A just transition for oil and gas regions? A comparative analysis of just transition policies in Denmark, New Zealand and Scotland

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Abstract

Oil and gas regions across the world are undergoing significant changes as the pressure to decarbonise economies and reduce emissions becomes increasingly necessary to limit the effects of climate change. Concerns regarding broader impacts to the economy, uncertainty surrounding what we are transitioning toward, and, vitally, the inherent risks to workers and their communities are important considerations for ensuring a just transition. This comparative policy review examines just transition commitments, drivers, institutional structures, and accountability mechanisms in three oil and gas dependent regions, drawing out key lessons and leading practices. The regions of Taranaki (New Zealand), Aberdeen (Scotland), and Esbjerg (Denmark) have all committed to transitioning away from the oil and gas sector and employ place-based policies to drive their transitions, with distinctive challenges and opportunities that can inform Canada's own transition. These cases utilise expert interviews to guide an in-depth analysis of academic and grey literature to reveal key characteristics of a just transition that Canada can integrate into its own policies.

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1. Introduction

The 6th Intergovernmental Panel on Climate Change report has been described by the United Nations Secretary General as no less than a 'code red for humanity' (IPCC, 2014). The risks of climate change are clear and urgent actions are needed to decarbonise industries, economies, and societies on multiple fronts. This is not just a technical challenge but also an economic and social one. Regions that are economically dependent on the oil and gas sector will be disproportionately burdened with the costs. These costs are not limited to financial burdens but also psychological, such as a loss of identity and community or the deterioration of physical and mental health (Atteridge & Strambo, 2020). To mitigate the impact of these burdens, or *distributional implications*, governments have begun to integrate aspects of 'just transition' principles into their decarbonisation policies to reduce harm to people and communities (Atteridge & Strambo, 2020, p.6).

The concept of a just transition first arose from the US labour movement and has since that time proliferated. The 2015 Paris Agreement of the *United Nations Framework Convention on Climate Change* solidified its importance with the proviso that signatory nations take into account "the imperatives of a just transition of the workforce and the creation of decent work and quality jobs in accordance with nationally-defined development priorities" (United Nations Framework Convention Climate Change, 2015). Just transition policies are about *reducing the harm* of energy and industrial transitions on workers, communities, businesses and other rights holders and stakeholders, while simultaneously amplifying *the benefits.* The Organisation for Economic Cooperation and Development (OECD) describes a just transition as "a deliberate effort to plan for and invest in a transition to environmentally and socially sustainable jobs, sectors and economies" (Smith, 2017). It is a way to recognize and manage energy and industrial transitions so that the workers, communities, and other stakeholders do not face disproportionate risks or harm (Krawchenko & Gordon, 2021, p. 1). Just transition plans integrate a diversity of goals and expertise to facilitate the best possible outcome for the decarbonisation process and minimise hardship (Rosemberg, 2010).

Managing a just transition is complex and has important industry specific and place-based dynamics. Regions and communities have different energy and industry profiles which impact the nature of transitions, including the critical question of what an industry is transitioning to. There

is a large and growing literature on just transitions: much of this literature employs case studies to examine existing sustainability transitions (see for example Diluiso & et al., 2021 for an overview of coal transitions and opportunities for policy learning). Many of these studies examine if the transition has been managed well or not, drawing important lessons for future policy learning. Many studies have focused on coal phase outs since coal has been one of the early high GHG emission industries to be addressed by governments (examples include the sectoral transition in Germany, the UK, Australia, and Canada, among others) (World Bank, 2021; Center for Strategic and International Studies, 2021;Diluiso & et al., 2021). However, other types of transitions are less studied, in particular oil and gas transitions.

For Canada, the successful transition of the oil and gas industry will be key to meeting its GHG reductions commitments. As of 2022, Canada pledged to achieve net-zero emissions by 2050, a reduction of 40-45% from 2005 levels (Government of Canada, 2022). The oil and gas sector is the largest contributor to GHG emissions (177 MtC02e in 2020), closely followed by the transportation sector (155 MtC02e in 2020) (Government of Canada, 2021). Canada also recently passed the *Sustainable Jobs Act*, which places just transition concepts such as social dialogue and regional impacts, at the center of its commitments (Government of Canada, 2024). Developing policies for oil and gas dependant regions in Canada will be imperative to meeting the targets, but Canada is only at the beginning stages of addressing this issue. Policy learning from other countries and regions that have tackled oil and gas transitions may provide useful insights on how to manage transitions here.

This thesis examines oil and gas transitions in three regions with significant and ongoing commitments to transition the oil and gas sectors: Esbjerg (Denmark), Aberdeen (Scotland) and Taranaki (New Zealand). It examines the approaches that these regions and their respective countries are taking to manage oil and gas transitions and for potential policy learning for Canadian oil and gas regions. The transition toward a net-zero economy will disproportionally burden Canadian oil and gas regions and policies must be in place to support the affected communities and people. This is also significant due to the politics and culture of the region which have been historically resistant to change in their oil and gas sectors. Policies to support a just transition are thus particularly important as they address political and public acceptability in a sector that has campaigned for an "ideological identification of… private interest with the broader public interest"

(Maclean, 2018, p. 56). Just transition principles can help separate these interests and ensure that the transition process pursues a more equitable future for everyone.

Problem Statement and Significance of Contribution

To date, there have been numerous reports by international, national, and subnational organisations detailing the framework and elements required for a just transition, increasing in frequency and urgency as the climate emergency grows (Atteridge & Strambo, 2020; European Trade Union Confederation, 2024, Adams et al., 2016; Just Transition Center, 2017). These reports point to the far-reaching changes needed to support a just transition, which entails a "long-term, multi-dimensional, and fundamental transformation processes through which established socio-technical systems shift to more sustainable modes of production and consumption" (Markard et al., 2012, p. 959). Governments, as a result, will "require a radically different set of guiding principles in the context of sustainability transitions" (Frantzeskaki et al., 2012, p. 21). As Canada continues to pursue its commitments to the Paris Climate Accord and decarbonise its economy, research is required to identify what cohesive mix of policies and governance arrangements will successfully mitigate harms done during the decarbonization transition[1]. One of the least explored and understood, is how to transition oil and gas economies.

While there is a great deal of knowledge and historical and practical examples of transition policies, for instance, coal transitions in advanced economies, far less is known about how to transition (decarbonize) the oil and gas sector[2]. Learning from the transition process in other countries with similar commitments can improve the process in Canada. Presently, the oil and gas sector is responsible for 27% of Canada's Scope 1 and 2 GHG emissions (Scope 1 emissions refers to direct emissions, while Scope 2 refers to indirect emissions) (Government of Canada, 2022). No Canadian government has committed to phase-out the industry; however, the Government of Canada is exploring regulatory options to cap and reduce oil and gas sector GHG emissions (Government of Canada, 2022b). There remain high hopes within the industry that carbon capture, utilisation, and storage (CCUS) technologies can prolong the dependence on their industry. The

[1] A carbon neutral economy is defined as: having a balance between emitting carbon and absorbing carbon from the atmosphere in carbon sinks (European Parliament, 2019).

[2] For example, in 2019 Canada launched a targeted response to phase out the coal sector and provide recommendations on how to ensure a fair transition. Subsequently, *Canada's Task Force on Just Transition for Canadian Coal Power Workers and Communities* successfully secured federal funding for impacted communities.

oil and gas sector is a billion-dollar industry, and those who benefit from current economic arrangements "devote enormous resources to preserving the status quo" (Pierson, 2000, p. 35). Consequently, durable transition policies can be difficult to implement and makes adopting experimental, and potentially risky, transition policies unattractive, further complicating the identification of successful policies. Comparative analysis can "provide a substitute for experimental approaches to policy development," and grant policy-makers insight into alternative policy approaches untested in the domestic context (Dodds, 2013, p. 251). Comparative analysis utilizes case studies with suitable comparators to draw lessons, both positive and negative, from the experiences of others, in a process of policy learning. Having concrete data and real-world examples can abate the influence the oil and gas industry has on slowing-down the transition and provide governments with ammunition to decarbonise its economy.

1.1 Purpose and Scope

Case studies are crucial to understanding the complex and evolving dynamics of transitions due to the concentration of change at the regional level (Green & Gambhir, 2019, p. 907). This thesis employs comparative case studies of oil and gas producing regions in New Zealand, Denmark, and Scotland to identify and contrast just transition policy approaches. These countries have all made commitments to reducing or phasing out the oil and gas sector, and despite differences in context, important lessons can still be drawn from their transitions (Krawchenko & Gordon, 2021). Each region selected for this comparative case study has committed to integrate just transition principles into their oil and gas phase-outs. The case studies will specifically examine the commitments, approaches, and accountability mechanisms of these regions as they undergo their own transition process. Comparing the just transition policies of these regions can help to understand their orientations to "long-term change in large socio-technical systems" (Meadowcroft, 2009, p. 324).

This comparative case study employs a mixed methods approach and combines interviews with key experts alongside a review of academic and grey literature including government documents. The literature review forms the foundation of the research and has focused on identifying the regions where the respective governments have made commitments to the transition process; their approach towards the transition process; and the types of accountability and outcome metrics that are in place to determine success. Data from the interviews have served as a method for verification, as actual policy implementation may differ from the proposed method outlined in

related documents. The interviews provide insights into the process of transition policy development and insight into the challenges of developing successful strategies. Together the two different streams of data collection corroborate findings and limit potential bias.

Comparing oil and gas transitions in other regions to develop domestic policy is needed to create successful policy and regulatory framework. Policy makers cannot expect the oil and gas sector to voluntarily reduce its emissions to adequate levels for a net-neutral economy, rather a "sustainable energy transition is not possible in a society unless the government intervenes by imposing binding constraints on carbon emissions" (Meadowcroft, 2009, p. 324). Indeed, oil companies have been extremely successful at lobbying against environmental assessment of the sector, and "continue to play a leading role in… drafting its preferred amendments to existing environmental legislation" (Maclean, 2018, p. 54). If Canada is to adhere to its 2030 and 2050 targets, there is limited time for experimentation. Comparative case studies provide the basis for policy learning and allow governments to adopt policies that are proven to work in the oil and gas transition. Comparison also provides the proof of success that can sway voters, diminish political opposition, and gain industry buy-in, emphasising the importance of comparative data for a historically divisive sector. Exploring how other countries manage their oil and gas transition process will provide valuable insights for Canadian policymakers who can learn from the mistakes and successes of their international counterparts to create cohesive, stable policy that achieves the long-term aims of a just transition.

Research Questions

1) **Commitment:** What are the commitments to decarbonise/phase out the oil and gas industry and how were they established (e.g., how did this policy change occur, what were the drivers, who was involved etc.)
2) **Approach:** What is the approach that has been taken to the proposed phase out? Does this include legislative requirements, new sources of funding, institutional structures, bottom-up, top down, just transition commitments, etc.
3) **Accountability and outcomes:** How does the state/region/industry report on accountability and outcomes? What are the measures, how do they determine success, who is involved, how does is a 'just transition' defined?

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2. Literature Review

This literature review explores key themes that have arisen from examining the development of a just transition. Since its inception, during the 20th century coal and other industrial transitions such as the chemical and automotive sectors, there have been numerous studies that have explored the essential components of a just transition, including the challenges and opportunities inherent within the process. This review aims to provide an overview of the current research on just transitions, particularly within the context of the oil and gas transition. The key themes that arose from the review provide the foundation for my conceptual framework and informs the analysis of the case studies.

What is a 'just transition'?

During the 1970s, governments in North America began to implement environmental legislation and regulation in response to growing concerns regarding the negative impacts of unchecked pollution. However, given the adverse effects these new regulations had on existing labour markets, workers and unions began urging for a "range of measures to secure workers' rights and livelihoods," which later became known as a 'just transition' (Krawchenko & Gordon, 2021, p. 1). The call for a just transition has since been adopted by international labour unions and the United Nations, among other international organisations, as integral to the sustainable transition process and ultimately ensures that governments ask the critical question: "who wins, who loses, how and why" (Newell & Mulvaney, 2013, p. 2).

The question of who wins and who loses has become increasingly topical as the effects of climate change become more pronounced; particularly as those who are least responsible will likely shoulder the heaviest burden (ILO, 2016; ITUC, 2009; UNFCCC, 2020). The unequal distribution of costs and benefits have led governments and international organisations to increasingly integrate just transition principles into their transition frameworks to mitigate negative impacts on those most vulnerable (Rosemberg, 2010). The configuration of these transition frameworks "impact how transition goals are identified and how coalitions are convened" (Krawchenko & Gordon, 2021, p. 1), thereby bringing together a diversity of goals and expertise into an arena that has been traditionally dominated by the scientific community (Rosemberg, 2010, p. 141). Climate change policy and just transition policies become entwined

in a shared goal of elevating social justice issues, which will only be further exacerbated during the climate crisis (Meadowcroft, 2009).

Despite the adoption of just transition principles, the definition of justice and how it relates to the sustainable transition is contested (Krawchenko & Gordon, 2021). Annabella Rosemberg, writing for the International Labour Office, defines just transition as:

> "The conceptual framework in which the labour movement captures the complexities of the transition towards a low-carbon and climate-resilient economy, highlighting public policy needs and aiming to maximise benefits and minimise hardships for workers and their communities in this transformation" (Rosemberg, 2010, p. 141).

Rosemberg's definition is further delineated by the International Trade Union Confederation, which defines just transitions as a "tool the trade union movement shares with the international community" (Just Transitions Centre, 2023). Both definitions emphasise the complementary design of just transition policies with environmental policies to ensure the burden of climate change is shared, and highlights how a just transition framework is a tool policy makers can utilise to achieve this goal.

The path to a just transition is not linear, and the goals of those advocating for a just transition are varied (Krawchenko & Gordon, 2022). Place-based, context-specific policies that address the pattern of inequities and climate-related impacts of a given region have proven more successful (Rosemberg, 2010, p. 129). This approach can help to gain industry support for transitions by building place-based coalitions (Rosemberg, 2010, p. 129). Ongoing, iterative research is required to develop these policy mixes and to identify what good policy looks like given that transitions can take "decades to occur and are highly uncertain in terms of future development" (Frantzeskaki et al., 2012, p. 21). Consequently, it is important for policymakers to understand the overarching elements that inform the just transition framework, with particular respect to social dialogue, distributional implications, policy implementation, and transition management. The themes are detailed below and inform the elements of my conceptual framework.

Social Dialogue to Develop Just Transition Policies

The 2030 Agenda for Sustainable Development emphasises the centrality of social dialogue in the transition process (United Nations Framework Convention on Climate Change, 2020), which the

ILO (2015) defines as the integration of relevant actors' perspectives (i.e., unions, workers and communities, industry professionals, government agents) "to forge consensus on pathways towards environmental sustainability with decent work" (p. 9). The report highlights how social dialogue is an "integral part of the institutional framework for policymaking and implementation at all levels" by helping governments "identify the skills needed currently and in the future, and to take appropriate measures" (United Nations Framework Convention on Climate Change, 2020, p. 15). Smith (2017), in her report for the OECD, furthers this definition by explaining, "It includes formal processes of negotiation, consultation and information exchange and covers both economic and social policies and agreements" (p. 4), aspects which reside at the core of the just transition process. Without the inclusion of social dialogue, key aspects such as industrial strategy, innovation, and community development can lack context-specific dimensions and opportunities for future collaboration (Smith, 2017).

According to the UNFCCC (2020) "there is no 'one size fits all'" when it comes to the just transition process, rather "policies and programmes need to be designed in line with the specific conditions of countries'" (p. 20). Designing frameworks that ensure the inclusion of different values and stakes through social dialogue can ensure policies reflect the needs and conditions of specific regions, thereby tailoring the transition process to that region. This is particularly important to ensure that workers receive the right training and social protections they need to transition to a low-carbon future (United Nations Framework Convention on Climate Change, 2020, p. 25). This is further echoed in recommendations from the ILO and the Stockholm Environment Institute in their recommendations for a just transition, the latter emphasising it throughout their report on "*Seven Principles to Realize a Just Transition* (2020)*:* "Recognize that social dialogue is an integral part of the institutional framework for policy making and implementation at all levels" (pp. 7-19).

Social dialogue also helps to promote the idea that the transition to a low-carbon future is a shared goal, which, in turn, can ensure the durability of transition policies (Farla et al., 2012; Frantzeskaki et al., 2012; Green & Gambhir, 2019). Durability refers to the ability of policies to continue to achieve their goal, despite changes in government, public opinion, or other opposing forces (Lockwood et al., 2017). Utilising social dialogue to construct just transition policies can also influence the initial public and political acceptability of these policies as processes which are "perceived to be inclusive and fair are more likely to be publicly accepted and politically

sustained" (Green & Gambhir, 2019, p. 912). Furthermore, Frantzeskaki et al. in their paper on sustainable transitions assert that "inclusion and active involvement of multiple actors is important for co-constructing pathways to achieve sustainability and for ensuring social cohesion and equity" (pp. 24-25). Co-constructing pathways refers to the collaborative dimension social dialogue lends to policy development, which takes the interests of a variety of actors who "have all invested time, skills, personnel and political capital in the existing system" (Lockwood et al., 2017, p. 322), to create a shared commitment to the sustainable transition.

Social dialogue is one of the most important aspects of a just transition and any related policy development should integrate opportunities for dialogue in as many stages as possible. To achieve this integration Meadowcroft recommends "developing interactive processes where networks of actors implicated in a particular production/consumption nexus can come together, develop shared problem definitions, appreciate differing perspectives, and above all develop practical activities" (Meadowcroft, 2009, p. 326). The Government of Canada has adopted a dialogue approach for sustainability transitions. In 2023 they announced the creation of Regional Energy and Resource Tables (Regional Tables) which are "joint partnerships between the federal government and individual provinces and territories in collaboration with Indigenous partners – and with input from key stakeholders – to identify and accelerate shared economic priorities for a low-carbon future in the energy and resource sectors" (Government of Canada, 2024). To date these have been established in BC, the Northwest Territories, the Yukon, Nunavut, Manitoba, Ontario, Newfoundland, and the Maritimes. Discussions are underway in Quebec to integrate the model and Alberta has adopted its own version. The newly adopted *2024 Sustainable Jobs Act* also sets social dialogue as a core principle:

> "adequate, informed and ongoing dialogue on a labour force and people-centered sustainable jobs approach should engage relevant stakeholders and partners, including through social dialogue, to build strong social consensus in the shift to a net-zero economy" (Canadian Sustainable Jobs Act, 2024)

It establishes a Sustainable Jobs Partnership Council with representatives of Indigenous organisations, labour, industry and others to engage with Canadians and provide government with advice. Thus, social dialogue is becoming more important to the management of sustainability transitions in Canada with federal leadership at the centre.

Distributional Implications and Social Protection

The effects of climate change will not be felt evenly across regions. Significant burdens such as "financial hardship… social isolation, the loss of a working identity, and the deterioration of mental and physical health and life expectancy" will be felt more keenly by regions undertaking radical economic transformations in the decarbonization process (Atteridge & Strambo, 2020, p. 8). Sustainable transition scholars Green and Gambhir (2019) agree: "Industrial closures and associated job losses will often be concentrated in regional communities where they generate a significant share of the region's economic activity, meaning their closure would cause knock-on or 'multiplier' effects in these specially-affected communities" (p. 906), further exacerbating the burden on these communities. Rosenbloom, Meadowcroft, and Cashore (2018) in their article on sustainable transition policy stability, refer to this phenomenon as the distributional implications of climate change, which "relates to the distribution of costs and benefits as well as risks and opportunities across rich and poor countries and multiple generations" (p. 169). These distributional implications are part of why just transition policies require place-based and context-specific formulations and emphasises the need for higher levels of social protection in transitioning communities (United Nations Framework Convention on Climate Change, 2020; Smith, 2017; International Labour Office, n.d.).

Social protection can mitigate the distributional implications of the transition process and can include comprehensive pension plans, employment insurance, healthcare, and upskilling (Smith, 2017). By imbuing the transition process with social protection policies governments can uphold the principles of a just transition and also increase the "resilience and safeguard[e] populations against the impacts of economic and environmental vulnerabilities and shock[s]" (International Labour Organization, 2015, p. 16). Adequate social protections can also empower workers and their unions to demand more radical transformation within their industries, shifting future manifestations of energy sectors toward a more equitable future (Cahill & Allen, 2020, p. 10). For example, an employee who is provided with training for new energy sectors could be more "proactive in their support for the development of a new and greener economic plan" because they feel connected and ready to transition to a new field of employment (Rosemberg, 2010, p. 128). Empowered workers are less likely to feel the negative effects of climate change on their "self-esteem, self-efficacy, time-structure, identity, and physical health, vigour and energy (Green & Gambhir, 2019, p. 207), further mitigating distributional implications.

Highlighting the distributional implications of climate change can also ensure that the burden of cost for the transition is placed upon those most responsible. Workers have often paid the price for a corporation's lack of investment in research and development as regulations have begun to restrict CO2 emissions in energy sectors and profit margins are affected (Rosemberg, 2010). In order to regain lost profits, industries close factories and incur layoffs, at the expense of workers and their communities. Integrating social protection into the just transition framework ensures that corporations are tied to the well-being of their employees and that the burden of costs are distributed more evenly. Identifying the type of social protections that are important for each energy transition, given the diversity of needs across industrial sectors and regions, will ensure the twin goals of climate mitigation and social justice are achieved.

Policy Implementation: Stability and Cohesion

Cohesive policies refer to the development of policy and governmental direction that is consistent across national, subnational, and internal spheres (Smith, 2017). Coherent policies would enshrine the goals of a just transition in all levels of decarbonisation action and would require non-governmental bodies and industries to participate in the process and to share the burden (Mertins-Kirkwood & Duncalfe, 2021). Cohesive policies also refer to the need of just transition policies to work in concert with environmental policy, as decarbonisation represents the fundamental, non-negotiable element of a just transition (United Nations Framework Convention on Climate Change, 2020).

Policy stability—the ability of policies to continue to achieve their goals, even when political opinion has shifted—has even been called "the Holy Grail of climate policy design" (Rosenbloom et al., 2018, p. 168). Lockwood et al explain: "In such contexts [sustainable transitions], policy can switch significantly with changes of government or even changes in which group is dominant within a ruling party," rendering even the best policy design ineffective (Lockwood et al., 2017, p. 318). This is further punctuated by the relatively short time an elected official holds power (especially when compared to the long-time horizon of the transition process), which deters the implementation of policy goals that may lay outside their political term (Lockwood et al., 2017; Pierson, 2000). It is therefore necessary to ensure the development of policy arrangements that "facilitate cooperation by lengthening time horizons" (Pierson, 2000, p.

32), thereby imbuing transition policies with stability and ensuring their cohesion over a longer time horizon.

One method that has been advocated is the concept of path dependence, in which, due to the uncertainty of the future, policymakers should aim to create policies that place governments on a specific trajectory toward a sustainable future (Köhler et al., 2019; Pierson, 2000; Rosenbloom et al., 2018). Stability is therefore achieved by eliminating pathways which do not lead toward sustainability, effectively locking in future decision makers, which Kohler et al. (2019) maintain "is at least of equal importance to the specific policies in place at any given moment in time" (p. 2). Cohesion and stability are thereby intensely political undertakings, as it requires "public engagement in political life, party politics… cross-party consensus, the building of reform coalitions, and the buy-off of powerful interests" to create policies that effectively 'lock-in' future interests toward the overarching goal of decarbonization and just transitions (Meadowcroft, 2009, p. 335). Understanding why policy-makers choose certain types of mechanisms, which coalitions were involved in this, what options were closed to them, and how these choices are funded can illuminate effective methods for imbuing stability and cohesion into just transition policy mixes, strengthening their ability to achieve their goals.

Transition Management and Institutional Innovation

At the heart of all efforts to transition toward a more sustainable, equitable future is a "conscious effort to guide such transitions along desirable pathways" (Meadowcroft, 2009, p. 324). How governments manage this transition and guide it toward their transition goals is the product of their underlying philosophy of governance manifest as their framework for transition management (Meadowcroft, 2009). Transition management, as a tool for governance, is still relatively novel, but can be defined as a framework to "create space for short-term innovation and develop long-term sustainability visions linked to desired societal transitions" (Loorbach, 2010, p. 163). The concept of transition management originated in the Netherlands, a country that utilizes a governance model that is "well known for its collaborative policymaking, long-term planning, and innovative environmental policies" (Loorbach, 2010, p. 162), and has since been gaining traction in sustainable transition literature (Farla et al., 2012; Frantzeskaki et al., 2012; Loorbach, 2010; Meadowcroft, 2005, 2009, 2011). The framework is used to assess policies on the basis of their ability to achieve long-term sustainability goals and to manage governance activities in order to

ensure these goals are met. Not all governments undergoing sustainable transitions explicitly utilise all facets of transition management, but it provides a useful methodology for understanding the cohesion, stability, and effectiveness of just transition policies.

At the crux of transition management is the recognition that broader institutional transformation is required to achieve many of the goals extant within a just transition (Farla et al., 2012). Institutions include aspects of governance such as the bureaucracy, the Prime Minister's office, parliament, and the judicial system, and they serve as a method to constrain action and provide "valuable resources for those actors that benefit from the existing system" (Farla et al., 2012, p. 995). As a result, "institutional change becomes an issue of conflicting interests and power struggles" (Farla et al., 2012, p. 995). Currently, according to Pierson (2000), "as social actors make commitments based on existing institutions and policies, the cost of exit from existing arrangements generally rises dramatically (Pierson, 2000, p. 25), inhibiting the implementation of policies that would make a just transition possible. This leads to a paradox of embedded agency, in which there arises a "challenge of how actors can change the institutional and systemic conditions that are enabling and constraining their very actions in the present" (Farla et al., 2012, p. 996). Transition Management attempts to "structure and coordinate those informal networks of actors that, collectively and overtime, are able to influence regular policy" (Loorbach, 2010, p. 172), thereby changing the nature of institutional constraints and transforming them toward a sustainable transition.

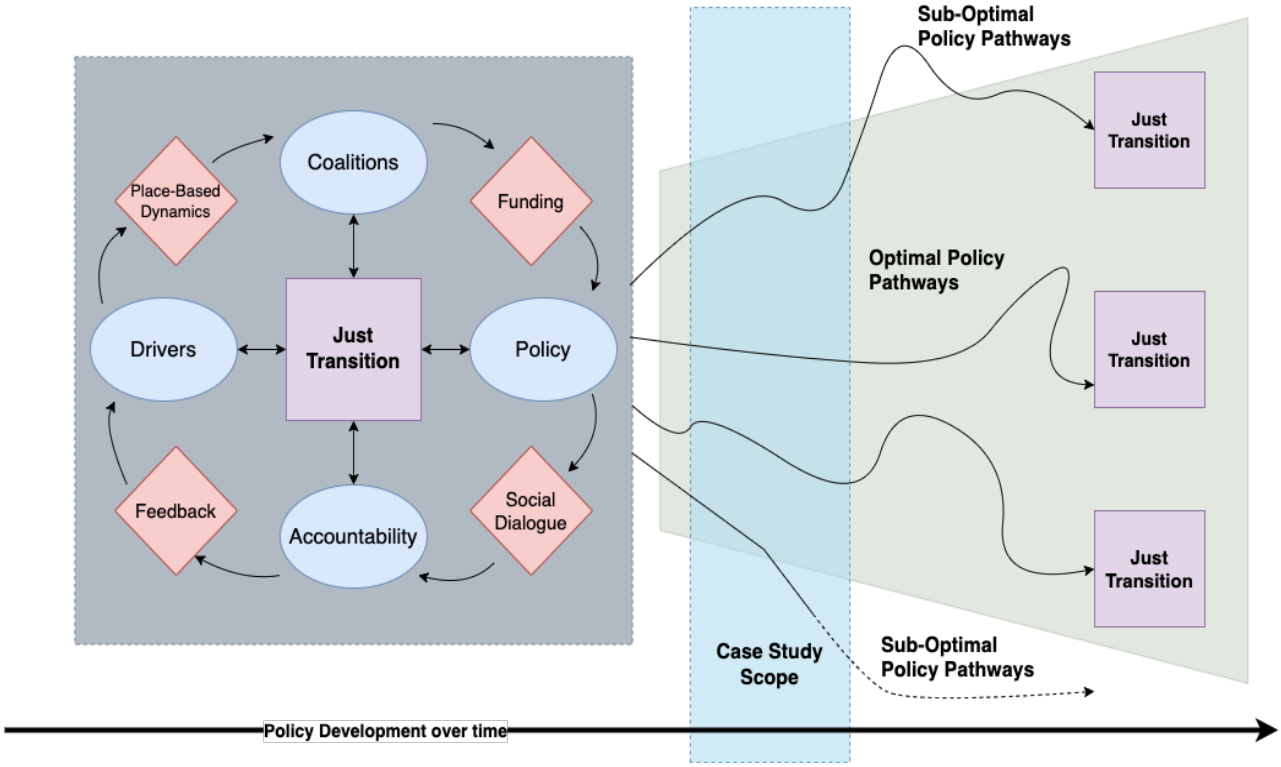
Institutional transformation is perhaps the most difficult and complex aspect of the just transition process. Institutional transformation is the "recognition of the necessity of large-scale structural change in one or more societal subsystems" (Frantzeskaki et al., 2012, p. 20), in order to achieve the radical change necessary to decarbonise the economy. This concept is related to political stability, in that political actors, and other benefitting agents, create policies and institutions that prevent future action from delimiting their goals, effectively closing other pathways in the process (Pierson, 2000). According to Rosenbloom et al. (2018): "institutions become increasingly difficult to dismantle the longer they have been in place and as they begin to take on important roles and become interconnected with public and private sector actors at all levels" (p.175). As the oil and gas sector represents a long-standing and entrenched industry that is often mutually beneficial to both governments and industry stakeholders, institutions have arisen that have created a "political 'lock-in' effect that is difficult to overcome" (Green & Gambhir,

2019, p. 914). Without institutional transformation, actors are exceedingly limited in the ways in which change can be achieved, limiting the ability for transition management frameworks to orient actor networks toward sustainable transition goals. Identifying and implementing aspects of transition management can help develop policies that give actors the tools necessary to transform the institutions they are constrained by imbuing policy with long-term stability.

2.1 Conceptual Framework

The goal of this research is to utilise a comparative study to identify policies that Canada can use to mitigate harms during its decarbonization process. To establish suitable parameters for comparison I created a conceptual framework that forms the foundation of my analysis (see figure 1). The components of my framework were drawn from the literature review and incorporate what I have found to be the necessary elements of a transition. I chose to represent the elements in a cyclical format to reflect the policy cycle, in which feedback is incorporated to improve the original policy. I also tried to emphasise the iterative nature of policy by using double-sided arrows, which also highlight the multidimensional and co-evolving facets of the process. Each element informs the next element in a cycle of policy development, in which each step is invariably informed by the principles of a just transition. This is embedded within a longer time horizon of policy development in which the path toward a just transition is subject to critical junctures of change.

Figure 1: Conceptual Framework



Authors' own elaboration based on thematic literature review.

By emphasising the drivers, the coalitions, the policies, and the accountability elements in my conceptual framework, I aimed to reveal the underlying power dynamics and **political economy of the just transition process** (Healy & Barry, 2017). Understanding these dynamics is essential to create the radical shift needed for the decarbonization process, as "policy-makers must consider the complex relationships between actors across the energy system, and the role politics play in maintaining, dissolving, and creating these relationships" (Lockwood et al., 2017, p. 315). The emphasis on **social dialogue** and **place-based dynamics** captures the distinctive effects of climate change on different regions and how this shapes the creation and implementation of policy mechanisms. All these elements contribute to the formation of socio-technical systems and must be understood to facilitate their transformation and influence new pathways. To capture longitudinal institutional path dependency and institutional lock-in, I placed my framework within the theory of historical institutionalism. This theory allows for an analysis with a longer time horizon, which captures policies that endure beyond an election cycle. By uncovering the

underlying path dependencies and institutional constraints, I was able to identify potential critical junctures that can trigger a shift in path development toward a sustainable and just transition.

Historical institutionalism is an approach to studying policies which argues that "decisions taken at the formation of an institution shape its trajectory in a path dependent way, constraining future policy options" (Dodds, 2013, p. 251). This ties into previously discussed concepts of institutional transformation and policy 'stickiness.' It emphasises that policies are not only shaped by policymakers themselves, but also by the institutions in which they operate in. Within these institutions some stakeholders would rather maintain the status quo than see change, good or bad (Thelen, 1999). By highlighting the importance of coalitions and placing it early in the transition policy cycle, I wished to capture the influence stakeholders have on policy adoption. Scholars of historical institutionalism suggest that "policy change is most likely to occur when potential opposing coalitions can be reduced in power" (Dodds, 2013, p. 251). Understanding the role coalitions play when I conducted my comparative analysis was an important consideration to identify policy learnings.

Historical institutionalism places feedback, longitudinal change, institutional constraints, and stakeholders at the centre of its analysis and I have attempted to integrate these essential elements into my conceptual framework. The cyclical pattern of the conceptual framework reflects the ongoing process of managing a just transition, which by nature is constantly in flux. This cycle is embedded within a longer time horizon of policy change which depicts the multiple paths that policies can take to achieve a just transition. These pathways are characterized by periods of fluctuation and change that may alter the course of their original design, emphasising the iterative nature of the policy cycle. The different trajectories of policy are characterized by the uneven paths toward just transitions, punctuated by varying degrees of consistency due to, for example, further policy change or leadership change. I have also highlighted that certain policy mixes may result in sub-optimal or optimal trajectories, given the complexities of longer time horizons which may be influenced by new stakeholders, for example. The scope of my case studies is concerned with early-stage policy development to identify policies which trigger change toward new policy trajectories. Consequently, my area of scope is situated at the beginning of the time horizon (outlined in light blue).

Within my policy cycle, indicators highlighted in blue represent the foundational elements of a just transition. These elements are iterative in nature, characterised by the double-sided arrow,

and are both informed by the goal of a just transition, and contribute to its formation. The indicators highlighted in pink provide the context and specificity necessary for the policy development of just transitions. Social dialogue is a key element that informs what types of accountability metrics and feedback is considered when assessing the effectiveness of policies. Social dialogue, engagement with the affected community or with relevant stakeholders, helps to embed the policy more firmly within the region. Social dialogue also highlights the differences between each region by identifying what *place-based dynamics* exist and what policies are used to address these issues. This goes on to inform the next phase of the cycle, assessing the *drivers of change* and the specifics of the *coalitions.* These elements influence funding allocations, either expanding or diminishing the availability of funds for the transition. The feedback is then incorporated again into the policies to inform the next policy cycle. Policy makers may then assess if the policies shifted these regions and their associated industries toward a just transition and respond accordingly. Or perhaps the effects of institutional lock-in and path dependency limited the change, constraining the stakeholders once more. For the Canadian context, we can take both positive and negative lessons from these cases and use this information for our own communities.

To further support my conceptual framework and assist the navigation of complex underlying path dependencies, I have also included the enabling conditions identified in Burch et al.'s work on Triggering Transformative Change (Burch et al., 2014) (See Table 1). Their work explores "critical enablers of innovation on climate change" that can shift socio-techno institutions toward sustainability pathways and will aid in the identification of the origins of change. I have listed their enablers and their description below which will supplement my conceptual framework when conducting my comparative case study.

Table 1. Eight enabling climate change policy conditions with the potential for engendering sustainable transformative change

Enabling Condition	**Description**
1. Participatory governance and social inclusion	Deep and ongoing engagement between state and non-state actors, including civil society and the private sector, both in policy design and implementation phase
2. Considering synergies and trade-offs with other priorities	Embedding in policy development and implementation an explicit exploration of linkages between climate change responses and economic development, social equity, non-climate environmental priorities (such as biodiversity), etc. Specific targets for GHG reduction set that both contribute to targets at higher levels of government and acknowledge a balance between what is
3. Set ambitious targets with specific deliverables, creative funding mechanisms to support them, and appropriate timing	

	feasible and desirable; timing of targets may include aligning with building turnover and election cycle
4. Employing a diverse set of tools to reach target	Creatively employing building codes, bylaws, community engagement, and other tools to coordinate efforts and accelerate progress
5. Monitoring and evaluation of key indicators (beyond simply GHG emissions)	Defining and constructing systems for gathering data on collaboratively defined and comprehensive measures of community sustainability
6. Iterative, adaptive management	Based on insights provided by monitoring and evaluation, opportunities are regularly available to adapt plans and policies, include new stakeholders, account for emerging science, take advantage of unexpected synergies, and avoid trade-offs. Link to policy innovation, and coherent framework, coupled with evidence of the importance of quasi-institutional intermediaries.
7. Strategic partnerships that coordinate efforts and integrate decision making	
8. Leadership	May originate in the technical, political, or community realms, but creates niche spaces in which innovation can occur, exploiting opportunities to achieve multiple objectives simultaneously

Adapted from "Triggering transformative change: a development path approach to climate change response in communities," by Sarah Burch, Alison Shaw, Ann Dale & John Robinson (pp. 477-480), 2014, *Climate Policy*.

Burch et al. developed these conditions to identify transformational change in communities and provide welcome nuance to the complexities of policy change. Given the complex, overlapping characteristics of transitions, their conditions are a useful framework to sift through the network of transition policies. For example, examining what they call "seeds" of policy trajectories can also explain how, despite promising beginnings, some policy mixes can still detour toward sub-optimal pathways (Burch et al., 2014). Combining my own conceptual framework with Burch et al.'s enabling conditions will provide greater nuance to my examination of transition management and policy change. Further, their table illustrates "specific characteristics of innovative community-level climate change responses that…might enable a more fundamental transition towards a sustainable development path" (Burch et al., 2014, p. 476), a useful insight into how to identify such policies.

Their conditions arise from a community-level analysis but emphasise that a multi-governance approach is necessary to address the multiple and overlapping objectives of climate mitigation. As I am examining transition policies at a regional level, their framework can help understand policy approaches which are not "strictly top-down nor bottom-up, but rather harness

multiple loci of agency… address the concerns of a wide array of actors" but which arise from a regional transition (Burch et al., 2014, p. 468). The conditions highlight the importance of stakeholders in leading and triggering change, but also in the iterative and ongoing engagement required to create enduring policies, a key component of Just Transitions. Their conditions will provide further nuance to my conceptual framework when examining stakeholders and coalitions by highlighting the importance of unexpected synergies and leadership within coalitions. This helps develop my understanding of HI as they point to specific strategies policymakers can employ to trigger change, which I can use as a framework for assessing my interviews and literature analysis. To identify policies that can be implemented within the Canadian context it will be crucial to understand which components of policies will engender long-term, institutional change to ensure the policies withstand the electoral cycle.

3. Methodology

This study employs a **comparative case study methodology** of oil and gas economies that have made commitments to/ or are amid transitioning the oil and gas industry. The methods entail:

- Academic literature review
- Document analysis – government documents and grey literature/media
- Interviews with key experts/stakeholders
- Descriptive statistics of key indicators

This study has identified three regions for comparison: Taranaki (New Zealand), Aberdeen (Scotland), and Esbjerg (Denmark), which are all advanced economies that have made commitments to phasing out their oil and gas industries. Despite the different contexts between these countries, there is still much to learn from comparing the mechanisms that are used to manage transitions in a way that is 'just', with a particular focus on regional development policies (Krawchenko & Gordon, 2021, 2022). An analysis of academic literature, government reports and documentation, media literature and statistical analysis developed the parameters of each case, which was further informed and verified with senior public servants to ensure the correct interpretation of interventions and approaches.

The documents analysis includes scholarly sources (peer-reviewed), grey literature (i.e., government documents), and financial documents. Analysis of these documents drew on my conceptual framework to assess aspects such as, the policies the government has committed to; what institutional framework is in place to support these policies; what coalitions are involved; and what are the funding mechanisms and subsequent accountability measures in place. This data was then corroborated through interviews with government employees, relevant subject matter experts, and coalition leaders (i.e., civil society leaders, union representatives). These categories were selected to provide confirmation of data drawn from the document analysis and to provide contextual support for why some policies work and why others fail. They also provided valuable insight into how the specific needs of each region are addressed, encouraging the success of policy learning. These aspects are discussed in more detail below and form the core elements of my research methodology.

Comparative analysis is an in-exploration of phenomena that can help us understand new ways of approaching a problem in the domestic sphere. Comparative case studies help us

"understand and explain why divergent policies are adopted in different contexts, and why they lead to a variety of outcomes" (Dodds, 2013, p. 6). Therefore, a comparative case study is a mechanism to "establish general empirical connections between the characteristics of the system and the phenomenon under investigation" (Gupta, 2012, p. 12). Due to the emphasis on singular phenomena, the generalizability of its findings is limited. However, for the purposes of policy learning, such cases usefully identify the practices and approaches that are employed (mechanisms and interventions) alongside the social and political conditions that either facilitate or detract from a course of policy action (e.g., policy coalitions and networks). Further, comparing policies across different nations "can also provide us with a deeper and richer understanding of the fundamental drivers of policy-making and how it impacts on the world" (Dodds, 2013, p. 5).

This research employs a **mixed methods approach**, in which data collection and analysis utilises thematic coding of both interviews and the document review. A mixed methods approach was chosen to investigate the shifting, complex, and real-life context of the phenomena. A document analysis provides an understanding of the government and regions' policy approaches and how they have changed over time including how institutions and key stakeholders have coordinated (or not). It also provided context on the specific characteristic, opportunities and challenges facing each case study region and the key stakeholders. Statistical data on aspects such as funding allocation and industry transition provides background context. This data was triangulated using interviews that highlight the choices and purposes behind the phenomenon, alongside verification. The purpose of using interviews and document analysis is to corroborate the findings from both streams of data and to limit the influence of bias. The interviews provide necessary data on the development and structure of policies, as well as provide empirical examples of just transition policies. They also provide interesting insights into the development of transition policies, illuminating some of the challenges or surprisingly simple aspects of the process. Although some of this data was gathered during the document analysis, the interviews function as a method for policy implementation verification, which may differ from the formal legislation. They also provide contextual support for the political arrangements that support or oppose the transition policies and illuminate the coalitions that are integral to their formation and success.

3.1 Data collection methods

The primary method of data collection was a document analysis of academic literature (peer-reviewed), government reports and documentation, media literature and statistical data, and funding arrangements. Ethical approval for this research was obtained from Research Ethics BC. As this research is part of a larger research project examining the Just Transition process in Canada, a harmonised ethics review model was utilised. The ethics certificate number is H21-03608. Obtaining the approval of Research Ethics BC confirms that the data collection methods are aligned with standard ethical practice, ensuring that the privacy and well-being of participants is protected. The conceptual framework steered the identification of relevant literature and supports the categorisation of the type of information needed to answer my research question. Each case study first identifies the structure of government and the lead departments to provide a scope of research for the documents. This facilitates the identification of grey literature and relevant key expert interviewees. I also utilised sources provided via professional recommendation, transnational reports and accompanying bibliographies. The key terms grew and evolved alongside the research. The following combinations of keywords were utilised during the review of the above databases:

- Just Transition, carbon-neutral, Socio-technical transformation, decarbonisation, path dependency, sustainable development, Oil and Gas sector, comparative case study, policy learning, comparative policy, climate goals, climate policy, policy mechanisms.

Documents were also assessed based on the original purpose of the document; who the target audience was; who developed the original document; how it changed from the draft stage to the final stage; and what type of study design was employed. This process aimed to limit bias in document interpretation and help ground the data in a systematic review. Preliminary drafts of completed documents were also included in the search to track change and development during the policy process, as "even subtle changes in a draft can reflect substantive developments in a project" (Bowen, 2009, p. 30). Deviations were often verified utilising data gathered during the interview process, which helped contextualise and give reasons for the change. The findings from the document analysis then informed the interview questions to further corroborate the data. The document analysis also provided context for the information gathered during the interview stage, further illuminating new interview questions.

To verify the findings of the document analysis, interviews of policy makers/public servants managing aspects of sustainability transitions; civil society leaders; relevant academic subject experts; regional/local development experts and policy makers were conducted. **The sample size was 14 participants**, five from each country, excepting Scotland. Participants were selected utilising purposive sampling and were identified via professional contacts and relevant institutional contact lists. This sampling technique was selected, "to focus on the people most likely to experience, know about, or have insights into the research topic" (McGregor, 2020, p. 239). Additional candidates were identified through government/union/thinktank websites or recommended through previously established contacts. I contacted potential interview contacts through email, based on a template developed with my thesis supervisor. Interviews were conducted either via videoconferencing or over the phone, given the disparate locations. Interviews typically lasted one hour, and some interviews were conducted 'off the-record' in which the interviewee wished to remain anonymous. For consistency, an interview script was developed prior to each interview and data consisted primarily of audio recordings and transcriptions of interviews. These were then transcribed and hand coded. The data was stored in a password protected file and limited personal information was collected (names and job titles).

Table 2 delineates the respondents, their respective countries, and their associated activity type. Names have been protected for privacy considerations.

Table 1: Respondent rubric

Interviewee Number	Country	Type
Respondent 1	Denmark	NGO/Industry
Respondent 2	Denmark	Government
Respondent 3	Denmark	Government
Respondent 4	Denmark	NGO
Respondent 5	Denmark	Government
Respondent 6	New Zealand	Government
Respondent 7	New Zealand	NGO
Respondent 8	New Zealand	NGO/Industry

Respondent 9	New Zealand	NGO
Respondent 10	New Zealand	Government
Respondent 11	Scotland	Academia
Respondent 12	Scotland	NGO
Respondent 13	Scotland	NGO
Respondent 14	Scotland	Industry

3.2 Case Selection

The regions identified for this comparative case study are **Esbjerg (Denmark), Taranaki (New Zealand) and Aberdeenshire (Scotland).** These cases were chosen as they are all oil producing regions that have committed to reducing or phasing out their oil sectors. Oil and gas in these regions represent a significant proportion of each nation's GDP and provide an important source of employment for the region. Each country has also integrated just transition principles in their plans to reduce or phase out their oil and gas sectors, particularly within the chosen regions. As all countries have made ambitious climate commitments, it is essential for each region to undergo a sustainable transition to meet these commitments.

Esbjerg, in Denmark, makes an interesting comparative case study due to Denmark's status as a world leader in oil and gas transitions, and as the largest producer of oil to establish a final phase-out date (Danish Ministry of Climate, Energy and Utilities, 2020). It has committed to reducing its GHGs by 70% by 2030, compared to the EU average of 55%, and has further committed to achieving net zero emissions by 2050. These commitments were formally enshrined in law and represent legally binding obligations. To achieve its necessary emission reductions, Denmark cancelled all future oil and gas extraction tender rounds in 2020, a measure that limits new areas of oil and gas exploration, and in 2050 will halt all oil extraction. Most of the oil and gas jobs are in the Esbjerg region, and it is estimated that 26,000 direct and indirect jobs will be affected during the transition (Danish Energy Agency, 2020).

New Zealand has explicitly committed to a just transition of its oil and gas industry, integrating just principles into its proactive approach to the transition (Government of New Zealand, 2019). They have committed to a net GHG emissions reduction of 50% below gross 2005 levels by 2030 and in April 2018, the New Zealand government announced there will be no further

offshore oil and gas exploration permits granted. The country's oil and gas producing sector, the Taranaki region, employs about 750 people directly (4700 across New Zealand) and is responsible for about 30% of the nation's GDP. New Zealand has committed to a phased transition of their oil and gas sector and devoted various pools of government funding to the transition, most notably a $3 billion Provincial Growth Fund to support diversification (Government of New Zealand, 2018).

The oil and gas sector in Aberdeenshire in Scotland produces 90% of the country's energy and supports about 65,000 jobs in this region. Scotland has committed to a 75% reduction of its GHGs, relative to 1990 levels, and has further committed to achieving net zero emissions by 2045, five years before Denmark. However, unlike Denmark who has created legally binding commitments to their phaseout, Scotland has made no firm commitment to achieve net zero emissions. To support the workers in this region, Scotland has embedded the principles of a Just Transition into its Climate Change (Emissions Reduction target) (Scotland) Act 2019 and created a Just Transition Fund (JFT) to support projects which contribute to the transition in the region (Government of Scotland, 2019).

The commitments of these regions go beyond market transformation, they also seek to build a future that is inherently sustainable and more socially equitable. By learning from other countries undergoing an energy transition, Canada can better understand what exactly its economy is transitioning *to,* and what this will mean for its workers and communities. The transition period will present difficulties, with an estimated loss of 6 million jobs globally (International Labour Organization, 2016). However, the new energy sector could create 24 million new jobs *and* integrate social solutions that mitigate the hardships associated with the transition (International Labour Organization, 2016). Comparative analysis is an important tool for policy learning to ensure that Canada's transition is successful. It bears noting that as this thesis goes to press, the New Zealand National Party which won the 2023 national election, has indicted that they will reverse many of the policies of the previous government, including the moratorium on offshore oil and gas exploration permits granted. The end of the moratorium will be proposed in Crown Minerals Act amendments to be introduced in parliament in the second half of 2024. This illustrates that such commitments remain beholden to the politics of the day and can be undone.

3.3 Data Analysis

A thematic analysis of the interviews and documents was utilised to identify essential phenomena for a just transition governance framework. A thematic analysis "is a search for themes that emerge as being important to the description of the phenomenon"(Fereday et al., 2006, p. 82). This analysis identified themes across the three countries with regards to critical intervention points, successes and challenges, and the conceptualisation of novel governance designs. A thematic analysis was chosen to complement the comparative case study design and to identify key aspects of the just transition policy process, which can then be transferred to the Canadian context. By assessing themes across the cases, this study provides an understanding of the range of policies utilised by the case-study countries, highlighting what policies Canada can adopt or learn from, and provide a "nuanced understanding of the policy process" (Gupta, 2012, p. 14).

To systematically analyse the documents a rubric, "based on the data's characteristics, to uncover themes pertinent to a phenomenon" (Bowen, 2009, p. 32), was employed. The raw data underwent a process of codification, which entails "recognizing (seeing) an important moment and encoding it (seeing it as something) prior to a process of interpretation" (Fereday et al., 2006, p. 83). The data was hand-coded and stored in a password protected database, which was then synthesised with the data derived from the document analyses in a reference management system (Mendeley).

Interviews were analysed to identify emergent themes, as well as hand-coded to stimulate reflexive interpretation. The interview transcripts were reduced to data relevant to the chosen phenomena, eliminating superfluous linguistic phrases (pleasantries, gap words such as uh, or uhm). Data gathered during the interviews were iteratively checked against data gathered during the document analysis to revise preliminary ideas and specifically search for data "that might discount preliminary assertions" (Roulston, 2014, p. 9). To avoid difficulties managing the data, Mendeley citation software was utilised to categorise the multiple data sets. Tags were applied to each data set and the data was password protected to further protect the identity of those interviewed.

The coding process first utilised an open coding method in which both the interviews and the document analysis underwent an initial review to identify "distinct concepts and themes for categorization" (Williams & Moser, 2019, p. 48). These broad categories of data made it easier to recognize regularly occurring phenomena, which then act as indicators for important concepts.

Once initial categories emerged, a specific code was attached to each category ensuring systematic classification of the data. Given the textual nature of my data, I employed a line-by-line method. This involved scrutinising each textual line of an interview or document to "recognize and codify nuances and discrete thematic connectivity with other themes" (Williams & Moser, 2019, p. 51). These thematic bundles formed the basis of my comparative analysis.

3.4 Case Studies

The next section shares findings from the three comparative cases of Esbjerg (Denmark), Taranaki (New Zealand), and Aberdeenshire (Scotland). Each case study follows a common structure by first outlining the political system, followed by an overview of the event or driver that caused a departure away from the status quo, after which the current state of the oil and gas region is described along with an explanation of the energy transition. The section then explores the management of the transition within each region, noting the difference in opportunities and challenges that arise from place-specific characteristics. Throughout the sections quotes from those interviewed act as a framework to lead the research, providing tangible examples of the process of transitioning oil and gas regions.

4. Esbjerg, Denmark

Table 2: Denmark Transition Characteristics

Population	• **Country: 5.9 million** • **Esbjerg Region: 73,000**
Climate Commitments	• Net-Zero by 2045 • 110% emissions reduction by 2050
Main driver	• 1970 oil and gas crisis • Climate Commitments enshrined in law
Relevant Institutions	• Ministry of Climate, Energy and Utilities • The Danish Energy Ministry • The Ministry of Trade • Port of Esbjerg • Orsted (Formerly DONG) • State of Green • Danish Council on Climate Change
Approach	• Legislated commitments • Investment in renewable technologies • Collaboration with Industry partners • Association of energy sovereignty with economic efficiency • Top-down direction, but bottom-up development. Little regional direction.
Funding	• Widespread taxation on electricity to fund R+D • Feed-in tariffs • Innovation Funds • Public-private partnerships
Accountability Mechanisms	• Climate Act: legally binding targets • Energy Agreements: politically negotiated and accepted • Danish Energy Agency: data collection • External audits • Annual, transparent reports on progress
Just Transition Mechanisms	• Social impact considerations in transition policies • Retraining programs • Inclusion of industry, unions and academia in policy design

Denmark is widely regarded as a leader in the transition toward a carbon-neutral society. In 2005, the Danish government outlined a plan to achieve a low-carbon society by 2050, and in 2011 it was the first country in the world to announce their aim to gain complete independence from fossil

fuels. In 2020, the Danish Parliament went one step further and passed a legally binding law for climate neutrality by 2050, cementing their commitments across a "broad political coalition (left and centre-right), providing a degree of policy durability that is uncommon in many other jurisdictions" (Krawchenko, 2022, p. 2). This cross-party consensus, characterised by high levels of co-operation, is evidence of Denmark's "well-functioning environmental governance and management system" which also benefits from robust participation by civil society in policy making (OECD, 2023, pg. 30). By 2021, Denmark achieved the greenest electricity mix in the EU-27, with over 80% of electricity generated by renewable sources (OECD, 2023, p. 35) and is "one of the first countries to develop and implement a green energy strategy based on broad political agreement" (OECD, 2019, pp. 17–18).

As a small country, Denmark has been required to utilise all regions and sectors in collaboration together. Respondent 1 explains, "In our history, there is only so much we can do alone, but we can do so much more together… that we can achieve much more when we collaborate" (Respondent 1).

4.1 Danish Political System

Denmark is a parliamentary democracy led by a prime minister appointed from the leading political party. The parliament is called the Folketing and is composed of multiple parties who must negotiate to form a multi-party coalition. The Folketing has 179 members who are elected by a proportional election system (two members are elected from the self-governing provinces of Greenland and the Faro Islands). Voters can cast their ballot for a party's overall list of candidates or for a specific candidate on a party list. As coalitions are a necessary feature of the Danish governance system, the "political culture is characterised by a high degree of pragmatism and consensus-seeking" (Pedersen, 2005, p. 1105). This is evident in the broad political support climate policies receive, despite differences in party ideology. It was under a conservative government (the Liberal Party of Denmark, Liberal Alliance and the Conservative People's Party) that the current Energy Agreement was established in coalition with the remaining minority parties: Social Democracy, the Danish People's Party, the Red-Green Alliance, the Alternative, the Social Liberal Party and the Socialist People's Party (Danish Energy Agency, 2018).

4.2 A New Path Forward

1970s Oil and Gas Crisis

The 1970s oil and crisis marked a period of transitional change in Denmark. The sudden rise in energy prices, resulting from an instability of oil and gas supply from the Middle East, demonstrated Denmark's reliance on international energy supply and its vulnerability to independent market forces. The crisis was further magnified by the increasing concern regarding diminishing fossil fuel reserves, a central topic at the United Nations Conference in 1972 (Jørgensen et al., 2017, p. 175). Prior to the crisis, Denmark had enjoyed an abundance of cheap oil and 92% of its energy came from imported oil (Christensen, 2013). Respondent 1 credited the 1970's oil crisis as pivotal to a rapid shift in policy, "When the oil crisis hit, it left a big mark in our economy, but also in our mindset in terms of the civil consciousness in society on being more environmentally conscious" (Respondent 1).

Policy makers, researchers, NGOs, and other concerned actors realised that a new energy future for Denmark was necessary and a search for new energy supplies and policy pathways underwent a rapid period of development. According to Jorgensen et al., who have published several papers on the dynamics of the Danish energy transition, the energy crisis triggered the creation of "a new set of policy mixes operating in some coherence, but also evolving within their respective arenas and the build-up of institutional frames within these" (Jørgensen et al., 2017, p. 175).

On the path to redefine the Danish energy mix, the various actors each imagined their own vision of the ideal transition pathway. The Danish government began by partnering with the national energy utilities to develop a framework that would ensure future energy security. The first Danish Energy Plan was launched in 1976. "The main objective was to reduce our [Denmark] dependence on oil, to direct the supply towards natural gas and nuclear power, but also to use coal and renewable energy" (Danish Environmental Protection Agency, 2024). At this time, renewable energy was only a small part of the reconfiguration of the Danish Energy system. Rather, emphasis was placed on replacing the supply of internationally sourced oil and gas with coal, natural gas, and nuclear power. The proposed addition of nuclear power to the energy mix enjoyed broad political support but was met with public controversy and a revised energy plan, without nuclear, was developed. Respondent 2 noted that:

> "We had a long debate on whether or not we should pursue nuclear power and that debate ended in 1985. When parliament decided against nuclear, I think

> most people in Denmark thought that was the correct decision. And the year after that, the Chernobyl reactor blew up. So that ended any debate that might be left after that" (Respondent 2).

Despite political support for the introduction of nuclear generation, public sentiment and input were strongly opposed and nuclear was removed from the plan. This highlights the important role public participation played in the development of the new energy future in Denmark.

Reconfiguration of Energy Infrastructure

The 1976 Energy Plan established the policy pathways for Denmark to become energy independent, but oil and coal were to remain the dominant source of power. The discovery of oil reserves in the Danish North Sea in 1966 was initially given low priority, but after the oil crises of the 1970s, there was a renewed effort to expand exploration activities and rapidly upscale domestic production. By 1993, "oil production surpassed the domestic demand making Denmark self-sufficient" (Sperling et al., 2021, p. 6). Combined heat and power (CHP) stations were also instructed to switch their fuel sources from imported oil to coal, a cheaper and more stable alternative.

To deliver energy, in the form of natural gas, from the Danish North Sea oil field the government invested heavily in a distributed grid system and expanded the district heating systems. In 1972, the Danish state-owned, Dansk Naturgas A/S, later renamed Dansk Olie og Naturgas A/S (DONG), was established to manage gas and oil resources and "marked a huge government investment in providing energy in Denmark, hence posing a threat and a competition to the established companies producing heating and electricity" (Ibsen et al., 2007, p. 50). The aim of this reconfiguration was to reduce dependency on imported oil and replace it with domestic natural gas supplies. Policy direction also encouraged a range of demand-side measures to increase energy efficiency in the built environment.

Along with increased energy efficiency, utility coordination was also a priority in the reconfiguration of the Danish energy system. According to Ibsen et al. "A detailed plan for heating on a scale previously unseen internationally was sketched out dividing the country into parcels in accordance with the most efficient energy source for that particular area." (Ibsen et al., 2007, p. 50). This would aid the replacement of oil with alternative energy sources, such as natural gas and eventually wind power, as decarbonisation efforts became increasingly important. Respondent 3 explains:

> "It was much easier to run a system as a big, centralized unit in terms of managing the system. So, if you are introducing energy from wind or solar you can see this is not only focusing on the individual wind or solar project, but rather how it integrates into the whole system" (Respondent 3).

This whole-system approach allows for increased flexibility on the grid to address peak load and intermittent energy supply from alternative energy sources.

2019 Climate Elections

The 2019 Danish general election was the first election in which the climate crisis was the foremost political issue, earning it the moniker 'climate elections.' The emphasis on climate and environmental policy nearly doubled compared to the previous election as polls demonstrated that 46 per cent of voters considered climate policies as their top concern (Altinget, 2019). Citizen initiative led social media campaigns, such as the use of climate-themed hashtags (e.g. #klimamarch), helped to "demonstrate wide public support for prioritizing the climate agenda" and brought the climate crisis into the purview of more established media outlets (Uldam & Askanius, 2022, p. 393). The prominent theme amongst the climate awareness campaigns was a sense of urgency. According to an analysis on the influence of social media during the 'climate election, "rather than expressing an entirely dystopian view, the [urgency] in candidates' tweets was vested with hope, which hinged on the election as an opportunity to bring about the change needed to alleviate the crisis" (Uldam & Askanius, 2022, p. 400). This formidable social movement would soon become a central component of the country's ambitious climate policy and ban on oil and gas licensing.

During the runup to the election, many aspects of society, such as labour, business associations, civil society organisations, and experts, "participated in energy and climate policy [discussions] through formal partnerships and institutions such as the Climate Change Council" (Krog & Sperling, 2019, p. 15). These engaged actors organised around a policy tool called a "citizen proposal," "which compels the parliament to at least discuss a proposal when 50,000 or more adult citizens have signed it digitally" (Krog & Sperling, 2019, p. 15). The climate proposal called on all parties to develop a climate agenda as part of their election campaign and advocated for the enactment of a binding climate law to ensure policy durability. The strength and timing of the citizen's initiative "led to a de facto deliberative process on the content of a [Climate Change Act] and GHG emissions reduction targets on the election trail" (Nash & Steurer, 2021, p. 1128).

The high level of engagement from civil society actors was, according to Respondent 1 and echoed by others interviewed, “in our DNA” (Respondent 1). Respondent 1 explains that there exists a strong tradition of engaging “across a plethora of different actors, because we are used to working like that. That's that” (Respondent 1). Their matter-of-fact explanation reflects the central role collaboration has played in the development of Danish policy which hinges on what researchers Sarah Nash and Reinhard Steurer describe as “parallel bilateral and multilateral negotiations between political parties” and “Denmark’s consensus-oriented politics” (Nash & Steurer, 2021, p. 1127). The success of civil-led advocacy campaigns and the pressure to actively engage with these actors is evident in the commitments made by all parties across the spectrum to adhere to ambitious climate policy.

4.3 Oil and Gas Region in context (Current state of play)

Despite having the largest share of wind electricity (54%) in the countries assessed by the IEA, oil still constitutes the largest source of energy in Denmark’s total primary energy supply (TPES) (International Energy Agency, 2023a, p. 9). This is rapidly changing, however, as Denmark’s oil and gas production peaked in 2005 and has been in steady decline, despite considerable remaining oil and gas reserves (British Petroleum, 2021). According to the OECD Environmental performance review in 2019, “The contribution of fossil fuels to TPES dropped significantly, from 82% in 2005 to 60% in 2017… while the share of renewables more than doubled over this period 15% to 35%” (OECD, 2019, p. 68). The review also found that “Oil production peaked in 2004 at roughly 22,700 m3” (pg. 6). This peak corresponded to twice the domestic oil demand.

Oil and gas exports contribute around 0.8% to total GDP in Denmark and total revenues. The state receives revenues from the oil and gas sector in three different ways. First, oil and gas companies are taxed at 25%, then there is a 52% tax rate on hydrocarbons (carbon tax), and finally, as shareholder of the oil and gas company, Nordsøfonden, the state receives revenues from its 20% share in the company (Sperling et al., 2021, p. 19) According to Sperling, the “economic significance of the oil and gas sector in Denmark has been following the same downward trend as the production volume (2021, pg. 20), and exports are significantly lower today than during the peak production years. The ownership of the gas and oil assets in Denmark has changed significantly in recent years (Sperling et al., 2021, p. 14). About 219 firms make up

the oil and sector and range significantly in size, 65% have 49 employees or fewer. According to Sperling, “The high number of small enterprises is a typical Danish feature, making the economy flexible but also vulnerable because smaller firms tend to employ more unskilled workers than larger ones, in relative terms” (Sperling et al., 2021, p. 19). However, there are large companies that exploit to Danish oil fields, including Equinor ASA, Norwegian Energy Company ASA, Energinet DK (the energy System Operator for Denmark), Total Energies SE, and Shell, together which dominate the market (Mordor Intelligence, 2024).

The oil and gas sector lags the wind sector, directly employing 1,565 people in 2019, compared to the 33,159 employed by the wind industry (State of Green, 2021). However, Oil & Gas Denmark estimated a total of direct and indirect jobs are generated by the sector; NGOs remain sceptical of these estimates (Sperling et al., 2021). The employment opportunities within the oil and gas industry range from offshore rig works to onshore accountants. According to a statistical analysis of the sector conducted by Damvad Analytics, of the 10,000 full time employees, 36% work directly in oil and gas companies and specialised offshore services, 24% work for hardware suppliers, and 41% in other services (Damvad Analytics, 2021). These opportunities are often mirrored within the wind industry: “From development of a project to decommissioning there is a need for offshore-specialized workers and technicians, ship crews, operators, engineers, as well as experts with knowledge regarding everything from logistics, health and safety, environmental aspects to administrative tasks, regulation, financial aspects” (Sperling et al., 2021, p. 14). Around half of all jobs associated with the oil and gas sector are in the region of Esbjerg. Given the increasingly stringent emissions targets and the success of offshore wind development from the Port of Esjberg, the Danish Government announced, in 2020, plans to establish two energy islands off the coast in the North Sea (Danish Energy Agency, 2020).

4.4 The Energy Transition in Denmark

Following the success of the 2019 climate election, the majority of parties agreed to a 70% reduction in emissions by 2030, which was soon enshrined in the 2020 Climate Act. The 2020 Climate Act legally bound the government to reduce GHG emissions by 50-54% in 2025 and by 70% towards 2030, from 1990 levels. The act also mandated an annual global climate impact report to assess the climate and carbon footprint of Denmark’s consumption (International

Energy Agency, 2023a). Building on the active civil society engagement process that characterised the election, the *Folketing* "developed an equity-centred transition framework and funding package" to accompany the targets outlined within the Climate Act (Danish Ministry of Energy and Utilities, 2019, p. 69). The 2020 Climate Act targets are considered highly ambitious relative to global commitments; however, the current coalition government is considering amending the act to "bring forward the climate neutrality target to 2045 and target a 110% emissions reduction by 2050" (IEA, 2023, pg. 9). For context, according to the IEA, such ambitious targets would require 70% emissions reduction in seven years, a similar number of reductions that took Denmark 30 years to achieve previously (International Energy Agency, 2023a, p. 9).

In line with the Climate Act, the *Folketing* also reached a broad agreement on the future of the oil and gas industry in the North Sea, which effectively ends fossil fuel extraction by 2050. The decision transpired under the leadership of a right-wing government, "demonstrating how widespread and early consensus on these matters was established in the country" (Sperling et al., 2021, p. 5). The *North Sea Agreement* paused the ongoing tendering round and cancelled the 8th and all future tendering rounds for licences. These licences grant "one or more companies the right to explore for and produce hydrocarbons in a defined area" (Danish Energy Agency, 2018). Cancelling future bidding rounds provided firms with a strong market signal to indicate future policy direction which provided an opportunity to develop long-term plans that aligned with government priorities. Although the cancellation of future bidding rounds essentially signals the end of future oil and gas development, industry has adapted remarkably well to the long-term change. Respondent 1 explains, "We have that continuity, to give security to investors, to say there is no doubt this is the way we are going, so we can start planning for this" (Respondent 1). The policies forecasted the future of the energy system which encouraged private oil and gas firms to reimagine their role within the broader energy system and instead began to refer to themselves as "energy providers" (Sperling et al., 2021, p. 28). Only one firm remained interested in bidding for an extraction licence following the pause on the tendering round (Sperling et al., 2021, p. 15).

Establishing long-term policy plans, even if they signal the decline of an industry, provide stability and room for consultation with affected industries. Respondent 3 attributes

these long-term, broadly supported plans to ensuring the private sector maintains their involvement in the energy transition. They explain that the private sector,

> "Know[s] that this policy will not change if the current government changes, so I think we have built up trust with the industry. And also, when we are doing these long-term energy plans, we do a lot of consultation, typical consultations in terms of market dynamics, so I think we [government and industry] have recognized the mutual benefits during these long-term policy plans" (Respondent 3).

Providing a strong foundation through stable policy frameworks for public-private partnerships has encouraged innovation and the rapid development of alternative energy sources and their related employment opportunities (Sperling et al., 2021).

The engagement with industry and academia to provide the inputs and skills for market dynamic analysis is a product of the "tradition" of collaboration mentioned previously. Speaking from the perspective of the Danish Energy Agency, Respondent 3 explains, "We have had this close cooperation with academia because I think when you are introducing policies into an energy system, it's important that we [academia and government] both try to calculate what was the dispute in terms of cost" (Respondent 3). The resultant policies aim to balance cost-effectiveness with social considerations, while avoiding potential carbon leakage (International Energy Agency, 2023a). Engagement with academia is further supported by considerations provided by the broader civil society. Public participation in environmental matters is supported by government-funded information campaigns to raise public awareness, and citizens can challenge environmental decisions through an appeal board of judges and experts (OECD, 2019, p. 30). Advisory bodies, such as the Environmental Economic Council and the Climate Council, also evaluate and provide policy recommendations that prioritise cost effectiveness and ensure the government is meeting its climate commitments. These layers of engagement help to maintain broad political consensus on climate and environmental-related policy and ensure they are durable enough to survive the political cycle.

Denmark's approach to the energy transition can be summarised by their bold commitment outlined with their current Energy Agreement: "Denmark must have the most integrated, market-based and flexible energy system in Europe, with efficient energy utilisation across the electricity, heating and gas sectors, and with a continued strong security of supply" (Danish Energy Agency, 2018, p. 13). Denmark's energy policy is detailed in comprehensive commitments called Energy Agreements. These Energy Agreements are supported by various

parties across the Parliament, evidence of the broad support these agreements enjoy in the Danish government. The Energy Agreements are a result of a "long tradition of using a policy mix of economic incentives, together with support for innovation and green technologies, ambitious targets and an effective centralised governance for the environment" (OECD, 2019, p. 38). The 2018 Energy Agreement outlines the framework for the 2020-24 period and aims to advance Denmark's commitment to becoming a carbon-neutral society by 2050. The Agreement is composed of ten priorities, with several initiatives for each ranging from increasing the flexibility of the energy system to phasing out oil and gas subsidies (Danish Energy Agency, 2018). For example, the Energy Agreement aims for 55% share of renewables and a phase-out of coal by 2030. As a result of these initiatives, more than half of the electricity produced in Denmark benefits from public support, market price support, or tax breaks to encourage investment (Sperling et al., 2021, p. 38)

The Danish government's desire to ensure policy stability through market stability is evident in their commitment to address environmental challenges while ensuring economic growth (Denmark was dubbed a "pioneer of Green Growth" by the OECD) (OECD, 2019, p. 34). As a senior analyst for the Danish Centre for Utilities and Supply, Respondent 2 observes that, "Policies have become more market-oriented in the last 20 years or so and the government has reduced its own influence on the energy sector in general. So it's mostly driven [now] by market access and less driven by the government" (Respondent 2). To ensure a "market-driven green transition" (Danish Energy Agency, 2018, p. 2) 0.5 billion DKK was allocated to deliver on the commitments in 2019 and this amount will steadily increase to about 2.8 billion DK by 2025. To maintain cost-effectiveness, direct regulation of associated industries is the favoured policy instrument which ensures flexible compliance and prioritises results rather than practice. Funding sources were derived from the government's significant fiscal surplus, which were then combined with funds collected from the energy sector via mechanisms such as tax revenues or dividend contributions (Danish Energy Agency, 2018, pp. 17–18). According to the OECD, Denmark enjoys the highest share of revenues derived from environmentally related taxes among the OECD countries, equal to 3.7% of GDP in 2017 (OECD, 2019). It should be noted that these revenues are in decline, in part by design, as industry improves efficiency and reduces their carbon output. Consequently, revenues from the clean tech industry and related exports are becoming increasingly important for the economy as oil and gas related revenues decline. Clean

tech has been the fastest-growing export sector in recent years, government aims to double value to at least DKK 140 billion by 2030 (OECD, 2019, p. 40).

The market-driven approach is contingent on establishing partnerships and initiatives with the business and labour community, thereby enabling green economic diversification. To support the business community in developing market-based solutions and leading the research and development of new green technologies, the Danish Government has established 14 climate partnerships with ambitious goals to reduce emissions and spark a green transition. Each partnership represents a key sector of the Danish economy, from Pension Denmark to the offshore wind company, Orsted. According to the Climate Partnership Playbook, "Each partnership was tasked with devising recommendations as to how its specific sector could contribute to reaching the 2030 goal" (State of Green, 2020, p. 6). As a result, 400 recommendations were produced and realised as actual policy initiatives. Respondent 1 asserts that these partnerships are necessary for innovation,

> "Each sector has an action plan for how to contribute to enable these crucial CO2 reductions, and also the public sector, in that coalition, has the role of defining the framework conditions and the private sector has the role of being the innovator, at looking at what solutions are possible" (Respondent 1).

To maintain dialogue after the initial recommendation stage and to maintain the private-public partnerships, a business forum that features a representative from each sector and the Ministers of Climate and Business, respectively, was established to ensure high-level commitment. It is through these partnerships and ongoing arenas of dialogue that Denmark has managed to ensure broad support from the business sector.

Looking forward, Denmark's most heavily emitting sectors, transport, agriculture, and industry sectors are the target of new climate reforms. The government plans to phase in a carbon tax from 2025 onwards to cover these sectors, as only about 45% of carbon emissions are covered by some type of carbon price. Denmark is considered a pioneer in carbon-pricing with "nearly all energy-related Co2 emissions [subject to] a price signal, except those from burning of woody biomass for heating" (OECD, 2019, p. 37). Conversely, to encourage competitiveness and innovation in the business sector, taxes imposed on household energy costs are generally higher, ranking them among the highest in the EU. However, this policy will be phased out to encourage fuel-switching in household heating as the government aims to further reduce emissions in the built environment.

Municipal and regional coordination is a central feature of Denmark's climate strategy. According to Sperling et al., "the shift to 100% renewable energy systems represents a new technological foundation for energy planning; i.e., energy systems that are tailor-made at the local level" (Sperling et al., 2011, p. 1338). In 2007, the Danish national government implemented a landmark reform of local government structure to devolve responsibility for most aspects of environmental management to 98 municipalities, including the municipality of Esbjerg (Krog & Sperling, 2019). The national government retains the authority to set the legal framework and provide guidance on implementation, but a tradition of municipal autonomy, enshrined in the constitution, allowed for strategic planning at the municipal level. As part of their environmental planning responsibilities, municipalities retain the authority for the implementation of policies, plans, and programmes, issuance of most environmental permits, and related inspections. However, the national government retains the authority to issue permits and inspections for the most complex and potentially harmful companies. Most Danish municipalities have combined climate and energy strategies and with these new environmental responsibilities and are able to share expertise across municipalities through Local Government Denmark. As part of the strategic planning, municipalities are required to budget for their plans as the national government does not provide any permanent funding opportunities (Krog & Sperling, 2019, p. 85).

4.5 Esbjerg

Esbjerg is the fifth largest city in Denmark and currently has about 110,000 residents. 36% of the population in Esbjerg is directly employed by oil and gas companies and specialised offshore services and one third of all jobs are energy related (Sperling et al., 2021, p. 20). Located in southern Denmark on the west coast of Jutland, the Port of Esbjerg is the largest along the Danish west coast and has traditionally been the primary location for Denmark's oil and gas activities (See figure 1). In 2022, the Port of Esbjerg generated 29.08 million EUR in revenue, much of that is attributed to the deployment of offshore wind technology from the Port (Port Esbjerg, 2022). According to a report done on the socioeconomic impact of the wind sector in Denmark, "Esbjerg's favorable socio-economic status compared to the national average… is not least due to its strong integration within the domestic and international energy sector" (QBIBS, 2020, pg. 58). The socio-economic benefits derived from the energy sector are a result of

continuous investments made by the Port of Esbjerg to transform the port from an important import-export center for the oil and gas industry into a leader in wind infrastructure (Quantifying Business Impacts on Society, 2020, p. 59). The decision to expand investment in the wind sector was triggered by positive market signals delivered by the Danish state government that promised an immediate and long-term expansion of the sector as well as direct large-scale investments in offshore wind beginning in 2001 with Horns Rev 1. These positive market signals and direct investments stemming from the government "launched a year-long port expansion project within the port and resulted in Esbjerg winning a long string of offshore wind projects in the North Sea" (Quantifying Business Impacts on Society, 2020, p. 7). Although the North Sea Treaty committed to a phased decline of the oil and gas sector and a major economic contributor for the region, Esbjerg was supportive of the North Sea treaty due the stability it lent to the future coordination of the sector's activities (Quantifying Business Impacts on Society, 2020)

Figure 2: Map of Denmark, Esbjerg highlighted in red.

Source: Esbjerg City Map (n.d.). *Map of Esbjerg, Denmark*. Wikimedia Commons. https://commons.wikimedia.org/wiki/File:Map_DK_Esbjerg.PNG

Although the Danish government itself has not called their strategy to transition regions, a just transition, they do adhere to many aspects of a just transition and are supportive of the European Union's broader commitments to Just Transitions. To support regions affected by the accelerated transition toward the net zero targets, particularly in oil and gas producing regions

such as Esbjerg, the government has adopted an aid package "to ensure local jobs for the existing skill set of oil and gas workers through CCUS and electrification projects" (International Energy Agency, 2023a, p. 11). As part of this package, DKK 90 million was allocated to support Esbjerg's transition through investment in activities such as green energy industry development and the expansion of sustainable infrastructure (Port Esbjerg, 2019). This financial support aims to offset the negative impacts to the region from phasing out oil and gas production. Direct investment to establish the wind industry in Esbjerg beginning in 2001 has made the port the center for other local companies to "test and transfer their experiences from oil and gas to a new sector; pursue growth in new markets and diversify their business strategy, also well beyond Denmark's borders" (Quantifying Business Impacts on Society, 2020, p. 7). The Danish government has also developed programs to provide workers in the region with the skills to work in the renewable energy industries. The training program is hosted through the Offshore Academy and is a product of a close cooperation with energy-based businesses and trade unions and benefits from funding assistance from the European Union.

Despite a relatively successful transition, there were still instances of debate between the local municipal authorities and the state government. Respondent 2 recalls a clash between the two governments over the closure of the local coal-fired power plant, "The municipality wanted the power plant to live a little longer because they wanted the surplus heat from the power station to supply the heat customers in Esbjerg, but the state was pushing towards closure" (Respondent 2). Despite municipal resistance, the state stood firm and urged Esbjerg to bring forward future plans to replace the power plants and implement the transition at greater speed. According to Respondent 2, "In the end we found a solution that satisfies everybody. So there was a conflict, but now there is no conflict anymore" (Respondent 2). This is evidence of the centralisation of energy management in Denmark, where it is the state that dictates the policy direction, and the regions are required to implement it. However, the Port of Esbjerg has made independent commitments to the clean transition and published a net zero plan in 2023, which highlights the use of smart grids to increase efficiency and reduce unnecessary waste (Port Esbjerg, 2023).

The commitments of Esbjerg to participate in a clean energy future reflect the strength of economic arguments, rather than moral ones, when it comes to managing the transition. Funding commitments, such as DKK 90 million from the North Sea Agreement to develop Esbjerg into a wind hub, demonstrate to the region that although oil and gas revenues are declining, there is a

tangible and lucrative replacement (Sperling et al., 2021). When discussing the concept of a just transition with those interviewed, there was confusion surrounding the concept. Many highlighted that because there was already a viable replacement for the revenues and jobs that were once singularly associated with the oil and gas industry, the transition to a cleaner economy was relatively orderly. Respondent 5 discussed the transition of workers from the oil and gas industry to the wind industry. They noted that due to Esbjerg's, and Denmark more broadly, tradition of engaging in close discussions with industry and relevant associations, there was a mutual desire to find solutions for the transfer of the workforce into the renewable sector (Respondent 5). Respondent 4 even spoke about a pig processing plant that was due to close and the owner and employees engaged with the local wind farm and secured employment opportunities for workers with transferrable skills, "So Esbjerg has been a long-standing example of how to do the transition in a way that secures your financial future as a worker, as a company, as a region" (Respondent 4). The uncertainty of a new future and the fear that goes a long with it can be mitigated as long as there are tangible and achievable replacements.

4.6 Conclusion

Denmark began its transition toward a new energy future as far back as the 1970s. They have continually evolved their energy sector to meet new challenges, which today is climate change. Their transition away from oil and gas was fuelled by the desire to become energy sovereign and economically independent from the international oil markets. This impetus proved to be politically enduring and garnered widespread political support. This transition eventually transformed into a transition away from oil and gas more broadly to meet climate and emission targets.

As the challenge of climate change looms, Denmark has strived to become a leader in renewable energy and decarbonisation of the economy. By placing the transition toward renewables and a greener economy as the economically superior choice, their oil and gas region, Esbjerg, has managed to overcome the challenges of the oil and gas decline. Working closely with industry and academia, the central government developed policies that ensured the green economy was just as successful as one based in oil and gas. This also helped to ensure that industry was an equal partner in the transition and just as willing as the government to achieve their climate targets. Esbjerg has also implemented strategies to take advantage of its new role as

the wind hub of Denmark, recognizing the economic and employment opportunities the sector presents. This was done in collaboration with the local industry, who worked together to transition workers and ensure employment levels were maintained. Underlying all elements of Denmark's transition is the focus on collaboration, truly a Danish tradition.

5. Taranaki, New Zealand

Table 3: New Zealand Transition Characteristics

Population	• Total: 5.2 million • Taranaki Region:127, 300
Climate Commitments	• Net-Zero by 2050 • 50% emission reduction by 2030
Main driver	• 2018 ban on all new offshore oil and gas exploration
Relevant Institutions	• Ministry of Business, Innovation and Employment • Climate Change Commission • Are Ake • Venture Taranaki • BusinessNZ • Regional Councils
Approach	• Bottom-up strategy design • Legislated targets • Localised implementation of transition policies • Renewable investment and economic diversification
Funding	• Emissions Trading System (ETS) • Grants for pilot projects • Public-Private partnerships • Governments allocation of funds for the transition • Tax incentives for private investment
Accountability Mechanisms	• Accountability framework embedded within strategic transition plans • Baseline data collection • Target timeline • Co-designed outcomes
Just Transition Mechanisms	• Co-design of transition policies • Community -Driven strategies • Community-led Transition taskforce • Integration of Māori principles throughout all strategies

New Zealand has committed to ambitious targets for reducing their greenhouse gas emissions and aim to achieve net zero by 2050, as outlined in their Climate Change Response (Zero Carbon) Amendment Act 2019 (International Energy Agency, 2023b). The government also announced, in 2018, that no additional offshore oil and gas exploration permits will be granted, although natural gas is expected to continue to play a role in New Zealand's energy mix. According to the IEA, "New Zealand's electricity system is the cornerstone of the government's strategy for decarbonising the energy sector" (International Energy Agency, 2023b, p. 11), as already over 80% of their electricity is generated by renewable sources in 2021. Under the Climate Change Response Act, New Zealand also established the independent Climate Change Commission to provide evidence-based recommendations for climate change action and established emissions budgets which are paired with emissions reductions plans. New Zealand

established their own Emissions Trading Scheme, which extends across most of the economy, except for agriculture and some aspects of the waste sector. New Zealand has also demonstrated they are a leader in community-based transition planning though their extensive stakeholder engagement process in the oil and gas region of Taranaki. The Taranaki Roadmap to 2050 reflects an emphasis on place-based and regional actions that aim to ensure the transition in Taranaki places justice at the heart of all policies.

5.1 Political System

New Zealand is a constitutional monarchy and has a population of about 5.1 million people. The ruling English monarch is represented by the Governor-General and acts as the official head of state. The government is led by the Prime Minister and is supported by an elected House of Representatives composed of 122 members. Voters are able to cast two votes: a party vote and an electorate vote. The Te Tai Hauāuru party represents the Māori electorate and is steadily gaining prominence within the political sphere. The 2023 election saw the defeat of incumbent centre-left Labour Party by the centre-right National Party in what would be one of the worst defeats of a sitting governments since 1996. The National Party, a conservatively fiscal party, may limit the focus on climate action, calling into question the durability of the climate-centred policies implemented under the Labour and the Green coalition.

5.2 A New Path Forward

In April 2018, the coalition government formed by the left Labour party and the centrist New Zealand First (NZF) and backed by the Green party, announced the end to further offshore oil exploration permits. In her address to the press, Prime Minister Jacinda Ardern stressed that this announcement was meant to provide a strong market signal for the future of the energy industry in New Zealand, “This is a responsible step which provides certainty for businesses and communities that rely on fossil fuels. We’re striking the right balance for New Zealand - we’re protecting existing industry and protecting future generations from climate change” (New Zealand Government, 2018). The announcement marked a turning point in New Zealand’s energy strategy, in which plans to transition oil and gas hub in Taranaki became a focal point of a future less reliant on oil and gas. This announcement helped to launch targeted initiatives

devoted to ensuring the transition in the region was informed by community and stakeholder engagement.

To support this and other transitions, the Government of New Zealand established a Just Transitions Unit (JTU) in 2018 within the Ministry of Business, Innovation, and Employment. This Unit formed a centre of expertise in government for managing transitions and supported partnerships between different regional actors and levels of government. As part of this initiative, a Just Transition Programme was established to "ensure that regions were activated and supported to plan and manage the… impacts of a transition" (Ministry of Business, 2024). According to the program mandate, a successful transition was one in which the impacted communities could identify opportunities specific to their regional context and act upon those opportunities in a way that was fair and just. In collaboration with academics and Māori representatives the Just Transition Programme published a comprehensive *Guide to Just Transitions* which featured five chapters that map out the process of managing a transition: 1) Foundations, 2) Connecting, 3) Planning, 4) Acting, and 5) Adapting (Allen et al., 2023). Woven throughout the guide are Māori words and values to strengthen concepts such as partnership, inclusiveness, equity, and collaboration, which are considered essential to the development and management of a just transition. The guide is meant to serve as an overarching roadmap for beginning the work of managing a transition by providing a foundation on which communities can develop and plan their own transition pathways. Following the change of government in 2023, the National Party chose to end the Just Transition Programme. Affiliated information and links were subsequently removed from the Government of New Zealand website and staff were reassigned to other departments following the decision. However, the Just Transition development guide is still available for community use.

However, among those interviewed for this study, many were critical of the announcement, dubbing it "little more than a political statement." The existing 31 oil and gas exploration permits were unaffected by the announcement, meaning that 100,000 sq. km will continue to be exploited from 2030 and beyond. Despite the limited impact on actual oil and gas exploitation, it became a much-debated topic during the most recent election. Respondent 7 explains:

> "It [the ban] created an artificial horizon for the industry with nothing to replace it. And that's been debated and dispute and disagreed with. It's been a fairly vast

> area of contention, to the point where the current government are going to overturn that ban" (Respondent 7).

Respondent 9 concurred, "It caused a shockwave… it did catch the oil and gas industry here [Taranaki] by surprise and I think it really pulled the rug out under the feet of a lot of investors" (Respondent 9). The lack of sector and regional support for the ban has posed challenges to the durability of the policy. The current government has yet to repeal the ban, but it was a critical component of their campaign and may have helped them achieve such a landslide victory.

Although the announcement, on the surface, had limited impact, the ban triggered fears regarding the lack of replacement for these essential components of the economy, "we have a pending gap between what was and is and what is to come" (Respondent 9). These fears were especially poignant in Taranaki, where a large proportion of the local economy and employment opportunities rely on the oil and gas industry. Even supporters of the ban were critical of the lack of engagement with the region, "But the government of the time hadn't made that announcement in conjunction with the local region. So they just made that announcement in Wellington out of the blue and blindsided the region" (Respondent 6). Further, according to Respondent 7, even industry was left in the dark regarding the announcement, "the leader of the industry in the country only been informed at 8pm the night before [the announcement]" (Respondent 7). Respondent 7 argued that this caused a decline in long term investment, particularly in infrastructure maintenance on existing offshore rigs. Indeed, in 2019 Chevron and Norwegian-based Equinor surrendered three permits that gave them rights to exploit more than 25,000 sq. km of ocean, with plans to divest activities in the region (*Chevron, Equinor Depart NZ Exploration Scene - NZ Herald*, n.d.).

To mitigate the lack of consultation and to help ensure the longevity of the policy, given the criticism from industry and the opposition, the government sought advice from the Parliamentary Commissioner for the Environment, an independent Officer of Parliament. A note regarding the ban was published in March 2020 and aimed "to extend the existing analysis by providing an assessment of what we know about the environmental effectiveness and likely economic impacts of the ban. It does not attempt to advocate for or against the ban" (Parliamentary Commissioner for the Environment, 2020, p. 2). The note outlined the importance of combining the ban with other, stronger climate policies, both on the demand side and the supply side. It also recognized the negative impacts the economy a decline in oil and gas

would have to New Zealand and concluded that the ban is only effective if it encourages other countries to follow suit, initiating a global decline in oil consumption. However, the announcement did precipitate movement among communities. The realities of the global transition were suddenly brought home, and many communities have taken this opportunity to start imagining and planning for a future less dependent on fossil fuels, utilising the tools and stories of just transition experiences to fuel their ideas.

5.3 Oil and Gas Region in context (Current state of play)

New Zealand is known for its high-quality and light crude oil, fetching premium prices on the international market and contributing an estimated NZ$2.5 billion to the GDP annually (Parliamentary Commissioner for the Environment, 2020). All crude oil extracted in New Zealand is exported, however, crude oil production in New Zealand has been steadily declining since 2011. Between 2011 and 2021 production was down 55% (International Energy Agency, 2023b). Extraction of oil is concentrated in 19 fields, all of which are located in the Taranaki region. According to the IEA, "Oil production in New Zealand is forecast to further drop to below 4 mb within the next five years and below 2 mb shortly after 2030" (International Energy Agency, 2023b, p. 144). The decline in oil production is due to decreasing reserves in the multi-decade old fields. However, even before the decline in production, according to the Parliamentary Commissioner for the Environment, "Globally, New Zealand's production of oil and natural gas is tiny. Its share of world oil production has fluctuated between 0.02 per cent and 0.08 per cent since the 1990s" (Parliamentary Commissioner for the Environment, 2020, p. 17).

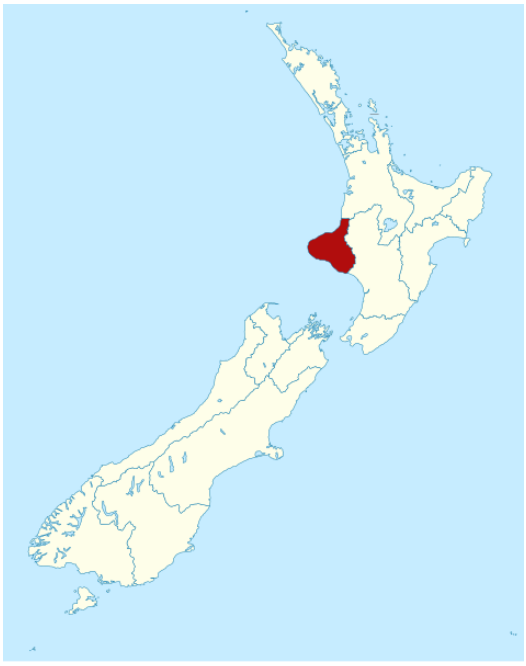
The three largest companies in the region, OMV New Zealand, Todd, and Greymouth Petroleum hold the market share of extraction royalties. In their economic analysis the New Zealand Institute of Economic Analysis found that the employment numbers for oil and gas extraction industry varied significantly across sources. According to Stats NZ oil and gas directly employed 710 people in Taranaki, but according to Venture Taranaki those indirectly employed by the industry were 4340. Overall, the number of direct and indirect jobs for the region was cited as high as 7,070 and as low as 5,941 (New Zealand Institute of Economic Research, 2019, p. 22). This may serve to evidence the potential bias Venture Taranaki has when directing the transition in Taranaki, perhaps overemphasising the significance the industry has for employment opportunities in the region. Venture Taranaki also features job postings for the

industry on their website, among other industries, primarily for offshore opportunities, such as drilling operations. A report released in 2020 by Venture Taranaki does highlight the feasibility of skill transfer from the oil and gas industry to the burgeoning wind industry, promising opportunities for new high-paying jobs to replace the declining oil and gas industry (Venture Taranaki, 2020). The impact of phasing out the oil and gas region in New Zealand has been debated and its significance serves as a broader indicator of global intentions toward the sector.

5.4 Taranaki

Located on the Westcoast of the North Island of New Zealand, Taranaki boasts a diverse and lush landscape nestled in the shadow of the great volcano, Mount Taranaki (See Figure 2). According to Māori tradition, the volcano, Taranaki Maunga, settled on the west coast of the island following an epic battle for the favour of the beautiful Pīhanga. Defeated, Taranaki fled to the west, carving the Whanganui River in his wake, and has remained in isolated peace ever since (Gossage & Taonga, n.d.). The region features a pristine coastline and is a hotspot for outdoor enthusiasts from around the world.

Figure 3: Map of New Zealand, Taranaki highlighted in red.



Source: Taranaki City Map (2013). *Taranaki Region location in New Zealand [Image].* Wikimedia Commons. https://commons.m.wikimedia.org/wiki/File:Taranaki_Region_location_in_New_Zealand.svg

Taranaki is also the industrial heartland of New Zealand, with agriculture, mining, manufacturing and energy production contributing to just under half the region's GDP. Manufacturing industries were the highest contributors to employment opportunities in 2023, followed by construction (Venture Taranaki, 2023) The mining industry, currently dominated by Canadian-owned Rio Tinto, in Taranaki has a long history and is expected to continue growing. In 2021, the sector saw a 48% growth rate and Government has made legislative changes to allow the fast-tracking of mining permits in the region (MarketLine, 2023). The legacy of mining, particularly coal, highlight the influence these industries have on a community's economic prospects but also their sense of identity. Between the mining and oil and gas sector, the majority of good paying jobs rely on these industries and the presence of coal dust is sometimes literally in the air. For those living in the region it might be hard to imagine an economy, or a landscape, without those industries present making it even more difficult to transition away from them.

The structure of the economy and job sector in Taranaki makes the region particularly vulnerable to disruptions in the oil and gas sector. Respondent 7 described the situation in Taranaki:

> "Taranaki is at the leading edge of transition because we have the industry homed here. And we have the expertise, the engineering, the employment opportunities here, all of these things. This is the region that has most to lose through the transition" (Respondent 7).

The disproportionate burden Taranaki carries underlines the importance of a just transition in the region. However, the availability of expertise and engineering infrastructure also presents a remarkable opportunity to deploy new clean energy opportunities and transform the region into an international hub for clean technologies. This narrative appears to be an important element in transitioning regions as it assures the community most affected by the decline of oil and gas that their region will be at the forefront of the new energy future and will benefit more from developing clean technologies than holding onto oil and gas technology.

Following New Zealand's commitments to the Paris Agreement in 2016 and the announcement to cease all new offshore oil and gas exploration permits in 2018, the local economic development agency, Venture Taranaki, began working on a new economic development strategy for their region. Utilising the Just Transition Programme's *Guide to a Just Transition*, Venture Taranaki convened a wide-ranging dialogue on how the region could

manage the just transition to a low-carbon economy. The development of the roadmap utilised a co-design process that "enables a wide range of people to make a creative contribution in the formulation and solution of a problem" to ensure a bottom-up approach was employed (Venture Taranaki, 2019, p. 5). Twenty-nine workshops were held on 12 transition topics, surveys and community outreach, a creative challenge and youth engagement. A lead group of twenty-seven volunteers steered the process, and the final report—the Taranaki Roadmap 2050—was co-created with communities, iwi (Māori nation/peoples), local and central government, businesses, educators, unions, and workers (Venture Taranaki, 2019). The roadmap lays out the region's vision for not only the future of the economy, but "all aspects of our lives" (Venture Taranaki, 2019, p. 2). The roadmap identifies 12 Transition Pathways to diversity and strengthen the local/regional economy (Venture Taranaki, n.d.). Some pathways relate to sectors (e.g., tourism); some are enablers (e.g., the regulatory environment); and some are both (e.g., energy, infrastructure and transport). Each 'pathway' has an associated action plan that identifies a coordination network and projects for implementation alongside budgetary requests to the national government and the anticipation that private sector funding will also be raised. The role of the now disbanded Just Transitions Partnerships team was to help to coordinate with other Government Ministries to identify funding opportunities and fill in gaps where there are no other alternatives.

A central theme of the strategy was resilience. The roadmap repeatedly placed emphasis on the opportunities for growth, skill development, and employment. This emphasis perhaps reflects feelings of uncertainty toward a new future in which the major driver of the economy, energy (28% of the regional economic output according to the strategy), is undergoing a fundamental transformation. According to those interviewed, the just transition planning process in Taranaki did cause apprehension and "nervousness" among the business community. One member of the central government-created just transition team discussed these feelings of apprehension by acknowledging the transition away from oil and gas and emphasised aspects of future resiliency: "The process of just transition will potentially accelerate the transition away from oil and gas, but it's also about creating local resilience to that transition to ensure that it's done with wisdom and depth and long term planning in mind" (Respondent 6). Respondent 6 further described the goals the transition team had for the region to build this resiliency:

> "We worked very closely in the region to help and to support the development of a medium to long term strategy to support the region shifting away from oil and gas dependency and enable them to realize their own aspirations for their future and the future of their children. And so, through a very inclusive process of ideas here, they developed the Taranaki 2050 strategy" (Respondent 6).

Venture Taranaki was chosen to lead the development of the roadmap given their experience in capacity building and economic development, as well as their close relationship with the Ministry of Business, Innovation, and Employment (MBIE), the ministry responsible for the Just Transition plan in New Zealand. However, when speaking to a member of the Just Transitions Patronships branch within MBIE, they argued that allowing Venture Taranaki to lead the planning process hindered the involvement of members not represented by the business community. They explain:

> "A review of the process in Taranaki found that because the team looked to Venture Taranaki, a lot of the power imbalance that is institutionalized was being repeated through the just transition process. There are traditional structures of wealth that the central and local government in businesses hugely advantaged" (Respondent 6).

This power imbalance was most acutely felt by the Māori people in the region "who had been marginalized by the just transition process to date" (Respondent 6).

To rectify the perceived imbalance of power expressed by the community in Taranaki, the just transition process currently being undertaken in the Southlands, placed members from the community itself as the lead on the development process. Respondent 6 explains:

> "But in the Southland, we set up an oversight group, representing the seven pillars of a just transition and they managed the process. So, it was true that it was harder because you had a diverse group, but it was better than having one agency with its own historical biases, strengths, and relationships. If you take care with setting up the oversight group, it works out better" (Respondent 6).

It was through this diverse group of representatives and greater emphasis on the planning process that ensured the development of a more inclusive strategy for the region and helped flatten the power imbalances. This collaborative effort was also apparent in the set of accountability mechanisms that were integrated into the roadmap to determine if the proposed transition pathways are working and to measure progress on specific metrics. The metrics were assigned achievable timelines and are measured against a definition of 'good' agreed upon by the Taranaki region. Outcomes based on a range of demographics (e.g. income, jobs, gender) are tracked and utilised to fill any policy gaps that were not addressed within the initial stages of the

strategy. An important element of the accountability framework was the emphasis on public and transparent reporting to ensure data was made available across institutions. This enabled better information sharing between the different coalitions by limiting obstructions to the flow of data. According to Respondent 10 coalitions which allow for an easy transfer of information supports the inclusion of decarbonisation policies within public and, importantly, private companies: "Making sure the people who can actually make change have the information available when they're all working together… so that people who are making financial decisions are considering decarbonisation" (Respondent 10). Flattening hierarchies and encouraging the flow of information become important contributors toward decarbonisation.

The relationship between the different stakeholders were established in a variety of ways. From formalised coalitions, such as the process lead by Venture Taranaki, to less formal coalitions, such as those established between different industries that all sought to decarbonise their activities and share information across their networks. One commonality between these range of coalitions was the emphasis placed on a shared vision. Respondent 7 explains, "What brings them [industry] all together to create a coalition, is the task that they are moving away from fossil fuels and to low carbon technologies for the energy source" (Respondent 7). Similarly, Respondent 6 discussed the importance of a shared vision to overcoming challenges during the transition process:

> "One of the things that we learned that it was critical to have a well formed and well articulated clear vision for the transition right at the outset that everyone agreed to. Once you had that it helped with the tricky times; you could come back to something you'd already agreed with the shared vision, and then revisit the challenges" (Respondent 6).

Establishing a shared vision for the future of the region can also provide certainty to its businesses, who may have to scramble to catch up to government policies if not given the proper time to prepare.

To truly achieve a just transition in the region, there will need to be a replacement for the void left by the oil and gas industries as they decline. A viable replacement will ensure that high-quality employment will still be available in the region and that the standard of living in the region remains stable. However, a recurring theme amongst those interviewed was unavailability of a viable replacement to encourage growth in a green economy. "There is a time mismatch, the displacement of oil and gas will happen faster than growth in the Green economy. I would hire

for example, the hydrogen company that is local here [New Zealand]. They would hire a few people, but at the same time, we would maybe lose 200 people there from the decline of the oil and gas industry and they would likely go either in totally different jobs in the region" (Respondent 8). This concern is echoed by Respondent 7, who worries that even if the replacement industry is there, the number of jobs will not be equivalent "But the oil and gas sector in Taranaki employs probably 7000 people and the offshore wind industry will eventually employ about 700 people. So, there is an inequity in terms of numbers of jobs" (Respondent 7). Although this example does not necessarily represent accurate figures, it does highlight that even with a viable replacement it will not be a 1:1 transfer of the workforce, nor will it mean that every worker will want to transfer their skills.

4.5 Conclusion

The 2018 announcement to ban all future offshore oil and gas permits was motivated by a moral obligation to take strong action on climate change. Unfortunately, the announcement was done without the support, or the knowledge, of the industry or the region of Taranaki, who had the most to lose from the announcement. The durability of the policy has been called into question, with uncertainty surrounding what the current, right-leaning government might decide to do about it[3]. It also left a significant gap between what was and what needs to be. With no tangible replacements for the decline of oil and gas, the feelings of uncertainty in the region have caused loss of investment and limited future employment options. However, the ban did spark intensified action from Taranaki to shift toward a diversified economy, with renewables at its core.

The Just Transition strategy in Taranaki was developed in conjunction with businesses and focused on the economic development of the region. The strategy was well planned and featured a number of actions informed by the local community. However, there lacked a clear and central vision for the future and the focus on economic developed seemed to clash with the moral argument that underpinned the 2018 announcement. This led to a focus on business interest and maintained structures of power that value wealth, rather than community development which underpin a just transition. The Just Transition strategy for Taranaki does

[3] The current government has made their stance on transitioning the region clear with their decision to disband the Just Transition Programme, which served as the framework for managing the decline of oil and gas in New Zealand.

provide an excellent framework for future transitions and the lessons learned from its development have already been implemented in other regions of New Zealand. The importance of implementing its actions and managing the transition are essential to the continued success of the region and, despite its bumpy beginning, the region is transforming itself into the new renewable hub of the country.

The 2023 national election brought into power the New Zealand National Party with a very different policy stance than its predecessor. The Government has now indicted that they plan to reverse the moratorium on offshore oil and gas exploration permits. The end of the moratorium will be proposed in *Crown Minerals Act* amendments to be introduced in parliament in the second half of 2024. Thus, while New Zealand serves as an example of how oil and gas could be slowly phased out, it also highlights how quickly these commitments can change.

6. Aberdeen, Scotland

Table 4: Scotland Transition Characteristics

Population	• Total: 5.5 million • Aberdeen Region: 262, 690
Climate Commitments	• 80% emissions reduction by 2050 • Net-Zero by 2045 • Commitment to a Just Transition
Main driver	• The 2006 Stern Review and subsequent Climate Change Act 2008
Relevant Institutions	• Ministry for Energy, Crofting, and Rural Affairs • Just Transition Commission • Climate Change Committee • Scottish National Investment Bank • Aberdeen City Council • Just Transition Fund
Approach	• Economic diversification • Top-Down • Innovation funding • Community-led transition projects
Funding	• Just Transition Fund for community-led initiatives • Scottish Investment Bank investment loans • Green Bonds • Interest rates • Contracts for difference • Tax and investment incentives
Accountability Mechanisms	• Just Transition Commission provides scrutiny to transition plans • Transition Milestones • Outcomes with timelines in transition strategies • Iterative indicators
Just Transition Mechanisms	• Derisk innovative projects in Scotland • Retraining programs • Collaborative policy design • Just Transition Commission recommends policy and audits programmes

The 2008 UK Climate Change Act, borne from a coalition of Labour, Conservatives and the green Friends of the Earth party, represented a pioneering national framework to combat climate change. The first of its kind Act requires the government to set legally binding long-term emissions reductions targets, or 'carbon budgets, 'which are monitored by an independent climate committee body (Muinzer, 2018). In 2019, the United Kingdom's Climate Change Act was amended to enshrine the UK government's commitment to achieving net zero by 2050 (UK Parliament, 2019).

As a devolved government, Scotland is subject to the objectives laid out in the CCA but has gone further in their ambition to reach Net Zero. In 2019, Scotland committed to achieving

net zero by 2045, an ambitious commitment as 82% of the UK's oil and gas is produced in Scotland (Scottish Government, 2019). As the largest producer of oil and gas in the UK, Aberdeen is particularly vulnerable to the decline of the sector and will be forced to shoulder a disproportionately larger share of the economic and social burden unless a just transition is realised in the region.

6.1 Political System

The Scottish Parliament is a democratically elected body comprised of 129 members who are elected for five-year terms. The Scottish government is a devolved government for Scotland, responsible for the governance of among other responsibilities, the economy, education, health, and the environment. Areas outside the purview of the Scottish government and instead are reserved for the UK government include immigration, foreign policy, and defence. Energy policy is shared across the governments, with policy direction stemming from the central UK government in London. The central piece of climate legislation, the Climate Change Act was implemented by the UK government in 2008 and has informed Scotland's more ambitious targets. Aberdeen is governed by council which functions as a single-tier authority, responsible for regional administration, such as transport and fire services.

6.2 A New Path Forward

In 2006, economist Nicholas Stern released the Stern Review for the Government of the UK (Stern, 2007a). The review detailed the effects of climate change from an economic standpoint and asserts that climate change is the greatest "market failure" that we have ever faced (Stern, 2007a). Stern argues that "reducing the expected adverse impacts of climate change is both highly desirable and feasible" and that "uncertainty is an argument for a more, not less, demanding goal, because of the size of the adverse climate-change impacts in the worse-case scenarios" (Stern, 2007b, p. 318). According to Respondent 11, "the review was one of the key drivers for underpinning the Climate Change Act 2008" which then, according to the respondent went on to inspire international recognition of the economic impacts of climate change, "the 2015 Paris COP was essentially the international version of the UK's thought leadership on climate change policy" (Respondent 11). It provided the economic underpinnings for a transition

away from fossil fuels and demonstrated that the transition could have the financial means to ensure it considered justice across all policy aspects.

The Climate Change Act set a new path forward for the largest economic sectors in the UK and for its devolved governments. It reorganized the energy markets and placed renewables as the solution for the displacement of oil and gas. Economic instruments, such as contracts for difference, which guarantee a stable price for electricity, were implemented and according to one interviewee, even altered how the oil and gas industry saw their role in the transition: "Oil and gas has traditionally been the voice of the wider energy sector. So, for them to say we [oil and gas] don't need any more that is quite meaningful for the wider community at large in the energy space." (Respondent 14). The energy sector, as the largest single source of GHGs in the UK was the "sector that is being most directly and pervasively targeted under the terms of the CCA… and the decarbonisation of the energy sector stands as a high priority" (Respondent 14). Perhaps the oil and gas industry's response to the targeted decarbonisation of their sector was a simply an acknowledgement of the writing on the wall.

The CCA also established the Climate Change Committee, which is an independent, statutory body, whose purpose is to "advise the UK and devolved governments on emissions targets and to report to Parliament on progress made in reducing GHG emissions…" (*About the Climate Change Committee - Climate Change Committee*, n.d.). Independent bodies, such as the Climate Change Committee, are important mechanisms to balance the various viewpoints and inputs on pathway development toward net zero. According to Respondent 12,

> "Due to the ability for those industries [oil and gas] to have the ear of the government, because they have such a hold in terms of jobs and the economic importance, when it comes to climate change. They then use those historical close relationships based on the economic imperatives to register their disquiet over any potential restrictions or taxes or whatever might be coming down the line" (Respondent 12).

Independent advisory boards can balance these interests and utilise their platform to push for increased action.

In 2017, a coalition of unions and environmental NGOs (the Just Transitions Partnership) formed to advocate for a long-term, independent oversight-focused commission with statutory authority to track and monitor the government's Climate Bill and ensure its alignment with just transition principles. In response, the Scottish Government established a short-term Just Transition Commission in 2019 for a two-year term to provide advice to Scottish Ministers. The

Commission embarked on a large public engagement exercise and submitted a final report to the Government in 2021 with four main recommendations:

1. Pursue an orderly, managed transition to net-zero that creates benefits and opportunities for people across Scotland.
2. Equip people with the skills and education they need to benefit from our transition to net-zero.
3. Empower and invigorate our communities and strengthen local economies.
4. Share the benefits of climate action widely; ensure costs are distributed on the basis of ability to pay (Just Transition Commission, 2021, pp. 14–15).

The Government accepted the recommendations of the Commission in full and established a national Just Transition Planning Framework to specify how it will transition to a net zero economy (The Government of Scotland, 2022). The intent of the framework is to establish a "consistent and ambitious approach to planning" and to "inform and complement pre-existing work, including industry-led initiatives" (Government of Scotland, 2021). It also created a junior ministerial post to coordinate these actions, the Minister for Just Transition, Employment and Fair Work. A new, permanent, statutory Just Transition Commission has been established to advise, monitor and evaluate progress on key targets. Its first priority is to develop a transition plan for the energy sector, which at the time of this writing is in consultation phase (The Government of Scotland, 2023).

To link the commitment to future justice with the injustices of the past, the Just Commission's 2021 report stated:

> "The story of how Scotland lost much of its heavy industry through the 70s and 80s is well known and an example of how not to manage structural change. There was little in the way of a 'just transition' for communities and families reliant on coal mining as pit closures swept the country" (Just Transition Commission, 2021, p. 22).

The top-down policies by the Conservative Government, under Margaret Thatcher, aimed to accelerate the decline of the publicly owned coal industry to create a coal sector independent from public subsidies (Phillips, 2023) . The government restricted the role of unions and took away their veto power, neglected to involve the community in the transition to limit resistance and ensure rapid closure. Little effort was put into ensuring the workers were supported during

the transition and massive strikes sprang up across the country; many were jailed for their participation and barred from finding work in subsequent mining operations (Phillips, 2023). With a legacy of a failed coal transition, there is pressure on the Scottish government to get it right and ensure mistakes are not repeated.

6.3 Oil and Gas Region in context (Current state of play)

The oil and gas reserves of the North Sea were first exploited by the UK in the 1960s and 1970s and Aberdeen soon became the main hub for oil and gas activities in Europe (Innes & Monios, 2018). Several large oil and gas companies, such as British Petroleum (bp), made Aberdeen their home and the area enjoyed higher levels of economic growth and affluence. During the 1980s the sector experienced an economic boom, which began to shift toward stagnation and decline in the subsequent years. In 2015, which saw a downturn in global oil prices, the sector experienced significant downsizing from which it has not recovered. An interviewee from the Low Carbon Contracts Company also highlighted that even when business was booming for the sector, subsidies played an important role: “So there is already an artificially inflated economy for the fossil sector because even though its been around for over 100 years, it still relies on various forms of government support to keep it going, especially in regions that are more economically dependent.”

According to Offshore Energy UK (OEUK), the oil and gas sector generated almost £30bn in Gross Value Added (GVA) in 2022 and about 75% of the UK’s energy is derived from oil and gas. OEUK’s economic report also found that around 220,000 jobs in the UK were supported by the sector, with around 93,600 located in Aberdeen and the surrounding areas (Offshore Energies UK, 2023). In terms of number of employees, the largest oil companies operating in Aberdeen is Schlumberger, ConocoPhillips, TechnipFMC, Shell, and Chevron (Subsea Oil and Gas Directory, n.d.). The associated companies, not directly involved in the process of extraction range from manufactures of valves and pumps to providers of high-quality survey reports, which can complicate figures representing direct and indirect employment. The Port of Aberdeen’s infrastructure has been designed to facilitate oil and gas operations and features the largest berthage port in Scotland (Port of Aberdeen, n.d.). However, the region has also experienced massive growth in the offshore wind sector and is now home to European Offshore Wind Deployment Centre, one of the largest hubs for deployment in Europe.

The presence of oil and gas in Aberdeen, and Scotland more widely, has had far reaching impacts. Respondent 12 elaborates:

> "Due to the geography of the oil and gas industry in the UK, we do have this situation where the importance of the oil and gas industry to Scotland in particular means that there is a strong regional difference in the conversation and a lot closer relationship regionally with those industries than there is with our types of industry" (Respondent 12).

From taxi drivers to teachers, the decline of the oil and gas sector has reverberated throughout the region, requiring targeted and wide-ranging solutions.

6.4 Aberdeen

Located in the Northeast of Scotland, Aberdeen is the third most populous Scottish city with an estimated population of around 200,000 people (See Figure 3). The Aberdeen City Council, comprised of five councillors and Mayor, is responsible for the planning, infrastructure and services of the city. The City Council has committed to becoming a net zero city by 2045 and "looks to lead on a just energy transition through leveraging its unique cluster of assets, resources and supply chain capabilities to advance opportunities in offshore wind, hydrogen production and carbon capture and storage" (World Energy Council, 2023, p. 2).

Figure 4: Map of Scotland, Aberdeen highlighted in red.

Source: City Map of Aberdeen (2014). *Aberdeen City in Scotland* [Image]. Wikimedia Commons. https://commons.wikimedia.org/wiki/File:Aberdeen_City_in_Scotland.svg

Aberdeen also represents a key component of Scotland's *Energy Strategy and Just Transition Plan* (The Strategy*)*. As a compliment to the Just Transition Planning Framework, which sets out eight just transition specific outcomes, the Strategy overlays these outcomes onto energy sector specific actions, thereby ensuring the principles of a just transition are embedded within the management of the energy transition. The Strategy sets out several key ambitions such as a generation-based goal: "more than 20 GW of additional renewable electricity on- and offshore by 2030" and an employment goal, "A just transition by maintaining or increasing employment in Scotland's energy production sector against a decline in North Sea production," to bring security, resiliency, and opportunity to Scotland (The Government of Scotland, 2023). The strategy emphasises the importance of Aberdeen as the ideal location for the new energy future citing the transferability of jobs from the oil and gas sector, of which ~98% are in Aberdeen, as a significant opportunity for economic and employment development (The Government of Scotland, 2023, p. 90). The Strategy also features significant funding through a £75 million Energy Transition Fund (ETF), £26 million of which will be allocated to Aberdeen to "become a focal point and catalyst for high-value manufacturing, research, development,

testing and deployment with significant opportunities in offshore wind, hydrogen, and carbon capture and storage" (The Government of Scotland, 2023, p. 93). The emphasis on employment and the clarity in what the region is transitioning toward provides a strong foundation for ensuring a just transition in the region.

However, the strategy is still in its early stages and many in Aberdeen are feeling the effects of the transition. As the main hub for oil and gas activities in the UK, Aberdeen has experienced a severe decline in economic growth and an increase in unemployment rates. Respondent 13 describes the impact of the decline in the region,

> "If you speak to taxi drivers, they don't make the same money they used to make. A taxi driver could get hired for a week by an oil firm just to drive people around. And because of this, it has completely skewed taxi prices in Aberdeen compared to other cities in the country. It's left a sort of expectation, of an idea of wealth in the city but in reality, the wealth isn't there" (Respondent 13).

Respondents were asked about how the community feels toward the transition in the region. Answers ranged from feelings of excitement and hope for the future of the offshore wind industry in the area, to feelings of nostalgia from the glory days of the oil and gas industry. Respondent 12 described the difficulty of expecting the average person to shoulder the burden of the transition when there are more pressing, very real concerns facing them:

> "The community, they are just thinking about next week or next month and they don't really have time to care. They just want some sense of stability. They are not really that bothered about whether it's working toward some climate targets or not, just so long as there's some sense of a stable future and they would really like some more schools and some better public transport. Thank you very much!" (Respondent 12).

Although the respondents spoke about the general care for the environment and for climate change that existed throughout the community, more immediate needs often trumped those concerns and pushed them behind other priorities.

The reduction in household wealth and opportunity in Aberdeen highlights the ripple effects the decline of oil and gas have on the surrounding regions. It is not only the workers in the sector that are impacted, but all those other sectors that rely on those incomes to remain economically viable, or households that rely on those incomes for significant portions of bills. It is also particularly difficult for those close to retirement, which according to the Strategy account for about 35% of the current oil and gas workforce (The Government of Scotland, 2023). Respondent 14 describes this effect in previous transitions, "We [the UK] saw large industries

fade out, whether it's shipbuilding, coal mining, iron, as some of the big iron foundries, and as a consequence can have very significant social disruption caused by the loss of employment opportunities in areas where those were concentrated" (Respondent 14). By creating an economy in which one industry dominates the mix, communities are extremely sensitive to fluctuations within that sector. Consequently, a focus of the transition in Aberdeen has been a diversification of the economy through instruments such as participatory budgets and net zero investments.

To lead the Just Transition in Scotland, the Scottish government created the Just Transition Commission to provide "independent advice on how to put justice at the heart of climate action in Scotland" (Just Transition Commission - Gov.Scot, n.d.). Respondent 12 describes its function:

> "It attempts to take deep dives into sectoral policies such as agriculture, industry, energy, or transport, and look at the extent to which any policies that are being implemented have just transition plans. So its managed to ensure that a lot of separate just transition plans are put together in each case" (Respondent 12).

This means that the Commission strives to understand what the multiplier effects of transition policies have on the region. It attempts to go beyond the allocation of funds to understanding how the closure of, for example, a refinery, might impact the community in which it was nestled. Respondent 12 elaborates, "It's about all of the people living in the shadow of that, for example the refinery, and how to transition the whole place to have, for example, enough housing, enough infrastructure" (Respondent 12). The Commission attempts to act like the glue that holds all the various threads of transition initiatives together and align them with the principles of justice, as laid out in their mandate. The terms of reference and MoU that outlines the parameters of their mandate provide a good foundation from which the commission can begin their work but there is more work left to do to ensure the role of the commission is an essential aspect of transition policies. Embedding the mandate of the commission within legally binding legislation can strengthen its position as the primary voice for ensuring a just transition.

One aspect of the essential work the commission reviews is the Just Transition Participatory Budgeting Fund. The idea and funding for this initiative was realised in 2022, during which time a coalition government between the Scottish National Party and the Scottish Green was looking to prioritise net zero initiatives. It was decided that a surplus within the capital spend budget would be put toward capital spend projects within communities to help

move these communities toward net zero and strengthen public participation in the transition. The Fund invited Aberdeen residents to vote on which transition initiatives will receive funding to "match local needs and priorities" and requires applicants to link their initiatives to broader net zero goals (Just Transition Participatory Budgeting Fund, n.d.). By utilising this type of funding mechanism, the government enables local participation in determining how public money is spent. Projects in Aberdeen that were awarded funding ranged from roof repairs to the Community Trust to a pregnancy loss garden at the Miscarriage Support Service building, projects that aim to connect the charities to a net zero future. This range of initiatives highlights how different the transition looks in each community and why initiatives like participatory budgeting are useful mechanisms for ensuring funds are distributed according to a place-based framework.

Despite the success of the initiative and the importance of community participation in allocation of funds to support the transition away from oil and gas, an interviewee at the fund was concerned that net zero priorities and the associated funds might turn out to be the "political flavour of the day" (Respondent 13). Respondent 13 elaborates,

> "I have been working [in the sector] for over 16 years now, and what I noticed is that it's cyclical. We will have the latest public sector work or public sector priority and that's what they are going to fund. So we have to do thing things and come up with projects that will meet those priorities to get funding. And then they say, you need to find the funding from somewhere else when it's no longer the priority of the day" (Respondent 13).

The nature of political cycles means that priorities are often imagined, implemented, and then sunsetted all within a three-to-four-year time frame. The frustrations of the short-lived cycle are echoed by another respondent who spoke of the difference between long-term targets and long-term policies:

> "It's long-term targets, it's not long term policies. And so that is going to start to unravel, now we are in this holding pattern because we've got a new government. Regardless of what colour they are [referring to the political spectrum], what they will actually do, in terms of trying to embed longer term policies, is still a big unknown" (Respondent 13).

The lack of certainty in priorities and funding further add to the feeling amongst the community that what they are really looking for is a sense of stability.

To balance the community driven grant process, another financial funding mechanism utilised by the Scottish Government is the Scottish National Investment Bank. Established and

funded by Scottish Ministers, the Bank "seek[s] to invest where the private sector is not providing sufficient investment to businesses or projects that support the development of a country's economy" (Scottish National Investment Bank, n.d.). As an independent body, the Scottish Investment Bank offers financing to businesses based in Scotland that uphold the values outlined in the Bank's mission statement and, importantly, must deliver a commercial return. Unlike funding dispersed by Governments that operate as grants or seed funding, the Bank operates as a public limited company responsible to its shareholders. However, the missions were designed and set by the Scottish government and aim to address long-term challenges, such as the transition of communities toward net-zero.

Identified in the Strategy as a key hub for the transition, Respondent 14 describes the situation in Aberdeen as a "classic need for a transition in that you've got lots of jobs associated with the oil and gas sector, not just through working on the rigs, but through services and other things as well" (Respondent 14). To encourage the diversification of the economy and to replace the gap that the decline of oil and gas has left in the region, the Bank has committed to investing heavily in the area, surpassing around 100 million pounds of capital, more than around a quarter of all capital committed through the Bank. Respondent 14 explains that committing capital in the region provides a strategic signal to the market that there are high levels of economic activity, helping to derisk further investment. Respondent 14 elaborates,

> "By investing commercially, that's the best way to show to the private sector that there is gains to be made in a certain sector and to bring them into, whether it's an emerging sector or and emerging business model, whatever it might be in a way that grants never can do that, because they are never going to demonstrate a commercial return" (Respondent 14).

The bank then utilises financial instruments, such as covenants, that hold companies accountable to the net zero commitments they have agreed to in order to receive the capital investment. For example, if a company is surpassing its net zero targets, the Bank may offer them a slightly lower interest rate on their capital loan, or if a company is falling behind on those commitments, a slightly higher rate. Overall, the Bank attempts to invest where it can contribute to the diversity of the economy in each region, to make communities more resilient to future shocks.

Despite the tales of wealth and plenty that emanate from those in Aberdeen nostalgic for the glory days of the oil and gas industry, there always existed an aspect of "persistent poverty,"

according to several of those interviewed. The challenge of transitioning the region must now address those persistent threads of poverty and the larger gaps left by the decline of oil:

> "So you are trying to address existing trends and challenges at the same time. But at the macroscale what happens when you have a highly productive, high paying sector drop away. It's going to be a real challenge for public finances, when they are already under pressure" (Respondent 14).

The Just Transition Commission is responsible for ensuring the policies meant to address these persistent aspects consider just transition principles, however it is clear that they still lack the resources and influence to direct policies toward transition pathways. For example, the priorities and the investments of the Scottish Investment Bank, a prominent tool in the transition, were not developed or updated in conjunction with the commission and their investment deals are done without consideration for the commission's expertise. The commission might lack the legislative teeth required to ensure the integration of just transition principles in all aspects of the transition, despite their mandate. However, the *Energy Strategy and Just Transition Plan* provides a strong and clear vision for the future of Aberdeen. The focus on economic diversification and increased employment opportunities, along with strong commitments to work with local governments and trade unions, places Scotland on a path to a more resilient future.

6.5 Conclusion

Scotland's dedication to the transition has so far exceeded that of the UK's with more stringent timelines and ample capital flowing toward the regional transition. The Just Transition Commission has provided academic expertise for broadening and embedding the scope of the transition, while financial mechanisms have dominated the political solutions to the existent and future problems facing the community of Aberdeen. Future success may be dependent on the shifting winds of politics as the rise of right-wing political parties shove out the Greens in coalition patterns. However, through continued efforts to draw the community into the transition, a clear and comprehensive transition strategy, and by making the transition an attractive sector for employment and commercial investment, Scotland may see continued success with their challenges.

7. Discussion and Conclusions

This comparative case study has examined three regions that have committed to, and are in the process of, a net-zero economy and a just transition to identify policies that Canada can use to mitigate harms during its decarbonisation process. To take lessons from the cases, there is a "the need to identify the 'seeds' of transformation in communities, in order to inform policy that might cultivate these seeds and accelerate sustainability transitions" (Burch et al., 2014, p. 469). The case studies focused on those early policies that aimed to establish pathways toward a just transition, specifically the moments that triggered a tangible change to the status quo. In Denmark, the seeds of change were identified as beginning during the 1970s oil and gas crisis, in which policy makers, reacting to the economic and energy instability the crisis brought, looked to link economic growth with energy. In New Zealand, the 2018 announcement to halt all new offshore oil and gas exploration permits precipitated the development of just transition strategies and the recognition of the disproportionate burden their oil and gas region will shoulder during the transition. In Scotland, it was the publication of the Stern Review, which served as the foundation for the Climate Change Act, which, in part, reorganised energy markets across the UK. However, although these drivers triggered moments of policy change and attempted to establish pathways toward a low emission economy, some policies were more successful than others at creating durable and successful pathways. By assessing each region's **commitments, approach, and accountability frameworks** and integrating qualitative data through expert interviews, several opportunities for policy learning have emerged.

Transformative change is more successful when driven by economic factors. Across all cases, respondents were able to identify points in time that triggered policy change. Ranging a from global crisis, in the case of Denmark, to academic publications, in the case of Scotland, the moments in time that shifted the direction of policy toward a just transition varied greatly. However, the regions in which the transition was more deeply embedded and resulted in greater change, were those who justified policy change on the grounds of economic efficiency.

National energy policy in Denmark shifted due to the global oil crisis, which drastically increased the price of oil, a major economic issue for Denmark at the time as they were reliant on imports for about 90% of their energy needs. This dramatic economic crisis triggered transformative change in the way the country approached energy and throughout all their subsequent energy plans and many of their policy statements is the emphasis on the economic

efficiency of the transition. The plans repeatedly link domestically produced energy, first with North Sea oil and then with renewables, with the optimal economic path forward. This is supported with academic reports and industry analysis, creating a culture of cooperation toward a common goal. This is further reflected in the Aberdeen case study, in which the Stern Review concludes that the most economically efficient way forward is to reduce emissions and mitigate to the highest extent the impacts of climate change. In response, the just transition in Scotland has been closely linked with economic diversification and funding support to derisk transition industries. Key stakeholders in the transition often look to the government for certainty and to manage risk regarding new economic opportunities associated with the transition. Placing economic efficiency as the basis for a transition provides a strong foundation for investment priorities. Although there is still much work to be done in both cases, they are home to the largest interconnected offshore wind farms in the world and have both radically reduced the exploitation of their respective oil reserves.

In New Zealand, the announcement to end offshore oil and gas exploration was primarily motivated by a moral duty to adhere to the Paris Climate Accord and to contribute to the global effort to reduce our emissions. The announcement did not speak of the economic benefits to New Zealand for transitioning away from oil and gas, leaving industry and communities apprehensive of the decision. With the change in government in 2023, Prime Minister Christopher Luxon has signalled a desire to end the moratorium on offshore oil and gas exploration permits in large measure due to energy security concerns. Unlike in Denmark, which has identified the wind industry as the most economically efficient pathway, New Zealand has lacked a clear direction for clean energy investments that may replace the economic hole left behind by the decline of the oil and gas industry. The lack of economic impetus behind the announcement leaves new economic pathways forward without clear direction. New Zealand has worked hard to build consensus within the Taranaki region on how to approach the transition and its plans reflect region-specific values and goals. This foundation may prove to be successful in its approach as long as costs and trade-offs are addressed and adequate funding sources to implement actions are found, even despite the Government's policy change on oil and gas permits.

Accountability mechanisms should be community-driven and region-specific. To ensure region-specific, justice centred transitions, the way in which success and 'the good' is measured should reflect the communities from which the transitions occur in. For example,

within New Zealand's Taranaki roadmap, the accountability indicators reflect the twelve pathways that were identified through the stakeholder engagement and development of the Taranaki Roadmap 2050. The pathways that were considered higher priority to the stakeholders, such as Jobs and Earnings and Health, were assigned a larger number of indicators for success to reflect the importance of ensuring these pathways were successful and to highlight when intervention is needed. The concept of 'good' was also defined within the text, informed by stakeholder engagement, reflecting the different ways in which concepts such as 'good' and 'justice' are fluid and inherently dependent on the context in which it is applied. Māori language was woven through many aspects of the indicators, acknowledging that it is through a communities' specific strengths and talents that transition potentials are uncovered and that no transition is the same.

Industry and academic partnerships are essential for durable policy design. In New Zealand and Denmark there are efforts to develop just transition policies utilizing a horizontal coalition arrangement. "Arrangements that include a wider group of stakeholders interacting across different levels," argue Burch et al., "are also important triggers of multi-system sustainability transitions" (Burch et al., 2014, p. 481). All those interviewed in Denmark spoke of a "culture" or a "tradition" of working together with academia and industry to plan the future of the energy mix and establish new pathways toward a cleaner future. This was echoed in their institutions and broad political support for these goals. Industry was an important partner in the transition, actively ensuring that workers were able to re-skill or transition into new opportunities. Academia was utilised to prove that transitioning was the better economic choice and provided the data and tools to establish an orderly transition. In New Zealand, coalitions were utilised to help repair the harms of colonialism and ensure that the Māori were important stakeholders in the transition. Language was used as a tool to unite stakeholders, integrated Maori words into their transition literature, which is better able to capture the metaphysical connection communities feel with the land in which they live and work. Far beyond just a place where you work, one's community provides a link to your past and future and the ineffable idea of home.

Policies that encourage economic diversification enhance community resiliency. At the core of Just Transition policies is ensuring that communities most affected by the decline of the oil and gas industry are not disproportionately affected. The transition toward a low carbon

economy, according to the ILO, "must be just and fair, maximizing opportunities for decent work, economic prosperity, social justice, and rights, thus leaving no one behind" (International Labour Organization, 2016, p. 17). A core component of ensuring community resiliency is developing policies and investments that bring new opportunities to the region and nurture economic diversification (Atteridge & Strambo, 2020). Community resilience also supports the perception that the transition is a worthy goal as community members can see, and experience, the tangible socioeconomic opportunities the transition presents.

The Aberdeen case study highlights the importance of economic diversification in enhancing community resiliency. Aberdeen, even during periods of economic boom when the oil and gas industry was thriving, experienced high levels of societal inequity, where the wealth was predominantly contained within one subsection of the region. Efforts to strengthen community resilience through economic diversification and employment opportunities in Aberdeen is evident in the process of "'reconstellation' (top-down or government-led structural changes like privatization) and 'empowerment' (small-scale initiatives that gradually gain power and influence in a system)" apparent in the Scottish Investment Bank and Just Transition Community Investment Fund (Burch et al., 2014, p. 474). The Just Transition Community Investment Bank provided an important educational function for the transition in Aberdeen, by making community organisations aware of the impacts of climate change on all levels of society. Therefore, organisations traditionally outside the sphere of energy transitions and climate change risks, were drawn into thinking about how their work may be affected and, in turn, how they may be part of the solution. For example, creating a native plant garden for expectant or grieving mothers links the importance of ecosystem health with human health and helps to embed transition policies in a variety of sectors. This can help engage the community in formulating ideas and mechanisms for the transition and emphasise the importance of a larger socio-technical shift toward a cleaner future. Similarly, with the Scottish Investment Bank, large capital investments in net-zero pathways provide employment opportunities and recognizable market signals for a commercial shift toward the transition. Once again, the sphere of transition policies are expanded to include a broader scope of policies that reinforce community involvement in the transition.

Strategic and early institutional design shape transition pathways. Historical Institutionalism emphasises the importance of institutional design to pathway development and argues that the temporality extant in politics is essential to understanding the evolution of these

policies. HI is concerned with the origins of institutional and policy change and contends that evolution of these systems is, "dyssynchronous and full of unintended consequences" (Thelen, 1999, p. 383). Change is thus not only limited by the implementation of certain policies but can also come from the interactions among different institutional realms as "change in one arena affects other ongoing processes" (Thelen, 1999, p. 383). It is therefore essential to understand the political and social landscape in which policies and their associated institutions are conceived to recognize what pathways are being established.

Beginning in the 1970s in Denmark, after experiencing shocks to their energy system caused by the global oil and gas crisis, the government established the state-owned Dansk Naturgas A/S, later renamed Dansk Olie og Naturgas A/S (DONG) to manage their gas and oil resources. Very quickly, Denmark went from a significant importer of oil and gas to a producer and distributor of a largely untouched oil reserve under the North Sea. Policy direction was responsible for the creation and the structure of the institution, however, in the context of HI it is important to understand the political and social context in which this shift occurred. The 1970s oil crisis caused significant social disruption as governments scrambled to ensure security of energy supply and realised their vulnerability to crisis outside their political domains. This type of social disruption weakened the foundations on which accepted institutional structures rested and opened up avenues for change as the status quo proved inadequate for the challenges it needed to address. New institutions were required to respond to the shift in policy direction and governments needed to be seen as taking drastic action in response to a drastic crisis. The creation of DONG promised to restore the foundations of previously accepted institutions by continuing the pre-eminence of oil and gas in the energy supply but allowed enough structural change to reconfigure future energy policy pathways toward domestic supply of energy. The government was able to take the foundations of the old methods of obtaining energy, through the importation of oil, and transform these foundations into a new institution that was still responsible for obtaining oil, but from a different, domestic space. Utilising the social disruption caused by the oil and gas crisis to act as a trigger for seemingly radical institutional change.

Maintaining enough of the previous status quo, while still shifting policy trajectories also helped to limit uncertainty as new pathways were established. If uncertainty threatens to "interfere with the actors' calculations of how they will fare under alternative institutional arrangements… they may prefer the status quo to change" (Hall, 2009, p. 207). Actors familiar

with the politics of the oil and gas economy were allowed to retain much of their power even as the institutions shifted away from established method of obtaining energy, strengthening the institutional parameters of DONG at its inception. DONG became central to the new energy plan and successfully helped transition Denmark toward energy policies that placed energy sovereignty at its core. As the climate crisis began to surface, actors within DONG and other associated institutions were able to utilise the core mandate of energy sovereignty and respond to the new crisis in a familiar way, despite the transformative changes required. This is because, according to HI, the likelihood of institutional change is "affected by the outcomes of previous episodes of institutional change" as these outcomes "intensify or mitigate the collective action dilemmas facing actors interested in institutional change at later points in time" (Hall, 2009, p. 209). In the Denmark case study, the outcomes of the institutional change instigated by the oil and gas crisis allowed the institutions and their actors to imagine an energy future in which energy comes from Denmark in whichever form was most economically efficient. So as the climate crisis reared its head, the pathways toward renewables, and the domestic source of power they provide, were already established. Currently, DONG, now renamed Orsted to reflect its transition to renewable energy, is the largest global supplier of wind energy and the largest power producer in Denmark and has completely divested from oil and gas.

New Zealand has also established specific institutions to manage the transition, but it is uncertain if they share a central vision for the benefits the transition may bring, undermining the need for strong coalitions. Following the announcement in 2018 by the Labour Party government to halt all new offshore oil and gas licenses, the government created several institutions to manage the transition. Are Ake was established to connect business and industry to investment and project opportunities that support the low carbon transition. Since 2018 and the establishment of these institutions, New Zealand has proactively sought ways to ensure the transition away from oil and gas is just and has greatly supported community driven strategies to transition particularly vulnerable communities. However, after interviewing board members at Are Ake, there appeared to be a misalignment with the goals of the government, the research of the academic community, and the interests of the business community. This has led to what Hall describes as "collective action dilemmas." Hall explains: "Where institutional change depends on the formation of a favorable coalition, analysts cannot neglect collective action dilemmas and the organizational structures that facilitate or impede coalition formation" (Hall, 2009, p. 209). The

lack of communication between the different levels of the low carbon economy (i.e. academic, government, industry) before signalling the decline of oil and gas, caused mistrust between the actors and may have impeded their ability to form strong coalitions, despite the development of new institutions the manage the transition. This has led to further uncertainty for the future of the transition and may have further influenced the politicization of the issue, as evident in the most recent election. To mitigate this collaborative dilemma Hall suggests that "the actors have to resolve the distributional issue of how to apportion the costs, benefits, and risks associated with coordination" (Hall, 2009, p. 210). This can be achieved by having a shared motivation for the gains a transition offers, such as diversified, low carbon economy. The New Zealand government may need to consider establishing specific channels of communication between the institutions, such as interagency agreements that outline the role of each agency involved in the joint initiative or collaborative digital platforms that synthesise information and resources into one accessible format.

Stronger coalition networks feature legislative and institutional foundations. In Denmark, to ensure that industry was supportive of the transition and to underline the positive economic benefits of energy sovereignty, government established specific channels for communication. For example, State of Green, a "public-private partnership between the Danish government and the country's three leading business associations (Danish Industry, Green Power Denmark, and the Danish Agriculture and Food Council)" helps connect business and industry with the relevant government, academic, or sector experts to encourage low-carbon development and to further embed decarbonisation in multiple aspects of the country. Establishing strong channels of communication and institutionalising the transition helped to mitigate opposition to institutional change as described by Hall, "Uncertainty is a central feature of politics. Where it is high enough to interfere with the actors' calculations of how they will fare under alternative institutional arrangements in a range of possible futures, they may prefer the status quo to change" (Hall, 2009, p. 208). By adopting new institutions that actively promote the goals of transitions and utilising it to participate in the green economy, the confidence in transition policies is enhanced, resulting in more durable policies.

In New Zealand, there was concerted effort to create pathways toward a just transition. Strategies were developed with communities and actions were crafted to ensure communities were not left behind in a new energy future. However, it was clear among those interviewed that

despite best efforts, the shift toward a just future is not guaranteed and many expressed concerns that it could further entrench fears surrounding the decline of oil and gas. The difficulty of transitioning away from oil and gas, despite efforts to establish transition pathways, may be due to the nature of established oil and gas trajectories. According to Burch et al., "The emissions and vulnerability trajectories…appear to be deeply imbued with inertia or path dependency, and thus are resistant to change" (Burch et al., 2014, p. 473). Burch et al. continues to explain that to adjust these trajectories there is a need to embed GHG emissions reductions into every level of decision making and failure to do so may limit the success of purely social or environmentally minded policies that aim to reduce emissions. This is reflected in the numerous references to the need for replacement industries and for the diversification of the economy and job sector. Although the announcement to halt all new offshore oil and gas exploration permits provides an excellent signal for the desire of the government to pursue decarbonisation pathways and twinned this with a desire to do it in a just way, the announcement was not combined with policies that strengthen the decarbonisation pathways in other areas of governance, such as transportation, technology, or low-carbon industrial innovation. Consequently, those interviewed felt that the announcement lacked depth and were sceptical of its ability to initiate substantive change. "The task then," argues Burch et al., "becomes to ensure that the shift becomes embedded or 'institutionalized' in daily practice but is also adaptable to changing future conditions" (Burch et al., 2014, p. 479).

In contrast to the relatively new and, and in some ways limited scope of transition policies in New Zealand, Denmark has been establishing transition pathways since the reorganisation of their energy markets in the 1970s. Since then, they have established several institutions and worked to embed transition policies in a variety of sectors, turning now toward agriculture as a new sector for decarbonisation. The 1970 oil and gas crisis was an unexpected external event that forced the Danish government to rethink their energy mix, in which many different visions for the future were considered. This reflects what to Burch et al. describes in their work, "No transition is planned and coordinated 'from the outset', but every transition becomes coordinated at some point through the alignment of visions and activities of different groups. This convergence is an achievement that emerges during transitions" (Burch et al., 2014, p. 475). The move toward renewables and a net-zero future was not envisioned at this time, nor was there great emphasis placed on the value of wind power for the energy system. However, in

what Burch et al., describe as niche-level innovations, wind power was able transcend its role as a "technological artifact" and become the link for private/public partnerships and a cultural symbol for the possibility of a clean future utilised in political campaigns (Burch et al., 2014, pp. 475–476). This then established an iterative relationship in which "technological artefacts… shape the types of innovation that are required by society" and in turn, "society and culture determine which technologies are amplified to shape society, leading to a transformative development pathway shift" (Burch et al., 2014, p. 475).

5.1 Conclusion

By examining the drivers, policy mechanisms, and integration of just transition concepts in Esbjerg, Taranaki, and Aberdeen, this research has provided insight into several key elements that can contribute to the development of a Just Transition policies in Canada. Strong coalitions, strategic institutional design, diversification of the economy, community-driven accountability mechanisms, and coupling transition goals with economic goals all lend strength to the stability and success of a transition. As Canada is still in the early stages of its transition, policy makers can integrate these learnings to better manage our own transition away from oil and gas.

A Just Transition looks and develops differently in every region, but fundamentally it is about maximising the benefits and reducing the harms associated with transformative change. Although each case presented its own regional challenges and diversity, it was clear that there are essential components of a transition that can limit the harms associated with the decline of an important industry. Future work should look at the oil and gas regions in Canada to understand what their own challenges and place-based considerations are and then utilise the policy learning from other jurisdictions to inform the policy approach.

To reach our climate goals in Canada there is a need to transform the oil and gas sector and move toward a decarbonised economy. Learning from other jurisdictions and partnering with academia and industry can help ensure an orderly transition that places the concept of justice at its core.

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