p. 141). Moreover, De Flander's (2017, p. 142) study on transformative capacity found that cities are complex systems that require a reflexive process for incremental learning but instead are often "strong proponents of copy-paste solutions as they are trying to make a business model from sustainable urban development." In McGuirk et al.'s (2015, p. 47) case study of a behavioural change program, *Treading Lightly*, uses a workshop format to provide "hands-on skills development in which householders work through their embeddedness in socio-technical networks in and around their homes and develop the skills to reconfigure these networks into lower carbon configurations." It is suggested that the CoA adopts the principles of *Treading Lightly* and increases its transformative capacity by providing more hands-on workshops needed to create incremental behavioural changes towards carbon neutrality.

All the recommendations made thus far would further decarbonise Adelaide if implemented correctly. However, there must be strong political will and the capacity among both the CoA and the GovSA for CNA actions to be effectively implemented. Therefore, the most important recommendation for improving the CNA initiative is for the CoA to harness the power of *community engagement* and *partnerships* for coordinated and collaborative governance. Gollagher and Hartz-Karp (2013, p. 2347) discovered that "while some versions of representative democracy such as the corporatist forms of government in Nordic countries are relatively collaborative and participatory, pluralist models, such as that practiced in Australia, endorse universal 'expert' knowledge and favour engagement with stakeholders as opposed to citizens." This is congruent with the results of this case study, where the CoA largely focuses on the stakeholders in the business sector over community engagement for decision-making on climate action. Respondent 4 from the private sector suggested engaging more with the community to strengthen CNA initiatives:

> … the biggest thing would be asking the community about what they believe can be done and not having it driven from the top-down perspective because I think there are a lot of people doing amazing work out here, and I think the answers probably need to come from [them] (R4).

By involving the community and the stakeholders for collaborative climate change action, the barrier to capacity and coalition building for CNA (see ***Table 12***) can potentially be overcome.

This research revealed that the CNA partnership program is a local climate action network instead of a legitimate partnership for co-governance of the *Action Plan*. While climate action networks are beneficial for building coalitions for a low-carbon economy, the partners can also build capacity. However, this requires frequent communication and meetings between partners that are not occurring presently. Regular dialogue among partners can result in joint problem-solving, decreased risk, and the collective production of new knowledge and innovation (Brinkerhoff, 2002, p. 220; Prestwood et al., 2018, p. 502; Taylor and Harman, 2016, p. 935). The Respondents who are partners of CNA express their interests in being more active in the network to create business-to-business connections and collaborate with the CoA on new ideas and improvements (R1, R3, R4, R11, and R13). For example, a stakeholder from the private sector describes a participation exercise in North America that inspired them to take action in Adelaide:

> There is one idea that I tried to get up a while ago and I just did not have time or capacity to do it…This 1 million cups program…Once a fortnight… they go 'okay we are meeting for breakfast at this space if anyone wants to come along' and then one of the businesses would talk about an initiative or a difficulty that they are having and you have all of your peers around you that would give them ideas about what they could actually do… that has been super successful... To actually bring people together in an organised fashion would be cool… (R4).

For this type of program to be successful in Adelaide, the CoA needs to facilitate connections within the CNA partnership program and provide the space for collaboration between businesses.

Lastly, this study demonstrated that the partnership between the CoA and the GovSA has been weakened for governing the *Action Plan*. This partnership needs to be amended and strengthened to continue to deliver larger, co-produced decarbonisation projects such as a net-zero transportation system. It is suggested that the CoA and the GovSA start meeting more frequently to allow open dialogue between key stakeholders and political leaders on carbon neutral strategies. This will also ensure that regulations and strategies at the State level are coordinated with initiatives at the city level. Community engagement alongside strong partnerships between local government, state government, and non-state urban actors can effectively build up the capacity for scaling-up and entrenching decarbonisation interventions and overcoming future barriers to disrupting carbon lock-in that is likely to arise due to the complexity of carbon neutrality. In the proceeding and final Chapter, concluding statements about the application of this case study for urban climate governance research are made.

5. CONCLUSION

Cities are home to over half of the world's population and the largest source of anthropogenic GHG emissions (While and Whitehead, 2013, p. 1325). Therefore, *how* cities govern climate change will have global impacts. The COP21 in Paris and research on urban climate governance have highlighted that it should not solely be the responsibility of national and international agencies to take climate change action. It should be all government levels, transnational networks, businesses and investors, and community organisations coming together for joint action and coordinated policy-making (Bulkeley et al., 2012; Gordon, 2013; van der Ven et al., 2017). The carbon neutral city has emerged as a new political experiment for decarbonising urban areas. However, this is a relatively new experiment, and research on the leading cities attempting to become carbon neutral in Australia is scarce. The City of Adelaide (CoA) demonstrates joint climate governance in its Carbon Neutral Adelaide (CNA) policies by forming a close partnership with the Government of South Australia (GovSA) and establishing a network of businesses and organisations committed to lowering their carbon emissions. This study has set out to explore the quality of these partnerships and networks with the CoA by answering the research question: *how effective are local government partnerships transitioning to a carbon neutral city?* In this concluding Chapter, the study's empirical findings and theoretical and policy implications are synthesised in *Section 5.1* and *Section 5.2,* respectively. Afterward, *Section 5.3* considers the research's limitations, followed by future research opportunities in *Section 5.4.* Final remarks and conclusions are made in *Section 5.5*.

5.1 EMPIRICAL FINDINGS

The empirical findings are summarised throughout the discussion Chapter and are organised by the five research aims set out to answer the research question. Three policy documents underwent a content analysis and resulted in a significant amount of codes for normalisation, capacity building, and coalition building to assess the CNA initiatives (see *Sections 4.2.1, 4.3.1,* and *4.4.1*). The most frequently referenced themes were *market forces* and *leadership,* emphasising the CoA and the GovSA's focus on growing the low-carbon economy and decarbonising internal processes. *Partnerships and co-governance* was also a common theme found in the policy documents, demonstrating that the CoA and the GovSA understand the importance of network governance and partnerships for governing CNA (see *Section 4.3.1*).

Asking the Respondents about the barriers or challenges they experience when implementing carbon neutral initiatives has revealed a deeper understanding of the relationship between the CoA and the stakeholders (see *Sections 4.2.3*, *4.3.3*, and *4.4.3*). The relationship between the CoA and the members of the partnership program is neutral. While both the CoA and partners in the business sector and civil society are working hard towards carbon neutrality, these groups are often siloed. There is a lack of collaboration, dialogue, and network building for cohesive governing (see *Section 4.3.4*). Furthermore, the Adelaide community outside of these networks remains unaware and disinterested in the CoA's ambitions to become carbon neutral. Bringing outsiders into the circle remains a challenge (see *Section 4.4.3*). The relationship between the CoA and the GovSA became an important point of discussion for how the *Action Plan* is governed (see *Section 4.2.2* and *4.2.3*).This study has found that the GovSA plays an important role in building the CoA's capacity to make tangible changes. Unfortunately, the partnership between the CoA and the GovSA was more disconnected than it was at its inception, which has disrupted Adelaide's pathways to carbon neutrality.

Despite the disconnection between the CoA and its local partners, the partnership program members are providing a coalition of political support for CNA (see *Section 4.3.4*). Additionally, it is discovered that the stakeholders are creating a low-carbon economy that is growing in size and recognition. It was also found that transnational climate action networks assist the CoA in governing carbon neutral initiatives by providing a space for open dialogue to solve problems and gain political leverage (see *Section 4.3.2*). This research has investigated the relationships between the CoA, non-state actors, climate action networks, and the GovSA because the stronger these relationships are, the more likely transformative and meaningful climate action from the bottom-up will occur (Bulkeley and Betsill, 2013, p. 141; McGuirk et al., 2015, pp. 42-43; van der Heijden, 2019, pp. 4-5). When there are conflicting political views among public officials and stakeholders, climate change policies are more likely to be weakened, and systems remain business-as-usual (Davidson and Arman, 2014, p. 304; Moloney and Horne, 2015, p. 2450).

This study has also adopted Bernstein and Hoffmann's (2018) model to determine Adelaide's trajectory is *improving in carbon lock-in* (see *Section 4.5*). This model has allowed for forward theorising of Adelaide's likely future and provides a warning that some relationships and political mechanisms need to be adjusted for Adelaide to remain a national and global leader

in urban climate governance. The Respondents provide specifics of the adjustments that are needed as they have the expertise and first-hand experiences in decarbonising Adelaide (see *Section 4.6*). Their responses highlighted that Adelaide is not on track to becoming one of the world's first carbon neutral cities, and it is unlikely that this goal will be met by 2025.

Considering the findings of each research aim, it is argued that Adelaide's local partnerships are *not* effectively governing the transition to a carbon neutral city because of a lack of transformative capacity, vertical and horizontal coordination, and political will.

5.2 THEORETICAL AND POLICY IMPLICATIONS

This research contributes to the increasing body of literature on urban climate governance. More recently, studies in urban climate governance are creating a new narrative "of cities as saviours of the planet in the face of climate change… and are hopeful of bottom-up collaborations involving citizens, businesses, NGOs and local governments" (van der Heijden, 2019, p. 2). However, there is concern that this narrative is disillusioned, and urban actors do not have to autonomy or capacity to drive climate change action as hoped (van der Heijden, 2019, p. 2). Some research in Australia has attempted to help fill this gap between the rhetoric and reality of urban climate governance (see Davidson and Gleeson, 2018; Davidson and Arman, 2014; McGuirk et al., 2014a; McGuirk et al., 2014b; McGuirk et al., 2015; Moloney and Horne, 2015). However, none of these studies focus on carbon neutral policies nor the capital city of Adelaide, as this research has done. This research has successfully identified the barriers and enablers Adelaide is experiencing on its pathway to carbon neutrality. Melbourne and Sydney are also aspiring to be carbon neutral, and there is an opportunity for them to learn from Adelaide's successes and missed opportunities.

This study has found that the CoA has been more successful at implementing decarbonisation initiatives that involve the GovSA. However, a change in leadership at the local and state levels has created a disconnect in the partnership and political conflict. This theory is consistent with findings from Moloney and Horne (2015, p. 2448) and Davidson and Gleeson (2018, p. 239), they find Melbourne's climate change action inhibited by a lack of multilevel governance and the Victorian government continuing to support fossil fuels and road construction.

Furthermore, this study has found that climate action networks at the local and transnational levels have been beneficial for providing political leverage and advocacy, technical

assistance, innovation and expertise for governing CNA. However, it remains unclear if these networks are scaling up to support a city-wide transition to a low-carbon economy. This is again congruent with Davidson and Gleeson's (2018, p. 239) study on Melbourne and Sydney's climate action networks. Similarly, McGuirk et al. (2014a, p. 145) found that Australian advocacy initiatives use climate action networks and partnerships to build constituencies for carbon reduction policies. However, their uniform nature poses a challenge to building a wider support base (McGuirk et al., 2014a, p. 145).

Lastly, this research has theorised that having legitimate public-private partnerships through the partnership program could build capacity for the CoA for governing carbon neutral initiatives. The informal nature of the partnership program is weakening its accountability and legitimacy for governing a city-wide transition. Likewise, studies on climate action networks critique them for being a group of elites that limit transformative urban climate change action and democratic control (Khan, 2013, p. 138; van der Heijden, 2016, p. 6). In contrast, Prestwood et al. (2018), Taylor and Harman (2016), and McGuirk et al. (2015) found cases where legitimate partnerships have found co-benefits and trade-offs that built the capacity for governing local decarbonisation initiatives.

Bernstein and Hoffman's (2018) model adopted for this study is dynamic and can be replicated for other decarbonisation interventions across Australia to determine which political mechanisms inhibit or catalyse coordinated climate action. It is discovered that the CoA is restricted by conflicting regulations and policy agendas from the top-down and a lack of capacity building instruments. Improving South Australia's vertical and horizontal coordination by reviewing carbon neutral policies and targets is necessary for Adelaide to become one of the world's first carbon neutral cities. This study has successfully investigated the gap between rhetoric and reality of cities for governing climate change in the Australian context and supports the literature on multilevel governance for coordinated climate change action (see Bernstein and Hoffmann, 2018; Bulkeley et al., 2012; Bulkeley, 2010; McGuirk et al., 2015). It has also explored the new socio-technical storyline of carbon neutral cities for an urban low-carbon transition (Tozer and Klenk, 2018). Nevertheless, this research has its limitations.

5.3 LIMITATIONS

One limitation to this research may be that the selected stakeholder groups do not represent the opposing groups to carbon neutrality, such as industrial factories running on fossil-

fuels or non-partners of the Adelaide community, which can create biases. However, because this research focuses on the political mechanisms for governing the policies, these opposing views would likely not be as informative as those directly involved in the decision-making and implementation processes. Second, the research discusses the partnership between the CoA and the GovSA, though stakeholders from the State departments were not interviewed. This can limit viewpoints and biases of the partnership. To help overcome this limitation, it was observed that three of the Respondents (R4, R14, and R16) had experience working at both the local and state level. These Respondents have provided diverse and valuable insights into the data set. Lastly, this research's data collection phase was conducted during the COVID-19 pandemic. This could have reduced Respondents' concerns towards climate change mitigation efforts. Limitations of this research open opportunities for future research.

5.4 FUTURE RESEARCH

This research has found that the State government holds most of the power and capacity for governing major socio-technical transitions such as the renewable energy grid and transportation systems and infrastructure. While the local government can encourage and influence these larger decisions, it is ultimately the State who decides what is prioritised and funded. Therefore, future research should investigate the GovSA's priorities for climate action and, more specifically, its transportation policies and projects. The partnership between the CoA and the GovSA should also be considered from the State's perspective to fill in the gap this research created. Melbourne and Sydney are also members of the CNCA and are facing similar barriers to decarbonising. There is a research opportunity to compare the progress and socio-political context of these three cities using a similar framework to this study. Furthermore, the implications of the COVID-19 pandemic on carbon emissions was often discussed with Respondents throughout this study (R4, R5, R6, R13, R14, and R16). Unfortunately, these discussions were beyond the scope of this study, and the impacts of the pandemic on carbon emissions from Adelaide will take more time to be revealed. Nevertheless, there is an excellent opportunity to research the correlation between COVID-19 pandemic and climate change actions.

5.5 FINAL STATEMENT

Adelaide is becoming a national and global leader in the low-carbon economy. In 2015, it set the ambitious goal to be the world's first carbon neutral city knowing such an achievement

would advance Adelaide's prosperity and liveability. Unsurprisingly, Adelaide has found many challenges to becoming carbon neutral. Conflicting political views and agendas, engagement with various stakeholders, and a deeply rooted dependence on fossil-fuels adds great complexity to governing the transition to a carbon neutral city. This study has chosen to investigate Adelaide's minimal progress towards this goal not to criticize its failures but to reignite its initial enthusiasm for reducing carbon emissions and expose the areas that need greater attention. The focus on partnerships and network governance provide the roadmap Adelaide needs to overcome these challenges and complexities, and successfully decarbonise its pathways to carbon neutrality. If successful, Adelaide will become a showcase city that inspires other municipal governments to take similar deep decarbonisation reform, ultimately mitigating the impacts of anthropogenic induced climate change.

APPENDIX

Appendix 1: Interview Guide

I. Local Government

1. Can you explain what your role is and what a typical day at work might involve?

2. Are you involved in developing and/or implementing climate policies for the city?
    a. What experiences have you had in implementing the Carbon Neutral Adelaide Action Plan? What are the challenges you face?

3. Since the Carbon Neutral Adelaide Action Plan was established, what has been the most successful changes you have experienced throughout the city in regards to decarbonisation?

4. In your experience, what are the benefits and achievements of the Carbon Neutral Adelaide Partnership program?
    a. Have these partners participated in government actions and decision-making? Implementation of actions? If yes, how so?

5. How has memberships with international climate action networks (e.g. CNCA, Global Covenant of Mayors for Climate and Energy, Regions Adapt) influenced or improved Adelaide's strategies for governing carbon emissions?
    a. Would you say that these networks have improved collaboration and coordination between levels of government and amongst cities for urban climate governance? Why/Why not?

6. In your opinion, what are the barriers Adelaide is facing when transitioning to a low-carbon economy and how can these explain the slowed progress in carbon reduction in recent years?

7. Considering the progress of the CNA Action Plan and the current political-economic state of South Australia, Do you believe Adelaide will become carbon neutral in the near future? Why or why not?

8. Do you think carbon neutrality is the best climate policy for a low-carbon urban transition?
    a. If you were to recommend a solution to improve the current Action Plan or an alternative climate policy experiment for decarbonising Adelaide what would it be?

II. Partnered Private Sector Businesses and Civil Society Organisations

1. What is your role and responsibilities at [insert company/organisation name]?

2. What are the expectations or agreements of Adelaide City Council and the Government of SA from this public-private partnership through Carbon Neutral Adelaide?

3. How has partnering with Carbon Neutral Adelaide influenced the actions, policies or behaviours of your organisation/business?
    a. Has this partnership provided you with information and support (i.e. incentives, grants, resources, technology) for reducing your carbon emissions? Give examples if relevant.

4. In your experience, in what ways has the company/organisation encouraged community engagement and education for low-carbon living?

5. Since partnering with Carbon Neutral Adelaide, has your company/organisation been given the opportunities to participate in deliberation of government actions and initiatives and/or collaborate with other Carbon Neutral partners?
    a. If yes, what does this look like?
    b. How do you think the relationship between the City of Adelaide and your business/organisation could be improved?

6. Have you heard of or been involved in any of the climate action networks that Adelaide is a member of? (e.g. CNCA, Global Covenant of Mayors for Climate and Energy, Under 2 Memorandum of Understanding)
    a. If yes, what is your opinion on them as a political mechanism for carbon neutrality?

7. What are the challenges that your business/organisation has been experiencing when implementing low-carbon initiatives?
    a. What do you think is Adelaide's biggest challenge for transitioning to a carbon neutral city?

8. Considering the progress of the CNA Action Plan and the current political-economic state of South Australia, Do you believe Adelaide can be carbon neutral by 2025? Why or why not?
    a. Do you think carbon neutrality is the best climate governance initiative for developing sustainable cities?

9. Do you think carbon neutrality is the best climate policy for a low-carbon urban transition?
    a. If you were to recommend a solution to improve the current Action Plan or an alternative climate policy experiment for decarbonising Adelaide what would it be?

III. Community groups and Residents

1. How long have you lived in the city? What do you like about living in Adelaide?

2. Have you heard of the Carbon Neutral Adelaide Action Plan?
    a. If yes, what is your opinion about it?
    b. If no, what comes to mind when you think of a carbon neutral city?

3. Do you want Adelaide to become carbon neutral? What does this goal mean to you?

4. Are there any examples of changes you have seen or heard about in regards to Carbon Neutral Adelaide?

5. Have you heard of or participated in a sustainability behaviour change or education program provided by your local government?
    a. If yes, how did it change (or not change) your behaviours towards the environment or community?

6. In your opinion, what are the barriers or challenges Adelaide city council and the State government are facing when attempting to transition to a low-carbon/carbon neutral economy? (these could be governmental, technological, economic, or behavioural barriers)

    a. What do you think the government could be doing differently to ensure that a systemic transition to a carbon-neutral city is taking place?

7. Considering the progress of the CNA Action Plan and the current political-economic state of South Australia, Do you believe Adelaide can be carbon neutral by 2025? Why or why not?

10. Do you think carbon neutrality is the best climate policy for a low-carbon urban transition?
    a. If you were to recommend a solution to improve the current Action Plan or an alternative climate policy experiment for decarbonising Adelaide what would it be?

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