

A Comparison of Carbon Emission Trading Systems in New Zealand and Canada: Diversity is Not a Virtue in Carbon Law and Policy

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Carbon emission trading has emerged as a primary means to address climate change. Trading systems operate across the globe, and the linkage of these systems will be a component in the post-Kyoto international climate framework. This paper examines the design and operation of trading systems in Alberta, Quebec, and New Zealand. The paper evaluates each of these systems in relation to (1) its impact on reducing carbon emissions, (2) its effectiveness at price discovery for carbon, and (3) its potential to link

with other systems. The paper concludes that the cap-and-trade system operating in Quebec is superior on each of these measures. This study also highlights the diversity in carbon law and policy across jurisdictions today, and suggests that international climate negotiations should focus on the development of common design parameters to guide the operation of national or subnational carbon emission trading systems going forward.

L'échange de quotas d'émissions de carbone s'est imposé comme un des principaux moyens pour mitiger les changements climatiques. Des systèmes d'échange se sont établis partout à travers le monde et leur harmonisation sera un élément important de la structure climatique internationale post-Kyoto. Cet article examine la structure et le fonctionnement des systèmes d'échange de l'Alberta, du Québec et de la Nouvelle-Zélande. À ces fins, il évalue chacun de ces systèmes relativement à (1) leur impact sur la réduction des émissions de carbone, (2) leur efficacité quant à la détermination du prix

du carbone, et (3) leur jonction potentielle avec les autres systèmes. L'article en vient à la conclusion que le système de plafonnement et d'échange en vigueur au Québec domine dans chacun de ces aspects. Cette étude souligne également la diversité actuelle du droit et des politiques du carbone parmi toutes les juridictions et suggère que les négociations internationales sur le climat devraient se concentrer autour du développement de paramètres communs afin d'augmenter l'efficacité des systèmes d'échange d'émissions de carbone nationaux ou infranationaux.

Titre francophone : Comparaison entre les systèmes d'échange d'émissions de carbone en Nouvelle-Zélande et au Canada : La diversité n'est pas une vertu dans le droit et la politique du carbone

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1. INTRODUCTION

Climate change resulting from excessive carbon¹ emissions has been labelled the world's "ultimate commons problem."² More specifically, climate change is an open-access commons problem. This arises when individual actors seeking to maximize their well-being deplete a resource because each actor has unimpeded access to the resource and everyone rushes to consume until the resource is depleted, or worse, has collapsed.³ The application of the commons problem to explain the decline or collapse of commercially harvested ocean fish populations is perhaps the most well-known application of this theory to environmental catastrophe.⁴

The global climate commons problem is one of excessive accumulation rather than depletion, but the essential parameters of the issue remain the same: the overall cost of excessive carbon emissions accumulating in the atmosphere is not internalized by individual actors. In the absence of controls, we all have unconstrained liberty to emit carbon into the atmosphere and will continue to do so because the marginal benefit of activities such as burning fossil fuel exceeds the marginal cost of associated carbon emissions that lead to climate change.

¹ In this paper reference to carbon is intended to represent carbon dioxide and the suite of greenhouse gases treated as its equivalent.

² Robert N Stavins, "The Problem of the Commons: Still Unsettled after 100 Years" (2011) 101:1 *American Economic Review* 81 at 96-103 [Stavins, "The Problem of the Commons"].

³ Elinor Ostrom, *Governing the Commons: The Evolution of Institutions for Collective Action* (New York: Cambridge University Press, 1990) ch 1.

⁴ *Ibid*, ch 5.

The current rate of carbon emissions from human activity and the overall accumulation of carbon in the atmosphere are at unprecedented levels.⁵ Carbon emissions from human activity are identified as a contributing factor to the loss of arctic sea ice, rise in sea levels, ocean acidification, and extreme climate events such as heat waves, drought, floods, and wildfires.⁶ Species extinction and habitat loss is also attributed to human-induced climate change.⁷ Economic loss resulting from weather or climate related events has increased substantially across the globe in recent decades.⁸

The need to address excessive carbon emissions with international and national control measures was formally endorsed with the creation of the *United Nations Framework Convention on Climate Change*⁹ in March 1994. The Convention led to the development of the *Kyoto Protocol* in 1997 and the commitment therein by signatory industrial nations listed in Annex I to reduce their carbon emissions by an average of 5 percent below 1990 levels over the duration of an initial commitment period between 2008 and 2012.¹⁰ A key aspect of the *Kyoto Protocol* was the establishment of a carbon emission trading program between signatory nations and an international cap-and-trade framework for carbon emissions.¹¹

This market-based regulation has since eclipsed traditional command-and-control regulation as the preferred policy tool for placing controls on carbon emissions because it focuses on efficient reductions; in other words, an overall reduction in carbon emissions at the lowest possible cost. The ascendance of a cap-and-trade scheme to address climate change is not really a surprise. Economists have advocated for this sort of market-based regulation to address a commons problem since the mid-twentieth century, and in particular to address excessive emissions.¹²

⁵ Intergovernmental Panel on Climate Change, *Climate Change 2014: Synthesis Report*, IPCC, 2014 at 9–11, online: <ipcc.ch/pdf/assessment-report/ar5/syr/SYR_AR5_FINAL_full.pdf>.

⁶ *Ibid* at 10–16.

⁷ *Ibid* at 15.

⁸ *Ibid* at 16.

⁹ *United Nations Framework Convention on Climate Change*, 9 May 1992, 1771 UNTS 107 (entered into force on 21 March 1994).

¹⁰ *Kyoto Protocol to the United Nations Framework Convention on Climate Change*, 11 December 1997, 2303 UNTS 148, 37 ILM 22 (entered into force February 16, 2005) art 3, online: United Nations Framework Convention on Climate Change <unfccc.int/resource/docs/convkp/kpeng.pdf>.

¹¹ For an overview of the *Kyoto Protocol* and the mechanics under the protocol to address carbon emissions reduction: see United Nations, “Kyoto Protocol”, *Framework Convention on Climate Change*, online: <unfccc.int/kyoto_protocol/items/2830.php>.

¹² The seminal work here includes Ronald Coase, “The Problem of Social Cost” (1960) 3 *JL & Econ* at 1 and JH Dales, *Pollution, Property & Prices: An Essay in policy-making and economics* (Toronto: University of Toronto Press, 1968) ch VI. More recent work includes Robert N Stavins, “Experience with Market-Based Environmental Policy Instruments” in Karl-Göran Mäler & Jeffrey Vincent, eds, *Handbook of Environmental Economics, Volume 1: Environmental Degradation and Institutional Responses* (Burlington: Elsevier, 2003) 355; Thomas H Tietenberg, *Emissions Trading: Principles and Practice*, 2d ed (Washington: Resources for the Future, 2006). The most important implementation of a market-based trading system to address excessive emissions is the United States acid rain program used to control sulphur dioxide emissions: see Robert N Stavins, “A Meaningful U.S. Cap-And-Trade System To Address Climate Change” (2008) 32:2 *Harv Envtl L Rev* 293 at 300 [Stavins, “A Meaningful U.S. Cap-And-Trade System”].

The primary objective of market-based regulation as a control on carbon emissions is to assign a price to the externality of emissions accumulation in the atmosphere, such that we more accurately internalize the emissions cost into production decisions and generate incentive for emitters to lower their level of emissions.¹³ Emissions allowance trading provides those with a relatively high marginal cost of actual emissions abatement with the option to acquire entitlements to emit from others with a lower marginal cost of emissions. Likewise, those with a relatively low marginal cost of actual emissions abatement have an incentive to maximize emissions reduction and profit by selling excess entitlements into the market. The result in theory is that the commons resource is not depleted because the market assigns a price to emissions and costs rise as overall emissions accumulate so we do not over pollute, and allowing emitters to trade entitlements between themselves ensures emissions abatement is implemented by those with the lowest marginal cost thereby ensuring an overall reduction occurs at the lowest possible cost to society.¹⁴

Despite the fact that the *United Nations Framework Convention on Climate Change* was signed two decades ago and has almost 200 signatory nations, achieving international consensus on how to reduce emissions remains elusive. The *Kyoto Protocol* has enjoyed some success as a regulatory initiative to address excessive carbon emissions in the global atmosphere, but its shortcomings have policymakers searching for a new international law and policy framework.

Perhaps the strongest legacy of the *Kyoto Protocol* is that it fostered the development of regional and national carbon emissions trading systems. The European Union established a multi-national carbon emissions trading system back in 2005 to facilitate compliance with the *Kyoto Protocol*.¹⁵ Another example is the New Zealand emission trading system, which commenced in 2008 as a means for New Zealand to satisfy its commitment under the *Kyoto Protocol*. Carbon emission reduction obligations and, in particular, carbon trading markets have been slow to develop in North America. However, Canada and the United States are home to several sub-national carbon emission trading systems, including markets in California, Quebec, and Alberta. Other countries flirting with carbon trading schemes include China, South Korea, and Mexico.¹⁶

The shortcomings of the *Kyoto Protocol* include the fact that nations with large carbon emission profiles, such as China and India, do not have emissions reduction obligations, and achieving the reduction targets for the first compliance period ending in 2012 were unrealistic. Further, as international law, the *Kyoto Protocol* applies to signatory nations rather than to emitters themselves. The second commitment Kyoto period will expire in 2020 and following,

¹³ See generally *ibid.*

¹⁴ Stavins, "The Problem of the Commons", *supra* note 2 at 92-103.

¹⁵ See EC, *Commission Directive 2003/87/EC of the European Parliament and of the Council of 13 October 2003 establishing a scheme for greenhouse gas emission allowance trading within the Community and amending Directive 96/61/EC*, [2003] OJ, L275/32. For a detailed overview of the European Union trading system see Ellerman, Convery & De Perthuis, *Pricing Carbon: The European Union Emissions Trading Scheme* (New York: Cambridge University Press, 2010).

¹⁶ See International Emissions Trading Association, "The World's Carbon Markets: A case study guide to emissions trading" (2014) online: International Emissions Trading Association <ieta.org/worldscarbonmarkets>.

a new international legal framework will succeed the current *Protocol*.¹⁷ The difficulties with Kyoto have led some commentators to suggest the new framework will be a “bottom up” arrangement whereby regional or national carbon emission regulatory schemes are linked together and form a global carbon market.¹⁸

Consistency or harmonization in design features across regional and national carbon emission trading schemes may not be essential to form a global carbon market out of linked regional and national systems, but it is clearly an important consideration in this “bottom up” arrangement. The purpose of this study is to assess the extent to which the Alberta, Quebec, and New Zealand schemes are consistent in design and operation, and hopefully shed some light on the difficulties which lie ahead in the pursuit of a global carbon market consisting of linked regional systems. The study compares the three carbon emission trading systems on the following four design features: (1) the emissions cap, (2) the scope of coverage in regulated emitters, (3) the allocation of entitlements to emit carbon, and (4) measures used to control compliance costs. Section 2 of the paper explains why these criteria are used for the comparison, and gives an overview of these four elements and some variations in their design.

Why use Alberta, Quebec, and New Zealand as subjects for this study? These jurisdictions were chosen for a number of reasons including the simple reality that the author had some familiarity with the mechanics of each regime before undertaking the research and spent several months in New Zealand during early 2014. Collectively these three jurisdictions also provide a sample of the diversity in carbon law and policy existing today, each has a carbon emissions compliance obligation and some form of trading market but the mechanics of each system is very different. New Zealand also provides an informative comparison with the Canadian systems because of key similarities amongst the two nations. Public policy in both Canada and New Zealand is influenced to some extent by a larger neighbour and carbon policy is no exception. Each country has export-driven economies with a large resource industry capable of influencing public policy on carbon emissions. Both Canada and New Zealand are former British colonies and thus their respective legal systems share common attributes in relation to the structure and function of legal institutions, the legislative process, and the common law. Legal process can thus be ruled out as a variable in the comparative study.

After setting out the comparative framework in section 2, the paper examines the law and policy governing carbon emission trading in New Zealand. New Zealand established the world's first national carbon emission trading system (NZ ETS) in conjunction with the commencement of the first Kyoto commitment period in 2008. The analysis in section 3 identifies notable policy choices made by New Zealand in establishing the NZ ETS and imposing carbon emissions obligations on economic actors. The discussion also examines the legal framework in some detail.

Section 4 describes the law and policy governing the carbon emissions regulatory framework in the Canadian provinces of Alberta and Quebec. Some readers may ask why this study would

¹⁷ For a very general overview of current international developments: see United Nations, “Towards a Climate Agreement”, *UN and Climate Change*, online: <un.org/climatechange/towards-a-climate-agreement>.

¹⁸ See e.g. Judson Jaffe & Robert N Stavins, “Linkage of tradable permit systems in international climate policy architecture” in Joseph E Aldy & Robert N Stavins, eds, *Post-Kyoto International Climate Policy: Implementing Architectures for Agreement* (New York: Cambridge University Press, 2010) 119 at 136-141.

have a provincial focus instead of a national focus in Canada. The reason is simply that national policy leadership on carbon emissions is almost non-existent in Canada. Forests have fallen as the federal government mulls over policy alternatives to address carbon emissions.¹⁹ Moreover, the current federal plan does not incorporate market-based policies to address climate change, instead relying on proposed command-and-control regulations to limit the intensity of carbon emissions generated by coal-fired power plants.²⁰ In the absence of national direction, several provinces have implemented their own market-based carbon emissions regulatory schemes. At this time, Alberta and Quebec are the only Canadian jurisdictions with legal rules that contemplate a carbon market.

The last section of the paper compares the design features in each of the three systems to make some observations in relation to: (1) the impact of each scheme thus far on reducing carbon emissions, (2) the effectiveness of the carbon trading system on price discovery for carbon emissions, and (3) the potential for linkage between regional systems. The substantive rules of the three carbon emission trading systems studied here vary extensively on each of the four design features set out in section 2. Each jurisdiction has a unique approach to setting an emissions cap and allocating entitlements into the market, draws its own line on the scope of coverage for compliance obligations, and has its own take on the importance of controlling compliance costs. This paper concludes the Quebec cap-and-trade system is the most effective of the three in achieving the goal of carbon emissions reduction and price discovery on the entitlement to emit carbon.

This study also demonstrates the need for international oversight on the design features of regional, national, or subnational carbon emissions trading systems and their governing regulatory framework. If indeed the post-Kyoto international carbon policy will rely on the formation of a global carbon market realized from a collection of regional, national, and subnational schemes, then international climate negotiations should be focused on developing a common set of parameters to guide the formation of national and subnational carbon emissions trading systems which are consistent or harmonized to the greatest extent possible.

2. DESIGN FEATURES IN CARBON EMISSION TRADING SYSTEMS

The effectiveness of a carbon emission trading system to assign a price on carbon often hangs in the balance of political manoeuvring and power struggles. The design and operation of the regulatory framework involves many policy decisions, each of which has significant implications. As has been noted elsewhere,²¹ there is a strong role for the state in the creation and operation of a carbon market. For example, government officials must set the overall emissions cap to generate conditions of scarcity necessary for price discovery on the costs of emitting carbon. The carbon market alone does not limit emissions. As such, the amount of actual emissions reduction in a given jurisdiction depends entirely on the policy decision to set the cap and prescribe the quantity of allowable emissions. Likewise, the state determines who must comply with the emissions limit. The emissions cap may apply to the entire economy or it may

¹⁹ For some discussion on previous federal initiatives: see Alastair R Lucas & Jenette Yearsley, "The Constitutionality of Federal Climate Change Legislation" (2012) 23:3 J Envtl L & Prac 205.

²⁰ See Government of Canada, *Canada's Action on Climate Change*, online: <climatechange.gc.ca>.

²¹ See generally Markus Lederer, "Market Making via Regulation: The Role of the State in Carbon Markets" (2012) 6:4 Regulation & Governance 524.

only apply to a specified group of emitters and economic actors with strong political influence may pressure policymakers to exempt them from emission reduction obligations. A limited scope of regulated emitters may be more palatable for political reasons and administrative ease; however a small number of participants reduces the scope of emissions reduction and reduces the number of traders in the carbon market and its liquidity which, in turn, affects the ability of the market to set prices.

The role of politics in the design and operation of existing carbon schemes is readily apparent. Regulatory frameworks tend to exclude certain economic sectors from compliance obligations and/or impose less onerous reduction obligations on them. These excluded sectors are often those with strong political influence. As is shown in section 3, the New Zealand system, for example, does not impose emissions reduction on agricultural activities despite the fact this sector accounts for about 50 percent of the nation's total carbon emissions. This political character ensures that carbon emission trading schemes will vary in design across jurisdictions.

There is a vast amount of literature on carbon emission trading schemes, and much of it looks at design issues such as establishing the emissions cap or deciding how entitlements to emit are distributed into the market. A survey of the literature indicates there are four key design elements in a carbon emission trading scheme: (1) the emissions cap, (2) the scope of coverage in regulated emitters, (3) the allocation of entitlements to emit carbon, and (4) measures used to control compliance costs.²² What follows is an overview of these four elements and some possible variations in their design.

2.1 THE EMISSIONS CAP

The overall objective being a reduction in carbon emissions, the starting point is to cap the total allowable quantity of carbon emissions during a prescribed temporal period. It is important to note at the outset that an emissions trading system can exist without a cap. The New Zealand system described in section 3 clearly illustrates this point.

²² The literature used to develop this framework included peer reviewed journal articles in Canada and the United States, as well as notable secondary sources. The Canadian sources are Lucas & Yearsley, *supra* note 19 at 215-216; Christine J Kneteman, "Building an Effective North American Emissions Trading System: Key Considerations and Canada's Role" (2010) 20:2 J Envtl L & Prac 127 at 134-142; John Goetz et al, "Development of Carbon Emissions Trading in Canada" (2009) 46:2 Alta L Rev 377; Grant Boyle, "A Review of Emerging GHG Emissions Trading in North America: Fragmentation or Progress?" (2009) 46:1 Alta L Rev 174 at 177-180; Brian Evans, "Principles of Kyoto and Emissions Trading Systems: A Primer for Energy Lawyers" (2004) 42:1 Alta L Rev 167 at 185-202. The United States sources are Joseph E Aldy & Robert N Stavins, "The Promise and Problems of Pricing Carbon: Theory and Experience" (2012) 21:2 Journal of Environment & Development 152 at 157-159; Slobodan Perdan & Adisa Azapagic, "Carbon Trading: Current Schemes and Future Developments" (2011) 39:10 Energy Policy 6040 at 6041-6042; Judson Jaffe, Matthew Ranson & Robert N Stavins, "Linking Tradable Permit Systems: A Key Element of Emerging International Climate Policy Architecture" (2009) 36:4 Ecology LQ 789 at 792; Stavins, "A Meaningful U.S. Cap-And-Trade System", *supra* note 12 at 306-323. Secondary sources are Blas Luis Perez Henriquez, *Environmental Commodities Markets and Emissions Trading: Towards a Low-Carbon Future* (Baltimore: Taylor & Francis, 2013) at 40-43; Scott D Deatherage, *Carbon Trading Law and Practice* (New York: Oxford University Press, 2011) ch 3; Karsten Neuhoff, *Climate Policy after Copenhagen: The Role of Carbon Pricing* (New York: Cambridge University Press, 2011) ch 3.

For the initial compliance period, it is common for a regulatory authority to establish the cap based on historical emissions levels.²³ In order to effect a reduction in carbon emissions, the cap is lowered over successive compliance periods.²⁴ A clear example of how a cap is established in law is the Quebec scheme, discussed in detail in section 4.2 below, where governing legislation provides ministerial power to set the maximum allowable carbon emissions per calendar year. Another possibility is an intensity limit, as opposed to an absolute limit, whereby the law requires an emitter to reduce its emissions calculated per unit of economic production. In other words, the regulatory framework demands increasing efficiency in carbon emissions. Each regulated emitter must calculate a baseline intensity of carbon emissions per unit of economic production in a facility, but absolute emission levels can increase so long as the intensity remains below the baseline limit. As is shown in section 4.1, Alberta has an intensity-based carbon emissions cap.

2.2 THE SCOPE OF COVERAGE IN REGULATED EMITTERS

All carbon emission reduction schemes to date have commenced with a limited scope of emitters who are subject to an emissions limit. The governing legal framework will typically prescribe activities or, alternatively the type of facilities, which are subject to a compliance obligation.

A jurisdiction may choose to impose emissions reduction obligations on the so-called upstream activities, whereby the fossil fuel source of carbon is extracted or enters the economy.²⁵ An example of an upstream activity is a coal mine. A jurisdiction may also decide to include downstream activities where carbon is released in manufacturing processes or otherwise in the consumption of fossil fuels. The inclusion of downstream activities and consumers will drastically increase the number of regulated entities in a carbon emissions reduction scheme. A larger pool of regulated entities enhances the integrity of the cap as a means to reduce carbon emissions and the liquidity of the trading market, but also increases the complexities and cost of administration in areas such as monitoring, compliance, and enforcement.

There is a balance to be struck between ensuring an adequate scope in coverage and minimizing administrative costs to regulate the scheme, and where the line is drawn varies significantly across jurisdictions. A common measure is to establish a threshold quantity of annual emissions whereby a person who emits carbon under the threshold quantity in a compliance period is not subject to obligations. Both the Alberta and Quebec regimes provide an example of this, as described in section 4.

2.3 THE ALLOCATION OF ENTITLEMENTS TO EMIT CARBON

The carbon emissions entitlement is an intangible legal creation that entitles its holder to emit a prescribed quantity of carbon. The entitlement is known by many names including

²³ The paradigm example of this is the *Kyoto Protocol*, which established its cap based on a percentage of 1990 emission levels.

²⁴ Stavins argues the reduction should be gradual over a long-term trajectory: see Stavins, "A Meaningful U.S. Cap-And-Trade System", *supra* note 12 at 306–307.

²⁵ Stavins argues a cap on emissions from upstream sources is most effective in terms of environmental and economic considerations: see *ibid* at 309–313.

an emissions allowance, an emissions reduction unit, an emissions credit, and an emission offset. The name or characterization of an entitlement is of some significance as will be shown below, but the most critical design aspect is how an entitlement is allocated into the market.²⁶ Accordingly the legal framework governing a carbon emission trading scheme will establish rules on how entitlements are allocated or distributed.

In a cap-and-trade scheme, the total amount of allowable emissions for a compliance period is divided into allowance units and distributed into the market either by free allocation, auction, or a combination of the two. Additional allocation methods may include lottery or first in time/first in right, but these methods are not typically employed in emissions trading.²⁷

Free allocation is the most common distribution method in an emissions trading system.²⁸ This is likely to ensure the regulatory system is widely accepted by regulated emitters at the outset, since those persons who receive free entitlements in an amount based on their historical carbon emissions do not have to internalize the cost of excessive carbon emissions unless their actual emission levels exceed their historical levels (assuming these levels match the quantity of allowances received at no cost). The policy rationale for free allocation may also include protecting a sector of the domestic economy from international competitors who do not face carbon costs. But free allocation is not without its complications; for example, the problem of how to treat new entrants into the system who do not have a historical record of emissions.

Allocation by auction can provide a source of public funds,²⁹ but also imposes a very high cost on emitters since they must internalize the cost of all emissions not just those over their historical level. Some jurisdictions thus prefer a hybrid method of free allocations and auction, whereby in the early stages of the program most if not all entitlements are issued for free and only a small percentage of entitlements are reserved for auction. The Quebec scheme is an example of the hybrid approach, and is described in section 4.2.3.

Free allocations are typically prescribed in law, rather than left to the discretion of public officials. For example, in both Quebec and New Zealand, the governing legal framework sets out the quantity and recipients of free emissions allowances during each compliance period. The law has more of a procedural role in auctions by providing rules on when and how auctions are run. An example of these rules can be found in Quebec, as described in section 4.2.3.

An emissions reduction credit is earned by a regulated emitter rather than allocated into the market.³⁰ Each credit represents a quantity of carbon emissions reduced below a prescribed baseline or threshold. The credit is recognized by the regulatory authority at the end of a compliance period when actual emission levels are measured against the baseline requirement. The regulated emitter earns credits to the extent their actual carbon emissions are below the baseline set by law. The use of reduction credits eliminates the initial allocation problem described above with free allocation, but introduces the need for measurement and

²⁶ Tietenberg, *supra* note 12 at 127–128.

²⁷ *Ibid.*

²⁸ *Ibid* at 131.

²⁹ Tietenberg notes the state may run zero-revenue auctions whereby sale proceeds are refunded in some fashion: see *ibid* at 130.

³⁰ Tietenberg identifies notable distinctions between systems that employ earned credits and those that allocate allowances: see *ibid* at 18–19.

verification. A variation on the reduction credit is an emission offset which also represents a quantity of carbon emissions reduced below a prescribed threshold, but an offset is earned by a non-regulated emitter and, as discussed below, is generally considered a measure to control compliance costs in a carbon emission trading system. The Alberta system employs both emissions reduction credits and emission offsets, as described in section 4.1.

2.4 MEASURES USED TO CONTROL COMPLIANCE COSTS

Once an entitlement is allocated to or earned by an emitter or other market participant, the legal framework will set out whether the holder can submit it for compliance to cover emissions, choose to retain or bank the entitlement for a subsequent compliance period, or trade the entitlement to another participant. Trading carbon emissions entitlements is essential to price discovery on the cost of emissions.³¹ Carbon trading is also the primary means by which regulated emitters can manage their compliance costs.³² If abatement of actual emissions to meet a limit is more expensive than the market price of entitlements to cover the excess emissions, an emitter can choose to acquire the entitlements rather than reduce its own emissions. So the market not only ‘discovers’ a price on carbon emissions, trading in the market may also provide an emitter with a less costly means of compliance. Legal frameworks governing carbon emission trading systems typically direct insufficient attention to ensuring suitable conditions exist to foster liquidity, transparency, and order in the trading market.³³

Carbon emission offsets are another means of cost control for regulated emitters. A carbon emission offset represents a quantity of carbon emissions reduced as compared with a baseline level for the conduct of a non-regulated activity. A regulated emitter may acquire offsets and submit them to satisfy a compliance obligation. Carbon emission offsets are commonly generated by carbon sequestration associated with land use, land use change and forestry, and underground carbon capture and storage.³⁴ Legal rules have a prominent role in setting out how an emission offset is generated, measured, and validated. The Alberta system provides a good illustration of this and is described in section 4.1.4.

A primary concern with carbon emission offsets is whether the offset represents a real and additional reduction in emissions.³⁵ A legal framework which addresses this problem will typically do so by prescribing a methodology to calculate the amount of offsets generated by a particular activity and setting out the process by which an offset is verified as real. The use of offsets in a cap-and-trade system has attracted some criticism, in part because it is difficult in practice to verify real and additional emission reductions but also because the use of an offset allows a regulated emitter to exceed its cap. This is known as leakage: a carbon emission

³¹ Aldy & Stavins, “The Promise and Problems of Pricing Carbon: Theory and Experience” *supra* note 22 at 157.

³² Stavins, “A Meaningful U.S. Cap-And-Trade System”, *supra* note 12 at 315.

³³ Shaun Fluker & Salimah Janmohamed, “Who Regulates Trading in the Carbon Market?” (2014) 26:2 J Envtl L & Prac 81 at 109. See also Robert Baldwin, “Regulation Lite: The Rise of Emissions Trading” (2008) 2 Regulation & Governance 193 at 200–201.

³⁴ Stavins, “A Meaningful U.S. Cap-And-Trade System”, *supra* note 12 at 322.

³⁵ Stewart AG Elgie, “Carbon Offset Trading: A Leaky Sieve or Smart Step?” (2007) 17:3 J Envtl L & Prac 235 at 249–257.

reduction in one activity results in an increase in emissions elsewhere.³⁶ One method of addressing these concerns is to enact legal rules that limit the number of offsets that a regulated emitter can submit for compliance purposes. The Quebec system has these sorts of rules.

Another measure to control compliance costs is to allow regulated emitters the option of an administrative payment to cover excess carbon emissions in a compliance period. The fund payment is based on a legally prescribed price per ton of emissions which thus serves as the ceiling price on the cost to emit carbon.³⁷ The fund payment compliance option serves as a cost control measure if the prescribed price is low or at least below what the expected market price would be.

The following two sections examine the law and policy governing carbon emissions in New Zealand, Alberta, and Quebec. The examination is organized on the basis of the design elements set out above. The last section of the paper uses these elements to assess the effectiveness of these systems in relation to: (1) its impact thus far on reducing carbon emissions, (2) its effectiveness at price discovery for carbon emissions, and (3) its potential to link with other systems.

3. CARBON EMISSION TRADING IN NEW ZEALAND

New Zealand ratified the *United Nations Framework Convention on Climate Change* in September 1993, committing the nation to implement measures to reduce carbon emissions. In late 2002, New Zealand ratified the *Kyoto Protocol* and committed to reduce its overall average carbon emissions during the first Kyoto commitment period to 1990 levels.³⁸ New Zealand subsequently enacted legislation to implement its carbon emission trading system (the NZ ETS) effective January 1, 2008 to coincide with the commencement of the first Kyoto commitment period.³⁹

The purpose of the NZ ETS is to provide incentives in the New Zealand economy to reduce carbon emissions and to devolve the country's Kyoto obligation to the private sector.⁴⁰

³⁶ *Ibid* at 254–257.

³⁷ A price ceiling in a system that also employs minimum bid auctions to allocate entitlements into the market would produce a price collar on carbon and thus significant cost certainty for regulated emitters: see Aldy & Stavins, “The Promise and Problems of Pricing Carbon: Theory and Experience,” *supra* note 22 at 158.

³⁸ New Zealand currently estimates that the country has met its Kyoto commitment: see NZ, Ministry for the Environment, “Latest Update on New Zealand’s Net Position”, online: <mfe.govt.nz/climate-change/reporting-greenhouse-gas-emissions/nzs-net-position-under-kyoto-protocol/latest> (1 April 2015).

³⁹ The most comprehensive examination of the legal and policy framework governing the NZ ETS is Alastair Cameron, ed, *Climate Change Law and Policy in New Zealand* (Wellington: Lexis Nexis, 2011). Additional literature includes Toni E Moyes, “Greenhouse Gas Emissions Trading in New Zealand: Trailblazing Comprehensive Cap and Trade” (2008) 35 *Ecol LQ* 911; Geoff Bertram & Simon Terry, *The Carbon Challenge: New Zealand’s Emissions Trading Scheme* (Wellington: Bridget Williams, 2010); David Bullock, “Emissions trading in New Zealand: development, challenges and design” (2012) 21:4 *Environmental Politics* 657.

⁴⁰ NZ, Ministry for the Environment, *The Framework for a New Zealand Emissions Trading System* (Wellington: Ministry for the Environment, 2007) at 14, online: <mfe.govt.nz/publications/climate-change/framework-new-zealand-emissions-trading-scheme> [*NZ ETS Framework*].

The NZ ETS remains the country's primary mechanism to generate incentives for carbon emissions reduction and ensure New Zealand complies with its international commitments.⁴¹

The annual absolute level of carbon emissions in New Zealand for 2012 is calculated at 76.048 million tons of carbon, representing a rise in absolute emissions of approximately 25 percent over 1990 levels.⁴² New Zealand has an unusual emissions profile for a nation with an industrial economy. Approximately 46 percent of carbon emissions in New Zealand are generated by or associated with pastoral agriculture.⁴³ The agricultural sector dominates the economy with significant growth in dairy farming in recent decades and accounts for approximately 60 percent of the value in New Zealand's total annual exports.⁴⁴ Carbon emissions in the agricultural sector consist of methane gas produced by livestock and emissions associated with the use of nitrogen fertilizer.⁴⁵

The governing statute on carbon emissions reduction is the *Climate Change Response Act (CCRA)*.⁴⁶ New Zealand enacted the *CCRA* in 2002 in conjunction with ratifying the *Kyoto Protocol* to provide a legal framework for meeting its Kyoto commitment and then amended the *CCRA* in 2008 and 2009 to implement the NZ ETS. The legislation and several regulations enacted thereunder provide for a comprehensive legal framework. The *CCRA* is a long, complex statute. The primary purposes of the statute include providing the rules pursuant to which New Zealand complies with its international obligations on carbon emissions, creating the NZ ETS and establishing the compliance obligations thereunder, and providing for the administration of both the Kyoto and NZ ETS regimes including compliance, monitoring, and enforcement.

Parts 2 and 3 of the *CCRA* set out administrative provisions concerning New Zealand's Kyoto obligations. These provisions create several institutions in this regard including a registrar to manage accounts for unit holdings and a monitoring agency to measure and report on national carbon emissions. They also provide for the acquisition, holding, and disposition of Kyoto units (assigned amount units, removal units, emission reduction units, or certified emission reduction units) and New Zealand units by the Crown. Part 6 sets out provisions in relation to New Zealand's emissions target, which empower the Governor in Council to set and amend the target by regulation.

The majority of the *CCRA* is found in Parts 4 and 5, which establish the NZ ETS and set out the rules which govern it. Part 4 includes provisions which set out the entities covered by the NZ ETS, the rules on the allocation of emissions units and the submission of units for compliance, monitoring and enforcement powers granted to the New Zealand Environmental

⁴¹ NZ, Ministry for the Environment, *New Zealand's Greenhouse Gas Inventory: 1990 – 2012* (Wellington: Ministry for the Environment, 2014) at 22, online: <mfe.govt.nz/publications/climate-change/new-zealands-greenhouse-gas-inventory-1990%E2%80%932012> [*NZ 2014 Carbon Report*].

⁴² *Ibid* at 30. New Zealand's claim to have met its Kyoto commitment is because of net emissions which take into account carbon sequestration from forest growth: see NZ, Ministry for the Environment, "Latest Update on New Zealand's Net Position", November 12, 2014 online: <mfe.govt.nz/climate-change/reporting-greenhouse-gas-emissions/nzs-net-position-under-kyoto-protocol/latest> .

⁴³ *Ibid* at 38, 148.

⁴⁴ *Ibid* at 149.

⁴⁵ *Ibid* at 148.

⁴⁶ *Climate Change Responsive Act 2002* (NZ), 2002/40 [*CCRA*].

Protection Agency, and sanctions for non-compliance. Part 5 sets out sector-specific provisions governing compliance obligations in forestry, manufacturing, agriculture, and waste.

3.1 THE EMISSIONS CAP

There is no domestic cap or limit on carbon emissions in New Zealand. The NZ ETS was established as a mechanism to facilitate New Zealand meeting its Kyoto commitment, which caps the nation's overall emissions between 2008 and 2012 to 1990 levels. The country as a whole is thus liable for its carbon emissions under the first Kyoto commitment period, but individual economic actors within New Zealand are not subject to carbon emission limits. The compliance obligation of a regulated emitter amounts to submitting a requisite number of emissions units to match actual emissions during a compliance period. Thus a regulated emitter is able to increase its actual carbon emissions without penalty so long as it submits the necessary amount of emissions units.

The NZ ETS was designed to be integrated with New Zealand's commitment during the first Kyoto commitment period (2008-2012). During this first Kyoto period each emissions unit issued by the New Zealand government was backed by an emissions unit held by New Zealand under the *Kyoto Protocol*.⁴⁷ Regulated emitters were allowed to exchange emissions units issued by New Zealand for Kyoto units held by the government and, with a few exceptions, regulated emitters could submit Kyoto units instead of domestic units for compliance in New Zealand.⁴⁸ The decision to integrate the NZ ETS with Kyoto was based, in part, on the need to generate more liquidity into the NZ ETS during its early stages by providing regulated emitters with the ability to access emissions units issued elsewhere.⁴⁹

Regulated emitters have been able to submit an unlimited number of Kyoto units for compliance purposes under the NZ ETS. This will change going forward, as New Zealand has chosen not to participate in the second Kyoto commitment period.⁵⁰ Thus Kyoto units other than initially assigned amount units issued to New Zealand under the *Kyoto Protocol* will not be accepted for compliance under the NZ ETS after 2015.⁵¹ In the absence of further policy changes to how emissions units are issued under the NZ ETS, this decision will effectively cap domestic carbon emissions in New Zealand because the number of available New Zealand units issued under the *CCRA* is limited. But it remains to be seen exactly how this will unfold.

⁴⁷ *NZ ETS Framework*, *supra* note 40 at 41.

⁴⁸ *NZ 2014 Carbon Report*, *supra* note 41 at 22. Kyoto unit eligible for compliance purposes include emission reduction units, removal units, and certified emission reductions. For a description of these units and restrictions on the eligibility of specified types: see NZ, Ministry of the Environment, "Surrendering Emission Units" (6 December 2013) *Climate Change Information*, online: <climatechange.govt.nz/emissions-trading-scheme/obligations/surrendering-units.html> [NZ, "Surrendering Emission Units"].

⁴⁹ *NZ ETS Framework*, *supra* note 40 at 42-47.

⁵⁰ See NZ, Ministry of the Environment, "New Zealand's emissions' reduction targets" (7 May 2015) *Climate Change Information*, online: <climatechange.govt.nz/reducing-our-emissions/targets.html>.

⁵¹ NZ, "Surrendering Emission Units", *supra* note 48.

3.2 THE SCOPE OF COVERAGE IN REGULATED EMITTERS

When it was first introduced in 2007, the NZ ETS contemplated all sector coverage in the domestic economy with staggered entry by sectors into compliance obligations.⁵² Carbon sequestration in forest growth was a key component in New Zealand's plan to meet its Kyoto obligations during the first commitment period.⁵³ Accordingly, forestry was the first sector subject to obligations because the government was eager to create incentives to reduce deforestation. The other five sectors subject to compliance obligations track the categories of economic activity set out in the *Kyoto Protocol*: liquid fossil fuels, stationary energy, industrial manufacturing, agriculture, and waste.⁵⁴

Within each covered economic sector, not every emitter is subject to a compliance obligation. New Zealand policy was to select points of obligation based on minimizing administrative costs, capturing a significant percentage of sector emissions, feasibility in monitoring and verifying emissions, and ensuring the point of obligation generates the desired incentives to reduce emissions while not unduly impairing economic production.⁵⁵ Generally speaking, the objective was to minimize the number of entities with a compliance obligation while maximizing the coverage of emissions to ensure desired incentives are generated throughout the economy. This means in practice that the NZ ETS targets primarily upstream activities whereby the fossil fuel source of carbon is extracted or enters the New Zealand economy.

A regulated emitter is a person – described as a “participant” – who carries out an activity described in Schedules 3 or 4 of the *CCRA*.⁵⁶ The activities set out in Schedule 3 are organized by the categories of economic activity set out in the *Kyoto Protocol*: forestry, liquid fossil fuels, stationary energy, industrial manufacturing, agriculture, and waste. Participants who conduct an activity set out in Schedule 3 are required to comply with the obligations set out in *CCRA*. Participants who conduct an activity set out in Schedule 4 may elect to comply with the obligations set out the *CCRA*, but have no duty to do so.⁵⁷ One reason why a person may voluntarily elect to be a ‘participant’ under the *CCRA* is because Schedule 3 participants who sell transport fuel, coal, or natural gas are relieved of their compliance obligation under the NZ ETS when they sell such energy products to a purchaser who is a voluntary schedule 4 participant.⁵⁸ Accordingly, they do not pass on the cost of carbon emissions compliance to the purchaser. Likewise, the purchaser is able to manage its own compliance costs by trading in the NZ ETS, rather than have costs unilaterally imposed by their energy supplier.

Each participant is required to submit an annual emissions return to the New Zealand Environmental Protection Agency disclosing its carbon emissions from regulated activities and carbon sequestration from eligible activities.⁵⁹ This information forms the basis upon which a

⁵² *NZ ETS Framework*, *supra* note 40 at 30–33.

⁵³ *Ibid.*

⁵⁴ *Ibid.*

⁵⁵ *Ibid* at 34.

⁵⁶ *CCRA*, *supra* note 46, s 54(1).

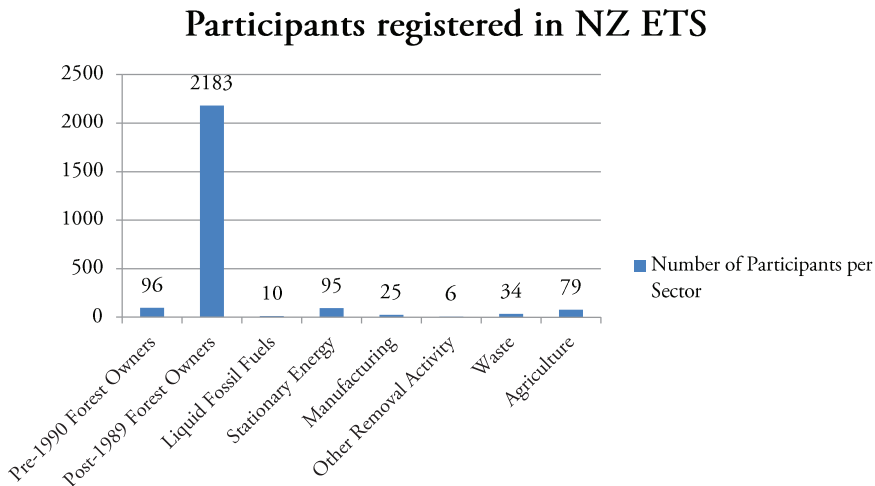
⁵⁷ *Ibid*, s 57(1).

⁵⁸ *Ibid*, ss 201, 202.

⁵⁹ *Ibid*, s 65.

participant’s compliance obligation is calculated. Sections 63 and 63A of the *CCRA* set out the obligation of a regulated emitter to submit one New Zealand emissions unit or one Kyoto unit for every two tons of carbon emissions in a compliance period. The *CCRA* initially prescribed a one unit-for-one ton exchange, but this was subsequently relaxed to the current one-for-two exchange in 2009 amendments as a temporary measure to allow for a more gradual implementation of compliance obligations.

As of May 2014, the NZ ETS registry established by the *CCRA* lists 2528 participants. The following table outlines the number of participants per category of activity set out in Schedule 3:



(Source: New Zealand Emissions Unit Register, online: <eur.govt.nz>)

Because the NZ ETS was designed by New Zealand for Kyoto compliance, the *CCRA* distinguishes the forestry sector between post-1989 forests and pre-1990 forests to reflect the 1990 year baseline embedded in the first Kyoto commitment period. Section 181 provides that the clearing of pre-1990 forest without subsequent reforestation is ‘deforestation’ and is a Schedule 3 activity to which compliance obligations attach.⁶⁰ An example of this would be a change in land-use from forestry to agriculture. Section 180 prescribes the landowner of the cleared forest as the participant to whom compliance obligations attach unless the right to deforest is vested in a third party and the landowner has no control over the decision to deforest. So landowners of pre-1990 forests can harvest and replant trees without a compliance obligation under the *CCRA*.

Landowners of new forest planted after 1989 may choose to participate in the NZ ETS as a voluntary Schedule 4 participant under section 188 of the *CCRA*. As a participant, the landowner is liable under the *CCRA* for carbon emissions based on the volume of deforestation on their lands and must submit New Zealand emissions units or Kyoto units to cover those

⁶⁰ The amount of carbon released from deforestation activity is calculated pursuant to the *Climate Change (Forestry Sector) Regulations 2008* (NZ), 2008/355.

emissions. As a participant in the NZ ETS, the post-1989 forest landowner is entitled to receive New Zealand emissions units for carbon sequestration in forest growth. The amount of carbon emitted or sequestered is calculated in accordance with the *Climate Change (Forestry Sector) Regulations*.⁶¹ The Crown accrues Kyoto units for carbon sequestration in post-1989 forests where the landowner has not elected to be a Schedule 4 participant under the *CCRA*. As the above chart indicates, post-1989 forest landowners make up the large majority of participants in the NZ ETS.

In the liquid fossil fuels sector the point of compliance obligation is domestic supply of transportation fuels prescribed by regulation.⁶² A person who removes more than 50,000 litres of transportation fuel per year from a refinery for the purpose of domestic supply in New Zealand is a Schedule 3 participant under the *CCRA*. These persons consist of the five fuel suppliers in New Zealand: BP Oil, Chevron, Gull, Mobil Oil, and Z Energy, as well as companies who have elected to participate in the NZ ETS as a Schedule 4 participant.⁶³ The amount of carbon emissions associated with transportation fuel supply is calculated in accordance with the *Climate Change (Liquid Fossil Fuels) Regulation*.⁶⁴

Stationary energy participants include persons who import or produce threshold amounts of coal and natural gas for domestic supply, generate power from sources that result carbon emissions, and burn fossil fuel in refining petroleum. The amount of carbon emissions associated with energy production and refining is calculated in accordance with the *Climate Change (Stationary Energy and Industrial Processes) Regulation*.⁶⁵ In the industrial manufacturing sector, the regulated emitter is a person who produces designated materials set out in Schedule 3 of the *CCRA* such as steel or iron, imports synthetic greenhouse gases, or operates electrical switchgear that uses sulphur hexafluoride. The amount of carbon emissions associated with manufacturing processes is calculated in accordance with the *Climate Change (Stationary Energy and Industrial Processes) Regulation*.⁶⁶ In the waste sector, a person who operates a landfill disposal facility is a Schedule 3 participant and the amount of carbon emissions associated with waste disposal is calculated under the *Climate Change (Waste) Regulation*.⁶⁷ Persons who manufacture or import amounts of specified products below a threshold set out in the *Climate Change (General Exemptions) Order*⁶⁸ are exempt from compliance obligations under the NZ ETS. Similarly a fuel, stationary energy, or waste disposal participant may be eligible to reduce their compliance obligation by using a unique emissions factor obtained in accordance with the *Climate Change (Unique Emissions Factor) Regulation*.⁶⁹

⁶¹ *Ibid*, s 20.

⁶² *Climate Change (Liquid Fossil Fuels) Regulations 2008* (NZ), 2008/356, s 4.

⁶³ Companies who purchase large amounts of transportation fuel such as Fonterra and Air New Zealand have elected to participate in the NZ ETS as Schedule 4 participants.

⁶⁴ *Climate Change (Liquid Fossil Fuels) Regulation*, *supra* note 62, s 6.

⁶⁵ *Climate Change (Stationary Energy and Industrial Processes) Regulations 2009* (NZ), 2009/285, Part 2.

⁶⁶ *Ibid*, Part 3.

⁶⁷ *Climate Change (Waste) Regulations 2010* (NZ), 2010/338.

⁶⁸ *Climate Change (General Exemptions) Order 2009* (NZ), 2009/370.

⁶⁹ *Climate Change (Unique Emissions Factors) Regulations 2009* (NZ), 2009/286.

The current number of participants in the agricultural sector is low because farmers who would otherwise be liable for carbon emissions associated with fertilizer application on their land and the raising of livestock remain exempt from compliance obligations under the *CCRA*.⁷⁰ Agricultural participants at the moment comprise of persons who import or produce nitrogen fertilizer, dairy processors, and those who commercially export or slaughter livestock. These participants, however, are subject only to reporting carbon emissions. When initially conceived in 2007, the NZ ETS contemplated full coverage in the agricultural sector including farming by 2013.⁷¹ In 2009, the timetable for the inclusion of agriculture was extended to January 2015.⁷² In 2012, the scheduled timeframe was removed⁷³ and presently there is no contemplated date for the imposition of compliance obligations on the agricultural sector.

3.3 THE ALLOCATION OF ENTITLEMENTS TO EMIT CARBON

New Zealand issues emissions units by free allocation and as earned compensation for carbon sequestration activity. The principles underlying free allocation to participants in the industrial sector include a desire to minimize or avoid the relocation of manufacturing activity out of New Zealand to avoid compliance costs and to reduce the economic cost of transitioning to a low-carbon economy.⁷⁴ Regulated emitters who are deemed able to pass on the cost of compliance obligations to consumers, for example suppliers of transportation fuel and electricity producers, do not receive free allocation of emissions units.⁷⁵ Owners of post-1989 forests and other specified activities (e.g. carbon capture and storage) earn emissions units for carbon sequestration. New Zealand allocates these earned units based upon annual returns filed in the prescribed format.

The forestry and commercial fisheries sectors received a one-time free allocation of emissions units as compensation for lost market value in lands that now face restrictions on land-use (forestry) and increased input costs (fuel consumed in the fisheries). Section 72 of the *CCRA* required New Zealand to allocate a prescribed amount of emissions units to landowners of pre-1990 forests. Section 74 did likewise for holders of commercial fishing licenses. The allocation to forest landowners was based on size of the eligible forest and the acquisition date by the landowner. Landowners who purchased their pre-1990 forested land before November 2002 were entitled to receive 60 emissions units per hectare, while those who purchased after that date received 39 units per hectare.⁷⁶ New Zealand set aside a total of 700,000 emissions units for allocation to the commercial fishing industry.⁷⁷

⁷⁰ *CCRA*, *supra* note 46, ss 2A(8), 2A(9). Farming becomes subject to compliance obligations under the *CCRA* upon declaration by Order in Council.

⁷¹ *NZ ETS Framework*, *supra* note 40 at 96.

⁷² Bullock, *supra* note 39 at 666.

⁷³ NZ, Ministry of the Environment, "Agriculture in the Emissions Trading Scheme" (19 April 2013) *Climate Change Information*, online: <climatechange.govt.nz/emissions-trading-scheme/participating/agriculture>.

⁷⁴ *NZ ETS Framework*, *supra* note 40 at 58–71.

⁷⁵ *Ibid* at 61.

⁷⁶ *Climate Change (Pre-1990 Forest Land Allocation Plan) Order 2010* (NZ), 2010/190.

⁷⁷ *Climate Change (Fishing Allocation Plan) Order 2010* (NZ), 2010/134, s 6.

Persons who conduct “eligible industrial activities” prescribed by regulation are entitled to an annual free allocation of New Zealand emissions units in accordance with sections 80 to 85 of the *CCRA*.⁷⁸ These prescribed industrial activities include the production of listed products such as steel or newsprint, as well as a small number of grocery items such as tomatoes or flowers.⁷⁹ Some, but not all, of the industrial activities eligible for an allocation of emissions units are also listed as Schedule 3 activities under the *CCRA*.

The allocation of units under the NZ ETS is thus distinct from a true cap-and-trade system where the cap is divided into allowances and distributed into the market. Under the NZ ETS only a person who conducts an eligible activity receives a free allocation of units. Accordingly there are regulated emitters under the NZ ETS who do not receive an allocation of emission units, whereas contrarily, there are non-regulated persons who receive a free allocation of emissions units but who do not have a compliance obligation under the NZ ETS.

3.4 MEASURES USED TO CONTROL COMPLIANCE COSTS

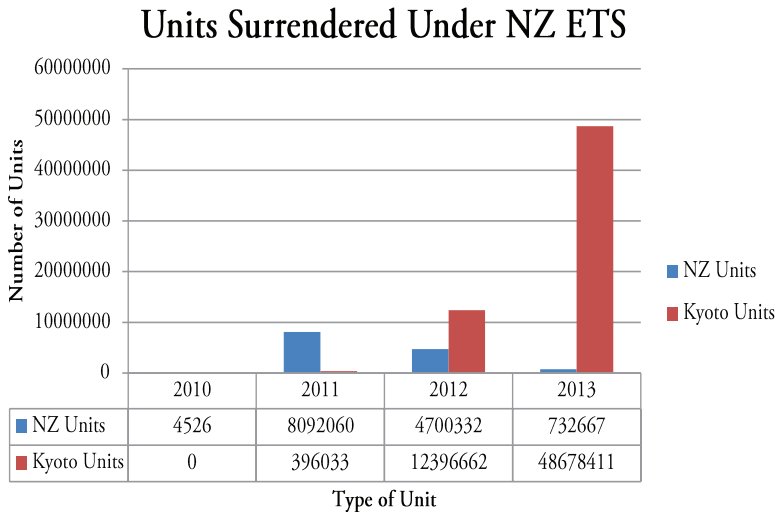
The primary cost control measure in the NZ ETS has turned out to be the ability of participants to surrender Kyoto units such as emission reduction units or certified emission reductions acquired from international sources for compliance purposes. The market price of these Kyoto units has plummeted to almost nothing in recent years, and thus regulated emitters can minimize their compliance cost by importing Kyoto units into New Zealand and submitting the international units for compliance under the *CCRA*. Empirical data supports this conclusion by showing that the number of Kyoto units submitted for compliance has dramatically increased over successive compliance periods, with a corresponding decrease in the number of domestic New Zealand units submitted. The flood of Kyoto units into New Zealand has resulted in low prices for a New Zealand unit.⁸⁰

⁷⁸ Eligible activities are prescribed in the *Climate Change (Eligible Industrial Activities) Regulations 2010* (NZ), 2010/189.

⁷⁹ *Ibid.*

⁸⁰ OM Financial operates an over-the-counter market for New Zealand emissions units and discloses bid/ask and closing prices on its website: see OM Financial, *CommTrade Carbon*, online: <commtrade.co.nz>. The spot price per unit has fluctuated between approximately 3 and 7 NZ\$ over the past 3 years. The reason for the collapse in the spot price of New Zealand emissions units was provided by Nigel Brunel – the Director of Carbon and Energy Markets with OM Financial in Auckland, New Zealand.

The following table sets out the total number of units surrendered under the NZ ETS up to the end of 2013.



(Source: New Zealand Emissions Unit Register, online: <eur.govt.nz>)

Section 178A of the *CCRA* allows a regulated emitter to pay \$25 per ton (effectively \$12.50 per ton under the current relaxed obligation implemented by 2009 amendments to the *CCRA*, noted in section 3.2 above) in lieu of surrendering emissions units. The legislated fund payment per ton is far in excess of the current market price of a New Zealand emissions unit or a Kyoto unit. This would suggest there is little economic incentive to use the fund payment for compliance purposes in the NZ ETS.

The large number of Kyoto units imported into the NZ ETS has surely diminished the need for domestic carbon trading by regulated participants to manage compliance costs. Carbon trading under the NZ ETS would typically involve the transfer of New Zealand emissions units from a person who receives allocations (for example, a person who conducts an eligible industrial activity) or earns units for carbon sequestration (for example, the owner of post-1989 forest growth) to a participant with a compliance obligation who does not receive an allocation of New Zealand emissions units (for example, the supplier of transport fuel). However, access to inexpensive Kyoto units has drastically reduced the incentive for NZ ETS participants to acquire New Zealand emissions units in the market.⁸¹

⁸¹ Nonetheless some industry participants with compliance obligations have agreed to purchase New Zealand units as part of a corporate sustainability program, despite the fact the domestic units are more expensive than international Kyoto units. For example, Mighty River Power is one of New Zealand's largest electricity generators and is a Schedule 3 stationary energy participant under the *CCRA* because its geothermal electricity generation produces carbon emissions. Mighty River has agreed to purchase New Zealand units from owners of post-1989 forests located in regions of New Zealand where intact forests are ecologically desirable: see Mighty River Power, "Carbon Credit Tender, A First under ETS", online: <mightyriver.co.nz/Media-Centre/Latest-News/2010-Archive/Carbon-Credit-Tender,-A-First-Under-ETS.aspx>.

The New Zealand system does not recognize or otherwise employ carbon emission offsets. One reason for this is perhaps because forestry is a regulated sector under the NZ ETS. Carbon sequestration associated with land use change or forestry is incorporated into the NZ ETS as a method of earning domestic units. Moreover, as noted in section 3.2 above forest landowners make up the majority of participants under the NZ ETS. In other carbon emissions trading systems where carbon sequestration is conducted by non-regulated activities, the sequestration would earn credit as offsets and be available to regulated emitters as a cost containment measure.

4. CARBON EMISSION TRADING IN CANADA

Carbon emissions reduction has not been a policy priority for the Canadian federal government. The absence of national direction has produced a fragmented carbon policy landscape in Canada. Most provinces have imposed carbon emissions reporting obligations on certain segments of their economy, but only three jurisdictions have enacted legal obligations with the intent of reducing carbon emissions: British Columbia, Alberta, and Quebec.⁸² Notwithstanding the apparent reluctance of federal officials to implement a national carbon policy, the now-disbanded National Roundtable on the Environment and the Economy recommended in 2009 that Canada establish a national cap-and-trade carbon emissions scheme as its core policy mechanism to generate a price on carbon emissions and incentives in the economy to reduce emissions.⁸³

Canada ratified the *Kyoto Protocol* in 2002 but subsequently failed to take any meaningful steps towards implementing a legal framework to implement its Kyoto commitment to reduce overall carbon emissions by 2012 to 94 percent of 1990 levels. The 2007 *Kyoto Protocol Implementation Act*⁸⁴ was enacted in a minority Parliament with the support of opposition parties and was meagre in substantive content, consisting primarily of enabling provisions allowing the federal government to develop a plan to meet Canada's commitment under the *Kyoto Protocol* and enact regulations to limit carbon emissions. The governing Conservatives had no intention of implementing measures under the legislation and, after a failed attempt by environmental groups in judicial review litigation to force the government's hand on its Kyoto

⁸² This paper does not address the question of constitutional authority over a national carbon emissions regulatory scheme. Scholars are divided on whether the federal government or the provinces have legislative authority in this regard. Lucas and Yearsely suggest the provinces might have a stronger legislative claim than the federal government to regulate carbon emissions (*supra* note 19), but Peter Hogg argues the federal government has strong constitutional authority to legislate a national carbon emissions trading system under its criminal law power (Peter Hogg, "Constitutional Authority over Greenhouse Gas Emissions" (2009) 46:2 *Alta L Rev* 507). In any case, it seems likely a national carbon trading system could emerge either as a federal initiative or as a collaborative effort amongst the federal government and the provinces and territories.

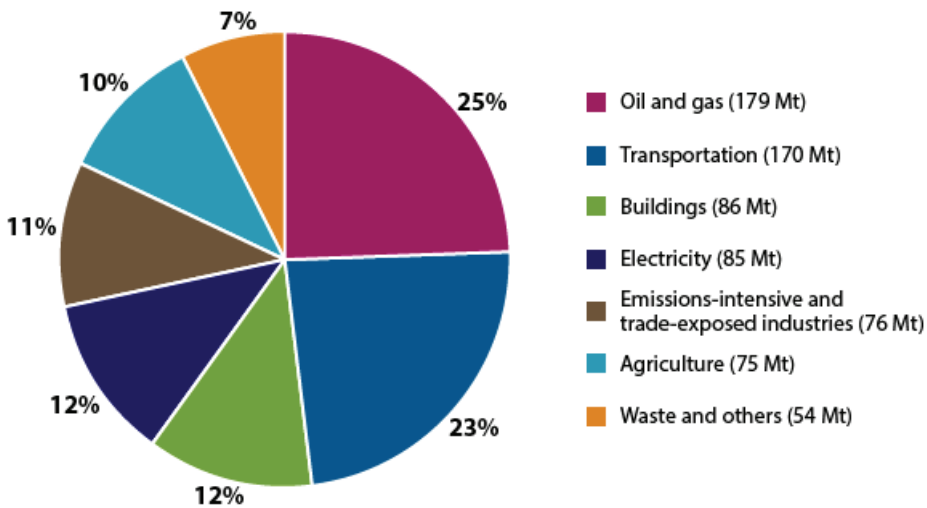
⁸³ Canada, National Roundtable on the Environment and the Economy, *Achieving 2050: A Carbon Pricing Policy for Canada* (Ottawa, 2009) online: <collectionscanada.gc.ca/webarchives2/20130322180743/http://nrtee-trnee.ca/wp-content/uploads/2011/08/carbon-pricing-advisory-note-eng.pdf>.

⁸⁴ *Kyoto Protocol Implementation Act*, SC 2007, c 30 as repealed by *Jobs, Growth and Long-term Prosperity Act*, SC 2012, c 19, s 699.

commitments,⁸⁵ the *Kyoto Protocol Implementation Act* was repealed.⁸⁶ Canada subsequently withdrew from the *Kyoto Protocol* before the end of the first commitment period in December 2012.⁸⁷

Environment Canada estimates total absolute carbon emissions in Canada during 2013 at 726 million tons, which represents an absolute increase in carbon emissions of 18 percent over 1990 levels.⁸⁸ The following chart breaks down carbon emissions by sector in Canada.

Distribution of Greenhouse Gas Emissions by Economic Sector – Canada 2013



(Source: Environment Canada, online: <ec.gc.ca/indicateurs-indicators/default.asp?lang=en&n=F60DB708-1> (17 April 2015))

The Province of Alberta is home to the largest energy development sector in Canada and, not surprisingly, is the largest source of carbon emissions in Canada, with the fastest growth rate of absolute emissions in the country. The following graph compares carbon emissions across Canadian jurisdictions since 1990.

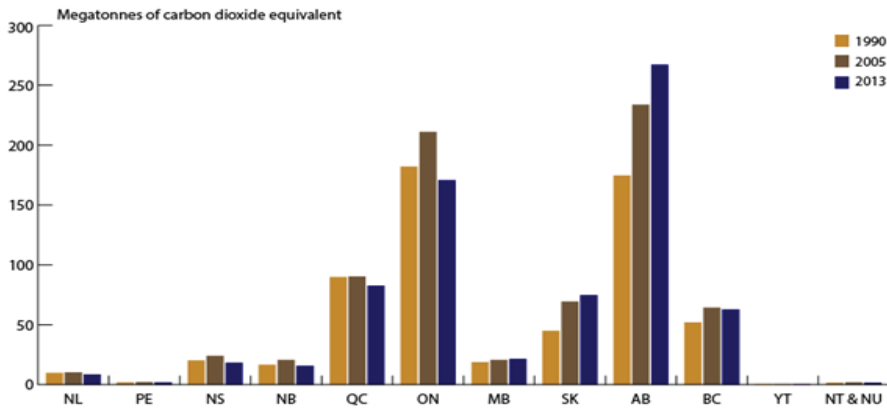
⁸⁵ *Friends of the Earth v Canada*, 2009 FCA 297, 93 Admin LR (4th) 72.

⁸⁶ *Kyoto Protocol Implementation Act*, SC 2007, c 30 as repealed by *Jobs, Growth and Long-term Prosperity Act*, SC 2012, c 19, s 699.

⁸⁷ Canada issued notification of its intent to withdraw under article 27 of the *Kyoto Protocol* in December 2011. For some commentary: see Nigel Bankes, “Why Canada Should Not Withdraw From the Kyoto Protocol” (1 December 2011) *University of Calgary Faculty of Law* (blog) online: <ablawg.ca/2011/12/01/why-canada-should-not-withdraw-from-the-kyoto-protocol/>.

⁸⁸ “National Greenhouse Gas Emissions”, online: Environment Canada <ec.gc.ca/indicateurs-indicators/default.asp?lang=En&n=FBF8455E-1>.

Greenhouse Gas Emissions by Province and Territory - Canada, 1990, 2005, and 2013



(Source: Environment Canada, online: <ec.gc.ca/indicateurs-indicators/default.asp?lang=en&n=18F3BB9C-1> (17 April 2015))

In the absence of federal leadership, carbon emission trading systems have emerged at the provincial level in Canada.

4.1 CARBON EMISSION TRADING IN ALBERTA

Alberta was the first jurisdiction in Canada to implement legal rules governing carbon emissions reduction. Alberta imposed mandatory emissions reporting obligations in 2003 and subsequently enacted emissions reduction rules in 2007. The applicable legal framework in Alberta consists of the *Climate Change and Emissions Management Act (CCEMA)*⁸⁹ and a number of regulations enacted thereunder including the *Specified Gas Reporting Regulation (SGRR)*,⁹⁰ the *Specified Gas Emitters Regulation (SGER)*,⁹¹ as well as various policy guidance.⁹²

4.1.1 THE EMISSIONS CAP

There is no absolute carbon emissions cap in Alberta. The *Climate Change and Emissions Management Act* establishes what is known as an intensity baseline-and-credit system. The legislation requires each regulated emitter to calculate a baseline intensity of carbon emissions per unit of economic production in a facility.⁹³ For example, in relation to oil production the intensity figure represents the amount of carbon per barrel of production. Over the course of successive compliance periods, a regulated emitter must reduce its emissions intensity below its

⁸⁹ *Climate Change and Emissions Management Act*, SA 2003, c C-16.7.

⁹⁰ *Specified Gas Reporting Regulation*, Alta Reg 251/2004 [SGRR].

⁹¹ *Specified Gas Emitters Regulation*, Alta Reg 139/2007 [SGER].

⁹² For a detailed critique of the Alberta system: see Matthew Bramley et al, *Responsible Action? An assessment of Alberta's greenhouse gas policies* (Drayton Valley: Pembina Institute, 2011) online: <pembina.org/reports/responsible-action.pdf>.

⁹³ *SGER*, *supra* note 91, ss 20–23.

baseline by a specified percentage, up to 12 percent.⁹⁴ At the end of each compliance period, a regulated emitter must report its actual emissions intensity per unit of production and account for the difference between its actual emissions and the baseline target.⁹⁵ Leach provides an illustration of the true-up for an oil sands mine facility:

The mine has an emissions performance benchmark of 0.048 tonnes per barrel (t/bbl) of bitumen, from which it was required, in 2008, to reduce emissions by 4 percent since it was in the second year of coverage under the policy. Accordingly, its allowable emissions were 0.046 t/bbl. Emissions from the mine in 2008 were 566,910 t on 7.35 million cubic metres of total bitumen production, at an intensity of 0.077 t/bbl. As a result, the facility faced a compliance gap of 228,969 tCO₂e.⁹⁶

In basic terms, the absolute level of carbon emissions generated by a regulated facility in Alberta can rise so long as it is matched by increased economic production.

4.1.2 THE SCOPE OF COVERAGE IN REGULATED EMITTERS

Regulated emitters in Alberta include a combination of upstream and downstream carbon sources such as energy producers, coal-fired power generators, industrial manufacturers, gas plants, chemical refineries, feedlot operators, and landfills. The *SGRR* and *SGER* themselves do not prescribe regulated activities, but rather the regulations referentially incorporate the list of activities set out in the Schedule to the *Environmental Protection and Enhancement Act*⁹⁷, with this list covering the usual suite of stationary energy, mining, and manufacturing activities governed by carbon emissions rules elsewhere. Noticeably absent from coverage in Alberta, however, is the combustion of transportation fuels.

The *SGRR* requires annual carbon emission reports from regulated emitters who operate a facility which emits at least 50,000 tons of carbon in a year.⁹⁸ In 2011 Alberta received emissions reports from 164 facilities. Power plants and oil sands facilities are by far the largest sources of carbon emissions in Alberta, with 23 reporting facilities (35.4 percent of reported emissions) and 27 reporting facilities (39.8 percent of reported emissions) respectively.⁹⁹

The *SGER* sets a higher emissions threshold to trigger carbon emissions reduction obligations. Regulated emitters who operate a facility which emits at least 100,000 tons of

⁹⁴ *Ibid*, s 3. The Alberta government recently announced its intention to raise this reduction to 15% effective January 1, 2016 and 20% effective January 1, 2017, see Alberta Environment and Parks, “Industrial Emissions Management”, online: <aep.alberta.ca/climate-change/programs-and-services/industrial-emissions-management.aspx>.

⁹⁵ *Ibid*, ss 5, 6, 11.

⁹⁶ Andrew Leach, “Policy Forum: Alberta’s Specified Gas Emitters Regulation” (2012) 60:4 Canadian Tax Journal 881 at 888 [footnote omitted].

⁹⁷ *Environmental Protection and Enhancement Act*, RSA 2000, c E-12.

⁹⁸ *SGRR*, *supra* note 90, s 3(1). The 50,000 threshold is set by: Alberta Environment and Sustainable Resource Development, *Specified Gas Reporting Standard*, online: <aep.alberta.ca/climate-change/guidelines-legislation/specified-gas-reporting-regulation/documents/SpecifiedGasReportingStandard-Mar2014.pdf>.

⁹⁹ Alberta Environment and Sustainable Resource Development, *Report on 2011 Greenhouse Gas Emissions*, May 2013 at 20, online: <aep.alberta.ca/climate-change/reports-and-data/documents/2011ReportGreenhouseGasEmissions-May2013.pdf>.

carbon in a year are subject to emissions intensity reduction obligations under the *SGER*.¹⁰⁰ Based on the available data for 2011, approximately 100 reporting facilities exceeded the 100,000 ton threshold and were subject to a reduction obligation. The number of regulated emitters would be less than 100 since some emitters operate more than one regulated facility.

4.1.3 THE ALLOCATION OF ENTITLEMENTS TO EMIT CARBON

The Alberta carbon scheme does not allocate emission allowances at the outset of a compliance period. Entitlements enter the Alberta market when earned by either a regulated emitter as an emissions performance credit or by a non-regulated entity as an emissions offset (described in section 4.1.4 below). A regulated emitter generates one emissions performance credit for each ton of carbon in which its reported emissions is less than its baseline target.¹⁰¹ The focus of the legal framework is on measurement and verification of the emission reduction to ensure issued credits represent real reductions. A regulated emitter must disclose in a prescribed report whether its actual emissions are above or below its intensity baseline for each compliance period.¹⁰² Alberta has published technical guidance to direct regulated emitters through the verification process.¹⁰³

4.1.4 MEASURES USED TO CONTROL COMPLIANCE COSTS

In cases where its emissions intensity in a compliance period exceeds its baseline limit, a regulated emitter has three options to cover the excess and achieve compliance: (1) submit emissions performance credits earned in a previous compliance period or acquired in the market from another participant, (2) submit emissions offsets acquired from a non-regulated entity, or (3) pay \$15 per ton into the Climate Change and Emissions Management Fund.¹⁰⁴ Notably, the Alberta system does not limit the number of offsets a regulated emitter can submit in a compliance period.

Alberta has a relatively mature and comprehensive carbon emissions offset program. A carbon emission offset may be generated by a person other than a regulated emitter who conducts a prescribed activity in a manner that reduces its carbon emissions relative to usual methods. Section 7 of the *SGER* sets out rules on the creation and use of carbon emissions offsets for compliance purposes in Alberta, although most of the details are set out in guidance published by Alberta Environment and Sustainable Resource Development (Alberta Environment). The

¹⁰⁰ *SGER*, *supra* note 91, s 2.

¹⁰¹ *Ibid*, s 9.

¹⁰² *Ibid*, s 11.

¹⁰³ Alberta Environment and Sustainable Resource Development has published technical guidance for the creation and submission of emissions performance credits: see Alberta Environment and Sustainable Resource Development, *Technical Guidance for Completing Specified Gas Compliance Reports*, Version 7.0 (Edmonton: Alberta Environment, 2014) online: <aep.alberta.ca/climate-change/guidelines-legislation/specified-gas-emitters-regulation/documents/TechGuidanceCompletingSpecGasComplianceRpts-Feb2014.pdf>.

¹⁰⁴ *SGER*, *supra* note 91, ss 4(3), 5. The Alberta government recently announced its intention to raise the fund payment amount to \$20 per ton effective January 1, 2016 and \$30 per ton effective January 1, 2017, see Alberta Environment and Parks, "Industrial Emissions Management", online: <aep.alberta.ca/climate-change/programs-and-services/industrial-emissions-management.aspx>.

carbon reduction activity must occur in Alberta, be an action that is not otherwise required by law, and produce emissions reductions which are measurable, replicable, and real.

Alberta employs the protocol method to establish the business-as-usual emissions baseline from which reductions are measured for a project to calculate the generation of carbon offsets. Any person can develop a project protocol, but the protocol must be approved by Alberta Environment before projects conducted under the protocol will generate carbon offsets.¹⁰⁵ A person other than a regulated emitter can generate offsets by conducting an activity in accordance with the protocol. A one ton reduction in carbon emissions produced by activity relative to the business-as-usual scenario and that complies with rules set out in the *SGER* and the applicable protocol results in one carbon offset.¹⁰⁶ There are currently 34 approved project protocols in Alberta.¹⁰⁷

Alberta reports that since the commencement of its offset program in 2007, a total of 191 offset-generating projects had been registered as of August 2015.¹⁰⁸ Agricultural land management protocols for projects that eliminate or reduce tillage are the most common source of offsets. Alberta reports that approximately 24 million offsets have been submitted for compliance up to and including the 2014 compliance year.¹⁰⁹ Compliance statistics published by Alberta Environment for the years 2008 to 2014 illustrate that payments into the Climate Change and Emissions Management Fund is by far the most popular compliance mechanism used by regulated emitters to cover emissions above their intensity limit.¹¹⁰

Carbon emissions policy in Alberta contemplates the trading of emissions entitlements between regulated emitters and emissions offset producers, however a carbon trading market has been slow to develop in Alberta. There are several possible reasons for this. Alberta's 2008 Climate Change Strategy does not explicitly address carbon trading, so it is not surprising to find little institutional support for a trading market in Alberta.¹¹¹ Moreover, empirical compliance data such as the 2012 figures shown above suggests the fund payment to the Climate Change and Emissions Management Fund is currently too low, at \$15 per ton. The payment amount is set by ministerial order,¹¹² which effectively provides Alberta complete

¹⁰⁵ Alberta Environment and Sustainable Resource Development has published technical guidance on protocol development: see Alberta Environment and Sustainable Resource Development, *Technical Guidance for Offset Protocol Developers*, Version 4.0 (Edmonton: Alberta Environment, 2013) online: <aep.alberta.ca/climate-change/guidelines-legislation/specified-gas-emitters-regulation/documents/TechnicalGuideOffsetProject-Feb2013.pdf>.

¹⁰⁶ *SGER*, *supra* note 91, s 7(1.4).

¹⁰⁷ See Alberta Environment and Sustainable Resource Development, "Approved Quantification Protocols" (6 September 2015) online: <aep.alberta.ca/climate-change/guidelines-legislation/specified-gas-emitters-regulation/offset-credit-system-protocols.aspx>.

¹⁰⁸ CSA Group, "Alberta Emissions Offset Registry Listings", online: <csaregistries.ca/albertacarbonregistries/eor_listing.cfm>.

¹⁰⁹ Alberta Environment and Parks, "Industrial Emissions Management", online: <aep.alberta.ca/climate-change/programs-and-services/industrial-emissions-management.aspx>.

¹¹⁰ *Ibid.*

¹¹¹ Alberta Environment and Sustainable Resource Development, *Alberta 2008 Climate Strategy*, online: <environment.gov.ab.ca/info/library/7894.pdf>.

¹¹² *SGER*, *supra* note 91, s 8(2).

discretion to raise or lower this safety valve measure. Given this discretionary legal structure, it is also not surprising that the fund payment is a political topic in Alberta.¹¹³

4.2 CARBON EMISSION TRADING IN QUEBEC

Quebec has a true cap-and-trade scheme, which commenced on January 1, 2013. The Quebec carbon scheme is governed by the *Regulation respecting a cap-and-trade system for greenhouse gas emission allowances*¹¹⁴ enacted under the *Environment Quality Act*.¹¹⁵ Price discovery on carbon is a key component of Quebec's climate change policy.¹¹⁶

Transportation fuels are the largest source of carbon emissions in Quebec (estimated at 43.5 percent of total provincial emissions in 2009), followed by industrial manufacturing (estimated at 28 percent of total provincial emissions in 2009).¹¹⁷ However the first compliance period in the cap-and-trade scheme, which covers the two-year period of January 1, 2013 to December 31, 2014, did not include transportation fuels. This sector is now subject to compliance obligations in the second compliance period as of January 2015.¹¹⁸

4.2.1 THE EMISSIONS CAP

The carbon emissions cap in Quebec is established by a combination of enactments. The total number of emissions allowances available to be issued by Quebec to regulated emitters in a calendar year is capped by an Order in Council issued under section 46.7 of the *Environment Quality Act*.¹¹⁹ The current Order in Council discloses the cap number for each calendar year until 2020. The cap number lowers over successive years, taking into account the addition of transportation fuel in 2015, in order to achieve an overall carbon emissions reduction of 20 percent by 2020 relative to 1990 levels.¹²⁰ Sections 19 and 21 of the *Regulation respecting a cap-and-trade system for greenhouse gas emission allowances* impose a duty on regulated emitters to submit one emissions unit for one ton of carbon emissions during a compliance period. The combination of the statutory limit on the number of allowances which can be issued by

¹¹³ James Wood, "Premier Jim Prentice draws fire for linking carbon levy to low oil prices", *Calgary Herald* (7 November 2014) online: <calgaryherald.com/news/alberta/Premier+Prentice+draws+fire+linking+carbon+levy+prices/10360315/story.html>.

¹¹⁴ *Regulation respecting a capandtrade system for greenhouse gas emission allowances*, CQLR c Q2, r 46.1 [*Quebec Cap-and-Trade Regulation*].

¹¹⁵ *Environment Quality Act*, CQLR c Q-2.

¹¹⁶ Quebec, Minister of Sustainable Development, Environment and the Fight against Climate Change, *2013-2020 Climate Change Action Plan*, online: <mddelcc.gouv.qc.ca/changements/plan_action/pacc2020-en.pdf>.

¹¹⁷ *Ibid* at 7.

¹¹⁸ *Quebec Cap-and-Trade Regulation*, *supra* note 114, ss 2(2), 19(2).

¹¹⁹ *Determination of annual caps on greenhouse gas emission units relating to the capandtrade system for greenhouse gas emission allowances for the 20132020 period*, OC 11852012, (2012) GOQ II, 3612 [*Determination of annual caps*].

¹²⁰ For the 2020 target: see *Concernant l'adoption de la cible de réduction des émissions de gaz à effet de serre du Québec à l'horizon 2020*, OC 1187-2009, (2009) GOQ II, 5871; see generally *2013-2020 Climate Change Action Plan*, *supra* note 116.

Quebec and the statutory obligation to submit allowances to cover carbon emissions establishes the cap.

4.2.2 THE SCOPE OF COVERAGE IN REGULATED EMITTERS

Sectors subject to carbon emissions reduction obligations in Quebec currently include mining, oil and gas development, industrial manufacturing, power generation, natural gas, and transportation fuel distribution.¹²¹ Regulated emitters are persons with activity in one of the prescribed sectors and generate at least 25,000 tons of carbon per year.¹²² Approximately 80 facilities in Quebec were subject to limits on carbon emission as of January 1, 2013.¹²³ The number of regulated emitters would be less than 80 since some emitters operate more than one regulated facility.

Regulated emitters are required to report their carbon emissions for each calendar year.¹²⁴ For each compliance period (the initial period is 2 years, and subsequent periods are scheduled for 3 years), a regulated emitter must submit the quantity of emissions units equal to its reported emissions during that period. Emissions units available for compliance include units allocated or sold to regulated emitters by Quebec, a carbon offset generated under a designated project in Quebec, and emission units or carbon offsets from jurisdictions linked to the Quebec market.¹²⁵

4.2.3 THE ALLOCATION OF ENTITLEMENTS TO EMIT CARBON

Quebec employs a hybrid of free allocation and auction to distribute entitlements to regulated emitters. Quebec allocates the majority of available allowances under the cap at no charge to regulated emitters involved in mining and industrial manufacturing. The quantity of allowances allocated to a regulated emitter is based on their historical emissions and production levels in accordance with calculations set out in the *Regulation respecting a cap-and-trade system for greenhouse gas emission allowances*.¹²⁶ The purpose of free allocation is to mitigate the costs

¹²¹ *Quebec Cap-and-Trade Regulation*, *supra* note 114, Appendix A.

¹²² *Ibid*, s 2. Mandatory carbon emissions reporting applies to facilities that emit at least 10,000 tons per year: see *Regulation respecting mandatory reporting of certain emissions of contaminants into the atmosphere*, CQLR, c Q-2, r 15, s 6.1.

¹²³ See Quebec, Minister of Sustainable Development, Environment and the Fight against Climate Change, *Liste des établissements visés par le Règlement concernant le système de plafonnement et d'échange de droits d'émission de gaz à effet de serre (RSPÉDE) au 1er janvier 2013, et des émissions de gaz à effet de serre déclarées et vérifiées pour l'année 2012*, online: <mdelcc.gouv.qc.ca/changements/carbone/liste-etablissements-visesRSPÉDE.pdf>.

¹²⁴ *Regulation respecting mandatory reporting of certain emissions of contaminants into the atmosphere*, *supra* note 122, s 6.2.

¹²⁵ *Quebec Cap-and-Trade Regulation*, *supra* note 114, s 3(5).

¹²⁶ *Ibid*, ss 39–44. The entities entitled to free allocations and the quantity of their entitlement are set out in Appendix C.

associated with emissions obligations on Quebec industry facing international competition.¹²⁷ Quebec intends to reduce the amount of free allocation annually starting in 2015.¹²⁸

Quebec may also conduct up to four allowance auctions per year.¹²⁹ The legislated initial minimum price per unit was \$10 in 2012, and the price has risen annually since then.¹³⁰ Auction rules are set out in the *Regulation respecting a cap-and-trade system for greenhouse gas emission allowances* and policy guidance.¹³¹ Generally speaking, the auction functions as follows. The government issues public notification of an upcoming auction.¹³² A regulated emitter or any voluntary participant may register to submit bids in the auction. Only bids above the floor price are accepted. The sale price for all accepted bids is the lowest bid price that allows for the sale of the last available units. All successful bids pay the same price in the auction. The units sold by auction are valid for compliance in specified or subsequent years. As of the time of writing, Quebec has completed eight auctions.¹³³

4.2.4 MEASURES USED TO CONTROL COMPLIANCE COSTS

There is no fund payment compliance option in the Quebec scheme, although Quebec does have the discretion to conduct auctions by mutual agreement at a prescribed price, which could operate as a price ceiling.¹³⁴ A regulated emitter may cover up to 8 percent of its carbon emissions in a compliance period using carbon offsets generated by an emissions reduction project in accordance with a prescribed protocol.¹³⁵ There are currently only three approved offset protocols in Quebec, including the sequestration of methane gases from livestock and landfills.¹³⁶

¹²⁷ Quebec, Minister of Sustainable Development, Environment and the Fight against Climate Change, *Regulation Respecting a Cap-and-Trade System for Greenhouse Gas Emissions Allowances: Technical Overview*, 2013 at 8, online: <mddelcc.gouv.qc.ca/changements/carbone/documents-spede/technical-overview.pdf>.

¹²⁸ Quebec, Minister of Sustainable Development, Environment and the Fight against Climate Change, “Quebec cap and trade System - in brief”, online: <mddelcc.gouv.qc.ca/changements/carbone/documents-spede/in-brief.pdf>.

¹²⁹ *Quebec Cap-and-Trade Regulation*, *supra* note 114, s 45.

¹³⁰ *Ibid*, s 49.

¹³¹ *Ibid*, ss 45–55. User manuals and information on the auction platform are available online: Quebec, Minister of Sustainable Development, Environment and the Fight against Climate Change, *The Carbon Market - Documentation*, online: <mddelcc.gouv.qc.ca/changements/carbone/documentation-en.htm>.

¹³² Quebec, Minister of Sustainable Development, Environment and the Fight against Climate Change, *Auction Notice 27 may 2014*, online: <mddelcc.gouv.qc.ca/changements/carbone/ventes-encheres/Avis-Vente_aux_encheres_27_05_2014_Ang.pdf>.

¹³³ Auction results are published online: Quebec, Minister of Sustainable Development, Environment and the Fight against Climate Change, *Cap-and-Trade Auction Notices and Results*, online: <mddelcc.gouv.qc.ca/changements/carbone/avis-resultats-en.htm>. Verified in July 2015.

¹³⁴ *Quebec Cap-and-trade Regulation*, *supra* note 114, s 56–64.1. The lowest prescribed price per allowance is \$40; *ibid*, s 58.

¹³⁵ *Ibid*, s 20.

¹³⁶ The approved protocols and the methodology for calculating offsets generated by projects in accordance with the protocol are listed in *ibid*, Appendix D.

5. ANALYSIS

The foregoing sections of this paper have examined the carbon emissions regulatory schemes in New Zealand and the Canadian provinces of Alberta and Quebec. The examination of each system focused on the following four design features: (1) the emissions cap, (2) the scope of coverage in regulated emitters, (3) the allocation of entitlements to emit carbon, and (4) measures used to control compliance costs. This final section engages in a comparative analysis of the law and policy that establishes these design features in each of the three systems. The general legal structure governing carbon emission trading in each jurisdiction is essentially similar. The regulatory framework consists of a parent statute and an extensive amount of technical content in subordinate legislation (regulations) and policy guidance. However, while the general framework has a similar structure or form across jurisdictions, the substantive content is very distinct. Given the variations across systems, the comparative analysis in this section attempts to elicit the relative strengths and weaknesses of each system in relation to: (1) its impact thus far on reducing carbon emissions, (2) its effectiveness at price discovery for carbon emissions, and (3) its potential to link with other systems. The analysis suggests the design of the Quebec system is most likely to accomplish the objective of price discovery and an overall reduction in carbon emissions

It is worth reiterating at this point that the reduction of carbon emissions is not a direct outcome of market transactions. The decision to limit carbon emissions is a public policy choice made apart from the market, as such, the amount of emissions abatement in a given jurisdiction depends primarily on the decision to establish a cap on emissions and determine who must comply with it. The trading market itself is simply the means by which to implement the reduction policy.¹³⁷

The systems in New Zealand and Alberta demonstrate that it is possible to implement a carbon emissions trading scheme without an absolute cap on emissions. With this in mind, it does not come as a surprise to learn that both jurisdictions have also experienced growth in carbon emissions during the lifespan of their emissions trading system. Annual absolute carbon emissions in New Zealand rose successively between 2010 and 2012 from 73.491 to 76.048 million tons of carbon.¹³⁸ Annual absolute carbon emissions from regulated facilities in Alberta rose successively between 2008 and 2013 from an aggregate of 110.642 million tons in 2008 to 132.069 tons in 2013.¹³⁹ By comparison in a system with a true cap on emissions, regulated facilities in Quebec reported a reduction in absolute carbon emissions during the first year of its carbon emissions trading system in 2013. Annual absolute carbon emissions from regulated facilities in Quebec were 21.046 million tons in 2012 and 19.711 million tons

¹³⁷ Dales, *supra* note 12.

¹³⁸ UNFCCCOR, *Report on national greenhouse gas inventory data from Parties included in Annex I to the Convention for the period 1990-2012*, 41st Sess, Agenda Item 3(e), FCCC/SBI/2014/20 (2014) at 14, online: <unfccc.int/resource/docs/2014/sbi/eng/20.pdf>.

¹³⁹ Environment Canada, *Reported Facility Greenhouse Gas Data* (17 April 2015) online: <ec.gc.ca/ges-ghg/default.asp?lang=En&n=8044859A-1>. The Alberta data was accessed using the query search function to isolate data from reporting facilities located in Alberta.

in 2013.¹⁴⁰ The legislated carbon emissions cap in Quebec for 2013 was 23.2 million tons.¹⁴¹ These results provide credence to earlier criticisms that the absence of a legislated absolute cap in New Zealand and Alberta would mean their respective carbon emissions policy would not result in a reduction of carbon emissions.¹⁴²

There is also the view that price discovery on the entitlement to discharge or emit is arguably the only true objective of a market-based policy to address pollution.¹⁴³ The market price of an entitlement to emit carbon is established by supply and demand forces, as well as trades in entitlements amongst market participants, with the marginal price of an entitlement being that which brings together a willing seller and a willing buyer.¹⁴⁴ The supply of entitlements at any given time in a carbon market will be influenced by the amount of entitlements issued into the market by the regulatory authority and the quantity of existing entitlements offered for sale by market participants. The demand for entitlements at any given time is a function of the need to emit and the requirement to cover emissions with entitlements. Supply and demand in a carbon market is thus highly influenced by policy decisions, and accordingly, one might expect the effectiveness of a carbon market on price discovery to vary across jurisdictions.

Price discovery is weak in the carbon emissions trading systems of all three jurisdictions studied here, but the Quebec system appears the most robust of the group because of its allowance auctions. In an earlier paper, I have argued the legal frameworks governing carbon trading in Canada direct insufficient attention to regulating for the liquidity, transparency, and order necessary for price discovery in the trading market.¹⁴⁵ The *CCRA* likewise has no provisions to regulate the NZ ETS on these parameters. Carbon trading in all these jurisdictions is non-transparent and so the caveat with the analysis on price discovery that follows is that it is difficult to assess price discovery with much certainty without reliable trading data.

The most transparent indicator of a carbon price in Alberta is the \$15 per ton payment made by regulated emitters into the Climate Change and Emissions Management Fund to cover emissions above their baseline intensity limit. However this does not represent a market price agreed to between a buyer and seller of emissions units, but rather operates more like a carbon tax levied by the Alberta government on emissions above a threshold level. Alberta does not allocate entitlements into the market, so there is no auction or other mechanism upon which to assess prices. Transaction details involving the purchase and sale of earned emissions performance credits (in the case of a regulated emitter) or emissions offsets (in the case of a non-regulated emitter) would provide a measure of carbon price in the Alberta market, but these details are not publicly available.

¹⁴⁰ *Ibid.* The Quebec data was accessed using the query search function to isolate data from reporting facilities located in Quebec.

¹⁴¹ *Determination of annual caps, supra* note 119, s 1.

¹⁴² For a detailed critique of the shortcomings of the NZ ETS to limit carbon emissions: see Bertram & Terry, *supra* note 39. For a detailed critique of the Alberta system: see Bramley et al, *supra* note 92.

¹⁴³ The comments here about the fundamentals of price discovery in a market-based regulatory scheme are based on the seminal work of Dales, *supra* note 12 at 93–97.

¹⁴⁴ Aldy & Stavins, “The Promise and Problems of Pricing Carbon: Theory and Experience”, *supra* note 22 at 157.

¹⁴⁵ Fluker & Janmohamed, *supra* note 33.

The most transparent indicator of a carbon price in Quebec is the auction reserve price for current year allowances, and at the time of writing this was posted as \$16.39 per 2015 allowance for the August 2015 auction.¹⁴⁶ The sale price in successive allowance auctions under the Quebec system has risen from the initial price of \$10.75 per ton in December 2013.¹⁴⁷ The total number of emissions allowances issued into the Quebec market cannot lawfully exceed the legislated emissions cap and each allowance represents one ton of carbon within that cap, so the auction price does provide a measure of price discovery on carbon emissions. However, for now Quebec employs a hybrid of free allocation and auction to distribute entitlements to regulated emitters in a compliance period, and since the majority of emissions allowances are distributed at no charge to regulated emitters the auction price does not reflect the true carbon price in the Quebec market.

The spot price for New Zealand units in the over-the-counter market at the time of writing was \$6.85,¹⁴⁸ but given how few of these units are submitted for compliance under the NZ ETS, it is questionable that this represents the true cost of emitting carbon in New Zealand. New Zealand issues emissions units by free allocation, in some cases to entities that do not have a compliance obligation, and as earned compensation for carbon sequestration activity.¹⁴⁹ Given that the large majority of units submitted for compliance under the NZ ETS have been Kyoto units, it seems the spot price for these international units is a better reflection of the carbon price in New Zealand than the emissions units issued by New Zealand itself.¹⁵⁰ The spot price for Kyoto certified emissions reduction units on ICE Futures Europe, a regulated trading market for emissions allowances, at the time of writing was only \$0.52 per unit.¹⁵¹

In addition to poor transparency, another issue for price discovery is few numbers of participants with emissions compliance obligations that need to acquire entitlements in the market. In all three jurisdictions, the governing legal framework prescribes the type of activity subject to compliance obligations, with exemptions for those who emit under a threshold level of carbon emissions. The *CCRA* in New Zealand includes a relatively wide coverage of economic sectors under compliance obligations, but the largest number of participants, by a large margin, are owners of post-1989 forested land who earn emissions units from carbon sequestration since their timber is too young for harvesting. These landowners thus presently contribute more to the supply of entitlements. The demand-side of the market in the Quebec and Alberta markets is likewise meagre, each jurisdiction having only about 100 participants.

¹⁴⁶ See Quebec, “The Carbon Market: Cap-and-Trade Notices and Results”, online: <mddelcc.gouv.qc.ca/changements/carbone/avis-resultats-en.htm>.

¹⁴⁷ *Ibid.*

¹⁴⁸ OM Financial operates an over-the-counter market for New Zealand emissions units and discloses bid/ask and closing prices on its website: see *CommTrade Carbon*, *supra* note 80 (6 September 2015).

¹⁴⁹ Bertram and Terry observe that New Zealand emissions units simply represent the transfer of wealth from one sector (those entities with compliance obligations) to another sector: see Bertram & Terry, *supra* note 39 at 51–59.

¹⁵⁰ Bertram and Terry accurately predicted that New Zealand would be a price taker in the international market for carbon emissions units and that, accordingly, the price of carbon emissions under the NZ ETS would reflect the cheapest of the Kyoto units: see *ibid* at 51.

¹⁵¹ ICE Futures Europe, “Emissions CER Index” (6 September 2015), online: <theice.com/marketdata/reports/icefuturesurope/ECXCERIndex.shtml>. For some discussion on regulated trading markets for emissions allowances, see generally Fluker and Janmohamed, *supra* note 33.

However the demand-side of the Quebec market will increase in future years with the inclusion of the transportation fuel section in the second compliance period, which commenced in January 2015, and the ability of California buyers to acquire entitlements from Quebec sellers by virtue of their linked systems.¹⁵²

The absence of a limit on the supply of entitlements to emit in the New Zealand and Alberta systems provides another difficulty for price discovery in those markets. In New Zealand, the *CCRA* has allowed a regulated emitter to import an unlimited number of international Kyoto units for the purpose of submitting them for compliance under the NZ ETS. Likewise in Alberta, the *SGER* allows a regulated emitter to submit an unlimited number of emissions offsets acquired from non-regulated entities, and the legal framework does not prescribe a limit on the number of offsets that can be generated by protocol projects. In contrast, the *Regulation respecting a cap-and-trade system for greenhouse gas emission allowances* limits both the type of entitlements and the number of offsets that can be used for compliance under the Quebec system. Regulated emitters in Quebec can submit allowances issued only by Quebec, California, or other jurisdictions formally linked to the Quebec system in the future, and since these allowances are based on historical emissions of regulated emitters there will be a limit on the amount of surplus after accounting for compliance obligations. As well, regulated emitters can only submit offsets earned by non-regulated entities to cover up to 8 percent of their emissions in a compliance period. These restrictions provide for a limit on the supply-side of the Quebec system that does not exist in New Zealand or Alberta.

In summary, the available empirical data suggests the design of Quebec's carbon emissions trading system is superior to that of New Zealand and Alberta in relation to: (1) its impact thus far on reducing carbon emissions, and (2) its effectiveness at price discovery for carbon emissions. Absolute levels of carbon emissions from regulated entities in Quebec is falling and price discovery on the entitlement to emit carbon is more transparent and more certain in Quebec than in the other systems. The comparison across these three systems suggests the absolute cap on emission levels, emission allowance auctions, and measures that restrict or limit the number of allowances, credits or other units that enter the market, each have a positive impact on price discovery in the Quebec cap-and-trade system. While all three markets have a relatively a small demand-side, the Quebec system appears to have stronger potential for improved demand over time.

The potential of one carbon emissions scheme to link with another system is the subject of extensive literature¹⁵³ and the post-Kyoto global carbon policy will almost certainly focus on linked regional systems. Jaffe and Stavins survey ideas for the development of global climate policy post-Kyoto and, in particular, explore the possibility of a new international arrangement whereby regional and national carbon schemes are linked together to form an effective global

¹⁵² For an overview of the Quebec-California linked carbon market see Quebec, Minister of Sustainable Development, Environment and the Fight against Climate Change, *A New North American Carbon Market*, online: <mddelcc.gouv.qc.ca/changements/carbone/documents-spede/linking-quebec-california.pdf>.

¹⁵³ This study was not intended to exhaustively canvass the issues in relation to the linking of carbon emissions trading systems. Nonetheless, some of the literature used to construct the comparative framework in section 2 does address linkage between carbon systems. See *supra* note 22.

carbon market.¹⁵⁴ Aldy and Stavins suggest this “bottom up” approach may already be asserting itself as the global policy framework going forward:

A new international policy architecture may be evolving on its own, based on the reality that tradable permit systems, such as cap-and-trade systems, are emerging worldwide as the favored national and regional approach. Prominent examples include the European Union’s Emission Trading Scheme (EU ETS); the Regional Greenhouse Gas Initiative in the northeastern United States; and systems in Norway, Switzerland, and other nations; plus the existing global emission-reduction-credit system, the CDM. Moreover, cap-and-trade systems now appear likely to emerge as the chosen approach to reducing greenhouse gas emissions in an additional set of industrialized countries, including Australia, Canada, Japan, New Zealand, and the United States.¹⁵⁵

Consistency or harmonization in design features across emissions trading schemes may not be essential to form a global carbon market with this “bottom up” approach, but it is clearly an important consideration in the development of an effective arrangement. Too much inconsistency is likely to impede the development of any such international carbon policy architecture.

In North America, the Western Climate Initiative is emerging as the foundation for a regional carbon emissions trading system that consists of linked subnational schemes. The Western Climate Initiative itself is an umbrella organization consisting of member jurisdictions who agree to implement a domestic carbon emissions cap-and-trade system following common design features and carbon emission reduction goals.¹⁵⁶ California and Quebec were the first two jurisdictions to formally link their cap-and-trade systems under the umbrella of the Western Climate Initiative.¹⁵⁷ The two jurisdictions signed an agreement in 2013 to harmonize their respective carbon schemes effective January 1, 2014.¹⁵⁸ Pursuant to the agreement Quebec and California mutually recognize emission allowances and offsets distributed in each jurisdiction, allow regulated emitters to trade the units across jurisdictions, and conduct joint allowance auctions.¹⁵⁹ In April 2015, the Province of Ontario announced its intention to implement a

¹⁵⁴ Jaffe and Stavins, *supra* note 18.

¹⁵⁵ Joseph E Aldy & Robert N Stavins, “Lessons for the international policy community” in Joseph E Aldy & Robert N Stavins, eds, *Post-Kyoto International Climate Policy: Implementing Architectures for Agreement* (New York: Cambridge University Press, 2010) 899 at 911-912.

¹⁵⁶ Western Climate Initiative, online: <wci-inc.org>.

¹⁵⁷ See Quebec, Minister of International Relations and La Francophonie, “Carbon Market: Quebec and California link their respective cap and trade programs” (1 October 2013) online: <mrifce.gouv.qc.ca/en/salle-de-presse/communiqués/2013/2013_10_01>.

¹⁵⁸ *Agreement between the California Air Resources Board and the Gouvernement Du Quebec concerning the harmonization and integration of cap-and-trade programs for reducing greenhouse gas emissions*, 27 September 2013, online: <arb.ca.gov/cc/capandtrade/linkage/ca_quebec_linking_agreement_english.pdf> [*Agreement*]; Shaun Fluker & Rolandas Vaiciulus, “Linking the California and Quebec Emissions Trading Schemes” (3 December 2013) University of Calgary Faculty of Law (blog), online: <ablawg.ca/2013/12/03/linking-the-california-and-quebec-emissions-trading-schemes>.

¹⁵⁹ *Agreement*, *supra* note 158, ss 6–8. As of the time of writing, California and Quebec have completed 2 joint allowance auctions.

carbon emissions cap-and-trade system under the Western Climate Initiative, and link with Quebec and California.¹⁶⁰

The provinces of Alberta, Ontario, and Quebec are the three largest carbon-emitting jurisdictions in Canada.¹⁶¹ The prospect of a regional carbon emissions trading system operating in Ontario and Quebec brings forward the question of whether Alberta will join this system. The policy answer in the short-term appears to be no: Alberta does not intend to link its carbon emissions trading system with Quebec and Ontario.¹⁶² However the more difficult question is whether Alberta could link with these systems, even if it chose to do so. The analysis of design features set out above provides some food for thought in this regard.

The linkage of existing emissions trading systems which developed independently of each other almost certainly requires the participating jurisdictions to amend their applicable legal frameworks. Even in the case of the agreement between California and Quebec to link their carbon emission trading systems under the Western Climate Initiative, both jurisdictions had to amend their respective legal frameworks to, among other things, provide for recognition of allowances and offsets produced in another jurisdiction.¹⁶³ This was a relatively easy task since the design features in both jurisdictions were developed under the common oversight of the Western Climate Initiative. Linking Alberta with Quebec would pose more difficulties. The design features in the Alberta system are sufficiently distinct from those in the Quebec system that in order for Alberta to link with Quebec necessary amendments to the *Climate Change and Emissions Management Act* and the *Specified Gas Emitters Regulation* would be substantial.

The intensity baseline-and-credit system implemented by the *SGER* in Alberta presents the fundamental barrier for linking with the Quebec cap-and-trade system. As described in section 4.1 above, the Alberta system does not allocate emission entitlements in units that make up a total number of allowable emissions in a compliance period, but rather a regulated emitter earns units (emissions performance credits) for the amount its actual carbon emissions are below its intensity baseline in a compliance period. Under the Alberta system, a regulated emitter who improves its efficiencies in carbon emitted per unit of production may earn emissions performance credits even if its absolute carbon emissions increase during a compliance period. Put another way, Alberta may issue emissions performance credits into the market during a compliance period that nonetheless experiences growth in absolute carbon emissions from regulated emitters. These credits would not represent a one ton reduction in carbon emissions and are thus would not be fungible with emissions allowances issued by Quebec under the *Regulation respecting a cap-and-trade system for greenhouse gas emission allowances*. Quebec cannot recognize emission performance credits issued by Alberta for compliance purposes without impairing the integrity of its emissions cap.

¹⁶⁰ Ontario Government, News Release, “Cap and Trade System to Limit Greenhouse Gas Pollution in Ontario” (13 April 2015) online: <news.ontario.ca/opo/en/2015/04/cap-and-trade-system-to-limit-greenhouse-gas-pollution-in-ontario.html>.

¹⁶¹ Environment Canada, “Greenhouse Gas Emissions by Province and Territory”, online: <ec.gc.ca/indicateurs-indicators/default.asp?lang=en&n=18F3BB9C-1>.

¹⁶² James Wood and Chris Varcoe, “Prentice rejects cap-and-trade emissions system as Quebec and Ontario join forces”, *Calgary Herald* (13 April 2015) online: <calgaryherald.com/news/politics/prentice-says-he-doesnt-favour-cap-and-trade-emissions-system-as-quebec-and-ontario-join-forces>.

¹⁶³ For some commentary: see Fluker & Vaiciulus, *supra* note 158.

The only similarity in design between the Alberta and Quebec schemes is the scope of regulated emitters with a compliance obligation. Otherwise, the general focus of rules in Alberta's *CCEMA* and *SGER* appear to be more towards the control of compliance costs than on carbon emissions reduction or price discovery. The fact that payments into the Climate Change and Emissions Management Fund represent a significant portion of how regulated emitters achieve compliance in Alberta places considerable doubt on whether Alberta even has a carbon emissions trading system. The fund payment and relatively extensive emissions offset program in Alberta contrasts with the absence of same under the Quebec cap-and-trade system, but it is difficult to say whether these differences represent insurmountable operational barriers to linkage along the lines of the problem noted above on how allowances and credits are allocated or earned in the two provinces. Nonetheless, these inconsistencies almost surely dampen any political incentive for the two jurisdictions to work together and link their carbon emissions trading systems.

6. CONCLUSION

Carbon emissions trading is firmly entrenched as a primary tool to address the global climate commons problem. The primary objective is to assign a price to the externality of carbon emissions and generate financial incentives for emissions reduction. The general theory underlying carbon emissions trading systems is that the cost to emit will rise as overall emissions accumulate in the atmosphere and thereby encourage abatement to occur. Those emitters with a high marginal cost of implementing abatement technology will have the option to acquire entitlements to emit from others with a lower marginal cost of emissions. As such, the overall reduction in carbon emissions will occur at the lowest possible cost to society.

A system of tradable entitlements to emit carbon does not, in itself, lead to a reduction in carbon emissions. A regulatory authority must set an emissions cap in a given jurisdiction. The decision to prescribe a limit on carbon emissions is a policy decision subject to the usual suite of political manoeuvring and power struggles in modern government. Indeed the design of a carbon emissions trading system as a whole is influenced significantly by a wide range of interests. The environmental lobby calls for a stringent cap on emissions. Economic actors lobby for exemptions from compliance obligations or measures to minimize the cost of compliance. State officials seek ways to minimize administrative costs. Thus we should expect that national or subnational carbon emissions trading systems will vary significantly in design and operation across the globe.

This paper examined the carbon emissions trading systems in New Zealand, Alberta, and Quebec in relation to four common design features: (1) the emissions cap, (2) the scope of coverage in regulated emitters, (3) the allocation of entitlements to emit carbon, and (4) measures used to control compliance costs. The general legal structure governing carbon emission trading in each jurisdiction is essentially similar. The regulatory framework consists of a parent statute and an extensive amount of technical content in subordinate legislation (regulations) and policy guidance. However while the general framework has a similar structure or form across jurisdictions, sections 3 and 4 demonstrate the substantive design features are very distinct. These differences implicate the effectiveness of each system on reducing carbon emissions and establishing price discovery on the entitlement to emit carbon. The conclusion

reached here is that the design of the Quebec cap-and-trade system is relatively superior in relation to achieving both these objectives.

Perhaps the most valuable insight from this study is the need for international oversight on the design features of regional, national, or subnational carbon emissions trading systems and their governing regulatory framework. In North America, the Western Climate Initiative is proving to be a model in this regard. If indeed the post-Kyoto international carbon policy will rely on the formation of a global carbon market realized from a collection of regional, national, and subnational schemes, then international climate negotiations should be focused on developing a common set of parameters to guide the formation of national and subnational carbon emissions trading systems which are consistent or harmonized to the greatest extent possible. Diversity is not a virtue in global carbon policy.

