Designed to Endure: Insights into the Resilience of Carbon Tax Policies

by
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B.A., Simon Fraser University, 2015

Project Submitted in Partial Fulfillment of the Requirements for the Degree of Master of Public Policy

in the
School of Public Policy
Faculty of Arts and Social Sciences

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SIMON FRASER UNIVERSITY
Summer 2018

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Abstract

The following research is intended to provide insights that can help to guide government decision-makers in designing carbon tax policies for continuity or resilience. It provides an overview of carbon tax policies in the Republic of Ireland, the Province of British Columbia (Canada), and in Australia. A comparative analysis juxtaposes technical design decisions and political factors in each of the case studies presented. This analysis is used to outline key considerations to be deliberately applied by policy makers during the process of designing and maintaining a carbon tax. Conscious consideration and application of these insights have the potential to improve the continuity and resilience of carbon tax policies. Some key strategies appear to promote resilience. The research suggests that revenue neutrality and a gradual phase-in approach to the tax rate are important components of a politically resilient carbon tax. In addition, policy-makers should not aim to spread costs and benefits too thinly in their design of exemptions and in the setting of rates. Certain industries or groups will lose under a carbon tax; this is inevitable. Trying to spread the "pain" too widely will likely create a powerful coalition against the policy, and weaken the likelihood of continuity or resilience.

Keywords: Carbon Tax; Policy; Continuity; Resilience; Australia; British Columbia; Ireland; Governance
Dedication

This research is dedicated to the many fascinating and knowledgeable interviewees who generously gave of their valuable time. They evoked in me a keen interest to keep on digging into this topic that initially seemed straightforward but proved to be both complex and fascinating. The interest in my work and encouragement from key interviewees helped me more than they know. I have also learned how much it can mean to someone in my position to receive such positivity and encouragement from a professional that is under no obligation to give of their time, let alone to put in that extra effort. I hope to one day be in a position to emulate them in the future. This research is also dedicated to my fiancé Mark and my parents, who have always held me in highest regard and have always had without question, utmost confidence in my ability to achieve my goals.
Acknowledgements

I want to acknowledge the professors of Simon Fraser University’s School of Public Policy. They are an amazing group of academics with a strong passion for engaging with inquiring minds. In particular I want to thank Joshua Gordon, my supervisor, who maintained a calm confidence in my work even as I blew through my initial (and all) deadlines. Thank you, Josh!
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<tbody>
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<td>BC</td>
<td>British Columbia</td>
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<tr>
<td>€, c</td>
<td>Euro, Euro Cent</td>
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<tr>
<td>U.S.</td>
<td>The United States of America</td>
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<tr>
<td>ESRI</td>
<td>The Economic and Social Research Institute</td>
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<tr>
<td>/TonneCO2</td>
<td>Per a Tonne of CO2</td>
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<tr>
<td>/TonneCO2-e</td>
<td>Per Metric Tonne of Carbon Dioxide Equivalent Emissions</td>
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<td>GHG</td>
<td>Greenhouse Gas</td>
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<td>CCPA</td>
<td>Canadian Centre for Policy Alternatives</td>
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<tr>
<td>EITE</td>
<td>Emissions Intensive Trade Exposed</td>
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<tr>
<td>ROI</td>
<td>Republic of Ireland</td>
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<td>NI</td>
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<td>IBEC</td>
<td>Irish Business and Employers Confederation</td>
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<td>European Union Emissions Trading Scheme</td>
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<td>OECD</td>
<td>Organisation for Economic Co-operation and Development</td>
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<td>IMF</td>
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Chapter 1. Introduction

1.1. Introduction

There is a wealth of research on the technical components of carbon tax design, which focuses on maximizing the effectiveness of such taxes. Less studied are elements of carbon tax design that will promote the political continuity or resilience of carbon taxes. As one author states, regarding policy in general, the textbook recommendation (in terms of technical design) is formulated in a context that is very different from the political context. Hard thinking is required to interpret and apply political insights to foster policy stability. The following research aims to begin this type of hard thinking. To do so, it engages in a critical and comparative assessment of three carbon tax policies in three jurisdictions as they evolved within their respective political environments. The three carbon taxes are analyzed through a lens of political continuity or resilience. The research concludes that the political resilience of a carbon tax relies on much more than just solid technical design. In particular, three strategies are highlighted:

Do not underestimate the impact of the political climate of the time: Do not assume that following ‘textbook’ recommendations will lead to resilience or political acceptance of a carbon tax policy. In contrast: jurisdictional tailoring and an ability and willingness to understand and react to jurisdictional political pressures is crucial.

Do not spread the benefits too thinly: There will always be winners and losers under a carbon tax. Don’t try to address every potential ‘winner’ and every potential ‘loser’. The resources available for providing benefits are limited. Rather, focus on the key players as needed and put out political fires at the key stages of risk to resilience as they evolve (e.g. upcoming election), rather than trying to predict where fires will break out over time in advance. Be prepared to put out fires, but maximize the use of available resources for providing benefits to key stakeholders wisely.
Jurisdictional tailoring is vital, but key design features are likely to contribute positively to resilience: Revenue neutrality and a low starting rate are key design features. While they do not guarantee resilience, they can contribute to the resilience of a carbon tax policy. Less straightforward are design decisions regarding societal and business/industry compensation and exemptions, and emissions/fuel coverage decisions.

These prescriptions, or ‘insights’, are arrived through an analysis of different policy design decision nodes in three jurisdictions. In other words, an examination of the elements of the technical design as they interact with the political environment provides implications for the resilience of carbon tax policies. The following section discusses some of these policy design nodes, and associated key insights.

1.2. Specific Design Component Conclusions

Carbon taxes differ in technical design in a range of ways. Some of the central differences relate to: revenue use, the tax rate, fuel or emissions coverage, societal exemptions and compensation, industry exemptions and compensation. The insights from later analysis are briefly discussed here:

Revenue Use Design: Revenue neutrality can increase political feasibility, particularly in terms of implementation, but does not guarantee resilience. In contrast, it is likely that even a revenue raising model, particularly under external pressures and impetus, has the potential to be resilient.

Rate: Starting at a relatively low rate can aid in political acceptance of a carbon tax and mitigate opposition. Over time, rate increases can be introduced successfully under the right conditions. Starting at a high rate provides an opportunity for opposition to misconstrue the real impact of the carbon tax. There is likely a maximum rate that the population is willing to sustain under different carbon tax designs (Carl & Fedor, 2016). Further research may provide better guidance in determining an acceptable, or at last most likely to succeed, range for setting an initial rate.
**Fuel/Emissions Coverage:** Broad coverage may appeal to business and industry over narrow coverage. A low percentage of emissions coverage does not seem to contribute substantially to resilience, nor does a high percentage of emissions coverage appear to contribute negatively to resilience. Coverage as it interacts with the emissions intensity of industry (and perhaps the economy) and the targeting of that coverage appears to have a greater impact on resilience. This conclusion deserves further exploration.

**Societal (equity) Exemptions and Compensation:** In order to maximize continuity and resilience, it is best to implement societal exemptions and compensation as required by the politics of the jurisdiction. While attempts to address projected regressivity may be technically sound and ethically appealing, the public does not appear to truly understand the mechanics of most strategies to address regressivity under a carbon tax policy. Even when the benefit is directly tied to the carbon tax, such as income tax cuts under a revenue neutral model, many of the electorate perceive the negative impact of the carbon tax to be either separate from or bigger than the benefits provided to address the negative impact. It may be optimal to utilize benefits to put out or minimize political fires as they arise, rather than attempt to pre-emptively address any regressivity. Some initial benefits may be helpful to improve the political feasibility of first implementing a carbon tax, but beware of committing all revenue available for benefits at the very beginning. A carbon tax is a long-term strategy, and having the capacity to provide benefits if opposition arises is of value.

**Business/Industry (economic) Exemptions and Compensation:** Greater business/industry compensation does not seem to directly equate to greater business/industry support, at least not in the sense of a direct trade-off between extent of compensation/exemptions and its impact on continuity/resilience. This appears particularly true if only the heaviest emitters are targeted, as even with substantial compensation, the overall cost is still focused on a small number of businesses that can easily organize and oppose the carbon tax. From an effectiveness lens, there is also concern that too much compensation negates the impact of the price signal on emitters. A better approach, if feasible, may be similar to that of societal compensation: provide minimal initial compensation, but leave ‘room’ in the design to increase and provide
compensation to business over time if opposition arises. There is certainly a risk of opposition with either approach. It may be helpful to keep the motivation of business/industry front of mind: if an alternative is less costly for the majority of those impacted, that is the option that the majority impacted are likely to pursue.

1.3. Generalized Carbon Tax Resilience and Continuity Conclusions

Other deliberations relate to more generalized insights to be considered during the process of designing a carbon tax policy. Some of the central insights relate to the strength of a carbon tax, the political environment, external pressures and opportunities, different approaches to the benefits and costs, communication with stakeholders, and the importance of timing. The insights from later analysis are briefly listed here:

- The weaker the carbon tax, the more resilient it is. However, if designed with due care and attention, even a strong carbon tax can be resilient.
- Utilize policy windows and external pressure opportunities with due care. Beware failing to consider the political environment of the time.
- There is no one-size-fits-all best approach. Jurisdictional tailoring is key.
- Don’t spread the compensatory benefits too thin: Do not try to please everyone. ‘Sell’ the right design feature to the right stakeholder in order to put out political fires as needed to maintain resilience.
- Don’t channel the tax incidence too narrowly: Beware of targeting a small group of powerful emitters or stakeholders who can readily organize to oppose a carbon tax policy.
- Use a well rounded multi-disciplinary approach.
- Maintain open channels of communication with key stakeholders, while viewing this information through a lens of assessing for strong versus weak threats to resilience.
- Timing is key, wait for optimal circumstances, or at least minimize risky circumstances. Be cognisant of upcoming elections, which appear to be key tipping points and have the potential to be politically co-opted.
1.4. Outline of the Report

The research proceeds as follows. Chapter 2 defines the policy problem. Chapter 3 provides relevant background information, such as the history of carbon taxation and existing literature on the political economy of carbon taxation. Chapter 4 describes the methodology employed. Chapter 5 sets out the policy options, or in this case, decision making nodes. Chapter 6 outlines the three carbon tax policies under review. Chapter 7 offers a comparative analysis of the three jurisdiction’s carbon tax policies. Chapter 8 delivers detailed conclusions, both of a technical nature and of a more general perspective, and three key takeaways are provided.
Chapter 2. The Policy Problem

Carbon pricing, including carbon taxation, is a crucial aspect of effective climate change strategy to reduce harmful greenhouse gas emissions (World Bank; Ecofysc; Vivid Economics, 2016). However, carbon taxes have proven to be politically unpopular and fragile; therefore, this research examines how to best design carbon tax policies for political continuity and resilience.

There are two different aspects to the question. The first is the challenge of the introduction of a carbon tax policy. The second is the long-term stability or resilience of a carbon tax policy. The research here is focused on the second component: on-going continuity and resilience of a carbon tax policy. To this point, this has not been sufficiently studied. While there is a strong body of research on the technical design of carbon taxes, much of this knowledge is disconnected from the complex political reality of the jurisdictions within which they are enacted. The hope of this research is to imbed the policy design of technical components of taxes within that political context.

The timeline for climate-related action is extremely tight in order to prevent the worst of the projected climate change related disasters. Climate action is needed now. Yet carbon taxes rely on long term continuity and resilience to maximize effectiveness. Only in this way will carbon taxes profoundly shape consumption patterns in sustainable ways. The utility of carbon taxes depends on them remaining in place over the long term, far beyond the typical election cycle in a developed democratic jurisdiction. A stark example of this political dilemma is the repeal of the carbon tax that Australia introduced in 2012 after just two years. The fact that a carbon tax could be repealed so soon after its implementation suggests that it is not sufficient merely to introduce a carbon tax policy. Similar concerns are prominent in Canada today, where national efforts at carbon pricing are facing strong political headwinds.
Chapter 3. Background Research Overview

3.1. Broad Consensus: Pricing Carbon as a Key Strategy

In 2015, world leaders met to discuss climate change goals, leading to the development of the Paris Agreement (World Bank; Ecofysc; Vivid Economics, 2016). At that time 189 countries, which represent 98 percent of the global population, agreed to take voluntary measures to maintain global warming increases at less than 2 °C (World Bank; Ecofysc; Vivid Economics, 2016, p. 10). The World Bank (World Bank; Ecofysc; Vivid Economics, 2016) identifies carbon pricing as a key factor in reducing emissions, “with about 100 Parties—accounting for 58 percent of global GHG emissions—planning or considering these instruments” (World Bank; Ecofysc; Vivid Economics, 2016, p. 10). Carbon Taxation, one of the two main carbon pricing methods, has been identified as a cost-effective strategy to efficiently reduce emissions, and has garnered the support of key international organizations including the OECD, the IMF, and the World Bank (Canada’s Ecofiscal Commission, 2015) (Canada's Ecofiscal Commission, 2016).

Not all agree that carbon pricing policies are the best option to address long term emission reduction needs. There is criticism of carbon pricing mechanisms, mainly due to the proliferation of low carbon tax rates among those carbon taxes that have been resilient, and the suggestion that our efforts at reducing harmful emissions might be better focused in ‘clever’ emissions regulations (Jaccard, Hein, & Vass, 2016). There is some validity to these concerns. Certainly, a carbon tax that has a low rate and thus low effectiveness at reducing emissions is not on its own sufficient for the mitigation of harmful emissions. Yet a carbon tax is one of the most economically efficient emissions reduction mechanisms that a government can implement. Even if a carbon tax makes up

1 Carbon Taxation and Emissions Trading Schemes are the two main carbon taxation templates (cap-and-trade or baseline-and-credit ETS systems) (Canada’s Ecofiscal Commission, 2015)
only a portion of viable emissions reducing mechanisms, it is still a worthwhile mechanism to implement in terms of the cost and benefit, and will have an impact on the margin in terms of changing behaviour and investment decisions. The cost of implementing a carbon tax is typically very small since most of the required components, such as a mechanism for the collection of the tax on fuels, are already in place in many jurisdictions. A carbon tax can be used either as a base policy with other regulations built on top of it, or as a complementary policy to other regulations and mechanisms aimed at reducing emissions.

3.2. Global Growth in Carbon Pricing Mechanisms

The 1990s saw a global push towards carbon pricing mechanisms. Finland and Poland introduced a carbon tax in 1990, Norway and Sweden in 1991, Denmark in 1992, Latvia in 1995, and Slovenia in 1996 (World Bank Group, 2017) (Partnership for Market Readiness, 2017). By 2004, eight separate initiatives had been implemented that covered less that 1% of global emissions (World Bank Group, 2017), but by 2010, nineteen initiatives were in place covering nearly 5% of global emissions. If China maintains its emission trading system (ETS) commitments, by 2020 there will be 51 separate carbon pricing initiatives in place that will cover almost 20% of global emissions (World Bank Group, 2018).
Carbon pricing systems have gained momentum globally. It is crucial that these policies maintain continuity if climate change mitigation goals are to be achieved.

3.3. The Polluter Pays Principle

It is an unfortunate reality that the previously ignored harmful GHG emissions cannot be reduced today without imposing net costs on some polluters. As one article states, “we should not expect the unfettered market to lead to rapid reductions in the supply of fossil fuels” (Covert, Greenstone, & Knittel, 2016, p. 19). Research shows that the implementation of a carbon pricing mechanism in various jurisdictions will not fully resolve climate change, or even stop the use of fossil fuels. However, carbon pricing is both a key and base policy pillar that can be both effective and economically efficient, around which supportive policies to reduce additional emissions can be formed (Partnership for Market Readiness, 2017) (Jaccard, Hein, & Vass, 2016).
3.4. Carbon Taxation in Canada

The Federal Government of Canada has implemented a pan-Canadian framework, and by 2018 all provinces must implement some type of carbon pricing and must at minimum cover emissions from fossil fuels (World Bank Group, 2017). Provinces can either opt to implement a carbon tax that will start at a minimum rate of CAN$10/tCO$_2$-e, with scheduled annual rate increases reaching CAN$50/tCO$_2$-e by 2022, or alternatively implement a cap and trade model with emissions credit reductions equivalent to the carbon tax set tax rates (World Bank Group, 2017). Provinces are currently at various points in the implementation process (World Bank Group, 2017). British Columbia, Alberta, Ontario and Quebec already had established carbon pricing mechanisms prior to the federal government announcement (Government of Canada, 2016). Provinces that do not establish a carbon pricing mechanism within the allotted time frame will be subject to a federal levy on fossil fuels or a price on industry pollution (Government of Canada, 2016).

The response to the federal carbon pricing mandate has been revealing, further reinforcing the thesis that carbon pricing is at constant risk of political cooptation. In Ontario, the cap and trade carbon pricing model implemented in 2017 came under fire during the 2018 provincial election (Grinspun & Gray, 2018). Despite the fact that Ontario will be saddled with a federal carbon tax if there is no provincial pricing system in place, and despite the fact that a reversal of the cap and trade model will be costly and inefficient for Ontario, as part of his campaign Doug Ford promised to ‘scrap the carbon tax’ (Buchanan, 2018). Ford declared that the carbon pricing mechanism “does nothing for the environment” (despite the evidence that it has) and that he would implement a much more affordable model; experts are sceptical (Beugin, Drummond, Hodgson, & Cappe, 2018). A plethora of programs intended to encourage and facilitate positive environmental behaviours funded by the cap and trade revenues under the Green Ontario Fund Programs were cancelled shortly after the election (Buchanan, 2018). Experts have voiced concern over the negative impact the reversal is likely to have on Ontario’s economy (Beugin, Drummond, Hodgson, & Cappe, 2018) (Forbes, 2018). One expert stated that “it is unclear how this allowance liability, and looming carbon pricing disputes with the federal government, will play out – and the resulting uncertainty will
weigh on business decisions in Ontario” (Forbes, 2018). All signs point to the reversal as a very poor policy decision, and yet the populist perspective appears to have prevailed over rationality. The politicization of an arguably successful carbon pricing policy is concerning, and reinforces the need for further research into designing resilient carbon pricing mechanisms.

3.5. Carbon Taxation Versus Cap and Trade

In 2013, governments around the world generated US$21.7 billion in revenue from carbon tax systems (Carl & Fedor, 2016). The average carbon revenue as a share of GDP was 0.13% for countries with a carbon tax system and 0.02% for cap and trade (Carl & Fedor, 2016, p. 52). A significantly higher proportion of revenue from jurisdictions with cap and trade models was spent on ‘green’ subsidies (70%) than in jurisdictions relying on a carbon tax, while among jurisdictions with carbon tax models, revenue was much more likely to be spent on tax cuts, rebates, and general government funds (72%) (Carl & Fedor, 2016). Carl & Fedor (2016, p. 52) conclude that “there are two principal insights gained from this: first, system design makes a difference in how revenue is spent, and secondly system design is tied to how much is spent”. The study supports the notion that larger sums of revenue are being produced via carbon tax systems globally compared to cap and trade systems, indicating the importance of directing the use of these sums towards maximizing societal ‘good’ and maintain public support for emissions reduction goals (Carl & Fedor, 2016).

As shown through Carl and Fedor’s (2016) research, there are many insights yet to be gained from broad-based comparative analysis of cap and trade and carbon tax models, but the following research and analysis focuses solely on carbon tax policies. While the available research indicates that both cap and trade and carbon tax systems can be successful at reducing emissions, the following research aims to contribute to the understanding of carbon tax policies and strategies for government decision makers to help to promote the resilience and continuity of carbon taxes.
3.6. The Political Economy of Carbon Taxes

The design features of a carbon tax can each help to improve political feasibility or reduce it, in addition to contributing positively or negatively to the resilience of a carbon tax policy. Then there is the broader concern of how to maximize and maintain effectiveness of a carbon tax policy while also ensuring it remains resilient. “A central challenge of democratic governance: promoting society’s long-run welfare in the face of short-run political imperatives” (Jacobs, 2011).

3.6.1. Revenue Use

Different uses of revenue appeal to different segments of society. Revenue from a carbon tax can be put into direct funds to individuals, companies, sectors, green initiatives, reducing taxes and tax benefits, welfare and social programs. The challenge is to determine what revenue use strategy maximizes support for a carbon tax, overall, and over time. There is a strong argument for revenue neutrality in the literature. It can lower labour costs, is appealing to many businesses and industry, and preferable over other more economically distortionary taxes. In addition, it can promote carbon tax resilience as future governments are more reliant on the carbon tax as a revenue source (Harrison, 2013). It is politically unpopular to increase taxes. The reversal of a revenue neutral carbon tax, particularly one at a high rate, would likely require either increasing taxes elsewhere or reducing expenditures, both of which tend to be politically unpopular for most political parties.

On the other hand, voters are generally more inclined to prefer earmarking over other revenue-use designs, such as revenue neutrality (Dresner & Dunne & Clinch & Beuermann, 2006). Substantial research shows that the public has difficulty grasping a concept like ‘revenue neutrality’ (Jaccard, Hein, & Vass, 2016). While it might be easier to garner the support of business/industry through a concept like revenue neutrality, it might in turn evoke the ire of the electorate, which may see it as a ‘trick’ (Dresner & Dunne & Clinch & Beuermann, 2006, 901) (Clean Energy Canada, 2015).
3.6.2. **Communication**

If one is able to make revenue recycling more salient to the public, it may help to promote support (Aldy, 2017) (Partnership for Market Readiness, 2017). In general, it is key to communicate clearly on various aspects of carbon tax design to all segments of society in order to maximize support and develop a strong jurisdictional understanding of the various political pressure points (Partnership for Market Readiness, 2017) (Clean Energy Canada, 2015). Research shows that electoral risks exist in the lack of understanding of a carbon tax by the electorate, and there is strong evidence of lobbying by business/industry influencing voter’s understanding of a carbon tax policy (Jaccard, Hein, & Vass, 2016) (Baranzini, Van den Bergh, Carattini, Howarth, & Padilla, 2017). The complexity of carbon tax policy and imperfect information opens the design up to political cooptation, political-ideological motivations, and the possibility of reversal (Jaccard, Hein, & Vass, 2016) (Harrison, 2013) (Baranzini, Van den Bergh, Carattini, Howarth, & Padilla, 2017). Transparency is commonly cited as a key strategy to be employed by government (Baranzini, Van den Bergh, Carattini, Howarth, & Padilla, 2017) (OECD, 2010) (Partnership for Market Readiness, 2017).

3.6.3. **Political Leadership**

Strong political leadership, or a strong figurehead to promote political acceptance of a carbon tax is identified in the literature as a major boon in the political feasibility of a carbon tax, particularly to promote its implementation (Clean Energy Canada, 2015) (Harrison, 2013) (Rabe, 2018). There is a risk to continuity of a carbon tax when that figurehead is no longer in place or in power, and a government with a different agenda or political motivation oversees the carbon tax (Aldy, 2017) (Jaccard, Hein, & Vass, 2016).

3.6.4. **Setting the Rate and Rate Increases Over Time**

It is politically palatable to start at a low level of initial taxation and increase over time as is politically tolerable (Aldy, 2017) (Clean Energy Canada, 2015). One author identified that, “the more enduring carbon pricing initiatives have set far more modest goals” (Rabe, 2018). Much of the literature recommends establishing a schedule of rate
increases and maintaining it over time, allowing for business/industry to invest and adjust to the projected price signal with greater confidence (Clean Energy Canada, 2015) (OECD, 2010) (Baranzini, Van den Bergh, Carattini, Howarth, & Padilla, 2017). One article cited that industry is frequently concerned more with policy uncertainly than the cost minimization under carbon pricing initiatives (Sustainable Prosperity, 2011). Another article cited that the best approach would be to update carbon pricing formally over time, allowing for adjustment to new information, whether it be political, economic or environmental (Aldy, 2017).

3.6.5. **Concessions, Compensation and Exemptions**

There is substantial debate on the extent of concessions and their application. One report cites that “energy-intensive industries have in many countries through lobbying managed to receive a very favorable treatment, resulting in less effective policies” (Baranzini, Van den Bergh, Carattini, Howarth, & Padilla, 2017, p. 8). Another expert states that, “it is critical that any concessions be based on sound analysis and clear principles rather than political leverage, and also carefully designed to maintain an effective carbon price signal” (Harrison, 2013). While this is conceptually appealing, the research also states that concessions and exemptions are key to increasing political palatability, and in many cases have been the key to implementing and maintaining a carbon tax, and mitigating opposition (Partnership for Market Readiness, 2017) (Harrison, 2013) (Jaccard, Hein, & Vass, 2016) (Partnership for Market Readiness, 2017) (Baranzini, Van den Bergh, Carattini, Howarth, & Padilla, 2017) (Jenkins, 2017). The mitigation of competitiveness risks, especially among emissions intensive trade exposed industries, is cited as crucial, both for economic reasons and for resilience (Aldy, 2017). Rabe (2018) states that “the kinds of carbon prices that are likely to be politically feasible can play a number of constructive roles but may well need to avoid high levels or broad application if they are to prove politically feasible and sustainable” (p. 194). A different report suggested to, “keep it simple: design a policy that’s easy to administer thanks to broad coverage and minimal exemptions” (Clean Energy Canada, 2015). Another stated that “in jurisdictions where influential fossil energy producers and industrial energy consumers are aligned in opposition to CO₂ pricing, neutralizing opposition from industrial energy consumers by subsidizing clean energy adoption and
keeping energy input prices low could remove a major barrier to CO2 pricing” (Jenkins, 2017, p. 24).

The use of carbon tax revenue to address regressivity and other equity concerns is cited as key in much of the literature. In general, it is cited that “acceptability is much higher when a progressive energy tax is proposed, provided that information on its distributional properties are made salient” (Baranzini, Van den Bergh, Carattini, Howarth, & Padilla, 2017, p. 8). Revenue funds can be utilized in a credible way to establish and sustain constituency support, but an unclear plan for allocation has the potential to ‘divide a political base’ (Rabe, 2018). Funding allocation decisions are likely to be constrained by the public’s funding priorities at the time (Jenkins, 2017). The electorate’s equity and funding priorities may not necessarily align well with actual equity or regressivity concerns, forcing the government to provide funding that may be better used elsewhere in order to maintain resilience (Baranzini, Van den Bergh, Carattini, Howarth, & Padilla, 2017) (Jaccard, Hein, & Vass, 2016). The electorate’s perception is not necessarily rational, reasonable, or in alignment with the reality of the carbon tax design (Jaccard, Hein, & Vass, 2016). Jaccard (2016) identifies that “even when climate policies have been designed with mechanisms to minimize their impacts on particular individuals, groups, regions and industries, many people inherently presume that they will face significant impacts and dismiss contradictory evidence” (p. 5).

3.6.6. Political Institutions

Part of the challenge of the resilience of carbon tax policies is the challenge of maintaining credible commitment in the context of four-year political terms and an ideological divide on climate change theory and policy. There are some insights in the literature into this challenge, though it is an area deserving further study. It is possible that a carbon tax implemented by a political party typically seen as pro-business/industry is more likely to be maintain continuity due to the type of design favoured by these political parties. Carl & Fedor (2016) provide insight into the ‘ideology’ hypothesis, having charted out global carbon taxes as implemented by ‘left’ or ‘right’ leaning governments, and then placing them along a scale of the percent of revenue-use either going to general funds (increased tax) versus the portion recycled (neutral tax), as seen below.
There is a clear clumping of carbon taxes with a high portion of revenue recycling as implemented by right leaning governments. This supports the idea that business would perceive right-leaning governments as more likely to implement a carbon tax that might be to their preference (reduced corporate taxes for example) as opposed to a design that is seen as just a tax increase on business/industry. Assuming that a carbon tax policy design that is preferential to business/industry contributes to continuity, this may indicate that a carbon tax implemented by a right-leaning government might be more resilient. According to the research, left leaning governments have a broader spread of revenue use design, with far more carbon taxes having a greater portion of revenues taken into general funds as opposed to being recycled (Carl & Fedor, 2016).

Another component of the ‘ideology’ hypothesis is the idea that a carbon tax implemented by a ‘right leaning’ political party (typically pro-business and not pro-environment) is more likely to maintain continuity than one implemented by a ‘left leaning’ political party (typically pro-environment) due to their relative voter bases. If a

Figure 3.2. Share of Revenue Recycled or in General Funds compared to Political Ideology of Government in Power in Year of First Revenue

Source: Figure taken directly from (Carl & Fedor, 2016, p. 59)
carbon tax is implemented by the furthest right-leaning party available, it might not leave political ‘room’ for a right-leaning party to turn the carbon tax issue into an election wedge issue. Any other political parties that would fall to the “left” of the furthest right leaning political party would risk alienating their typically pro-environmental voter base if they opted to attempt to politically coopt the carbon tax as an election wedge issue. In addition, if the carbon tax is supported by the furthest right leaning party (the party typically supported by and in greatest contact with business/industry), business/industry may not have access to a political party that may bend to lobbying efforts to reverse a carbon tax policy.
Chapter 4. Methodology

4.1. Outline of the Methodology

The methodology consisted of a literature review, interviews with experts, and a case study of a carbon tax policy in three separate jurisdictions. The information gained from the case studies and interviews was compiled and applied to the hypotheses for each decision-making node, producing insights into the node's relative importance in the continuity and resilience of carbon tax policies.

4.1.1. Literature review

The literature review included an overview of publicly available information including academic and grey literature, and information and data sources available through the SFU library. Various search engines were employed using key words to search for relevant material. The search began with a broad view of carbon pricing and narrowed over time, eventually focusing on three main jurisdictions. Through the literature review, the nodes of government decision-making in regard to the design of carbon tax policies were mapped out, and hypotheses were developed based on these nodes and their predicted potential to be significant factors in the continuity and resilience of carbon tax policies.

4.1.2. Interviews with Experts

Interview questions and topics were developed from the literature review, the case study research, and information garnered from other interviewees. Twenty-three separate interviews were completed, among government employees, politicians, academics, think-tank researchers, and business representatives and advocacy groups in each of the three jurisdictions. Cold-calls, emails and ‘snowball’ sampling were utilized
to make initial contact with potential interviewees. Information was gathered through a series of interviews ranging in length from 30 minutes to 2.5 hours (with an average time of approximately 1.25 hour) via skype, telephone, and in-person interviews, dependent on the participants’ preference and location. Interviewees were individuals who held first-hand knowledge of carbon tax policies or information regarding carbon tax policies within the three jurisdictions under review (see Appendix for a complete list of interviewees). The purpose of the interviews was to supplement publicly available data and information garnered through the literature review. Interviews were conducted in a semi-structured conversational format.

### 4.1.3. Case Studies

Three case studies, British Columbia (Canada), Ireland, and Australia, were selected through an examination of various jurisdictions where carbon taxes were successfully and recently (within the past 10 years) implemented, as identified through a literature review. The case studies were utilized to identify key factors and considerations leading to the implementation of the carbon tax, barriers to implementation, key stakeholders involved in the implementation process or in opposition to the process, and other relevant political insights regarding the process of carbon tax design decisions and their interaction with continuity.

### 4.1.4. Developing the Nodes of Decision Making and Associated Comparative Analysis

The following research examines technical key decision-making nodes of carbon tax policy within each jurisdiction as those design decisions interacted with the political environment of that jurisdiction, assessed through a lens of resilience. This examination revealed insights into the continuity and resilience of carbon tax policies. For the purpose of this research, the comparative analysis focuses on the carbon tax design decision nodes that were established through the literature review, case study research, and expert interviews as most relevant to identifying insights into the continuity and resilience of carbon tax policies.
Chapter 5. Policy Options: The Decision-making Nodes

5.1. Policy Options: Decision-Making Nodes

The process of designing and implementing a carbon tax requires government decision makers to make choices on key decision-making nodes. The main nodes include the following choices:

Figure 5.1. Checklist for the Five Steps of Carbon Tax Design

<table>
<thead>
<tr>
<th>Define the tax base</th>
<th>Determine the tax rate</th>
<th>Address potential undesirable effects</th>
<th>Determine use of revenues</th>
<th>Ensure oversight and compliance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Decide which sectors to cover. Decide which gases to cover. Choose the points of regulation. Choose the entities to regulate and set thresholds.</td>
<td>Determine the basis for setting the tax rate. Determine how the rate will develop over time.</td>
<td>Assess the risk of the tax leading to carbon leakage or producing negative distributional effects. Consider the costs and benefits of adopting measures to mitigate risks. Consider the costs and benefits of different measures. Develop criteria to determine eligibility for assistance measures.</td>
<td>Calculate projected revenue from the carbon tax. Determine whether to lower income or other taxes, increase targeted spending, or to do both. Decide whether to allow offsets.</td>
<td>Map the required roles and functions for administering the tax. Establish clear procedures and ensure coordination of key entities. Include clear and meaningful penalties for noncompliance.</td>
</tr>
</tbody>
</table>

Source: (Partnership for Market Readiness, 2017, p. 12)

For the purpose of this research, of all possible design decisions that must be made in the development of a carbon tax, key decision-making nodes were selected. The decision-making nodes selected include revenue use design, tax rate, fuel/emissions coverage, societal (equity) compensation and exemptions and business
(economic) compensation and exemptions. For the purpose of this research, each decision-making node is considered as a policy option, and each policy option has the possibility of contributing positively or negatively to the continuity and resilience of a carbon tax policy. The following table outlines the policy options and provides a short description of the relevant related decision-making node, including identifying which of the three jurisdictions under study utilized that policy option within that node.

**Table 5.1. Decision-Making Nodes and Policy Options Selected, by Jurisdiction and Status**

<table>
<thead>
<tr>
<th>Decision-Making Node</th>
<th>Policy Option Selected</th>
<th>Jurisdiction</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Type of Revenue Use Design</strong></td>
<td>General Budget/Increase Revenues</td>
<td>Ireland</td>
<td>Continuity</td>
</tr>
<tr>
<td></td>
<td>Revenue Neutrality</td>
<td>BC</td>
<td>Continuity</td>
</tr>
<tr>
<td></td>
<td>Revenue Recycling/Earmarking/Mixed Revenue Uses</td>
<td>Australia</td>
<td>Reversed</td>
</tr>
<tr>
<td><strong>Rate of Taxation, Tax Rate Increases over Time</strong></td>
<td>Low Initial Rate of Taxation, High On-going Rate</td>
<td>BC</td>
<td>Continuity</td>
</tr>
<tr>
<td></td>
<td>Medium Initial Rate of Taxation, High On-going Rate</td>
<td>Ireland</td>
<td>Continuity</td>
</tr>
<tr>
<td></td>
<td>High Initial Rate of Taxation, Carbon Tax Reversed</td>
<td>Australia</td>
<td>Reversed</td>
</tr>
<tr>
<td><strong>Extent of and Type of Emissions/Fuel Coverage</strong></td>
<td>Low Coverage of Emissions/Fuel Types</td>
<td>Ireland</td>
<td>Continuity</td>
</tr>
<tr>
<td></td>
<td>Medium Coverage of Emissions/Fuel Types</td>
<td>Australia</td>
<td>Reversed</td>
</tr>
<tr>
<td></td>
<td>High Coverage of Emissions/Fuel Types</td>
<td>BC</td>
<td>Continuity</td>
</tr>
<tr>
<td><strong>Extent of ‘Societal’ Compensation and Exemptions</strong></td>
<td>Low/Medium ‘Societal’ Compensation and Exemptions</td>
<td>BC</td>
<td>Continuity</td>
</tr>
<tr>
<td></td>
<td>Low ‘Societal’ Compensation, High Exemptions</td>
<td>Ireland</td>
<td>Continuity</td>
</tr>
<tr>
<td></td>
<td>High ‘Societal’ Compensation and Exemptions</td>
<td>Australia</td>
<td>Reversed</td>
</tr>
<tr>
<td></td>
<td>Low ‘Business/Industry’ Compensation, High Exemptions</td>
<td>Ireland</td>
<td>Continuity</td>
</tr>
<tr>
<td></td>
<td>High ‘Business/Industry’ Compensation and Exemptions</td>
<td>Australia</td>
<td>Reversed</td>
</tr>
</tbody>
</table>
Chapter 6. Jurisdictional Case Studies Summary: Ireland, British Columbia, Australia

The following section provides a brief summary of the carbon tax design components in each jurisdiction.

6.1. Ireland

The carbon tax in Ireland has maintained continuity since its initial implementation.

Table 6.1. Ireland Technical carbon tax Design Summary

<table>
<thead>
<tr>
<th>Design Component</th>
<th>Carbon Tax Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date Implemented</td>
<td>May 2010</td>
</tr>
<tr>
<td>Rate</td>
<td>Initial 2010: €15/TCO₂, 2012: €20/TCO₂</td>
</tr>
<tr>
<td>Revenue Use</td>
<td>Initial General Revenues, No Hypothecation General budget, Revenue Raising</td>
</tr>
<tr>
<td>Fuels Taxed</td>
<td>Initial May 2010: Transport fuels (Auto Diesel and Petrol), Non-transport fuels, Aviation Gasoline, Kerosene, Marked Gas Oil, Fuel Oil, Other LPG, and Auto LPG, Natural Gas On-going May 2013: Coal and Peat</td>
</tr>
<tr>
<td>Exemptions</td>
<td>Initial Emissions already covered under EU ETS, Solid fuels, certified combined heat and power plants, Installations covered under the Environmental Protection Agency Emissions Covered by Greenhouse Gas Emissions Permits</td>
</tr>
</tbody>
</table>
### Design Component | Carbon Tax Details
---|---
On-going | Agriculture, heavy oil and LPG (partial), high-efficiency CHP (partial), and fuel used in agriculture (via income tax relief) (Partnership for Market Readiness, 2017)
November 2016: Partial Biomass fuels/fuels containing 30%+ biomass fuel proportionally exempt
Compensation | Industrial (economic)
Societal (equity) | Farm Diesel (agriculture): offsetting tax relief
Mineral programs
Increase in Vouched Fuel Allowance Scheme
Percentage Emissions Covered | Initial
| 33%² of GHGs

#### 6.1.1. Rate

The carbon tax was announced in budget 2010 and implemented in May 2010 at a rate of €15 per tonne of CO2 emitted, applying to specific fuels (petrol, gasoline, kerosene) based on a formula that accounts for emissions content³ (Government of Ireland, 2010). Consideration of future rate increases to the carbon tax occurs on an annual basis through the Ministry of Finance (CC/2017/01/23). An increase in the carbon tax was implemented in 2012 to a rate of €20/TCO₂. Increases to the rate are considered on a case by case basis, with the Ministry of Finance annually assessing whether to raise the carbon tax rate the upcoming fiscal year. The lower starting rate of €15 was part of an attempt to avoid potential pushback (RM/2017/02/27). The current rate of €20 resulted in an additional cost of 4.6c carbon charge per litre on petrol and 5.3c carbon charge per litre on diesel (Ireland Department of Finance, 2016; Government of Ireland, 2010). Other fuels increased substantially more, in proportion to their carbon content. For example, SEAI calculated that the 2012 and 2013 addition of the carbon tax to solid fuels directly resulted in a cost increase of 16% (€2.39) on a 40kg bag of coal and by 13% (€0.52) on a bale of briquettes (Sustainable Energy Authority Ireland, 2014).

² Note that over 40% of Ireland’s GHGs are already captured under the EU ETS scheme
³ “NCV × EF × A. NCV is the net calorific value of the description of mineral oil concerned expressed in terajoules per 1,000 litres, EF is the carbon emission factor of the description of mineral oil concerned expressed in tonnes of CO2 per terajoule, A is the amount, €15, to be charged per tonne of CO2 emitted” (Government of Ireland, 2010)
Table 6.2. Ireland Carbon Charge by Fuel Type 2017

<table>
<thead>
<tr>
<th>Description of Oil</th>
<th>Carbon Charge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Light Oil</td>
<td></td>
</tr>
<tr>
<td>Petrol</td>
<td>45.87€ Per 1,000 litres</td>
</tr>
<tr>
<td>Aviation gasoline</td>
<td>45.87€ Per 1,000 litres</td>
</tr>
<tr>
<td>Heavy Oil</td>
<td></td>
</tr>
<tr>
<td>Used as a propellant</td>
<td>53.3€ Per 1,000 litres</td>
</tr>
<tr>
<td>Used for air navigation</td>
<td>53.3€ Per 1,000 litres</td>
</tr>
<tr>
<td>Used for private pleasure navigation</td>
<td>53.3€ Per 1,000 litres</td>
</tr>
<tr>
<td>Kerosene used other than as a propellant</td>
<td>50.73€ Per 1,000 litres</td>
</tr>
<tr>
<td>Fuel oil</td>
<td>61.75€ Per 1,000 litres</td>
</tr>
<tr>
<td>Other heavy oil (including MGO)</td>
<td>54.92€ Per 1,000 litres</td>
</tr>
<tr>
<td>Liquefied Petroleum Gas</td>
<td></td>
</tr>
<tr>
<td>Used as a propellant</td>
<td>32.86€ Per 1,000 litres</td>
</tr>
<tr>
<td>Other liquefied petroleum gas</td>
<td>32.86€ Per 1,000 litres</td>
</tr>
<tr>
<td>Substitute Fuel</td>
<td></td>
</tr>
<tr>
<td>Used as a propellant instead of unleaded petrol</td>
<td>45.87€ Per 1,000 litres</td>
</tr>
<tr>
<td>Used as a propellant instead of diesel</td>
<td>53.3€ Per 1,000 litres</td>
</tr>
<tr>
<td>Used other than as a propellant</td>
<td>54.92€ Per 1,000 litres</td>
</tr>
<tr>
<td>Solid Fuel</td>
<td></td>
</tr>
<tr>
<td>Coal</td>
<td>€52.67 per tonne</td>
</tr>
<tr>
<td>Peat</td>
<td></td>
</tr>
<tr>
<td>Peat briquettes</td>
<td>€36.67 per tonne</td>
</tr>
<tr>
<td>Milled peat</td>
<td>€17.99 per tonne</td>
</tr>
<tr>
<td>Other peat</td>
<td>€27.25 per tonne</td>
</tr>
<tr>
<td>Mineral Oil Tax on Vehicle Gas</td>
<td>€3.70 per megawatt hour at gross calorific value</td>
</tr>
<tr>
<td>Natural Gas</td>
<td>€3.70 per megawatt hour measured at gross calorific value</td>
</tr>
<tr>
<td></td>
<td>€4.10 per megawatt hour measured at net calorific value</td>
</tr>
</tbody>
</table>

Source: (Irish Tax and Customs, 2017)
6.1.2. **Revenue and Revenue Use**

Due to various factors, such as the global recession and Ireland’s on-going and subsequent agreements with key international organizations (e.g. the ‘Troika’⁴), and binding 2020 climate and energy agreements with financial penalties for non-compliance, Ireland was required to develop strategies to raise revenue (Tax Strategy Group [Ireland], 2016, 1) (Ireland Department of Finance, 2016) (The Journal, 2017) (Convery, Dunne, & Joyce, 2013). The carbon tax was one strategy implemented to raise revenue.

**Table 6.3. Ireland Department of Finance 2011 to 2016 Receipts from Carbon Tax**

<table>
<thead>
<tr>
<th>Receipts from Carbon Tax</th>
</tr>
</thead>
<tbody>
<tr>
<td>2011</td>
</tr>
<tr>
<td>€298m</td>
</tr>
</tbody>
</table>

*Estimate Only
Source: (Ireland Department of Finance, 2016)

**Table 6.4. Ireland 2016 Net Excise Receipts by Commodity**

<table>
<thead>
<tr>
<th>Commodity, Head of Duty</th>
<th>2016 Net Receipts (€)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carbon AutoDiesel</td>
<td>171,426,636</td>
</tr>
<tr>
<td>Carbon Petrol</td>
<td>58,519,752</td>
</tr>
<tr>
<td>Carbon Aviation Gasoline</td>
<td>42,139</td>
</tr>
<tr>
<td>Carbon Kerosene</td>
<td>52,825,306</td>
</tr>
<tr>
<td>Carbon Marked Gas Oil</td>
<td>56,082,875</td>
</tr>
<tr>
<td>Carbon Fuel Oil</td>
<td>2,160,118</td>
</tr>
<tr>
<td>Carbon Other LPG</td>
<td>8,798,950</td>
</tr>
<tr>
<td>Carbon Auto LPG</td>
<td>142,481</td>
</tr>
<tr>
<td>Carbon Natural Gas</td>
<td>55,817,046</td>
</tr>
<tr>
<td>Carbon Solid Fuel</td>
<td>24,432,254</td>
</tr>
<tr>
<td>Carbon Total</td>
<td>430,247,557</td>
</tr>
</tbody>
</table>

Source: (Irish Tax and Customs, 2016)

⁴ The European Commission, the European Central Bank and the International Monetary Fund (IMF), known collectively as ‘the Troika’ (Convery, Dunne, & Joyce, 2013).
As a rule, Ireland’s Department of Finance is against hypothecation (CC/2017/01/23), and no ‘earmarking’ of the carbon tax revenue was implemented as part of the design. Though the carbon tax revenue was not hypothecated, general government revenue was utilized to address key equity concerns through programs such as the Winter Fuel Allowance, Warmer Homes Scheme and the Better Energy Homes Scheme (CC/2017/01/23) (Deirdre, Convery, & Dunne, 2012; Ireland Department of Finance, 2009; Citizens Information, 2010). It should be noted, that due to a lack of hypothecation or revenue neutrality function in the carbon tax design, one cannot directly state that these measures exist due to the implementation of the carbon tax (most cited programs existed prior to the implementation of the carbon tax), though one interviewee stated that “over 200$ million has been spent” on equity measures (CC/2017/01/23).

Most measures identified by interviewees as societal compensation measures existed prior to the carbon tax announcement, though the expansion of a Vouched Fuel Allowance Scheme was a program directly tied to mitigate fuel poverty caused by the carbon tax, as described in the Minister for Finance’s 2009 statement (Ireland Department of Finance, 2009). However, the Vouched Fuel Allowance scheme was cut significantly in Budget 2012, the year that the carbon tax rate increased to €20/tCO₂. This cut casts doubt on the commitment of the government to address the regressivity typically inherent in a carbon tax (Deirdre, Convery, & Dunne, 2012). In sum, very little revenue was invested to directly address societal equity and regressivity concerns, despite various stakeholders firmly supporting a strategy to address these concerns as part of their support (or at least lack of direct opposition) for a carbon tax (RT/2017/01/24).

6.1.3. **Fuels Taxed and Exemptions**

Most fuels are taxed under the carbon tax including oil, diesel, petrol, aviation gasoline, kerosene, liquified petroleum gas, natural gas, and solid fuels (e.g. peat), with few exemptions (Irish Tax and Customs, 2017). Initially solid fuels, such as peat, were exempt from the carbon tax (Irish Tax and Customs, 2016). This exemption was due to lobbying by the industry, concerns over cross-border fuel sourcing, and regressivity concerns since low income households typically utilize peat and other solid fuels in Ireland (Deirdre, Convery, & Dunne, 2012) (MD/2017/01/24) (Ireland Department of
Finance, 2009) (Kennedy, Lyons, & Morgenroth, 2017) (Grant Thornton Ireland, 2013) (RM/2017/02/27). Farm diesel did not receive an exemption. However, due to a strong agriculture lobby, farmers did receive a complimentary measure in order to offset the May 1, 2012 increase of €5 per tonne (from €15/tonne to €20/tonne). This took the form of a double income tax relief for farmers (Ireland Department of Finance, 2014) (The Irish Farmer’s Association, 2011) (The Irish Farmer’s Association, 2011) (Department of the Taoiseach, 2011) (Convery, Dunne, & Joyce, 2013) (Hennessy, 2016) (Register of Lobbying, 2016) (RT/2017/01/24). This measure affected a major source of Irish emissions: agriculture was projected to account for 45.6% of non-ETS sector emissions by 2020 (Ireland Environmental Protection Agency, 2015). One interviewee identified that he had sat in meetings where the Irish Farmers Associated threatened that the Green Party ‘would never have a seat again’ if the Green Party attempted to push the concept of addressing emissions from agriculture (MD/2017/01/24).

Exemptions were also implemented for biofuels as a way to encourage the growth of the biofuel industry (CC/2017/01/23) (National Oil Reserves Agency, 2017) (Hearne, 2012). While the carbon tax was implemented equally to petrol and diesel, the overall excise rate for petrol is €58.7c while the overall excise on a litre of diesel is €47.9c (Ireland Department of Finance, 2016). As stated by the Department of Finance (2016, p. 8), “the reduced rate of excise duty on diesel is due to diesel being viewed as the traditional fuel of business”.

The most significant exemption to the tax is that of fuels already taxed under the EU ETS. In Ireland, any installations partaking in an identified list of activities that produce specified emissions above a certain threshold are subject to the EU ETS, and therefore exempt from the carbon tax (Government of Ireland, 2010; European Commission, 2017; Ireland Environmental Protection Agency, 2017; Ireland Department of Finance, 2010). As a result, most of the ‘heavy hitter’ industries with strong financial backing and powerful lobbies, were exempt from the carbon tax.
6.2. British Columbia

The carbon tax in BC has maintained continuity since its initial implementation.

Table 6.5. British Columbia Technical Carbon Tax Design Summary

<table>
<thead>
<tr>
<th>Design Component</th>
<th>Carbon Tax Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date Implemented</td>
<td>July 1, 2008</td>
</tr>
<tr>
<td>Rate</td>
<td></td>
</tr>
<tr>
<td>Initial</td>
<td>July 1, 2008: $10/tonneCO₂</td>
</tr>
<tr>
<td>On-going</td>
<td>July 1, 2009: $15/tonneCO₂</td>
</tr>
<tr>
<td></td>
<td>July 1, 2010: $20/tonneCO₂</td>
</tr>
<tr>
<td></td>
<td>July 1, 2011: $25/tonneCO₂</td>
</tr>
<tr>
<td></td>
<td>July 1, 2012: $30/tonneCO₂</td>
</tr>
<tr>
<td>Revenue Use</td>
<td>Revenue Neutral</td>
</tr>
<tr>
<td>Fuels Taxed</td>
<td></td>
</tr>
<tr>
<td>Initial</td>
<td>Gasoline, diesel, natural gas, heating fuel, propane and coal⁵</td>
</tr>
<tr>
<td></td>
<td>Peat and tires when used to produce energy or heat</td>
</tr>
<tr>
<td>On-going</td>
<td>January 1, 2010: Gas Liquids</td>
</tr>
<tr>
<td>Percentage</td>
<td>96% of Fossil Fuel Emissions</td>
</tr>
<tr>
<td>Emissions Covered</td>
<td>70% of total GHG emissions</td>
</tr>
<tr>
<td>Exemptions</td>
<td></td>
</tr>
<tr>
<td>Initial</td>
<td>Minimal, very specific exemptions</td>
</tr>
<tr>
<td></td>
<td>Fuel for Inter-jurisdictional commercial marine and aviation purposes</td>
</tr>
<tr>
<td></td>
<td>Fuel to be exported</td>
</tr>
<tr>
<td></td>
<td>Key emissions from industrial processes, non-combustion emissions</td>
</tr>
<tr>
<td>On-going</td>
<td>Fuel sold to First Nations</td>
</tr>
<tr>
<td></td>
<td>Feb. 21, 2012 Temporary exemption for greenhouse growers</td>
</tr>
<tr>
<td></td>
<td>Feb. 19, 2013 Greenhouse Carbon Tax Relief Grant</td>
</tr>
<tr>
<td></td>
<td>Jan. 1, 2014 Coloured⁶ gasoline and diesel for farmers</td>
</tr>
<tr>
<td>Compensation</td>
<td>Industrial (economic)</td>
</tr>
<tr>
<td></td>
<td>General corporate tax rate cuts</td>
</tr>
<tr>
<td></td>
<td>Small business tax rate cuts</td>
</tr>
<tr>
<td></td>
<td>Industrial property tax credits increased</td>
</tr>
<tr>
<td></td>
<td>Various Business/Corporate Investments Tax Incentives and Cuts</td>
</tr>
<tr>
<td></td>
<td>(Ex: BC Film Tax Credit, Commenced 2013/2014).</td>
</tr>
</tbody>
</table>

⁵ See Table 6.6 BC 2016 Carbon Tax Rates by Fuel Type Based on $30/tonneCO₂e for detailed list

⁶ ‘Coloured’ gas and diesel are fuels that contain a purple dye identifying them as designated ‘farm’ gas/diesel and are taxed at a lower rate than fuel for general use.
Design Component | Carbon Tax Details
---|---
Societal (equity) | Low income climate action tax credit
| Reductions in personal income tax bracket rates
| Northern and rural homeowners grant (announced 2009)
| Tax Cuts to Various Social Programs (Ex: Children’s Fitness Credit, commenced 2012/2013)

6.2.1. Rate

As of July 1, 2008, the carbon tax was implemented at a rate of $10/tonneCO$_2$ based on the carbon content of combustible fuels. As outlined in the 2008 Budget, the carbon tax increased at an annual rate of $5/tonneCO$_2$ until it reached a rate of $30/tonneCO$_2$ as of July 2012. The rate was implemented at a low rate both for political feasibility and to enable an adjustment to the carbon tax gradually over time within a scheduled time frame. At that point, the government (under a new premier who had previously campaigned against the carbon tax) had an opportunity to review that rate and opted to freeze the rate at $30/tonneCO$_2$. At the $30/tonneCO$_2$ rate, in 2016 gasoline (petrol) cost an additional 6.67¢/litre, while diesel cost an additional 7.67¢/litre (British Columbia Ministry of Finance, 2017) (British Columbia Ministry of Finance, 2016). In 2017, the Federal Government of Canada announced the plan to establish a Canada-wide carbon pricing scheme at an initial rate of $10/tonneCO$_2$ as of 2018, to be increased to $50/tonneCO$_2$ by 2022 (Government of British Columbia, 2017). Consequently, the Government of BC will have to increase the rate of its carbon tax, or alternatively transfer into another type of carbon pricing mechanism such as a cap and trade model, which must reflect the federally dictated price within the allotted time frame.

<table>
<thead>
<tr>
<th>Fuel Type</th>
<th>Units for Tax</th>
<th>Tax Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gasoline</td>
<td>¢/litre</td>
<td>6.67</td>
</tr>
<tr>
<td>Diesel (light fuel oil)</td>
<td>¢/litre</td>
<td>7.67</td>
</tr>
<tr>
<td>Jet Fuel</td>
<td>¢/litre</td>
<td>7.83</td>
</tr>
<tr>
<td>Natural Gas</td>
<td>¢/cubic metre</td>
<td>5.70</td>
</tr>
<tr>
<td>Propane</td>
<td>¢/litre</td>
<td>4.62</td>
</tr>
</tbody>
</table>

Table 6.6. BC 2016 Carbon Tax Rates by Fuel Type Based on $30/tonneCO$_2$e
<table>
<thead>
<tr>
<th>Fuel Type</th>
<th>Units for Tax</th>
<th>Tax Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coal - high heat value(^7)</td>
<td>$/tonne</td>
<td>62.31</td>
</tr>
<tr>
<td>Coal - low heat value(^8)</td>
<td>$/tonne</td>
<td>53.31</td>
</tr>
<tr>
<td>Light Fuel Oil – Heating Oil/Industrial Oil, non-motor fuel oil</td>
<td>$/litre</td>
<td>7.67</td>
</tr>
<tr>
<td>Kerosene</td>
<td>$/litre</td>
<td>7.83</td>
</tr>
<tr>
<td>Naphtha</td>
<td>$/litre</td>
<td>7.65</td>
</tr>
<tr>
<td>Methanol</td>
<td>$/litre</td>
<td>3.27</td>
</tr>
<tr>
<td>Butane</td>
<td>$/litre</td>
<td>5.28</td>
</tr>
<tr>
<td>Ethane</td>
<td>$/litre</td>
<td>2.94</td>
</tr>
<tr>
<td>Pentanes Plus (includes Iso-octane)</td>
<td>$/litre</td>
<td>5.28</td>
</tr>
<tr>
<td>Refinery Gas</td>
<td>$/ cubic metre</td>
<td>5.28</td>
</tr>
<tr>
<td>Coke Oven Gas</td>
<td>$/ cubic metre</td>
<td>4.83</td>
</tr>
<tr>
<td>Coke</td>
<td>$/tonne</td>
<td>74.61</td>
</tr>
<tr>
<td>Petroleum Coke</td>
<td>$/litre</td>
<td>11.01</td>
</tr>
<tr>
<td>Tires – Shredded</td>
<td>$/tonne</td>
<td>62.40</td>
</tr>
<tr>
<td>Tires - Whole</td>
<td>$/tonne</td>
<td>30.66</td>
</tr>
</tbody>
</table>

Source: (British Columbia Ministry of Finance, 2017) (British Columbia Ministry of Finance, 2016)

6.2.2. Revenue and Revenue Uses

Revenue intake and use is easily transparent to the public. In fact, transparency is built into the very legislation through reporting requirements (Carbon Tax Act, 2017). BC’s annual Budget and Fiscal Plan must include a variety of components, such as fiscal revenue intake and a three-year plan of off-setting measures for the current and future fiscal years that indicate an established plan to maintain revenue neutrality (Carbon Tax Act, 2017). Revenue neutrality is a primary component of BCCT, and is defined in the legislation as having been maintained “if the dollar amount of the carbon tax collected in a fiscal year is less than or equal to the estimated dollar amount of the reduction in Provincial revenues in the same fiscal year as a result of revenue measures” (Carbon Tax Act, 2017, p. Part 2). Specific revenue use decisions, within the established model,

\(^7\) Coal of any type with a heat value greater than 27,000 kilojoules per kilogram $62.31 per tonne
\(^8\) Coal of any type with a heat value of up to and including 27,000 kilojoules per kilogram
are made on an annual basis when preparing the budget (ML/2017/02/22). The design feature of revenue-neutrality and its associated corporate and business tax cuts is a substantial factor in compensation for business, but also a political strategy to minimize opposition by the business community to a carbon tax.

**Table 6.7. British Columbia Annual 2008-2018 Carbon Tax Revenues**

(x $million)

<table>
<thead>
<tr>
<th>Year</th>
<th>2008/2009⁹</th>
<th>2009/2010¹⁰</th>
<th>2010/2011¹¹</th>
<th>2011/2012¹²</th>
<th>2012/2013¹³</th>
</tr>
</thead>
<tbody>
<tr>
<td>$306</td>
<td>$542</td>
<td>$741</td>
<td>$959</td>
<td>$1,120</td>
<td></td>
</tr>
<tr>
<td>$1,222</td>
<td>$1,198</td>
<td>$1,190</td>
<td>$1,201</td>
<td>$1,218</td>
<td></td>
</tr>
</tbody>
</table>

Note: *Estimated **Projected

⁹ (British Columbia Ministry of Finance, 2010)
¹⁰ (British Columbia Ministry of Finance, 2011)
¹¹ (British Columbia Ministry of Finance, 2012)
¹² (British Columbia Ministry of Finance, 2013)
¹³ (British Columbia Ministry of Finance, 2014)
¹⁴ (British Columbia Ministry of Finance, 2015)
¹⁵ (British Columbia Ministry of Finance, 2016)
¹⁶ (British Columbia Ministry of Finance, 2017)
¹⁷ (British Columbia Ministry of Finance, 2017)
¹⁸ (British Columbia Ministry of Finance, 2017)
The compensation mechanisms established to maintain revenue neutrality began mainly by reducing the tax rate for individuals, small businesses and corporations, and by providing a one-time cash benefit to households (Climate Action Dividend in 2008: $100 paid to all British Columbians, a one-time payment announced prior to the implementation of the carbon tax) (British Columbia Ministry of Finance, 2008).

The tax measures identified in the 2008 budget, directly tied to the revenues from the carbon tax, included:

- Low Income Climate Action Tax Credit
• Reduce Income Taxes
• Reduce Corporate and Business Taxes (British Columbia Ministry of Finance, 2008)

The carbon tax was introduced with a refundable Low Income Climate Action Tax Credit in place to compensate families. It over-compensated the vast majority of low income families impacted regressively by the tax (British Columbia Ministry of Finance, 2008). One interviewee stated that, “good analysis has shown [the carbon tax] is not as regressive as people think” (DB/2017/02/23). The low-income tax credit has not kept pace in terms of being proportionally equal to increases to the carbon tax rate (ML/2017/02/22) (Horne & Sauve, 2014). However, this does not necessarily indicate that the tax is regressive, though there is some disagreement over this. It does indicate that the government invested substantially in addressing equity concerns in the initial design by overcompensating households, which may indicate that the initial rate was partially established to help promote initial political acceptance of the carbon tax by the electorate (KH/2017/02/16). In an interview with the Ministry of Finance and the Ministry of the Environment, it was stated that the Ministry has managed the Low Income Climate Action Tax Credit to ensure that the carbon tax is not regressive, and that it continues to address equity concerns (MFME/2017/02/02).

As the carbon tax progressed and revenues generally increased annually, more tax measures beyond the basic original tax reductions and credits were introduced. Major milestones include the Northern and Rural Homeowner grant implemented in 2010/2011, and substantial measures implemented in 2012/2013 that began to fold additional tax measures into the carbon tax offsetting measures, such as;

• BC Seniors Home Renovation Tax Credit
• Children’s Fitness Credit and Children’s Arts Credit
• Training Tax Credit
• Small Business Venture Capital Tax Credit
• Film Incentive Tax Credit
• Extend Scientific Research and Experimental Development Tax Credit, Etc. (British Columbia Ministry of Finance, 2012)
The Northern and Rural Homeowners benefit was introduced in the 2009 Budget, providing a $200 potential maximum per household outside of the Greater Vancouver area (British Columbia Ministry of Finance, 2009). The benefit was established in response to organized opposition from rural stakeholders who claimed that they would experience a disproportionate cost attributed to the carbon tax (Horne & Sauve, 2014). In reality, the rural homeowners experienced lower additional costs from the carbon tax and it is the commuter belt that is disproportionately impacted by the carbon tax (Horne & Sauve, 2014). Despite the apparent weakness of the claim, the Government introduced the grant in 2009. It seems likely that awareness of the upcoming provincial election, held just months after the grant was announced, impacted the government’s decision-making in this regard. Interviewees stated that there was not substantive evidence to support the stated need for compensation to avoid regressivity of the carbon tax in rural areas, but rural lobbying pressures none-the-less influenced politicians at election time (MFME/2017/02/02).

6.2.3. Fuels Taxed and Exemptions

All fuels\(^{19}\) are taxed at the same carbon emissions equivalency rate except for biomass fuels: firewood, wood waste, ethanol, bio-diesel and bio-heating oil. (British Columbia Ministry of Finance, 2008, p. 13). The logic behind the exemption of biomass fuels is that “the carbon released by combustion was first drawn from the atmosphere by the plants through photosynthesis” (British Columbia Ministry of Finance, 2008, p. 13). Fuels that contain a mixture of biomass fuels and another taxable fuel are taxed at the rate of the taxable fuel unless the portion of biomass fuel can be readily identified (Carbon Tax Act, 2017). Gas liquids were not initially taxed (British Columbia Ministry of Finance, 2008, p. 13), but as of 2010, gas liquids are taxed under the standard rate.

There were minimal exemptions in the initial design. When the carbon tax was established, it covered 70% of B.C.’s total GHG emissions and 96% of emissions from combustible fuels (British Columbia Ministry of Finance, 2008, p. 13) (Pembina Institute, 2014).

\(^{19}\)See table 6 for complete list of fuels taxed and their rate of taxation
Fuel uses exempt from the tax, as identified in the 2008 Budget (British Columbia Ministry of Finance, 2008) include:

- Inter-jurisdictional commercial marine and aviation purposes
- Fuel to be exported
- Key emissions from industrial processes

Over time, additional exemptions or grants to counteract the fiscal burden of the carbon tax were implemented. Despite fear-mongering in the media (Bennett, 2012), a later study identified that agriculture, including greenhouse-growers, did not actually face statistically significant effects to either trade or competitiveness as a direct result of the carbon tax (Rivers & Schaufele, 2014). Strong lobbying from the agricultural industry was likely the primary reason why the BC Government singled out the agriculture industry in its 2012 budget speech (Rivers & Schaufele, 2014) (Various Personal Correspondence, 2017). The authors note that; “The BC Government did not provide empirical evidence to justify the agricultural sector’s exemptions, nor did it specify which criteria or evidence would support other sectors’ exemptions from the tax based on competitiveness arguments” (Rivers & Schaufele, 2014, p. 5). In 2012, commercial greenhouse growers received a temporary relief grant (Greenhouse Carbon Tax Relief Grant), which became permanent, granting 80% of carbon tax paid on natural gas and propane (used for heating and carbon dioxide production only) for commercial vegetable, floriculture, wholesale nursery and forest seedling greenhouse growers in BC of a certain size (British Columbia Ministry of Finance, 2013). In 2014, the agriculture industry attained an exemption to coloured gasoline and diesel (British Columbia Ministry of Finance, 2013). The exemption mirrors exemptions to the motor fuel tax that were held by agriculture long before the introduction of the carbon tax.

Due to production and distribution challenges, BC charges the carbon tax on Liquified Natural Gas on emissions above a certain threshold and exempts fossil fuels used in LNG production, but not combusted. (DB/2017/02/23). One author (and interviewee) explains that, “when it was introduced in 2008, the carbon tax applied to 77% of BC’s greenhouse gas emissions, but that has fallen to 70% in 2012 with a significant increase in non-combustion emissions from growing natural gas production” (Harrison, 2013, p. 9).
The cement industry is one of the larger emitters in the province (MFME/2017/02/02). Budget 2015 announced a grant established by the government to facilitate the industry’s move towards cleaner fuels at a swifter rate than might otherwise have occurred (MFME/2017/02/02). The incentive is conditional on the industry meeting or beating emissions targets and provides up to $22 million over the first three years, up to a total of $27 million over five years (British Columbia Ministry of Finance, 2015) (MFME/2017/02/02). The cement industry pays between $15-20 million a year in carbon tax (KC/2017/03/03). A representative from the Cement Industry of Canada stated that, while the industry had presented the cement industry’s challenges in meetings with the government for years prior to the announcement of the grant, “I was sitting there that day and I nearly fell off my chair when the Minister Mike DeJong announced that program” (KC/2017/03/03). The cement industry was the 12th most active lobbyist group in BC as of April 2013, with the carbon tax the focus of many of its lobbying activities in recent years (Skelton, 2014). It had been discussed that the potential for support existed, but it was not until the budget announcement that it was confirmed (KC/2017/03/03). The funding is put towards capital works for low carbon fuels or towards contracts for the purchase and acquisition of low carbon fuels (KC/2017/03/03). It was asked of one interviewee what would have to change in the design of the carbon tax in BC for the cement industry to take a hard stance against the carbon tax. The interviewee stated, “There has been an understanding by the provincial government that fairness on energy intensive trade exposed industries is an important problem and there does appear to be a willingness by government to address this. If the government said they wouldn’t work towards doing something about it, that would be problematic.” (KC/2017/03/03).
6.3. Australia

The carbon tax in Australia has not maintained continuity since its initial implementation.

Table 6.8. Australia Technical carbon tax Design Summary

<table>
<thead>
<tr>
<th>Design Component</th>
<th>Carbon Tax Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date Implemented</td>
<td>1 July 2012</td>
</tr>
<tr>
<td>Date Repealed</td>
<td>17 July 2014</td>
</tr>
<tr>
<td>Rate</td>
<td>Initial</td>
</tr>
<tr>
<td></td>
<td>Fixed rate July 1, 2012: $23 a tonne for two years, rising 2.5 per cent annually</td>
</tr>
<tr>
<td></td>
<td>July 1, 2013: $24.15</td>
</tr>
<tr>
<td></td>
<td>On-going</td>
</tr>
<tr>
<td></td>
<td>Intended to transition to Flexible Rate with price floor and ceiling</td>
</tr>
<tr>
<td>Revenue Use</td>
<td>53% Revenue Recycling</td>
</tr>
<tr>
<td></td>
<td>15% green earmarking (Carl &amp; Fedor, 2016)</td>
</tr>
<tr>
<td></td>
<td>40% of carbon price revenue to help businesses and support jobs, 50% to households</td>
</tr>
<tr>
<td>Fuels Taxed (Emissions Covered)</td>
<td>Electricity generation, industry, waste, fugitive emissions (emissions of carbon dioxide, methane, nitrous oxide and perfluorocarbons from aluminum smelting)</td>
</tr>
<tr>
<td>Exemptions</td>
<td>Legacy landfills, Household transport fuels, light vehicle business transport and off-road fuel use by the agriculture, forestry and fishing industries</td>
</tr>
<tr>
<td>Compensation</td>
<td>Industrial (economic) Jobs and competitiveness programs</td>
</tr>
<tr>
<td></td>
<td>Compensation for coal-fired electricity</td>
</tr>
<tr>
<td></td>
<td>Clean Energy Finance Corporation\textsuperscript{20}</td>
</tr>
<tr>
<td></td>
<td>Societal (equity) Assistance for low-income households, income tax reform, tax cuts</td>
</tr>
<tr>
<td>Percentage Emissions Covered</td>
<td>60% coverage total GHG emissions\textsuperscript{21}</td>
</tr>
</tbody>
</table>

6.3.1. Rate

The Australian rate was developed based on extensive modeling and abatement goals, combined with political negotiations (Partnership for Market Readiness, 2017, p.

\textsuperscript{20} A ‘Green’ Bank
\textsuperscript{21} (Partnership for Market Readiness, 2017)
The rate was set for a fixed price period, to commence on July 1, 2012, at $23 per tonne to rise 2.5% a year to compensate for inflation (Australian Government, 2011). After two financial years, the price on carbon was intended to transition into a flexible price via an ETS system (Australian Government, 2011). The ETS system was intended to utilize a price ceiling for three years based on market prices for carbon (international price), and a price floor of $15 (Australian Government, 2011). The system never made the transition as the carbon tax was reversed July 2014.

6.3.2. **Revenue and Revenue Use**

**Table 6.9. Australia Carbon Tax Revenue, 2012-2014**

<table>
<thead>
<tr>
<th></th>
<th>2012/13</th>
<th>2012/14</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$6.8b (AUD 6.6b)</td>
<td>Expected revenues: $7.0b (AUD 7.2b)</td>
</tr>
</tbody>
</table>

Source: (Carl & Fedor, 2016)

The first year of the carbon tax, the 2012-2013 fiscal year, the revenues were approximately $6.6 billion AUD, and forecasted to be $7.2 billion AUD for the following year (Carl & Fedor, 2016) (Schiermeier, 2014, p. 392). Green subsidies accounted for approximately 15%22, while other earmarking components such as transitional subsidies and other measures to address competitiveness accounted for approximately 45% (Carl & Fedor, 2016). Only 1% went to general funds to finance the administration of the carbon tax (Carl & Fedor, 2016). Approximately 53% of the carbon tax went to revenue recycling in the form of household assistance via income tax cuts and increases in direct payments (Carl & Fedor, 2016).

Revenue spending on compensating households was extensive, projected to total $14.9 billion (Lyster, 2011), with over 50% of the total revenue to be spent on households alone to compensate for the the carbon tax costs passed on to consumers (Australian Government, 2011) (Carl & Fedor, 2016) (Lyster, 2011). It was calculated that the carbon tax would increase the cost to households an average of $9.90 per week (Australian Government, 2011). The government developed household assistance to

22 “Shares may not add up to 100% as categories are not comprehensive and annual revenue budgeting may not match annual revenue inflow” (Carl & Fedor, 2016) pp.52.
counteract that impact, calculating that the average household would receive $10.10 per week in household assistance (Australian Government, 2011). The household assistance package focused on equity concerns by compensating lower income households in particular, such as “pensioners and low- and middle-income households” (Australian Government, 2011). The package increased pensions, increased family payments, provided income tax cuts, and raised the tax threshold (Carl & Fedor, Tracking global carbon revenues: A survey of carbon taxes versus cap-and-trade in the real world, 2016) to the degree that “more than 1 million people [would] no longer need to file a tax return” (Australian Government, 2011). The household’s assistance package contained other specific and detailed compensatory measures as well (Australian Government, 2011).

Compensation for industry and business was expansive. Coal-fired electricity generators, LNG projects, and EITE industries (such as aluminium production, steel manufacturing, pulp and paper manufacturing, glass making, cement production and petroleum refining (Robson, 2013)) were designated for compensation. Using complex criteria, firms in these sectors received “free carbon units”, essentially exempting them from paying the carbon tax (Lyster, 2011) (Australian Government, 2011). Other entities or interests were also targeted directly. The coal sector received a ‘Coal Sector Jobs Package’, and the steel industry a ‘Steel Transformation Plan’ (Australian Government, 2011). The Government also pledged $10 million for a Clean Energy Finance Corporation to focus on investing in “renewable energy, low pollution and energy efficiency technologies” (Australian Government, 2011). One author identified that the Australia’s carbon tax was particularly ‘notable’ for the extent of revenue earmarking for ‘transitional subsidies’ (Carl & Fedor, Tracking global carbon revenues: A survey of carbon taxes versus cap-and-trade in the real world, 2016). For example, it was projected that from 2011-2017, $1.3 billion would fund the ‘Coal Sector Jobs Package’ alone (Lyster, 2011). The government also attributed funds to promote the closure, or buy out, key inefficient coal facilities (Carl & Fedor, Tracking global carbon revenues: A survey of carbon taxes versus cap-and-trade in the real world, 2016). It was estimated that the free permits function would cost $9.3 billion for the EITE industries, and $5.5 billion for coal facilities and anticipated plant closures from 2011-2017 (Lyster, 2011). The government’s stated rationale for free permits was to address concerns of the
impact of the carbon tax on international competitiveness of these industries and businesses, to prevent leakage, maintain energy security, support investor confidence, and to provide transitional assistance (Australian Government, 2011).

6.3.3. **Fuels Taxed and Exemptions**

Australia’s carbon tax applied directly to specific emissions (Partnership for Market Readiness, 2017, p. 84) rather than to a broader base of specific fuels and focused only on the country’s ‘biggest emitters’ (Australian Government, 2011). The carbon tax applies to “emissions of carbon dioxide, methane, nitrous oxide and perfluorocarbons from aluminium smelting” (Robson, 2013, p. 18), and covers “the stationary energy sector, industrial processes, non-legacy waste, and fugitive emissions, other than from decommissioned coal mines” (Australian Government, 2011). This included natural gas entities and landfill facilities as well (Australian Government, 2011) (Australian Government Clean Energy Regulator, 2015). The government established an emissions threshold of 25,000 tonnes of CO2-e which was utilized to determine which specific entities would be liable to pay the carbon tax in the Financial 2012/2013 year (and moving forward) and which would be exempt (Australian Government, 2011) (Partnership for Market Readiness, 2017). While initially it was stated that the tax would apply to approximately 500 entities, the actual number of entities required to directly pay the carbon tax was later determined to be 370 separate businesses (Australian Government, 2014).

The majority of businesses, fuels utilized for household transport, households, biofuels, biomass, legacy emissions from landfills, and emissions from agriculture and forestry were all exempt from the carbon tax (Australian Government, 2011) (Robson, 2013, p. 18) (Australian Government Clean Energy Regulator, 2015). The rationale for exemption was twofold: 1) The government did not desire to burden small businesses with compliance costs, and 2) The carbon tax applied only to major emitters in order to enable the transition to a cap and trade market based system after the first two years of the carbon tax (Australian Government, 2011) (Robson, 2013, p. 18) (Australian Government Clean Energy Regulator, 2015).
It appears many of the exemptions (or immense compensations rendering key industries, in essence, exempt) were to an extent political in nature. An interviewee stated that the agriculture, mineral, and fossil fuel sectors, all strongly organized industries, “have influence beyond their importance” (AP/2017/02/22). There are robust political connections between these industries and key politicians. For example, the former Labour Party energy minister is now the head of the oil and gas lobbying organization; the former Conservative energy minister is now head of the Queensland Coal Association; and various other senior ministers are consultants to these industries (AP/2017/02/22). Lobbies of large export oriented and export exposed industries gained exemptions and compensation from the carbon tax by claiming that the carbon tax would make their industry uncompetitive and result in the export of Australian jobs. An independent report commissioned by the NSW Mining Industry claimed that the carbon tax would result in the loss of 4,700 jobs in 2020/21, and over $22 billions of exports between implementation and 2020/21 (AJM Staff, 2011).

It is of interest that, “while there is an economic argument for providing some compensation for some industries, there were no strong economic arguments for providing anything like the level of free permits given to the biggest polluters in Australia. The generosity of the assistance appears to be wildly out of step with the meager compromises made by the polluters” (Denniss, 2011). A report examining the ‘winners and losers of Australia’s carbon tax found that “brown coal electricity, black coal electricity and the brown coal mining sectors are big losers” (Meng, Siriwardana, & McNeill, 2011) under the carbon tax, affirming that perhaps some compensation was indeed necessary if the government hoped to avoid shocking coal-oriented sectors. However, one should note that the purpose of a carbon tax is to reduce emissions. Exempting these heavy emitters through compensatory measures at a rate of 94.5% takes nearly all the price signal pressure off these emitters. It is not too surprising that these industries invested substantial money in opposing the carbon tax after its implementation, as the carbon tax was designed to transition into a cap and trade scheme a few short years after implementation.
Chapter 7. Comparative Analysis

The following section provides a comparative analysis of the decision-making nodes as they interacted within the political reality of each jurisdiction, impacting the continuity and resilience of the carbon tax. The analysis is based on the information compiled from the literature review, case studies research, and interviews.

7.1. Revenue Use Design Type as a Factor in Continuity

<table>
<thead>
<tr>
<th>Component</th>
<th>Ireland</th>
<th>BC</th>
<th>Australia</th>
</tr>
</thead>
<tbody>
<tr>
<td>Revenue Use</td>
<td>General Revenue</td>
<td>Revenue Neutral</td>
<td>Revenue 'recycling' and Earmarking</td>
</tr>
</tbody>
</table>

Hypothesis: Carbon tax is more likely to maintain continuity if a model of revenue use is utilized that is perceived to reduce emissions versus designed as a general revenue raising strategy.

Hypothesis Outcome: Hypothesis not entirely confirmed.

Ireland’s carbon tax revenue is directed into general revenue funds, with no hypothecation. While generally an electorate is against the use of a carbon tax going into general funds and used solely to raise revenues (it is seen solely as a tax grab), stakeholders in Ireland understood from the beginning of discussions in 2009 that revenue raising would be the primary goal of implementing the carbon tax (CC/2017/01/23). Pre-recession discussions of the possibility of implementing a carbon tax revolved around an environmental focus, but after the recession, reducing emissions was collectively understood as a secondary goal in implementing the carbon tax (SL/2017/01/26) (CC/2017/01/23).

In BC, revenue neutrality has been a key factor in maintaining stakeholder support for the carbon tax. It is a clear selling point, which can be readily explained to
stakeholders. It shows explicitly that the carbon tax is not ‘just another tax grab’ as carbon taxes are often portrayed. Additionally, the tax cuts as a result of revenue neutrality can be directed to optimize political palatability as required in order to maintain continuity, such as adjusting the proportion of income tax cuts and business and corporate tax cuts over time. A government could initially start with a higher proportion of income tax cuts, presumably to help garner the support of the electorate, and shift tax cuts towards business/corporate tax cuts over time. The fact that corporate tax cuts would increase over time was a substantial selling feature for businesses and industry in BC (JF/2017/03/06) (KC/2017/03/03). One interviewee explained that it is difficult to get rid of funding once people and businesses become used to getting funding or tax cuts, thus under the revenue neutral model, governments that gain power would be disinclined to create trouble for themselves by opening up discussions around removing the CT and the discussing the possibility of raising taxes to address lost revenues (KH/2017/02/16). Once businesses and corporations receive tax cuts, they do not wish to see taxes later increase if the carbon tax would be reversed. This response may differ among EITE industries disproportionately impacted by a carbon tax. They may face substantial costs to their industry under a carbon tax policy, even with revenue neutrality and associated tax cuts (JF/2017/03/06) (KC/2017/03/03).

The Australian carbon tax recycled a large portion (approximately 50%) of revenues directly back to households, but most of the other portion was directed to specific new expenditures. Carl & Fedor (2016) explain23 that Australia had the highest per capita burden of tax revenue compared to other jurisdictions in terms of the proportion of revenue taken into general funds/earmarked. It is possible that the carbon tax was simply too complicated to explain in a concise way to the electorate, and the combination of increased overall taxes mixed with revenue recycling was too extensive for the electorate to accept, especially when faced with ‘per capita’ ratios far above the

23 “This meant that a per capita revenue burden of $180 annually—larger than all but three other global carbon-revenue systems in total—was directed toward niche public spending areas, many of them new government expenditures (see Appendix B for details). This level was twice that of second-highest system Norway (per capita spending of $92) and over five times that of third-highest system Switzerland ($35). To put this in context, Australia was spending twenty times the European Union cap and-trade system’s annual per capita total carbon revenue burden on niche areas alone” (Carl and Fedor, 2016, pp 57-58).
scope of other carbon tax or cap and trade models globally (Carl & Fedor, 2016). Additionally, the emitters captured under the carbon tax were only the heaviest emitters. As a result, many of the emissions intensive industries would have experienced very high costs under the carbon tax (though in practice most received offsetting compensation, especially initially). Some of these industries, such as the coal export industry, (particularly after the carbon tax’s planned transition to a cap and trade model) might have eventually faced substantial competitiveness issues as ‘price takers’ on the global market with their heavy reliance on the export of EITE goods. Even though the carbon tax was designed to help offset these competitiveness effects, the carbon tax model would still be costly over time to EITE industry.

A design feature of revenue neutrality appears to contribute positively to continuity but is not the sole mechanism which can succeed. Additionally, as shown through the case in Australia, even a high priority of revenue neutrality in the design cannot necessarily counteract other key design features and political considerations. The design feature of revenue neutrality does not guarantee continuity. Various other carbon taxes around the globe have maintained continuity with a mix of different revenue use models including revenue recycling, green earmarking, earmarking, and general revenues.

It appears that revenue decisions are especially important in cases of high per capita burden, as the electorate is likely to see a substantial increased tax burden in a negative light, even if it is clearly connected to climate change issues and even if climate change issues are generally supported by the electorate (as is the case in Australia). It may be of value, at least initially, to implement a simple and transparent model that can be easily explained to the electorate and one that does not substantially increase the tax burden, at least until the carbon tax becomes ‘part of the furniture’.

7.2. Rate as a Factor in Continuity

<table>
<thead>
<tr>
<th>Component</th>
<th>Ireland</th>
<th>BC</th>
<th>Australia</th>
</tr>
</thead>
</table>

44
<table>
<thead>
<tr>
<th>Component</th>
<th>Ireland</th>
<th>BC</th>
<th>Australia</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial Rate(^{24})</td>
<td>Medium</td>
<td>Low</td>
<td>High</td>
</tr>
<tr>
<td>$19.60/metric ton CO(_2) in 2010</td>
<td></td>
<td>$9.55/metric ton CO(_2) in 2008</td>
<td>$23.78/metric ton CO(_2) in 2012</td>
</tr>
<tr>
<td>On-going Rate(^{25})</td>
<td>High</td>
<td>High</td>
<td>N/A</td>
</tr>
<tr>
<td>$26.17 per metric ton CO(_2) in 2012</td>
<td></td>
<td>$28.64 in 2012</td>
<td>(No continuity)</td>
</tr>
<tr>
<td>Per capita revenue(^{26})</td>
<td>Low</td>
<td>Medium</td>
<td>High</td>
</tr>
<tr>
<td>$111</td>
<td></td>
<td>$239</td>
<td>$391</td>
</tr>
<tr>
<td>Share GDP</td>
<td>Low</td>
<td>Medium</td>
<td>High</td>
</tr>
<tr>
<td>0.03%</td>
<td></td>
<td>0.49%</td>
<td>0.60%</td>
</tr>
<tr>
<td>Overall HML Comparison</td>
<td>Low</td>
<td>Medium</td>
<td>High</td>
</tr>
</tbody>
</table>

Source: (Carl & Fedor, 2016) (Center for Climate and Energy Solutions, 2013)

**Hypothesis:** Starting with a low rate increases the likelihood of maintaining continuity.

**Hypothesis Outcome:** Hypothesis largely confirmed.

Ireland started with a fairly high relative rate. The revenue raising impetus of the carbon tax brought on by the recession impacted the setting of the rate and the political acceptance of the rate. The lower starting rate of €15 was part of an attempt to avoid potential pushback (RM/2017/02/27).

In BC, in its 2008 budget, the government states that there is explicit intent to start with a low rate followed by gradual annual increases, thus allowing for businesses and individuals to modify behaviours and decisions, and to provide predictability (British Columbia Ministry of Finance, 2008). This motive does indeed appear to be the primary reason behind the initial rate and gradual scheduled rate increases. The later decision to freeze the price rate at $30/tonne in 2012 was certainly more political, but also practical in terms of maintaining competitiveness for EITE industry. Industry and business in general (though all industry does not have by any means a unified stance) made it very clear to the government that a rate freeze was necessary in light of the fact that other

\(^{24}\) In US$, adjusted for comparison
\(^{25}\) In US$, adjusted for comparison
\(^{26}\) In US$, adjusted for comparison
jurisdictions had not immediately followed BC in applying a comparable carbon tax/carbon pricing mechanism (JF/2017/03/06) (KC/2017/03/03). As a result, businesses in BC experienced a disadvantage, particularly EITE industries. They advised government to wait until it became more apparent whether other jurisdictions would also be implementing a comparable carbon pricing mechanism of some kind. Various interviewees cited that gradual scheduled rate increases with a low starting rate are an incredibly valuable design features for political acceptance and also for promoting investment by business/industry into emissions reducing or green technologies.

In Australia, the rate for the carbon tax was developed through an extensive modeling process that developed the rate based on abatement outcomes and carbon tax levels, with the final rate determined through a combination of those modeled emissions goals and ‘political negotiation’ (Partnership for Market Readiness, 2017). A report identified that “the results of these modeling exercises provided important input for the negotiations” (Partnership for Market Readiness, 2017, p. 93). One interviewee identified that the rate was certainly influenced by the minimum rate that the Green Party was willing to accept (whose support was needed by the Labour party to maintain a majority) (AP/2017/02/22). The rate received substantial opposition from business as it was perceived to be far ‘out of step’ with the rest of the world’s rates, particularly the EU ETS rate (AP/2017/02/22). It was seen as an enormous penalty price compared to the rest of the world, leaving Australians feeling unfairly penalized (AP/2017/02/22). Many businesses that supported the carbon pricing in principle stated that the rate was simply too high to support (AP/2017/02/22). In truth, the price of carbon under Australia’s carbon tax was misaligned with other major carbon pricing mechanisms, in particular the price of carbon under the EU ETS. In May 2013, the price in Europe had dropped drastically to 3.40EURO, or about $4.50AUD, while the fixed price in Australia was set to increase to $25.40AUD for the 2014/2015 financial year (Pannell, 2013) (Hintermann, Peterson, & Rickels, 2016).

In Australia, unfortunately the timing of the implementation of the carbon tax with a high starting rate coincided with a few key events that influenced the later reversal of the tax. Due to a variety of inputs, one of which was a massive investment in the electricity transmission and distribution systems by the government, Australia
experienced a massive upsurge in electricity prices between 2009 and 2014 (RD/2017/02/14) (MOG/2017/02/21). Electricity prices increased by approximately 100% during that time, causing some of the electorate to falsely attribute much of the increase in their electricity bill to the carbon tax (RD/2017/02/14). The carbon tax in reality contributed only to a 9% increase in the cost to consumers while other factors were the true culprits in sky-rocketing prices (MOG/2017/02/21).

The electorate’s acceptance of the rate that is set is impacted by the electorate’s understanding of its application and impact to their lives. One interviewee stated that very few Australians understand the concept of money circulating the economy, causing many to misunderstand the true impact of key policies and to believe inaccuracies (AP/2017/02/22). For example, key politicians claimed that a leg of lamb would cost over $100 under the carbon tax, which was entirely untrue, and yet many people believed it to be true (AP/2017/02/22). Survey data support the concept that there was a disconnect in the perceived impact that the carbon tax would have, with much of the electorate misunderstanding the relative impact that the tax would have. Even though household transport fuel is exempted from the carbon tax, 50% thought that the carbon tax would “increase fuel prices by a lot” and 40% thought it would increase grocery costs a lot even though “treasury modelling indicates less than a dollar a week” (Lyons & Miriam, 2012). The authors accurately state that, “it’s not surprising that many people [were] under this impression, given the enthusiastically dire predictions of the politicians and commentators who oppose the policy” (Lyons & Miriam, 2012). An interviewee identified that “treasury had worked out the impact [of the rate] on people but it was not visible enough” (AP/2017/02/22).

Interviewees from all jurisdictions, not just Australia, provided anecdotal cases of the public misconstruing the impact of the carbon tax on their lives. Additionally, both BC and Australia experienced parallel fuel cost spikes (gasoline in BC and electricity in Australia) that were blamed on the carbon tax by members of the electorate – and opposition politicians. The main difference observed in the public’s response was general support for climate policy, the public’s perception of the political party that had implemented the carbon tax, and the simplicity of BC’s carbon tax versus the complicated design of Australia’s (strongly impacting the public’s understanding of the
tax). Both jurisdictions experienced an election shortly after implementing the carbon tax. In BC, the Liberal Party, which had implemented the carbon tax, won the election with 49 seats, while their opposition (the NDP) attained 35 (Elections BC, 2009). In Australia, the Labour party lost the election by 55 seats, down 17 seats from the last election, to 90 seats for the Coalition party under Tony Abbot (ABC News, 2013). While the carbon tax was certainly a factor in the election, the results are more likely due to eroded trust in the Labour party than solely a ‘referendum on the carbon tax’, as it was called. This indicates the value of public trust in the implementation of complex policy (including setting of the rate) that can be difficult to communicate in a concise way to the public. This is particularly true during an election period when opposing parties may leverage a lack of trust in order to promote an alternate view of the policy.

A low to medium starting rate that increases over time appears to be, unsurprisingly, the best rate design strategy to maintain continuity. Starting relatively low can aid in political acceptance and mitigate opposition. Industry/business and society in general can adjust more readily to a gradual rate increase. There is a trade-off between scheduled rate increases and flexible rate increases. On one hand, scheduled rate increases provide predictability, enabling long-term decision making for both government and business. Scheduled rates may help promote investment in the green economy and a broader shift by business that may not occur under less predictable circumstances. If a business is assured that costs will increase by a set amount over time, they may calculate that investing in a technology with substantial upfront investment costs may be more appealing and less costly than simply paying the carbon tax over time as the scheduled rate increases. This cost factoring is not viable under a carbon tax with a design that utilizes flexible rate increases. Business appreciates predictability; however, a set rate schedule may face pushback if the schedule is steep or business and the electorate do not perceive the rate increases to be viable.

It should be acknowledged that a low rate will have low effectiveness in terms of reducing emissions. It is reasonable to assume that a carbon tax with a minimal impact will be more politically feasible, as there is not a substantial motive to oppose the carbon tax. In order to be effective, the rate should increase over time to a higher rate.
### 7.3. Fuels Taxed (coverage) as a Factor in Continuity

<table>
<thead>
<tr>
<th>Component</th>
<th>Ireland</th>
<th>BC</th>
<th>Australia</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fuels Taxed</td>
<td>Low</td>
<td>High</td>
<td>Medium</td>
</tr>
<tr>
<td>Emissions Coverage % of total GHGs</td>
<td>33%</td>
<td>70%</td>
<td>60%</td>
</tr>
<tr>
<td>Overall HML Comparison</td>
<td>Low</td>
<td>High</td>
<td>Medium</td>
</tr>
</tbody>
</table>

**Hypothesis:** The fewer emissions covered by the carbon tax, the greater the likelihood of the carbon tax maintaining continuity.

**Hypothesis Outcome:** Hypothesis not confirmed.

#### Table 7.1. Fossil Fuels Targeted by Carbon Taxes and GHG Emissions Coverage

<table>
<thead>
<tr>
<th>Country</th>
<th>Fossil fuel types covered</th>
<th>Coverage of non-fossil fuels</th>
<th>Coverage (%) ghgs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Australia</td>
<td>all</td>
<td>Yes</td>
<td>60</td>
</tr>
<tr>
<td>BC</td>
<td>all</td>
<td>No</td>
<td>70</td>
</tr>
<tr>
<td>Chile</td>
<td>all</td>
<td>No</td>
<td>38</td>
</tr>
<tr>
<td>Denmark</td>
<td>all</td>
<td>No</td>
<td>45</td>
</tr>
<tr>
<td>France</td>
<td>all</td>
<td>No</td>
<td>35</td>
</tr>
<tr>
<td>India</td>
<td>coal</td>
<td>No</td>
<td>46</td>
</tr>
<tr>
<td>Ireland</td>
<td>all</td>
<td>No</td>
<td>33</td>
</tr>
<tr>
<td>Japan</td>
<td>all</td>
<td>No</td>
<td>70</td>
</tr>
<tr>
<td>Mexico</td>
<td>coal/oil</td>
<td>No</td>
<td>40</td>
</tr>
<tr>
<td>Norway</td>
<td>oil/gas</td>
<td>Yes</td>
<td>60</td>
</tr>
<tr>
<td>Portugal</td>
<td>all</td>
<td>No</td>
<td>26</td>
</tr>
<tr>
<td>S.Africa</td>
<td>all</td>
<td>Yes</td>
<td>75</td>
</tr>
<tr>
<td>Sweden</td>
<td>all</td>
<td>No</td>
<td>42</td>
</tr>
<tr>
<td>Switzerland</td>
<td>all</td>
<td>No</td>
<td>35</td>
</tr>
<tr>
<td>UK</td>
<td>all</td>
<td>No</td>
<td>25</td>
</tr>
<tr>
<td>Average</td>
<td>12/15 all</td>
<td>12/15: no</td>
<td>47</td>
</tr>
</tbody>
</table>

Source: (Partnership for Market Readiness, 2017, pp. 77-78)

The carbon tax covers only 33% of Ireland’s total GHG emissions, but over 40% of additional emissions are already captured under the EU ETS, bringing Ireland’s total
emissions coverage by some type of carbon pricing mechanism to over 70%, much
closer to BC’s level of coverage. It is of interest that key interviewees in BC, particularly
EITE industries, stated that they would prefer a system with a carbon tax for the general
economy, and a cap and trade system for EITE industries (JF/2017/03/06)
(KC/2017/03/03). Such a design would have similarities to Ireland’s entire carbon pricing
system. EITE industries have difficulty adjusting to the carbon tax, as they are typically
‘price takers’ and commonly the technologies vary in availability of options to reduce
emissions. A cap and trade system can provide these industries with additional options
to contribute to overall emissions reductions without paying as substantial of a fixed cost.

BC’s coverage is very broad, 70% of total GHGs are covered, and 96% of Fossil
Fuel Emissions (though the 96% fossil fuel coverage may have declined slightly due to
LNG’s exemptions) (KH/2017/02/16). Broad coverage across the economy was a
significant factor in the carbon tax gaining acceptance by the business/industry
community (JF/2017/03/06) (KC/2017/03/03). As one interviewee explained, it sent the
signal to business that the carbon tax was truly about addressing emissions and not just
taxing businesses/industries (JF/2017/03/06).

Australia’s coverage of GHGs was medium-high at 60%, but very narrow in the
application to specific businesses/industry. Liable entities numbered only about 370
separate businesses. The carbon tax was designed with the intention to transition to a
cap and trade model but was repealed before it could transition. It is possible the entities
targeted, many of the EITE industries, might have more readily accepted a cap and trade
model as it might have offered more affordable options to reduce emissions. Many of the
industries targeted could not readily or cost effectively reduce their emissions due to
technology limitations and tight profit margins on the global market as ‘price takers’.

Coverage that is too narrow in its application may result in opposition if only a
small number of entities are liable, though this could differ under a cap and trade model.
With that said, Australia’s business/industry were aware of the planned transition to a
cap and trade model, and yet many of the businesses/industries opposed the carbon
tax. The ratio of EITE industries that are targeted, versus non-EITE industries appears to
matter. Acceptance by business might have more to do with the coverage model (who it
covered) as opposed to the portion of GHG coverage in the economy, though both appear to play a role. An attempt to implement a carbon tax in France met opposition due to its “asymmetric treatment of small producers of energy and large producers of energy” (RT/2017/01/24). Perception by business of ‘fairness’ in application, and trust in government that the purpose of the carbon tax is environmentally based, may help promote acceptance of a carbon tax policy by business/industry.

Broad coverage can be more appealing to business than narrow coverage, as it may legitimize the carbon tax as an environmental tax rather than a tax increase, though this is likely particularly true for a revenue neutral model where some business/industries may actually benefit from tax cuts as a result of the carbon tax. Business/industry in BC would likely have opposed the carbon tax if it was revenue raising. With that said, the cement industry, despite being an EITE industries, continues to support the carbon tax even though it has resulted in an additional cost to their industry.

7.4. Societal (equity) Exemptions and Compensation as a Factor in Continuity

<table>
<thead>
<tr>
<th>Component</th>
<th>Ireland</th>
<th>BC</th>
<th>Australia</th>
</tr>
</thead>
<tbody>
<tr>
<td>Societal Compensation</td>
<td>Low</td>
<td>Medium</td>
<td>High</td>
</tr>
<tr>
<td>Initial Exemptions</td>
<td>High</td>
<td>Low</td>
<td>High</td>
</tr>
<tr>
<td>On-going Exemptions</td>
<td>High</td>
<td>Medium</td>
<td>High</td>
</tr>
</tbody>
</table>

**Hypothesis:** More societal compensation\(^{27}\) and exemptions will help promote the continuity of a carbon tax, as government will face less opposition from key stakeholders, mainly the electorate.

**Hypothesis Outcome:** Hypothesis not confirmed.

Initial discussions of a carbon pricing mechanism in Ireland were met with concerns over ensuring that the design addressed equity and regressivity, particularly by the opposing party. In practice, minimal societal compensation or exemptions were

\(^{27}\) Benefits or some type of compensation directly tied to or related to the carbon tax, targeting the electorate as opposed to business/industry.
implemented to address equity concerns as a direct result of the carbon tax. There were few measures that government could point to in order to help ‘sell’ the carbon tax to the electorate. Even so, it appears the electorate was more concerned with other policy changes and the fallout from the recession, or it is possible that much of the electorate accepted the carbon tax as a revenue raising necessity. Despite the lack of societal compensation and exemptions, the carbon tax dropped out of the public’s dialogue fairly quickly.

In BC the government used the revenue-neutral model to provide tax cuts and credits to low income households to address equity concerns. As the carbon tax evolved, societal compensation was increased to key segments to address new equity concerns, whether valid or in most cases invalid, which were politicized in the public discourse.

Australia designed a complex carbon tax that would provide neutralizing or nearly neutralizing compensation to most households, excluding approximately the top 20% of earners. Poor communication with the electorate resulted in the compensation package being misconstrued, leaving the electorate under the impression that costs of daily living would increase by unreasonable proportions. At times, both supporters of the carbon tax and those who opposed the carbon tax used the same numbers but painted the outcome in a different light. For example, the government identified that “the average household received AUD $10.10 ($9.80) per week through these measures”, which equals $525.20 annually, while an interest group claimed that, “this carbon tax is a bad idea because everything will cost more…and the cost of living of average households will rise by AUD $515 a year that you can’t afford” (Merkley, Eisen, & Green, 2012, p. 29). In the design, the government carefully developed the compensatory measures for households to adjust over time as required. For example, it stated that payments would be permanent and would “keep up with increases in the cost of living” (Parliament of Australia, 2011). The design integrated even minute details of societal compensation, such as special payments for individuals with high energy needs due to medical issues (Parliament of Australia, 2011). The only group not compensated for the increased cost were those in high tax brackets.
An interviewee identified that the mechanism of raising the low-income earners tax free threshold was not clearly linked to the implementation of the carbon tax by the government, causing people to see the carbon tax as simply increasing their costs (RD/2017/02/14). For example, when the price of electricity increased, it significantly impacted the low and middle earners (RD/2017/02/14). The price increase was attributed to the carbon tax, with people failing to understand that the carbon tax was only a small portion of the price increase and that they were actually better off in terms of compensation under the carbon tax mechanism than without it (RD/2017/02/14). One report identified that, “inadequate communication with the public is partly to blame: Australia’s former government failed to explain that carbon-pricing revenue is returned to low- and middle-income earners” (O’Gorman & Jotzo, 2014). Another interviewee explained that people tend to have a ‘disconnect between government revenues and where the money [for a carbon tax] actually comes from’, and that the connection between the carbon tax and its compensating measures for households ‘was not made strong enough’ (RD/2017/02/14).

Greater societal compensation does not seem to directly equate to greater societal support (and thus continuity), particularly if the design of that compensation package is complex and confusing to the electorate, and thereby open to politicisation. Minor compromises to address equity concerns, whether those concerns are factually ‘valid’ or not, can help overcome potential politicisation that has the possibility of disrupting the continuity of a carbon tax. Unlike broader exemptions from the carbon tax which mitigate effectiveness of a carbon tax, societal compensation can be accomplished without having a significant impact on reducing emissions by using revenues from the carbon tax to fund the compensation.

7.5. Business/Industry (economic) Exemptions and Compensation as a Factor in Continuity

<table>
<thead>
<tr>
<th>Component</th>
<th>Ireland</th>
<th>BC</th>
<th>Australia</th>
</tr>
</thead>
<tbody>
<tr>
<td>Business/Industry Comp</td>
<td>Low</td>
<td>Low-Medium</td>
<td>High</td>
</tr>
<tr>
<td>Initial Exemptions</td>
<td>High</td>
<td>Low</td>
<td>High</td>
</tr>
</tbody>
</table>
Hypothesis: More compensation and exemptions for business/industry will help promote the continuity of a carbon tax, as government will face less opposition from key stakeholders, particularly business and industry.

Hypothesis Outcome: Hypothesis not confirmed.

Ireland’s carbon tax design had minimal compensation or exemptions in its design; however, the majority of heavy emitting industries were exempt from the carbon tax and captured under the EU ETS. In Ireland, substantial consultation with business occurred and was on-going, with resulting minimal compensation applied to mitigate opposition by business to the carbon tax. Various interviewees identified that business and industry in Ireland were for the most part accepting of the later post-recession discussions of the carbon tax, though with key interests, such as agriculture, firmly against the tax. This general acceptance was identified as resulting from two key factors. First, the majority of ‘heavy hitters’ in business and industry were exempt from the carbon tax as by this time Ireland was a part of the EU ETS. These ‘heavy hitters’ had no motive to oppose the carbon tax. On a related note, there was also not a perception of ‘unfairness’ by industry/business targeted by the carbon tax since other industries were already priced under the EU ETS. Second, the recession provided an impetus for increased and new taxes. It was understood by business and industry that taxes would have to increase through one method or another, due to the need to raise revenues in Ireland after the recession’s impact on the economy of Ireland. Indeed, previous discussions in Ireland in 2006 about the possibility of implementing a carbon tax were met with strong opposition by various interest groups. Ibec, a group that lobbies for and represents businesses in Ireland and which ‘cumulatively employs over 70% of the private sector workforce’, was vocally anti-Carbon tax during original discussions with the government over the potential implementation of a carbon pricing mechanism in Ireland (Ibec, 2017) (Raidió Teilifís Éireann, 2007). Upon the recession and the general consensus on the necessity of raising taxes, most Non-ETS businesses and industries recognized that a carbon tax was one of the preferred options when compared to alternative taxation options. The external pressures on Ireland to raise revenues were very strong and the circumstances dire. This external pressure firmly outweighed most internal opposition to a carbon tax.
Compensation for business/industry in BC is fairly substantial. BC businesses and corporations have received substantial tax cuts, and more targeted funding via tax credits have been integrated into the carbon tax design over time. Corporate tax cuts were reversed by 1% of the promised 2%, and the government has heard some discord over this. Under the revenue neutral model, some businesses with low or no emissions still experience an advantage even with the reduced tax cut; thus there is no pressure from these sectors to remove the carbon tax as removal would likely result in an increase to taxes. Other funding mechanisms have been established as the carbon tax has evolved, including focused funding for the cement industry to enable a transition to cleaner fuels.

In BC, business was in essence not consulted or compensated substantively before the implementation of the carbon tax. In an interview with the Ministry of Finance and the Ministry of the Environment of BC, it was identified that, ‘they carried out only specific consultations for specific design issues that were identified, and no broad-based consultation’ (MFME/2017/02/02). The unexpected pro-environmental approach by the previously anti-environmental policy Liberal government in power at the time “took the business community by surprise” (JF/2017/03/06). It should be mentioned that substantial stakeholder consultation was completed for the general climate measures approach which the government was developing at the time and for pre-budget consultations. The government had announced in the 2007 throne speech that it would be implementing various climate measures as a priority, and some type of carbon pricing mechanism was among those measures identified, but specifics of the carbon tax approach were not stated (JF/2017/03/06) (WB/2017/02/17).

Industry and business, such as the BCBC, were heavily involved in these more general discussions, but concerns over proposed regulations and particularly legislation to reduce emissions were the primary focus at that time. One interviewee cited that, “we met with the cabinet committee on climate action chaired by the premier, met with various stakeholders, and the legislation finance committee held hearings in the fall of 2007 in the context of the government’s 2008 budget, and had a variety of other opportunities to interact with ministers and deputy ministers”. The general advice proposed by the BCBC was to slow down and do more analysis, work in a pan-Canadian
framework, and just ‘don’t do it’ (KC/2017/03/03). There was no focus on the specifics of a possible carbon tax design (JF/2017/03/06). It was only in post-implementation of the carbon tax that broader base stakeholders were consulted and had an impact on the design on the carbon tax. However, post-implementation, the government carried out open and genuine on-going consultation after implementation enabled the government to maintain the support of the key industries, or at least mitigate any significant opposition.

Australia’s carbon tax had extensive mechanisms and funding in place tied directly to the implementation of the carbon tax. Compensatory funding for households and businesses together allocated more funding than carbon tax revenues. The focused compensatory measures, on EITE industries in particular, were immense and included funding to mitigate up to 94.5% of carbon tax paid by these industries, and yet industry still strongly opposed the carbon tax. Although business and industry were consulted, compensated, and carefully considered, key industry still organized to oppose the carbon tax. The political temperature in regards to environmental policy was ice cold, with a strong opposition leader investing heavily in rhetoric and anti-carbon tax dialogue. It seems likely that industry saw an opportunity to stop paying the environmental tax, even if just temporarily. Indeed, a survey completed in 2012 of liable entities reported that, “79% of respondents expect that there will be a carbon price in Australia [in] 2020, and 81% by 2025. However, 38% expect the current carbon pricing legislation to be repealed by the end of 2015, and 40% by 2016. Yet half of those who expect repeal think that a carbon price will be re-instated by 2020. In other words, an overwhelming majority of the expert community surveyed think that there will be a price on carbon in the longer run, but a sizeable portion also think that the current legislation will not last – and implicitly, that it will be replaced by different legislation later in this decade” (Jotzo, 2012). It can be assumed that industry expected that if any climate action plan replaced the existing carbon tax plan, it would be minimally comprehensive (or at least less costly than the existing comprehensive plan) due to the political disaster that was environmental policy in Australia at the time. That gamble paid off for industry, with the subsequent climate policy barely touching on the comprehensiveness of the carbon tax, and certainly costing heavily emitting industries far less.
In a media release, the Australian Petroleum Production & Exploration Association (APPEA), representing Australia’s oil and gas industry, applauded the reversal of the carbon tax, citing the associated cost of the policy for the trade exposed industry (Australian Petroleum Production & Exploration Association, 2014). The Australian Trade and Industry Alliance (ATI) made up of a coalition of industry organizations (the Australian Chamber of Commerce and Industry, Australian Coal Association, Australian Retailers Association, Housing Industry Association, Manufacturing Australia and the Minerals Council of Australia), united under a common campaign using the catch-phrase, “carbon tax pain, no climate change gain’ which, according to ATI, “highlights the futility of the Government’s proposed scheme…it will impose massive costs for no material environmental dividend” (Minerals Council of Australia, 2011). The coalition’s position did not change over time. In 2013, a media release stated the firm position that the carbon tax must be removed, while a post-carbon tax reversal media release applauded the government for its decision to reverse the carbon tax (Business Council of Australia, 2013) (Business Council of Australia, 2014). In 2014, five power companies, out of the 370 total companies affected by the carbon tax, accounted for $2.03 billion of the total revenues, which is nearly half of the total (Business Spectator, 2014). It is not surprising that small groups of businesses that were strongly impacted were able to organize very successfully to promote a negative view of the carbon tax. Not only are these businesses large and wealthy, but the fact that only a small number of them were impacted enabled them to more readily organize and form a cohesive view.

One interviewee did cite that the perspective of the carbon tax among businesses was certainly not united. Rather, some industries and organizations were strongly and vocally against the carbon tax, while other industries and organizations kept quiet or simply were neither for or against the carbon tax. Some banks, for example, supported carbon pricing, as the potential for a tradeable ETS could be beneficial to the financial industry. A report titled Start-Up Compliance Costs of the Carbon Tax for Australian Liable Entities reported interesting findings, identifying that “a majority (60 per cent), supported the government’s plan for a clean energy future…A majority (62 per cent) believe that National Greenhouse and Energy Reporting will enable their businesses to make appropriate GHG emission investment decisions. Around 46 per cent of
respondents, “strongly disagreed” and “disagreed” to the statement, “carbon tax has caused investment uncertainty for my business” and 37 per cent “strongly agreed” and “agreed” …the implementation of the carbon tax did not cause investment uncertainty for a plurality of respondents (46 per cent).” (Rametse, 2014, pp. 16-17). These findings indicate that the response of business was far more complex than portrayed by mainstream media sources that tended to portray business as cohesively against the carbon tax. One study found that, “a powerful triumvirate campaigned against the law: mining companies, the conservative coalition parties and Rupert Murdoch’s newspapers. A study found that 82 percent of articles on the carbon tax in News Corporation’s Australian papers were negative” (Baird, 2014).

Support from industry is possible. It requires open dialogue and a willingness to try to address issues of competitiveness, though it appears to be feasible to provide this dialogue and openness after initial implementation (though acceptance of this approach may rest on various design decisions and their impact on business). There are multiple options and design components that can help gain the support of business, or to at least aid to mitigate opposition by business. A key insight is that acceptance of a carbon tax by business might have more to do with the coverage model (who is covered?) as opposed to the overall portion of GHG coverage in the economy by the carbon tax, though both appear to play a role. Industry, especially high emitters, dislike the concept of being singled out as the sole stakeholders to carry the cost of a carbon tax. Rather, business is more likely to support a carbon tax that is more dispersed.

Business/industry appear to be willing to entertain a carbon tax if they perceive fairness, and that the design of a carbon tax enables competitiveness to be maintained across jurisdictions. Enabling of competitiveness is a difficult concept to maintain for EITE industries as these businesses facing the increased costs from carbon tax that similar businesses in other jurisdictions may not face. A carbon tax can be designed to counter-act these competitiveness issues, perhaps with financial compensation. This type of approach is likely to gain the support of business, however, counteracting the financial impact of the carbon tax erodes the effectiveness of the carbon tax in reducing emissions and is not philosophically defensible. There may be an optimal balance that
can be determined, but more research is required on this topic. In addition, as seen in Australia, compensation does not guarantee the support of business/industry.

Greater business/industry compensation does not seem to directly equate to greater business/industry support. This appears particularly true if only the heaviest emitters are targeted, as even with substantial compensation, the overall cost is still focused on a small number of businesses that can easily organize and oppose the carbon tax. From an effectiveness lens, there is also concern that too much compensation can negate the impact of the price signal on emitters. A better approach, if feasible, may be similar to that of societal compensation: provide minimal initial compensation, but leave ‘room’ in the design to increase and provide compensation to business over time if opposition arises. There is certainly a risk of opposition to either approach.

Both Ireland and Australia implemented a carbon tax with high exemptions (if one considered the exemption of those industries covered under the EU ETS as a true exemption), yet of the two jurisdictions only Ireland maintained continuity. BC designed a carbon tax that began with minimal exemptions, yet also maintained continuity. In Australia’s case even though the intention was to transition into a cap and trade model, Australia’s initial application of a fixed price that applied only to its heaviest emitters (exempting all others) was in hindsight an error in design. A different carbon tax exemptions design that did not target a small number of high emitters may have helped mitigate the organization of a wealthy and highly motivated opposition of key industries that were targeted through the design.

Exemptions are undoubtedly a factor in continuity, but a design that includes high exemptions as part of the initial implementation of a carbon tax does not necessarily translate into high continuity. Rather, it may be a better strategy to design an initial carbon tax that has enough exemptions to gain support for its implementation, yet also minimizes exemptions as much as possible. After implementation, exemptions can be utilized as a political tool and increased as necessary to help mitigate opposition and maintain support. From a philosophical perspective, this strategy also helps to minimize
unnecessary exemptions that in turn can reduce the effectiveness of a carbon tax in reducing emissions.

It is important to establish dialogue with business in order to determine what type of design considerations might be politically palatable versus what design considerations might promote a strong negative reaction. This approach enables government to utilize design factors, such as exemptions, strategically. On the other hand, consultation has the potential to provide business with an opportunity to organize and oppose a carbon tax or to have a disproportionate impact on its design. In Australia, from the beginning, the government was open to consultation and to input from stakeholders about developing a carbon pricing mechanism. The government’s announcement that it would be introducing legislation to implement a carbon pricing mechanism in late 2011 included a statement that, “before this time, interested parties will have an opportunity to comment on draft legislation” (Australian Government, 2011). During the development of the design, the government completed careful consultation with experts, but also put out multiple papers for initial public discussion, initial design papers for public comment, and more detailed design paper for comment” (RD/2017/02/14). Experts helped develop the design, conducting “extensive modeling” for abatement goals and, in particular, in setting the rate. (Partnership for Market Readiness, 2017, p. 93). Even with substantial consultation and Australia’s attempt to attain the support of all relevant parties, the carbon tax was later reversed.

As with both compensation and exemptions, a better approach may be to provide minimal initial consultation, and substantially increase consultation and communication after the initial implementation of a carbon tax in order to adjust the carbon tax as needed to maintain continuity. This approach is not likely to be feasible in jurisdictions with strong sensitivity to environmental policies, as it risks a violent opposition that may be too strong to appease with reasonable exemptions and compensation. As a result, the outcome may be the reversal of the carbon tax policy, as seen in Australia. The balance between effectiveness, consultation, compensation, and exemption is difficult to determine in any concrete manner that may be transferable between jurisdictions.
Chapter 8.   Conclusions

8.1. Specific Design Component Conclusions

Revenue Use Design: Revenue neutrality can increase political feasibility, particularly to improve the political feasibility of implementation, but does not guarantee resilience. In contrast, it is likely that any revenue use model has the possibility of maintaining continuity under certain conditions, even a revenue raising model, particularly under external pressures and impetus.

Rate: Starting at a relatively low rate can aid in political acceptance and mitigate opposition. Over time, rate increases can be introduced successfully under the right conditions. Starting at a rate that is too high provides an opportunity for opposition to misconstrue the real impact of the carbon tax to the electorate. There is a likely maximum rate that the population is willing or able to sustain under different carbon tax designs (Carl & Fedor, 2016). Further research may provide better guidance in determining an acceptable, or at least most likely to succeed, range for setting the rate.

Fuel/Emissions Coverage: Broad coverage may appeal to business and industry over narrow coverage. A low percentage of emissions coverage does not seem to contribute substantially to resilience, nor does a high percentage of emissions coverage appear to contribute negatively to resilience. Coverage as it interacts with the emissions intensity of industry (and perhaps the economy) and the targeting of that coverage appears to have a greater impact on resilience. This conclusion deserves further exploration.

Societal (equity) Exemptions and Compensation: In order to maximize continuity and resilience, it is best to implement societal exemptions and compensation as required by the politics of the jurisdiction. While attempts to address any anticipated projected regressivity or inequality may be technically sound and ethically appealing, the
public does not appear to truly understand the mechanics of most strategies to address regressivity under a carbon tax policy. Even when the benefit is directly tied to the carbon tax, such as income tax cuts under a revenue neutral model, many of the electorate perceive the negative impact of the carbon tax to be either separate or bigger than the benefits provided to address the negative impact. It may be optimal to utilize benefits to put out or minimize political fires as they arise, rather than attempting to pre-emptively address any regressivity. Some initial benefits may be helpful to improve the political feasibility of first implementing a carbon tax, but beware of committing all benefits (and revenue available for benefits) at the very beginning. A carbon tax is a long-term strategy, and having the capacity to provide benefits if opposition arises is of value. In addition, perhaps of greater value than complex societal equity mechanisms is the value of public trust in the implementation of complex policy (including setting of the rate) that can be difficult to communicate in a concise way to the public. This is particularly true during an election period when opposing parties may leverage a lack of trust in order to promote an alternate view of the policy.

**Business/Industry (economic) Exemptions and Compensation:** Greater business/industry compensation does not seem to directly equate to greater business/industry support, at least not in a simplistic sense of a direct trade-off between extent of compensation/exemptions and its impact on continuity/resilience. This appears particularly true if only the heaviest emitters are targeted, as even with substantial compensation, the overall cost is still focused on a small number of businesses who can easily organize and oppose the carbon tax. From an effectiveness lens, there is also concern that too much compensation can negate the impact of the price signal on emitters. A better approach, if feasible, may be similar to that of societal compensation: provide minimal initial compensation, but leave ‘room’ in the design to increase and provide compensation to business over time if opposition arises. There is certainly a risk of opposition with either approach. It may be helpful to keep the motivation of business/industry front of mind: if an alternative is less costly for the majority of those impacted, that is the option that the majority impacted are likely to pursue.
8.2. Generalized Carbon Tax Resilience and Continuity

Conclusions

There is a trade-off between resilience and effectiveness. A very ineffective carbon tax is unlikely to face strong opposition, particularly if the political climate is impartial towards environmental policy upon its implementation. With that said, it is difficult to justify philosophically a very weak and ineffective carbon tax. An effective carbon tax does impose a cost on society, yet that cost is the pressure that pushes societal change in investment and behaviour. The key is to implement a carbon tax that maximizes its effectiveness within the bounds of what is politically feasible in that jurisdiction. It is better to have a weak carbon tax than no carbon tax. Complementary environmental policies can be implemented to address additional environmental challenges.

Utilize policy windows, and opportunities provided through the impetus of external pressure, with due care: Opportunities to leverage external pressures in order to implement a carbon tax may present themselves. For example, a recession, or political pressure via international accords or climate commitments may help open a policy window for the implementation of a carbon tax. However, jurisdictions should take care to judiciously balance these types of opportunities with the reality of the internal political environment and pressures. In Australia, Prime Minister Rudd was so strongly attached to the idea of Australia’s participation in international climate agreements and as climate leaders, that he failed to comprehend the reality of the political temperature in Australia at the same time. Various political mis-steps and a strong opposition leader who successfully political co-opted the carbon tax as a key election issue, resulted in the reversal of Australia’s carbon tax. In Ireland, the government recognized the risk of implementing a carbon tax as was being considered in 2006 due to a strong opposition to a carbon tax policy by various stakeholders, as identified through substantive consultation. After the 2008 recession, it was clear that opposition would be minimal, and the government successfully took advantage of leveraging the broader impetus in order to successfully implement a carbon tax.
There is no one-size-fits-all best approach: A carbon tax can be successful by utilizing a ‘textbook’ design, allowing for adjustments as required, or a complex design that attempts to maximize support and effectiveness. It can be a design that is set in stone, providing stability and predictability that may garner support, or one that leaves substantial room for flexibility as a deeper understanding of a carbon tax in one’s jurisdictions evolves, allowing for changes that may help maintain continuity. There is not one size fits all approach that should be implemented across every jurisdiction. Rather, the most important consideration in designing a carbon tax for continuity and resilience is tailoring the design and approach to one’s jurisdiction. Without a deep understanding of one’s jurisdictional pressure points and triggers, even a ‘textbook’ design that appears to ‘do everything right’ can fail. A lack of jurisdictional understanding also has the potential to open doors to cooptation of the design of a carbon tax. The inclusion of unnecessary exemptions in the design due to an invalidated fear that key industry will oppose a carbon tax can unnecessarily reduce the effectiveness of a carbon tax. Carl and Fedor (2012) summarize the reality of the implementation of carbon taxes best by stating that; “The path of even something as seemingly straightforward as a revenue-neutral carbon tax—from economic theory, through the political process, to real-world implementation—is in fact long and winding” (Carl & Fedor, Revenue-Neutral Carbon Taxes in the Real World, 2012).

Don’t spread the benefits too thin: Do not try to please everyone. ‘Sell’ the right design feature to the right stakeholder: Industry and business interests tend to understand the consequences of different taxation models and methods on their business and bottom line and will respond accordingly. The public does not tend to understand these types of complexities of carbon tax design, and often fails to see the benefit of a carbon tax beyond a tax increase. The public will however understand simple concepts such as the increased cost of filling their car with fuel, or a ‘tax grab’, or increased taxes. Australia spread the benefits too thinly, attempting to address as many equity concerns as possible, mitigate the impact of the tax on households, and small businesses. While conceptually this approach made sense, had appeal, and was based on substantial consultation, it was simply too complex for the average individual to understand, and far too open to political cooptation. Clear and measurable benefits and
costs, applied through a simplistic model that is easy to communicate, are key to maintaining the support of the electorate and preventing political cooptation of the issue.

**Beware of targeting a small group of powerful emitters:** If a government aims to introduce a carbon tax in a jurisdiction with a high reliance on emissions intensity in its economy and a high reliance on emissions intensive energy sources, it must be applied with extreme attention and care paid to the surrounding political environment. This is particularly true if a small number of entities are impacted substantially and also contribute substantially to the economy. The ratio of EITE industries that are targeted, versus non-EITE industries appears to matter (and likely the emissions intensity of major industries in a jurisdiction). It is beneficial not to channel the costs too narrowly.

**Use a well rounded multi-disciplinary approach:** It is rare that any one design decision can or should be made independent of other design decisions and jurisdictional tailoring. Rather, part of the challenge of designing a carbon tax for resiliency is that fact that so many of the design decisions are interconnected and predicting the impact of different design decisions is incredibly complex. A carbon tax should be designed with due care and consideration. Beware a failure to integrate the point of view and knowledge base of various interest groups and government sectors. Rather, develop a well-rounded perspective that can be layered over the technical design decisions.

**Maintain open channels of communication with key stakeholders:** Australia completed substantial consultation with stakeholders over time as discussions around implementing a carbon pricing mechanism evolved. The design was carefully cultivated to integrate the views of various stakeholders. Later, failures in consultation and communication particularly with the electorate contributed to the politicization of the carbon tax, leading to its eventual reversal. Ireland and BC both maintained communication channels and consulted with stakeholders throughout the implementation of the carbon tax. While this led to changes to the design, notable in increased political interventions in the form of exemptions or funding for key stakeholders, both carbon taxes maintained continuity over time. Strong on-going consultation with stakeholders may be crucial to the continuity of a carbon tax. Pre-implementation consultation may be substantial, as in Australia, but if on-going
consultation and communication falls short in maintaining a strong grasp of the perceptions of key stakeholders, a carbon tax faces the possibility of reversal.

A carbon tax “has to be introduced in a smart way that gains a social licence” (AP/2017/02/22). For example, in some jurisdictions, passing a carbon tax may be very challenging and one might choose to advocate for a more palatable but less effective carbon tax, while looking for opportunities to advance its effectiveness in the future (AP/2017/02/22).

Timing is key, wait for optimal circumstances, or at least minimize risky circumstances: Elections are risky tipping points in the continuity of a carbon tax policy. The support of the public is especially crucial if a carbon tax is implemented shortly prior to an election. If there is a clear risk of political cooptation of a carbon tax by the opposing party (as in the case of Australia), it may be of value to follow Ireland’s example and delay the implementation of a carbon tax until a time when it would be less likely to be politicised by the opposition party. A factor that may help a carbon tax maintain continuity is one that is implemented by the party which leans furthest to the right, or at least a party that is not typically environmentally focused but instead typically focused on business and the economy. Political co-optation may be less likely to occur or to be successful if the opposing party is more left leaning and a typically pro-environmental party as opposition to environmental policies is likely to alienate their voter base. A carbon tax that caters to business as needed for their support and is fair while still remaining effective at reducing emissions can garner the support of business, particularly if it appears that the other option might be a ‘worse deal’ for business/industry in terms of a design that might be utilized by a more left leaning party.

The importance of the timing of implementation of a carbon tax cannot be exaggerated. Timing is also the most challenging factor to control, due to the difficulty of predicting timelines and the added challenge of political cycles. A pro-carbon tax political party/government that is considering the implementation of a carbon tax should keep in mind that a carbon tax is a long-term policy option. It needs to remain in place over the long run in order to have the desired impact. If an analysis of the timing of implementing a carbon tax reveals risk of political cooptation or strong business or public opposition, it
may be better to wait for more opportune timing than to risk the reversal of a carbon tax policy and the negativity towards carbon tax policies that a reversal may evoke among business and the public. As one interviewee summarized, “you have to capture the pragmatic opportunities of your long-term agenda with the realities of transition" (AP/2017/02/22). Timing is an important background factor to consider and attach in one’s analysis to the other more tangible considerations and carbon tax design options. While ‘timing’ may be hard to conceptualize or control as a design decision on its own, it can be crucial in its alignment with other design factors that can be controlled. For example, the interaction of timing and public consultation, or timing and scheduled rate increases. It is not wise to schedule a substantial rate increase shortly before an election, unless one is certain that the majority of the electorate supports what they may perceive as a ‘tax grab’.

### 8.3. Final Key Takeaways

1) **Do not underestimate the impact of the political climate of the time:** Do not assume that following ‘textbook’ recommendations will lead to resilience or political acceptance of a carbon tax policy. In contrast: jurisdictional tailoring and an ability and willingness to understand and react to jurisdictional political pressures is crucial.

2) **Do not spread the ‘benefits’ too thin:** There will always be winners and losers under a carbon tax. Don’t try to address every one. Focus on the key players as needed and put out political fires at the key stages of risk to resilience, as they evolve (e.g. upcoming election) rather than trying to predict where fires will break out over time in advance. Be prepared to put out fires, but maximize related resources wisely.

3) **Jurisdictional tailing is vital, but key design features are likely to contribute positively to resilience:** Revenue neutrality and a low starting rate are key design features. While they do not guarantee resilience, they can contribute to the resilience of a carbon tax policy. Less straightforward are design decisions regarding societal and business/industry compensation and exemptions, and emissions/fuel coverage decisions.
References


## Appendix A: Chart of Interviewees by Jurisdiction

<table>
<thead>
<tr>
<th>Jurisdiction</th>
<th>Interviewee</th>
<th>Interviewee Description</th>
<th>Date of Interview</th>
<th>In-Text Citation Code</th>
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<tr>
<td>1 Ireland</td>
<td>Ciaran Conroy</td>
<td>Tax Policy; *Department of Finance *Please note that Ciaran’s views are his own and do not necessarily represent the official views of Ireland’s Department of Finance</td>
<td>2017/01/23</td>
<td>(CC/2017/01/23)</td>
</tr>
<tr>
<td>2 Ireland</td>
<td>Sue Scott</td>
<td>Former Head of environment policy research at the Economic and Social Research Institute, Dublin</td>
<td>2017/02/24</td>
<td>(SS/2017/02/24)</td>
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<tr>
<td>3 Ireland</td>
<td>Louise Dunne</td>
<td>Research Manager: Architecture, Planning &amp; Environmental Policy: University College Dublin</td>
<td>2017/01/17</td>
<td>(LD/2017/01/17)</td>
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<tr>
<td>4 Ireland</td>
<td>Seán Lyons</td>
<td>Associate Research Professor; Economic and Social Research Institute Adjunct Professor; Department of Economics; Trinity College Dublin</td>
<td>2017/01/26</td>
<td>(SL/2017/01/26)</td>
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<tr>
<td>5 Ireland</td>
<td>Richard S.J. Tol</td>
<td>Professor, Department of Economics, University of Sussex</td>
<td>2017/01/24</td>
<td>(RT/2017/01/24)</td>
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<tr>
<td>7 Ireland</td>
<td>Mark Dearey</td>
<td>Louth County Councillor, Member of Louth County Council, Green Party of Ireland</td>
<td>2017/01/24</td>
<td>(MD/2017/01/24)</td>
</tr>
<tr>
<td>8 Australia</td>
<td>Roger Dargaville</td>
<td>Deputy Director, Melbourne Energy Institute Lecturer in the School of Earth Sciences, University of Melbourne</td>
<td>2017/02/14 (PST)</td>
<td>(RD/2017/02/14)</td>
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<tr>
<td>9 Australia</td>
<td>Tony Wood</td>
<td>The Grattan institute, Energy Program Director</td>
<td>2017/07/10 (PDT)</td>
<td>(TW/2017/07/10)</td>
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<tr>
<td>11 Australia</td>
<td>Alan Pears</td>
<td>Senior Industry Fellow, RMIT University</td>
<td>2017/02/22 (PST)</td>
<td>(AP/2017/02/22)</td>
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<tr>
<td>12 Australia</td>
<td>Marc Hudson</td>
<td>PhD Candidate, Sustainable Consumption Institute, University of Manchester</td>
<td>2017/02/25</td>
<td>(MH/2017/02/22)</td>
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<tr>
<td>12 Australia</td>
<td>Anonymous</td>
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<td>Ministry of Finance</td>
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<td>Interviewee Description</td>
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<td>Ministry of the Environment</td>
<td>2017/02/02</td>
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<td>B.C.</td>
<td>Kathryn Harrison</td>
<td>Acting Dean, University of British Columbia Professor, Political Science, University of British Columbia</td>
<td>2017/02/16</td>
<td>(KH/2017/02/16)</td>
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<tr>
<td>B.C.</td>
<td>Marc Lee</td>
<td>Senior Economist, Canadian Centre for Policy Alternatives, BC Office</td>
<td>2017/02/22</td>
<td>(ML/2017/02/22)</td>
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<tr>
<td>B.C.</td>
<td>Nancy Olewiler</td>
<td>Professor of Economics and Director of the Public Policy Program, Simon Fraser University</td>
<td>2017/02/21</td>
<td>(NO/2017/02/21)</td>
</tr>
<tr>
<td>B.C.</td>
<td>Dale Beugin</td>
<td>Research Director, Canada's Ecofiscal Commission</td>
<td>2017/02/23</td>
<td>(DB/2017/02/23)</td>
</tr>
<tr>
<td>B.C.</td>
<td>Jock Finlayson</td>
<td>Executive Vice President and Chief Policy Officer, Business Council of British Columbia</td>
<td>2017/03/06</td>
<td>(JF/2017/03/06)</td>
</tr>
<tr>
<td>B.C.</td>
<td>Ken Carrusca</td>
<td>Vice President of Environment and Marketing (Western Region) for the Cement Association of Canada</td>
<td>2017/03/03</td>
<td>(KC/2017/03/03)</td>
</tr>
</tbody>
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Appendix B: Project Limitations

There are layers to carbon tax policies that deserve due consideration, but which are beyond the scope of this paper. Some questions that might come to mind follow:

*Why use term ‘Carbon Tax’ for all three jurisdictions even though they don’t all use that term?*

The use of the term ‘carbon tax’ for all jurisdictions simplifies the discussion and minimizes confusion. Australia referred to their carbon tax as a fixed rate carbon pricing system with a planned transition to a cap and trade model after two years. The carbon pricing legislation was reversed prior to the switch to a cap and trade system. Ireland labelled their carbon tax as a ‘Carbon Levy’, but this appears to have simply been a strategy to avoid referring to the pricing as a ‘tax’. British Columbia consistently refers to its carbon tax as a ‘revenue neutral carbon tax’, drawing attention to its number one ‘selling’ feature. For the purpose of comparing these three jurisdictions for the following research, a carbon tax by any other name is still a carbon tax.

*Why are some industries examined and interviewed and others not? Why are some examined in one jurisdiction and not the others?*

This research did not capture a full view of all major industries impacted by or that impacted the carbon tax in each jurisdiction. While such comprehensive research would be fascinating to undertake, a full exploration of all industries in each jurisdiction was simply beyond the scope of this paper. Additionally, some industries in some jurisdictions were more willing to speak candidly than others.

*Why are some important design features excluded from this research?*

Not all technical design factors were examined for each jurisdiction examined in this research. For example, the design feature of ‘compliance’ is an important feature but is not examined through this research. It was simply not possible to examine every facet of technical design. Less relevant factors were discarded for various reasons, mainly based on a lack of insight into that feature, where-as other features were commonly referenced through the interviews and case study research.
**Why is the issue of ‘carbon leakage’ mostly ignored?**

While some discussion of leakage occurs within the bounds of this research, it is an extremely complex topic requiring more and detailed research of its own. While leakage is certainly an important concern for jurisdictions implementing a carbon tax policy, it was beyond the scope of this paper to include this feature in any substantive light.

**What limits are there to applying the outcomes of this research to other jurisdictions?**

The reader should be aware that the conclusions of this paper are based on the three limited case studies. There is risk to applying conclusions from a limited case study to any other jurisdiction as outcomes may differ (Convery, Dunne, & Joyce, 2013, p. 34). When it comes to carbon taxes, one cannot simply ‘copy and paste’ from one jurisdiction to another. Rather, carbon taxes should be tailored to a jurisdiction in order to maximize continuity and resilience. It is hoped that this message is communicated with clarity through this research. While there are insights and interesting trends identified throughout the comparative analysis that have the potential to be applied in other jurisdictions, it is more the mode of thinking and key decision making nodes and their outcomes that should be applied to other jurisdictions considering the implementation of a carbon tax, rather than simply taking the outcomes as ‘law’ or applying the same design as a jurisdiction that has to date successfully maintained continuity of a carbon tax.
Appendix C: Basic Interview Questions

Interview Questions

Introduction

I am interested in developing a deeper understanding of the process of the introduction of a carbon tax in developed democracies, as related to government decision making regarding the design of a carbon tax. More particularly, I am interested in identifying factors which contribute positively (or negatively) to the political feasibility of a carbon tax. I am hoping to identify key factors which evoke support or opposition to a carbon tax among key stakeholders, and why. In addition, applying these insights through a lens of continuity/resilience and effectiveness of carbon taxes.

General carbon tax design question:

What societal components and which stakeholders influenced the design of the carbon tax in terms of government decision making, and to what extent?

Key government decision making nodes of carbon taxes:

Revenue use, compensation/equity considerations, industry exemptions and compensation, starting rate, rate increase, types of fuels taxed, transparency, future policy changes, timing of implementation, compliance by tax payers

Questions:

- To what degree and how did Interparty consensus/degree of environmental policy polarity/opposition parties impact the design? (Political structure? Voting structure?) Of which design components? (How do these components interact with the continuity/resilience of the carbon tax?)

- Which stakeholders had the most significant impact (and how) on the design? Which had the least? Why? (How do these components interact with the continuity/resilience of the carbon tax?)

- To what degree and how did public opinion (support or opposition) influence the design of the carbon tax? Of which design components? (How do these components interact with the continuity/resilience of the carbon tax?)

- To what degree and how did equity considerations impact the design? Of which design components? Which stakeholders were or are most relevant to
this component? (How do these components interact with the continuity/resilience of the carbon tax?)

- To what degree and how did Industry ability to organize, Industry ties to government/history of influence or ties to gov’t, Industry strong internal consensus w/minimal members, or Industry access to “formal” power resources (unions and trade organizations) impact the design? Of which design components? (How do these components interact with the continuity/resilience of the carbon tax?)

- To what degree and how did the media impact the design? Of which design components? (How do these components interact with the continuity/resilience of the carbon tax?)

- To what degree and how did compliance considerations (of entities paying the tax) impact the design? Of which design components? (How do these components interact with the continuity/resilience of the carbon tax?)

- To what degree and how did concerns over competitiveness of the economy impact the design? Of which design components? (How do these components interact with the continuity/resilience of the carbon tax?)

- To what degree did reliance on carbon heavy sectors impact the design? Of which design components? (How do these components interact with the continuity/resilience of the carbon tax?)

- To what degree and how did the economic climate impact the design? Of which design components? (How do these components interact with the continuity/resilience of the carbon tax?)

- To what degree and how did emissions reduction goals impact the design? Of which design components? (How do these components interact with the continuity/resilience of the carbon tax?)
### Appendix D: Initial Criteria and Measures Table

#### Table D.1. Comparing the Outcomes of Policy Options/Considerations Through a Lens of Continuity

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<td>Extent of Emissions Intensive economy</td>
<td>Importance of Reliance on Emissions to Implementation and Continuity. Extent of Emissions Intensive economy Relative Comparison Using HML, Qualitative Analysis CO2 Emissions per Capita % of emissions from electricity and heat generation CO2 emissions (kg per 2010 US$ of GDP) Carbon Intensity of Economy Carbon Intensity of Final Energy</td>
<td>Did the jurisdiction maintain continuity? Yes or no.</td>
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