

# Tried and True: Reducing Greenhouse Gas Emissions in New Zealand Through Conventional Environmental Legislative Modalities

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## I. Introduction

The potentially catastrophic dimensions of climate change are particularly salient in the Pacific region, where island countries' ability to adopt adaptation measures may be limited.<sup>1</sup> The gap between New Zealand's image as an environmentally conscientious world leader from this region<sup>2</sup> and its actual performance in meeting international obligations to reduce greenhouse gas (hereinafter: GHG) emissions is therefore particularly striking.<sup>3</sup> January 1, 2008 opened the so-called "commitment period" under the Kyoto Protocol, giving the 37 developed countries who have adopted "carbon equivalent ceilings" five years to meet specific GHG emission limitations or face sanctions.<sup>4</sup> Some countries, such as Denmark and Romania are doing remarkably well – with respective emissions of 13 and 18 percent below where they were in 1990 – the baseline or reference point for GHG emissions.<sup>5</sup> Unfortunately, New Zealand's emissions since 1990 have increased by some 25 percent even as under the Kyoto Protocol, they were to remain stabilized at 1990 levels.<sup>6</sup> Should GHG emissions produced by air travel associated with international tourism

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<sup>1</sup> Stephen Tully, "The Contribution of Human Rights as an Additional Perspective on Climate Change Impacts Within the Pacific", 5 *NZJPIL* (2007) 5 169-200.

<sup>2</sup> New Zealand remains the only country in the southern hemisphere to adopt a ceiling on GHG emissions.

<sup>3</sup> Ceri Warnock, *Climate Change And International Law: An Overview*, "Will We Turn In Time?" Paper presented at the LexisNexis Conference, 'Climate Change and the Law' held at Te Papa, Wellington, New Zealand on 6 – 7th September 2007.

<sup>4</sup> Article 3 (1) Kyoto Protocol to the United Nations Framework Convention on Climate Change, (Hereinafter: the Kyoto Protocol) (United Nations) 1998.

<sup>5</sup> Environment Department, The World Bank, *Growth and CO2 Emissions: How do Different Countries Fare?*, October 2007 at 7.

<sup>6</sup> The precise figure for New Zealand's exceedance is smaller due to the addition of "carbon sinks" which absorb CO2. See, Ministry of Environment, *Projected Balance of Emissions Units During the First Commitment Period of the Kyoto Protocol*, September 2007.

in New Zealand<sup>7</sup> be counted as part of the country's GHG allowances, it would amount to 7893 kilotons of CO<sub>2</sub> equivalents – or an additional 10 percent exceedance.<sup>8</sup> While the relative contribution of New Zealand to the world's overall greenhouse gas concentrations is small (less than half a percent of global discharges) per capita emissions are not.<sup>9</sup> From the perspective of public policy, the associated activities will have to change, or New Zealand's tax-payers will have to make a considerable outlay in purchasing "carbon credits" on international markets for reductions made in other countries.<sup>10</sup>

There are many reasons to which this lacklustre performance can be attributed. To begin with, as is often the case with "cap and trade" regimes,<sup>11</sup> New Zealand is paying a price for its generally strong environmental performance in 1990. Unlike Eastern European countries, which at that juncture were still home to heavy, polluting industries, (that soon thereafter collapsed but left generous carbon credits in their midst) New Zealand in 1990 received the vast majority of its energy from clean hydroelectric facilities and had a relatively modest fleet of cars. Economic development and the associated steep energy demands have changed that profile considerably.<sup>12</sup> Also, New Zealand's idiosyncratic livestock intensity – which accounts for about a third of emissions – makes its circumstances unique. Given present trends, the Ministry of the Environment anticipates the growing dairy herd and continued energy demands to push New Zealand's net emissions up further still, so that by 2012 levels could be more than 70 percent above those of 1990.<sup>13</sup>

<sup>7</sup> International tourism is a growing part of the country's economy, accounting for 19.2% of annual exports.

<sup>8</sup> Inga Smith and Craig Rodger, "Carbon Emission Offsets for International Transport to and From New Zealand", presentation to the National Energy Research Institute Conference, Auckland, 2007.

<sup>9</sup> New Zealand has the twelfth highest per capita GHG emission rate in the world. Ministry of the Environment, *New Zealand's Climate Change Solutions: An Overview*, September 2007 at 4.

<sup>10</sup> The Kyoto Protocol allows so-called "Annex I" countries who have made a commitment to meet emissions targets to purchase emissions credits from other countries to meet their allowances. See Articles 4, 6, 12, 17. Some estimates of the cost of purchasing "carbon credits" by the New Zealand government to make up for present shortfalls will reach 1 billion dollars (NZ). Rod Myer, "Carbon Tax Too Costly, Says NZ", *The Age*, December 30, 2005. Higher figures have been quoted recently due to the growing gap between emissions and the Kyoto ceiling and the rising price of carbon on world markets.

<sup>11</sup> Joe Kruger and William Pizer, "Greenhouse Gas Trading In Europe, The New Grand Policy Experiment" (2004) 46(8) *Environment* 8-23, at 11-13.

<sup>12</sup> "In 1990, just under 80 percent of total electricity generation in New Zealand came from hydro, geothermal, and wind sources (renewable energy). With 35 per cent growth in electricity demand since 1990, renewable sources made up about 70 per cent of total electricity generation in 2005." Ministry of the Environment, *New Zealand's Climate Change Solutions: An overview*, September 2007.

<sup>13</sup> Ministry of Environment, "Our Responsibility", <http://www.>

Lack of clear government consistency in formulating policy and an overestimation of the impact of forest sinks (that absorb CO<sub>2</sub> and thereby improve the national GHG balance sheet) are also responsible for the present quandary. Twice, the government embraced taxes (once for “sheep burps” and the other a general “carbon tax”) only to change its mind. Recently, Parliament adopted a carbon emissions “cap and trade” program as the centre piece of national climate change policy.<sup>14</sup>

In this sense, New Zealand has happily joined the general international fixation with market mechanisms and “cap and trade” systems,<sup>15</sup> as a “cost-effective” and politically palatable, way to meet the challenge of mitigation of greenhouse gases. In the past, most environmental problems were addressed through “command and control” legislation, where an acceptable level of environmental performance was identified, or a technology recognized as cost-effective and prescribed accordingly. Due to the anticipated breadth of necessary carbon emission reductions, trading systems are expected to be more politically acceptable than conventional controls or even taxes and indeed have been adopted by the European Union,<sup>16</sup> the UK and other jurisdictions.

And yet it would appear that the country, in its zeal to take its place at the table of creative public policy innovators, may have passed up some of the easier and more promising regulatory solutions which could close the present gap between international commitments and the domestic emissions profile. Indeed, it is argued, that sole reliance on a cap-and-trade system, will both lead to missed opportunities for cost-effective reductions in GHG emissions, as well as missed Kyoto deadlines. In this article we will consider the potential of greenhouse gas emission reductions in a variety of sectors which can be facilitated through legislation parallel to the broader cap and trade regulatory scheme that will be phased in over the next five years.

The article will begin with a brief review of the international legal history surrounding present legislative activity, and the expectations that New Zealand must meet under the United Nations Framework Convention on Climate Change (UNFCCC) and its subsequent Kyoto Protocol. A brief description of existing legislation that has emerged in response will follow, with an emphasis on its limitations. A brief

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[climatechange.govt.nz/nz-challenge/our-responsibility.shtm](http://climatechange.govt.nz/nz-challenge/our-responsibility.shtm) (last visited, January 23, 2008).

<sup>14</sup> Climate Change Response (Emissions Trading) Amendment Act 2008 (hereinafter: the CCRETA) <http://www.legislation.govt.nz/act/public/2008/0085/latest/DLM1130932.html>

<sup>15</sup> Cinnamon Carlarne, “Climate Change Policies an Ocean Apart: EU and US Climate Change Policies Compared”, 14 *Penn State Environmental Law Review*, 435.

<sup>16</sup> 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. For an excellent description of the European programme see: Joe Kruger, and William Pizer, *supra*.

presentation of the “Socolow” carbon wedge paradigm will be presented as a general context for several proposed legislative initiatives to reduce GHG emissions. Then the article will consider four areas in which potential interventions exist for reducing New Zealand’s greenhouse gas emissions and legislative mechanisms for facilitating them. Examples of regulatory schemes already in place in other jurisdictions will be mentioned as possible models for future legislation. These measures may not be part of the fashionable “cutting edge” economic instruments, but in many cases, they may be more effective. And as it is already clear after the 2007 Conference of the Parties to the UNFCCC held at Bali<sup>17</sup> that the Kyoto emission targets will become more stringent over time, they may provide some of the solution for what is certain to be a growing challenge for environmental law.

## II. The International Framework for Addressing Climate Change

### *The UNFCCC*

By the late 1980s a sufficient number of scientists were convinced that the planet was warming and that the ecological consequences could be severe to bring the issue of climate change into the centre stage of international discourse. Even such an unlikely advocate as UK Prime Minister Margaret Thatcher dedicated her final speech to the UN General Assembly in 1989 to the topic, calling on the family of nations to urgently adopt a framework convention to address the issue.<sup>18</sup> Soon thereafter, the General Assembly established an Intergovernmental Negotiating Committee to begin the complex drafting process.<sup>19</sup>

<sup>17</sup> For a review of the most recent conclusions of the UNFCCC’s Conference of the Parties in Bali (COP13) see: United Nation Framework Convention on Climate Change, COP13, Bali, 2007 ([http://unfccc.int/meetings/cop\\_13/items/4049.php](http://unfccc.int/meetings/cop_13/items/4049.php)).

<sup>18</sup> “The most pressing task which faces us at the international level is to negotiate a framework convention on climate change – a sort of good conduct guide for all nations. Fortunately we have a model in the action already taken to protect the ozone layer...that aims to prevent rather than just cure a global environmental problem. But a framework is not enough. It will need to be filled out with specific undertakings, or protocols in diplomatic language, on the different aspects of climate change. These protocols must be binding and there must be effective regimes to supervise and monitor their application. Otherwise those nations which accept and abide by environmental agreements, thus adding to their industrial costs, will lose out competitively to those who do not. The negotiation of some of these protocols will undoubtedly be difficult. And no issue will be more contentious than the need to control emissions of carbon dioxide, the major contributor – apart from water vapour – to the greenhouse effect. We can’t just do nothing.” Margaret Thatcher, speech to the United Nations General Assembly, November, 8, 1989 reprinted in Alon Tal *Speaking of Earth, Environmental Speeches that Moved the World*, New Brunswick, Rutgers University Press, (2006).

<sup>19</sup> General Assembly decision 45/212, (1991) 21 *Environmental Policy and Law* 76.

By then an Intergovernmental Panel on Climate Change (IPCC) was already actively considering the scientific controversies that the issue evoked. Established by the World Meteorological Organization and the United Nations Environmental Program, the IPCC was designed to be a broad international scientific body that would review the scientific evidence about climate change and prepare reports that reflect the prevailing viewpoints within the scientific community.<sup>20</sup> Their periodic reports expressed growing consensus among scientists that the world was growing warmer and that anthropogenic emissions of greenhouse gases were the proximate cause for the steady increase in temperature.<sup>21</sup>

After several rounds of stormy negotiations,<sup>22</sup> a draft of a general framework agreement had sufficiently coalesced to be part of the documents which were reviewed, and ultimately approved at the United Nations Conference on Environment and Development in Rio de Janeiro in 1992.<sup>23</sup> The framework convention was far less ambitious in its scope and expectations than advocates of a global initiative to address climate change had hoped for. The convention paid lip service to a number of principles that were by then popular in international environmental law, including “common but differentiated responsibilities”<sup>24</sup> which put

<sup>20</sup> The IPCC defines its mission as to “assess on a comprehensive, objective, open and transparent basis the latest scientific, technical and socio-economic literature produced worldwide relevant to the understanding of the risk of human-induced climate change, its observed and projected impacts and options for adaptation and mitigation.” See generally “About the IPCC” on the organization’s web-site: <http://www.ipcc.ch/about/index.htm>. The work of the IPCC was sufficiently exemplary in shaping the international discourse and forging a consensus that the body and its thousands of members were awarded a Nobel Peace Prize along with Al Gore in 2007.

<sup>21</sup> “We are certain of the following: there is a natural greenhouse effect...; emissions resulting from human activities are substantially increasing the atmospheric concentrations of the greenhouse gases: CO<sub>2</sub>, methane, CFCs and nitrous oxide. These increases will enhance the greenhouse effect, resulting on average in an additional warming of the Earth’s surface. The main greenhouse gas, water vapour, will increase in response to global warming and further enhance it...We calculate with confidence that: ...CO<sub>2</sub> has been responsible for over half the enhanced greenhouse effect; long-lived gases would require immediate reductions in emissions from human activities of over 60% to stabilise their concentrations at today’s levels...”: IPCC, First Assessment Report, “Executive Summary”, 1990.

<sup>22</sup> Mostafa K Tolba, with Iwona Rummel-Bulska, *Global Environmental Diplomacy, Negotiating Environmental Agreements for the World, 1973-1992*, Cambridge, MIT Press (1998).

<sup>23</sup> Gary Scott, Geoffrey Reynolds and Anthony Lott, “Success and Failure Components of Global Environmental Cooperation: the Making of International Environmental Law” (1995) *Journal of International and Comparative Law* 23. See also: United Nations Environmental Programme, *Evolving Environmental Perceptions: From Stockholm to Nairobi*, (Mostafa Kamal Tolba, Ed) London, Butterworths (1988).

<sup>24</sup> “Acknowledging that the global nature of climate change calls for the

the onus for reductions on the developed and rather than developing countries<sup>25</sup> and divided the family of nations up accordingly in its Annexes. In a relatively strong environmental response to the ongoing scientific debate about the magnitude of human contribution to global warming, it also contains a strong adoption of the "Precautionary Principle".<sup>26</sup> But the resistance of the United States to the designation of quantifiable emission targets and implementation timetables left it devoid of operational expectations.<sup>27</sup>

The convention did expect parties to maintain inventories and reports about anthropogenic emissions by sources and removals by sinks of all greenhouse gases<sup>28</sup> as well as establish financial mechanisms to assist developing countries.<sup>29</sup> All countries were expected to prepare programs and policies that would spell out those measures that were to be employed to mitigate climate change.<sup>30</sup> Yet, there were no prescriptive specifications with regards to the magnitude of emissions reductions or the form such mitigation measures might take. Perhaps most important, in retrospect, the convention established the necessary infrastructure for future initiatives and interventions to address climate change. These included the establishment of a Secretariat based in Bonn, a Global Environmental Facility that would be able to fund the necessary activities among developing countries and of course a governance system that would allow the parties to the convention to expand its mandate through Protocols<sup>31</sup> and expectations over time. Ratification was relatively swift

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widest possible cooperation by all countries and their participation in an effective and appropriate international response, in accordance with their common but differentiated responsibilities and respective capabilities and their social and economic conditions", UNFCCC, (preamble).

<sup>25</sup> *Ibid*, Article 4(7): "implementation of any commitments by developing countries depends on the provision of financial resources and technology transfer by developed countries." Article 4(3) also states: "The developed country Parties and other developed Parties included in Annex II shall provide new and additional financial resources to meet the agreed full costs incurred by developing country Parties in complying with their obligations ..."

<sup>26</sup> *Ibid*, Article 3(3): "The Parties should take precautionary measures to anticipate, prevent or minimize the causes of climate change and mitigate its adverse effects. Where there are threats of serious or irreversible damage, lack of full scientific certainty should not be used as a reason for postponing such measures, taking into account that policies and measures to deal with climate change should be cost-effective so as to ensure global benefits at the lowest possible cost."

<sup>27</sup> Donald Goldberg, "As the World Burns: Negotiating the Framework Convention on Climate Change", (1993) 5 *Georgetown International Environmental Law Review* 239 at 244.

<sup>28</sup> UNFCCC, *supra* Article 4(1)(a).

<sup>29</sup> *Ibid*, Article 11 establishes the commitment to establish an appropriate "Financial Mechanism" that will be overseen by both developed and developing countries, party to the convention.

<sup>30</sup> *Ibid*, Article 4(1).

<sup>31</sup> *Ibid*, Article 17.

and the agreement came into force on March 21, 1994, less than two years after it was adopted in New York.

### *The Kyoto Protocol*

It was soon evident that the “framework” convention had provided little but the proverbial normative skeleton, and that the “meat” would have to be added in subsequent agreements by the parties. No sooner had the convention come into force than a coalition of environmentalists and developing countries began lobbying for meaningful commitments in the form of targets and timetables for reducing GHG emissions.<sup>32</sup> The first conference of the parties in 1995 produced the so-called “Berlin Mandate” that set a process in motion that culminated in a Protocol’s approval on December 11, 1997 at COP3 in Kyoto.<sup>33</sup> When US Vice-President Al Gore agreed to attend the Kyoto meeting and directed his American delegation to show flexibility in setting emission targets, conditions were ripe for a substantive agreement that went far beyond the framework convention in its objectives and level of specificity.<sup>34</sup>

The Kyoto Protocol maintains the UNFCCC’s dichotomy between developed and developing nations, with the bulk of the commitments made by the former “Annex 1” countries that now included several Eastern European nations defined as having “economies in transition”.<sup>35</sup> Article 3 sets out the collective objective of reducing the overall GHG emissions of this group by “at least 5 percent below 1990 levels in the commitment period 2008-2012”.<sup>36</sup> Greenhouse gases, descriptively described in the original convention were now listed in Annex A of the Protocol as:

- Carbon dioxide (CO<sub>2</sub>)
- Methane (CH<sub>4</sub>)
- Nitrous oxide (N<sub>2</sub>O)
- Hydrofluorocarbons (HFCs)
- Perfluorocarbons (PFCs)
- Sulphur hexafluoride (SF<sub>6</sub>)

From this group, carbon dioxide, is by far the least efficient at absorbing infrared rays and contributing to a global warming. Yet, because its concentrations are so much higher than the other greenhouse gases, its role in global warming is “predominant”, contributing 80 percent of the “greenhouse effect” from current GHG emissions.<sup>37</sup> As a result it serves

<sup>32</sup> David Hunter, James Salzman, Durwood Zaelke, “The First COP and the Berlin Mandate” in *International Law and Policy*, at 625.

<sup>33</sup> FCCC/CP/1995/L.14 (April 7, 1995).

<sup>34</sup> *Ibid* at 629.

<sup>35</sup> Kyoto Protocol, Articles 2-8, contain the operational provisions, are solely directed at Annex I countries.

<sup>36</sup> *Ibid*, Article 3(1).

<sup>37</sup> Daniel Lashof and Dilip Ahuja, “Relative Contributions of Greenhouse Gas Emissions to Global Warming” (1990) 344 *Nature* 529-531.

as the “benchmark” for evaluating the potency of all GHG emissions, with other gases being assigned “CO<sub>2</sub> equivalents”.

The Kyoto Protocol was considered a “path-breaking” international agreement for many reasons, chief among these was its embracing of “trading” or flexible mechanisms. These four modalities allow Annex I countries to meet their emission targets, by paying sources in other countries to reduce emissions in their stead (or to expand their absorption) of greenhouse gases. For instance the Clean Development Mechanism (CDM) allows Annex I parties to pay for implementation of projects that reduce emissions that otherwise would not be taking place in non-Annex 1 countries and receive credit for the associated CO<sub>2</sub> equivalent reduction.<sup>38</sup> Alternatively, Joint Implementation projects allow an Annex I country to implement an emission-reducing project (or undertake one that removes carbon) in another Annex 1 country, and count the resulting reduction in emissions in meeting its own Kyoto target.<sup>39</sup>

In essence, the Kyoto Protocol adopted a global “cap and trade” system, largely based on the environmental and economic success of a conceptually similar pioneering programme that reduced emissions of sulfur dioxide (and the resulting acid rain) in the United States during the 1990s.<sup>40</sup> The global atmosphere is presumably indifferent to the specific origins of where greenhouse gases arise. So the Kyoto Protocol sought to create a framework in which emission sources would be abated and sinks that sequestered carbon would be expanded in places where

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<sup>38</sup> Kyoto Protocol, Article 12. A detailed description of the CDM rules can be found in Glenn Wiser, “The Clean Development Mechanism Versus The World Trade Organization: Can Free-Market Greenhouse Gas Emissions Abatement Survive Free Trade?” (1999) 11 *Georgetown International Environmental Law Review* 531.

<sup>39</sup> Article 6. The other two “flexible mechanisms” involve emission trading, whereby transactions of emission reduction units take place between countries or by companies authorized to act on their behalf (Article 17) and bubbles – whereby any group of Annex I countries may pool emissions targets (Article 4) and reach compliance together based on their collective allowances. Considerable detail about the different mechanisms can be found on the UNFCCC web-site: *The Mechanisms under the Kyoto Protocol: The Clean Development Mechanism, Joint Implementation and Emissions Trading*, [http://unfccc.int/kyoto\\_protocol/mechanisms/items/1673.php](http://unfccc.int/kyoto_protocol/mechanisms/items/1673.php) last visited, January 23, 2008.

<sup>40</sup> A thoughtful and concise review of the experience under the US acid rain SO<sub>2</sub> emissions trading programme can be found in: Jonathan Remy Nash and Richard L Revesz, “Markets and Geography: Designing Marketable Permit Schemes to Control Local and Regional Pollutants”, (2001) 28 *Ecology Law Quarterly* 569 at 582-588. See also, Jonathan Remy Nash, “Too Much Market? Conflict between Tradable Pollution Allowances and the “Polluter Pays” Principle”, (2000) 24 *Harvard Environmental Law Review* 465, and Jeffrey M Hirsch, “Emissions Allowance Trading Under the Clean Air Act: A Model for Future Environmental Regulations?” (1999) 7 *New York University Environmental Law Journal* 352.



it would be cheapest to do so.<sup>41</sup> Many countries were uncertain about their ability to reduce their emissions cost-effectively and consequently were wary of making commitments to that end. Accordingly, their concerns were assuaged and they were induced to accept quantifiable emission reduction targets with the knowledge that if they needed to, such emission reductions could be purchased in other countries, where presumably they could be attained less expensively.

The cap and trade system is not without its challenges, and ensuring compliance is not necessarily easier than overseeing conventional “command and control” environmental regulation.<sup>42</sup> But the Protocol’s emission trading orientation meant that the international community could make a meaningful commitment to begin the process of reducing GHG emissions, and rely on a global market to minimize the costs of a most daunting venture.

The Kyoto Protocol, by definition was a flawed instrument, limited by the complex political dynamics of global politics. The absence of any real commitment by developing countries to reduce GHG emissions<sup>43</sup> meant that a growing fraction of global emissions would not be regulated and that industries in Annex 1 countries might be disadvantaged when competing with firms operating in developing countries where GHG emissions were not regulated.<sup>44</sup> The United States continues to base its refusal to ratify the convention on this omission.<sup>45</sup> Indeed, it would take a full eight years, until February 16, 2005, for the Protocol to enter into force, almost a decade after it was negotiated. Yet, the ability of the UNFCCC COP13 gathering at Bali to hammer out a “road map” for negotiating further reductions by Annex 1 countries and the expeditious adoption of mitigation strategies by non-Annex 1 countries<sup>46</sup> suggests that the

<sup>41</sup> See generally Paul Radich, Bell Gully, “Kyoto and the Emissions Trading Market”, (2001) NZLJ 463.

<sup>42</sup> Joe Kruger and Christian Egenhofer, “Confidence Through Compliance in Emissions Trading Markets”, (2006) 6 *Sustainable Development Law and Policy Journal* 2.

<sup>43</sup> In fact, a few “non-Annex 1” countries (eg, Argentina, Kazakhstan, Costa Rica) adopted serious mitigation programmes and even emissions reduction target following the

<sup>44</sup> The need to expand the Kyoto commitments became self-evident in 2007 when China emerged as the greatest single source of greenhouse gas emissions, surpassing even the United States. “China Overtakes U.S. in Greenhouse Gas Emissions”, *International Herald Tribune*, June 20, 2007, <http://www.iht.com/articles/2007/06/20/business/emit.php>.

<sup>45</sup> “As you know, I oppose the Kyoto Protocol because it exempts 80 percent of the world, including major population centers such as China and India, from compliance, and would cause serious harm to the US economy. The Senate’s vote, 95-0, shows that there is a clear consensus that the Kyoto Protocol is an unfair and ineffective means of addressing global climate change concerns.” Letter from US President George Bush to Senators Hagel, Helms, Craig, and Roberts, March 13, 2001, White House web-site, [www.whitehouse.gov](http://www.whitehouse.gov). (last visited, January 23, 2008).

<sup>46</sup> *Supra*, note 17.

framework is durable and will serve as the basis for most countries of the world. Certainly, for the foreseeable future, its demands, targets and timetables will drive New Zealand's greenhouse gas emission policies and legislation.

### III. New Zealand's Response to Global Climate Change

One of the ironies about the effect of global warming is the diversity of its impacts. Climate change will undoubtedly produce "winners" and "losers". Based on government reports, it would seem that New Zealand may derive more benefits than damage from the anticipated raise in global temperatures.<sup>47</sup> Among the negative effects projected are greater floods, landslides, droughts and storm surges. Higher temperatures might compromise the profitability of some fruit crops in northern areas and extended dry periods are likely to reduce soil moisture (although western New Zealand is likely to receive more rain). The potential for an expanded range of some undesirable insects and pests has been raised but remains largely in the realm of conjecture.<sup>48</sup>

At the same time, the Ministry of Environment reports suggest that there is likely to be an increase in agricultural productivity in New Zealand due to elevated carbon dioxide concentrations and improved growth rates and water-use efficiency. The new, warmer conditions and lengthened growing seasons could shift a variety of climate-limited activities, including profitable crops and industries into southern areas. Some effects may balance out: conservation biologists do not believe that a shift in temperature gradients will have a meaningful effect on biodiversity and will not exacerbate any threatened species. Heat consumption and associated costs may drop during the winter (although air conditioning usage would surely go up in the summer).<sup>49</sup> Tourists may appreciate the warmer temperatures, but temperature increase will surely not help New Zealand's ski industry.<sup>50</sup> The IPCC projections for New Zealand are somewhat less sanguine particularly with regards to the impact of rising sea levels on coastal erosion.<sup>51</sup> While there are

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<sup>47</sup> Ministry for the Environment, *Adapting to the Impacts of Climate Change*, October, 2007.

<sup>48</sup> *Ibid*, also Ministry for the Environment, *Climate Change Impacts on New Zealand*, 2001.

<sup>49</sup> The Building Research and Manufacturing Association (BRANZ) anticipates that by 2030, the drop in heating requirements for homes may be as high as 70% in Auckland. *Ibid* at 26.

<sup>50</sup> Elisabeth Rosenthal, "How Do You Ski if There Is No Snow?" *New York Times*, November 1, 2007.

<sup>51</sup> "Future effects on coastal erosion include climate-induced changes in coastal sediment supply and storminess. In Pegasus Bay (New Zealand), shoreline erosion of up to 50m is likely between 1980 and 2030 near the Waipara River if southerly waves are reduced by 50%, and up to 80m near the Waimakariri River if river sand is reduced by 50% (Bell et al., 2001)...Sea-level rise is virtually certain to cause greater coastal inundation, erosion, loss of wetlands, and salt-water intrusion into

site-specific measures which can be taken in areas where the economic effects would be most costly, given the vast areas involved, options to adapt to rising sea levels are ultimately limited. Regardless of the local impacts, New Zealand's policies have *not* been driven by local interests per se, but rather a sense of international environmental responsibility. Cognizant of the potentially catastrophic impacts of global warming across the planet, New Zealand showed considerable alacrity in ratifying the UNFCCC (September 1993) although hesitated somewhat before expediting ratification of the Kyoto Protocol, only doing so on December 19, 2002.<sup>52</sup> Several statutes and policies have been enacted, with the most ambitious, a recently adopted comprehensive cap and trade program.

### Climate Change Response Act 2002

The Climate Change Response Act 2002<sup>53</sup> constitutes the first major legislative ratification tool for meeting New Zealand's obligations under the UNFCCC and the Kyoto Protocol. In fact, it prints out the full text of the two agreements as Schedule 1 and Schedule 2 of the Act. In practice, the legislation creates a comprehensive mechanism for monitoring the sources of greenhouse gases which contribute to climate change. The Act specifically defines its legislative *raison d'être* as two-fold: facilitating compliance with the national 1990 GHG emission targets stipulated under the Kyoto Protocol and meeting the reporting requirements of the UNFCCC.<sup>54</sup> The former it does quite poorly and the latter it does quite well.

The Act's major contribution ultimately might be deemed as institutional. The Minister of Finance is authorized to trade national emissions allowances and acquire certified emission reduction (or removal) units should this be necessary.<sup>55</sup> The Act instructs the Minister to appoint a registrar to record transaction details in its international

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freshwater sources (MfE, 2004a), with impacts on infrastructure, coastal resources and existing coastal management programmes." K Hennessy, et al, Chapter 11 – Australia and New Zealand, *Climate Change 2007" Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*, Cambridge University Press, (2007).

<sup>52</sup> Mai Chen, "Ratifying Kyoto", (2001) NZLJ 443.

<sup>53</sup> 2002 no. 40 (NZ).

<sup>54</sup> Section 3: "The purpose of this Act is to enable New Zealand to meet its international obligations under the Convention and the Protocol, including, but not limited to, – its obligation under Article 3.1 of the Protocol to retire units equal to the number of metric tonnes of carbon dioxide equivalent of human-induced greenhouse gases emitted from the sources listed in Annex A of the Protocol in New Zealand in the [first] commitment period; and its obligation to report to the Conference of the Parties via the Secretariat under Article 7 of the Protocol and Article 12 of the Convention."

<sup>55</sup> *Ibid* s 6.

dealings and act on the Minister's behalf to that end.<sup>56</sup> The registrar does not engage in the actual calculation of domestic emissions. This task falls to the Inventory Agency that is established by the law<sup>57</sup> to estimate annually New Zealand's human-induced GHG emissions by sources and removals by sinks of greenhouse gases and to prepare the necessary reports for the purpose of discharging New Zealand's obligations under Article 7.1 of the Kyoto Protocol.<sup>58</sup> The Inventory Agency operates out of the Ministry for the Environment.<sup>59</sup> The precise methodology for characterizing emissions is of course based on the IPCC-approved accounting system. Information can be received by reports or elicited by the work of inspectors who are formally appointed by the Minister under Part 3 of the Act.<sup>60</sup>

The Act is quite detailed and covers many of the property aspects of the new commodity created by "carbon credits". For example, an individual can open a holding account for removal units and transfer the rights to these units (according to the specified fees), including bequeathing them to one's heirs.<sup>61</sup> Moreover, New Zealand has regularly met its reporting obligations under the UNFCCC.<sup>62</sup> Yet, much like a competent accounting department in a business that is failing, it would appear that the best that the Inventory Agency has been able to do is to count the growing deficit in certified emissions reduction units, due to the steady climb in local GHG emissions.

### **The Resource Management (Energy and Climate Change) Amendment Act 2004**

The Resource Management (Energy and Climate Change) Amendment Act 2004 is one of the more curious pieces of legislation on climate change that has been introduced internationally. The bill was introduced to the House of Representatives in July 2003 on the basis of conclusions made by the Ministerial Group on Climate Change that the current Resource Management Act (RMA) did not adequately consider the effects of

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<sup>56</sup> *Ibid* s 6(b).

<sup>57</sup> *Ibid* s 32.

<sup>58</sup> Section 32(1)(a)(b). See also New Zealand's Greenhouse Gas Inventory 1990-2005 The National Inventory Report and Common Reporting Format, submitted to the UNFCCC.

<sup>59</sup> See generally: Bal Matheson, "Air", *Environmental and Resource Management Law*, Wellington, LexisNexis NZ, Ltd (2005). In particular "New Zealand's Greenhouse Gas Inventory" at 650-651.

<sup>60</sup> The law empowers inspectors to enter private properties – including livestock feedlots – but not dwelling houses: s 37(1).

<sup>61</sup> *Ibid*, at ss 18A, 18C and 18D.

<sup>62</sup> The New Zealand reports can be found on the UNFCCC web-site. For instance 1990-2005 emission trends are summarized in a comprehensive document (New Zealand's Greenhouse Gas Inventory 1990-2005) and the actual numbers appear as an excel spread sheet at: [http://unfccc.int/national\\_reports/annex\\_i\\_ghg\\_inventories/national\\_inventories\\_submissions/items/3929.php](http://unfccc.int/national_reports/annex_i_ghg_inventories/national_inventories_submissions/items/3929.php).

climate change.<sup>63</sup> Yet, the apparent ambivalence of legislators not only projects a mixed message – but a mixed mandate.

Ostensibly the amendment corrected this situation: The RMA Interpretations in s 2 now include a definition of “climate change”<sup>64</sup> and s 7 of the Purposes and Principles Part now require that: “all persons exercising functions and powers...in relation to managing the use, development and protection of natural and physical resources, shall have particular regard to:

(b) the efficiency of the end use of energy

(i) the effects of climate change

(j) the benefits to be derived from the use and development of renewable energy.”<sup>65</sup>

Yet, at the same time Parliament expressed concern that local resource management decisions could be *excessively* influenced by climate change considerations. Accordingly, the purpose of the Act at once calls for local authorities to plan for the effects of climate change; but “*not to consider the effects on climate change of discharges into air of greenhouse gases.*” A series of operational provisions explicitly prohibit climate change considerations when local planning decisions are made – presumably in order to preserve harmonization in national policy on the subject. Accordingly, the RMA’s s 70 now reads: “when making a rule to control the discharge into air of greenhouse gases under its functions under s 30(1)(d)(iv) or (f), a regional council must not have regard to the effects of such a discharge on climate change.”<sup>66</sup> At the same time, the Act allows consideration of: “the use and development of renewable energy” if it enables a reduction in the discharge into air of greenhouse gases, either – in absolute terms or relative to the use and development of non-renewable energy. Identical limitations were placed on local discretion in the areas of discharge or coastal permits.<sup>67</sup>

It should not have been surprising that this flagrant incongruence would be the focus of litigation, the most significant of which reached the Court of Appeal in December, 2007. In *Genesis Power Ltd v Greenpeace New Zealand, Inc*<sup>68</sup> the Court of Appeal was asked to offer declarative relief. As a major electricity utility, Genesis Power felt uncomfortable with an

<sup>63</sup> Cabinet Policy Committee, Ministerial Group on Climate Change Report: *Planning for the Effects of Climate Change: The Role of the Resource Management Act 2002* at 1, <http://www.mfe.govt.nz/issues/climate/resources/cabinet-papers/pol-02-146.pdf>.

<sup>64</sup> The Resource Management (Energy and Climate Change) Amendment Bill s 4: “climate change means a change of climate that is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and that is in addition to natural climate variability observed over comparable time periods.”

<sup>65</sup> *Ibid* s 3(a) (i-iii).

<sup>66</sup> *Ibid* s 6 concerning s 70A.

<sup>67</sup> *Ibid* s 7 concerning 104E.

<sup>68</sup> [2007] NZCA 569.

earlier High Court decision regarding the establishment of a power plant proposed by the Mighty River Power Ltd company. In their arguments to the High Court, environmental advocates at Greenpeace based their objections on the impact of the facility on climate considerations in the context of s 104E of the RMA.<sup>69</sup>

In the previous High Court ruling, Williams J had favoured an environmentally ambitious interpretation of this section. He held that the RMA enabled the consent authority to balance the power station activity alongside any proposal by the applicant which would effect “reduction in the discharge into air of greenhouse gases”.<sup>70</sup> Greenpeace argued that the operation of the coal-fired station would in effect subsidise the New Zealand coal industry (by enabling it to avoid internalising the cost to the country and the environment of GHG emissions). The result of a narrow interpretation would allow for coal generated electricity to be produced far more cheaply, essentially creating additional obstacles for renewable energy in New Zealand.<sup>71</sup>

But the Court of Appeal opted to agree with the Genesis position which argued that the exception which allows for consideration of the benefits of renewable energy should only be employed where a concrete proposal actually envisages the use of renewable energy. William Young P ruled that,

“A requirement to have particular regard to...the benefits of renewable energy” does not necessarily entail a requirement to have particular regard to the “disbenefits” in terms of climate change of non-renewable energy generation. In the particular statutory context, and for the reasons already given, we do not equate the absence of a positive factor as amounting to a negative factor. To allow proposals to provide energy from non-renewable sources to be evaluated against a general baseline that renewable energy production is better would necessarily cut right across the prohibition in s 104E.<sup>72</sup>

While the decision is a logical one in light of the fairly clear statutory language and even clearer legislative intent, it does confirm the fairly feeble commitment in New Zealand’s laws and regulations to promote economic activity and guarantee that power sources address the country’s problematic GHG emissions portfolio. To be sure there are other statutes which although not necessarily designed specifically as “climate change” laws, do contribute to public policy to reduce GHG emissions. For instance the Energy Efficiency and Conservation Act 2000, and the Energy Efficiency and Conservation Authority (EECA) created under it presumably contribute to the promotion of energy efficiency

<sup>69</sup> *Greenpeace New Zealand v Northland Regional Council* [2007] NZRMA 87.

<sup>70</sup> “That is a discretionary factor for the consent authority to take into account in deciding whether to grant consent to the permit application and, to that limited extent, to have regard to the effects of the discharge of greenhouse gases on climate change.” *Ibid.*

<sup>71</sup> *Genesis Power Ltd v Greenpeace New Zealand, Inc supra* at 10.

<sup>72</sup> *Ibid* at 17.

and conservation across all sectors of the economy. Indeed, the Energy Efficiency (Energy using Products) Regulations promulgated in 2002 formalize efficiency standards on common energy intensive items. Strategies have been formulated in areas as diverse as transportation, energy conservation and wastes to galvanize thinking and increase awareness about available alternatives to GHG intensive activities. Yet, the results have not been sufficient.

### **The Rise and Fall of Climate-driven Tax Legislation**

Two notable efforts to introduce taxes on GHG emissions are important in the context of a historical survey of New Zealand's climate change legislation and policy. One involved the failed attempt to respond to New Zealand's idiosyncratic GHG emissions profile and the inordinate contribution of agriculture (48.5 percent) most of which is a result of methane emissions from livestock.<sup>73</sup> In June 2003, the New Zealand government introduced a plan to impose a tax on livestock (amounting to \$8.4 million a year) as an incipient step to combat global warming. The tax was to be paid by farmers and the associated revenues would fund a new Agriculture Emissions Research Body to meet commitments to the Kyoto Protocol, namely reducing the production of greenhouse gases from livestock.

The virulence of the resulting "hue and cry" was unanticipated. Some 1000 farmers stormed New Zealand's Parliament in protest of the proposed tax, which they claimed was "unnecessary, unfair and potentially damaging to the economy."<sup>74</sup> The position of the agricultural sector held that as the benefit of the reduction in emissions from such a tax would be enjoyed by the general public, the general public should participate in any associated costs.

One reason for their strong aversion to the proposal was that with farmers already facing hard times due to a sharp downturn in returns for their produce, the levy would further disadvantage farmers struggling to compete against less conscientious nations. As reducing GHG emissions would benefit everyone, farmers argued that the tax should be absorbed by all taxpayers and not be sector-specific. Opponents also argued that

<sup>73</sup> Farm products may constitute over half of New Zealand exports, but they are also responsible for much of its greenhouse gas emissions. Agricultural emissions are dominated by livestock; methane emissions from livestock currently account for 32% of NZ's (NZ) Greenhouse Gas (GHG) emissions. Agricultural methane comprises 87% of total methane emissions and alongside nitrous oxide produced from agriculture comprises 49.5% of NZ total emissions. [www.maf.govt.nz/mafnet/rural-nz/sustainable-resource-use/climate/abatement-](http://www.maf.govt.nz/mafnet/rural-nz/sustainable-resource-use/climate/abatement-). Last visited, 18/01/2008. While sheep/beef is in gradual decline, dairying in NZ is experiencing a phenomenal boom and the economic importance of agriculture means that a conflict of interest arises between government and agricultural lobbies. It is predicted that ruminant methane emissions will be 16% over 1990 levels if present trends continue.

<sup>74</sup> *The New Zealand Herald*, June 20, 2003.

the contribution of GHG emissions from sheep and cattle, relative to factories in other industrialised countries, was ultimately trivial. The government quickly capitulated to the high profile protest and in lieu of the tax instituted a research programme to consider animal emission reduction alternatives that was funded out of the general state coffers.<sup>75</sup> The second and more recent foray into the realm of taxes to attain GHG emissions reduction was a government proposal for a comprehensive carbon tax. Set to come into effect in April 2007, it was cancelled in December 2005 long before it got off the ground. While many economists have advocated such measures for some time,<sup>76</sup> this would have been the first comprehensive carbon tax in the world. Although most energy related activities would be taxed, based on the experience of 2003 the proposed carbon tax specifically excluded methane and nitrous oxide gases from the agriculture sector, notwithstanding their prodigious contribution to overall emission levels.<sup>77</sup> Government estimates held that the tax, initially proposed to be NZ\$11/ton would have added 6 percent to household energy prices – the equivalent of NZ\$4/month. Many businesses were projected to have to pay an extra 9 percent. Revenues would initially produce NZ\$360 million a year. Until the completion of the Kyoto first Commitment Period, the tax was not to exceed \$25/ton.

There are several reasons that have been given for the cancellation of the proposed tax. Officially the government cited the high costs to the economy.<sup>78</sup> The rise in oil prices had already produced much of the behavioral change anticipated by the tax on petrol.<sup>79</sup> But in practice, it appears then it was a classic case of sliding down a “slippery slope”. With the best of pragmatic intentions, the government signaled its willingness to consider exemptions for particular energy intensive industries (eg, Comalco Aluminium which uses 15 percent of the country’s power or Carter Holt Harvey, the country’s biggest sawmill) if they adopted the world’s-best-practice standards of emissions. It did not take long for a deluge of requests for such waivers to appear from a range of producers, all of whom could claim special circumstances. The subsequent negotiations dramatically reduced the potential environmental benefits

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<sup>75</sup> *The New Zealand Herald*, October 16, 2003.

<sup>76</sup> William Nordhaus, “To Tax or Not to Tax: Alternative Approaches to Slowing Global Warming”, (2007) 1(1) *Review of Environmental Economics and Policy* 26-44.

<sup>77</sup> David Hopkins, “New Zealand World First for Carbon Tax” <http://www.edie.net>, May 6, 2005.

<sup>78</sup> “The Government has decided not to implement a carbon tax,” said New Zealand Climate Change Minister David Parker. “It will instead consider other ways to ensure New Zealand meets its commitments to cut greenhouse gas emissions.” Rod Myer, *supra*.

<sup>79</sup> Mr Parker said rising oil prices had already partly achieved the intended effect of the tax in the transport sector and officials had advised the tax would not cut emissions enough to justify its introduction. “Carbon Tax Ditched”, *The New Zealand Herald*, December 21, 2005.



that the tax was intended to achieve.<sup>80</sup> Ultimately, the government had the good sense to abandon the initiative before it reached legislative fruition in Parliament as it clearly would no longer “deliver the goods” nor bring New Zealand close to its Kyoto emissions commitment.

### **Climate Change Response (Emissions Trading) Amendment Act 2008**

After many years of discussion and preparation by an interdisciplinary team of economists, attorneys and environmental scientists,<sup>81</sup> the Climate Change (Emissions Trading and Renewable Preference) Bill (hereinafter: “CCB”) was tabled in Parliament on 4 December 2007. The CCB’s stated purpose was to allow New Zealand to meet its Kyoto obligations<sup>82</sup> by adopting what constitutes the world’s most comprehensive “cap and trade” regulatory scheme ever applied on a national level.<sup>83</sup> Under “cap and trade” programs, emission rights are defined according to a particular unit (eg, tons of SO<sub>2</sub>, CO<sub>2</sub>, etc) and then a regulatory “cap” of maximal total emissions is set that presumably reduces or is an acceptable level of pollution. The total carbon equivalent emissions are then allocated to all potential sources of emissions<sup>84</sup> and monitored via a registry. A market is then created where the rights to emit are bought and sold.<sup>85</sup>

Presumably, the system facilitates the most efficient reduction of emissions possible. When a firm finds that it can reduce its emissions at a price below the going market rate for the same number of carbon units, it will choose to do so and sell its units accordingly. For many years environmentalists were wary of such economic instruments for promotion of environmental ends on ethical<sup>86</sup> and practical grounds.

<sup>80</sup> Suzi Kerr, Presentation Director of Motu Economic and Public Policy Research, Lecture, January 23, 2007.

<sup>81</sup> See for example, Paul Radich and Bell Gully’s article fleshing a comprehensive system for New Zealand, very close to the recently proposed bill on the subject. “Kyoto and the Emissions Trading Market” (2001) *NZLJ* 463.

<sup>82</sup> CCB s 3 “purpose”.

<sup>83</sup> Ministry for the Environment, *A Guide to the Climate Change (Emissions Trading and Renewable Preference) Bill*, Fact Sheet 13, December, 2007.

<sup>84</sup> Allocation can either be done by way of auction or by free allocation. Typically, emissions trading programme have opted for the latter, but some systems, such as the European cap and trade programme, phase in the auctioning in of allocation rights. See Kruger and Pizer *supra*.

<sup>85</sup> Byron Swift, “Emissions Trading: Myths, Realities and Opportunities,” (2005) 20 *Natural Resources and Environment* 3. Also, Kirk Junker, “Ethical Emissions Trading and the Law”, 13 *University of Baltimore Journal of Environmental Law* 49.

<sup>86</sup> “We like to think that society would never provide an extra reward for individuals who simply fail to violate proscriptions or otherwise comply with pre-existing legal duties. And yet, when it comes to emissions trading, we provide extra reward to persons for their compliance with the pre-existing duty not to pollute.” Junker, *supra* at 151-152.

With the success of the American sulfur dioxide program, this opposition has largely dissipated.

On September 7, 2008, the extensive trading provisions of the CCB were separated from the original proposed legislation,<sup>87</sup> and on September 25, Parliament enacted the Climate Change Response (Emissions Trading) Amendment Act 2008 (hereinafter: the CCRETA).<sup>88</sup> The CCRETA itself is an expansive piece of proposed legislation, (the explanatory notes of the bill came to over 100 pages) making a thorough description of the Bill and its many substantive nuances and sectoral directives beyond the scope of the present article.<sup>89</sup> The following is a simplified description of ground-breaking legislation whose implementation will undoubtedly be the focus of considerable international attention.

The law is formatted as a series of amendments to the CCRA that establishes the groundwork and timetable for phasing in a comprehensive GHG emissions trading program.<sup>90</sup> This is based on an expansion of the CCRA's existing New Zealand Emission Units Register which will now process New Zealand Units (NZUs) of emission credits. These can be transferred between account holders once they are allocated or purchased. The CCRETA seeks to integrate these into the international, Kyoto affiliated market allowing for trading with overseas parties.<sup>91</sup> A second part of the initial bill that created a ten-year moratorium on fossil-fuelled thermal electricity generation in New Zealand (except in special circumstances, in particular the need to ensure the security of New Zealand's supply) is not part of the new statute.<sup>92</sup>

The proposed New Zealand emission trading system is to be phased

<sup>87</sup> Bill 187-2 was modified as Bill 187-3A.

<sup>88</sup> <http://www.legislation.govt.nz/act/public/2008/0085/latest/DLM1130932.html>.

<sup>89</sup> For a more detailed description of the system see: Barclay Rogers, "Carbon Markets", (2007) *NZLJ* 336.

<sup>90</sup> CCRETA, section defines the purpose of the Act as intending to: "(b) provide for the implementation, operation, and administration of a greenhouse gas emissions trading scheme in New Zealand that supports and encourages global efforts to reduce greenhouse gas emissions by assisting New Zealand to meet its international obligations under the Convention and the Protocol, and by reducing New Zealand's net emissions below business-as-usual levels".

<sup>91</sup> *Ibid.* Section 5 also states that the act seeks to:

"(a) enable New Zealand to meet its international obligations under the Convention and the Protocol, including (but not limited to)–

"(i) its obligation under Article 3.1 of the Protocol to retire Kyoto units equal to the number of tonnes of carbon dioxide equivalent of human-induced greenhouse gases emitted from the sources listed in Annex A of the Protocol in New Zealand in the first commitment period; and

"(ii) its obligation to report to the Conference of the Parties via the Secretariat under Article 7 of the Protocol and Article 12 of the Convention."

<sup>92</sup> CCB, *supra*, part 2, ss 66-67.

into different economic sectors over time.<sup>93</sup> Significantly, forestry and agriculture which have typically been excluded from other “cap and trade” initiatives internationally are integrated into the program, albeit the agricultural trading system will only come into force in 2013. Allocations of carbon credits are to be made by the Minister after having considered requests by individuals claiming that they are eligible for free allocations, and subject to public comments.<sup>94</sup>

Participants in the system are individuals who carry out activities that produce (or absorb) GHGs as set forward in the schedules at the end of the CCRETA.<sup>95</sup> Once their scheduled obligations begin, they are expected to register and maintain holding accounts,<sup>96</sup> calculate their emissions and surrender an emission unit for every ton of greenhouse gas that they produce. Participants whose activities remove GHGs from the atmosphere are able to earn a unit for every ton of CO<sub>2</sub> equivalents removed.<sup>97</sup> If participants’ actual emissions exceed their allowance they will have to buy extra units.

The trading system relies on the monitoring conducted by the participants in the system who are expected to calculate their emissions and report them between January 1st and March 31st on an annual basis.<sup>98</sup> All emission trading programs have to ensure the reliability of the information provided. To ensure effective oversight, a “chief executive” will administer the program, and is empowered to request relevant

<sup>93</sup> CCRETA, Part 5 sets the “sector specific” provisions. For instance, ss 179-197 set the timetable for the forestry sector, ss 198-203 for liquid fossil fuels (transport), ss 204-212 for the Stationary energy sector, ss 213-216 for agriculture, etc.

The following schedule sets the integration of different economic sectors into the trading programme:

Forestry: after 1 January 2008;

Liquid fossil fuels: after 1 January 2009;

Stationary energy: after 1 January 2010;

Industrial processes: after 1 January 2010;

Agriculture: after January 2011;

Animals: after 1 January 2011;

Waste (Operating a disposal facility disposal facility): after 1 January 2011.

<sup>94</sup> Pursuant to the Kyoto baseline dates, trees are divided into pre and post-1990 planting times. *Ibid*, ss, 180, 187.

<sup>95</sup> CCRETA, New Schedules 3 and 4 “Activities with respect to which persons must be participants”.

<sup>96</sup> *Ibid*, ss 62, 65.

<sup>97</sup> *Ibid*, ss 68-86.

Section 54 (1): “A participant is entitled to receive 1 New Zealand unit for each whole tonne of removals from the participant’s removal activities, as calculated in accordance with this Act.

(2) If a participant is entitled to receive a New Zealand unit, the chief executive must notify the Minister of Finance of (a) the number of New Zealand units to which the participant is entitled and (b) the details of the participant’s holding account.”

<sup>98</sup> *Ibid*, s 65 amending CCRA 62.

information from participants about their emissions (or removals) as well as to make emissions ruling, to better define, actual obligations.<sup>99</sup> The chief executive can also impose administrative penalties. The CCB sets the penalties for providing false or misleading information about emissions at \$25,000 for an individual and \$50,000 for a corporation.<sup>100</sup>

As described, the regulatory prescriptions will be phased in slowly and the law will undergo a lengthy, gradual period of implementation. It will take many years for the GHG reductions to be felt. It is not clear that the problem of climate change can wait that long. Besides, by adopting a cap and trade system as its sole strategy it appears that New Zealand will pay an economic price in the purchasing of carbon credits on an international market that may be extremely expensive. Experience from around the world suggests that may not be necessary. The following section considers a variety of initiatives, providing immediate cost-effective interventions and policies for reduction of local emissions.

#### IV. Carbon Wedges – and the Logic of GHG Emissions Regulation

Physics Professor Robert Socolow and colleagues from Princeton University have proposed a widely accepted paradigm for addressing the seemingly impossible task of reducing global emissions of greenhouse gases by the amount deemed necessary by the IPCC.<sup>101</sup> In order to avoid the anticipated doubling of CO<sub>2</sub> emissions over the next 50 years, Socolow proposes a menu of “no-carbon” or “low-carbon” strategies which would stabilize emissions at present levels. As no single strategy can provide the full requisite reduction, he proposes that the total amount be divided into fractions that are called “wedges”. The concept is featured at the end of Al Gore’s Academy Award winning documentary *An Inconvenient Truth*. A long laundry list of wedges is proposed – from wind power to improving lighting efficacy. All are based on existing technologies, but require regulatory and legislative intervention for wide-spread adoption:

To assess the potential of various carbon mitigation strategies, the concept of “stabilization wedges” is useful. The difference between the currently predicted path and the flat path from the present to 2054 gives a triangle of emissions to be avoided (see Figure 1a), a total of nearly 200 billion tons of carbon. This “stabilization triangle” can be divided into seven triangles – or “wedges” – of equal area (see Figure 1b on page 11). Each wedge results in a reduction in the rate of carbon emission of 1 billion tons of carbon per year by 2054, or 25 billion tons over 50 years.<sup>102</sup>

<sup>99</sup> *Ibid*, s 87 defines the authorities of the Chief Executive.

<sup>100</sup> See CCRETA, s 132, enforcement provisions.

<sup>101</sup> Rob Socolow, R Hotinski, J Greenblatt, and S Pacala, “Solving the Climate Problem, Technologies Available to Curb CO<sub>2</sub> Emissions”, (2004) December *Environment*, 8-19. See also: S Pacala and R Socolow, “Stabilization wedges: Solving the Climate Problem for the Next 50 years with Current Technologies” (2004) *Science* 305, at 968-971.

<sup>102</sup> *Ibid*, at 10.

The following list specifies the wedges which Socolow recommends as promising:<sup>103</sup>

**Table 2:** Possible “Wedges”: Strategies to Reduce Carbon emissions

#### **EFFICIENCY**

- Buildings, appliances, transport, industrial processing, lighting, electric power plants, upstream extraction.

#### **DECARBONIZED ELECTRICITY**

- Natural gas for coal
- Power from coal or gas with carbon capture and storage
- Nuclear power
- Power from renewables: wind, photovoltaics, solar concentrators (troughs and dishes), hydropower, geothermal.

#### **DECARBONIZED FUELS**

- Synthetic fuel from coal, natural gas, and biomass, with carbon capture and storage
- Biofuels
- Hydrogen
  - from coal and natural gas, with carbon capture and storage
  - from nuclear energy
  - from renewable energy (hydro, wind, PV, etc)

#### **FUEL DISPLACEMENT BY LOW-CARBON ELECTRICITY**

- Grid-charged batteries (“plug-in hybrids”) for transport
- Heat pumps for furnaces and boilers

#### **NATURAL SINKS**

- Forestry (reduced deforestation, afforestation, new plantations)
- Agricultural soils

#### **METHANE MANAGEMENT**

- Landfill gas, cattle, rice, natural gas

All of the technologies that are suggested by Socolow have been shown to be cost-effective in sundry contexts and many might produce meaningful reductions in New Zealand’s GHG portfolio. If, however, local climate change strategy is based on the emissions trading system set forward under the CCRETA, it may take many years until meaningful economic incentives emerge to produce them. Since the measures proposed by Socolow make economic sense at both the micro and macro levels, there is considerable logic for promulgating rules that would

<sup>103</sup>

Source: Robert Socolow, *Stabilization Wedges and the Urgency of Scale-Up*, Power Point Presentation, Washington, DC November 9, 2005.

expedite these measures, without waiting for the phase-in of a given economic sector into the evolving trading system. Empirical evidence has shown that cap and trade systems are given to political pressures which can mean that reductions by key sectors, which could reduce emissions at relatively little expense, are not pursued.<sup>104</sup> Indeed, one of the key criticisms of cap and trade systems is that once allowances are allocated under a cap and trade system, GHG emission sources with sufficient allowances may not have sufficient reason to reduce emissions and critical opportunities will be foregone.<sup>105</sup> Indeed, Suzi Kerr, one of the key architects of the proposed New Zealand cap-and-trade model and an articulate advocate internationally for emissions trading systems acknowledges:

In some cases, the information required to make efficient decisions, even when a carbon price exists, is too complex for the actors involved, or the transaction costs of making efficient decisions is too high. In these cases (for example energy efficient light bulbs or home insulation) performance standards can be effective.<sup>106</sup>

These reservations become especially compelling when the actual profile of New Zealand emissions emerges. The Ministry for the Environment reports the following profile of GHG emissions:

|                                  |         |
|----------------------------------|---------|
| Energy 33,481.7 Gg,              | (43.4%) |
| Industrial Processes 4,336.7 Gg, | (5.6%)  |
| Solvents 48.4 Gg,                | (0.1%)  |
| Waste 1,847.1 Gg,                | (2.4%)  |
| Agriculture 37,445 Gg,           | (48.5%) |

Despite being the major source of GHG emissions, agricultural emissions are not scheduled to be integrated into the emission trading system for many more years. Moreover, as substantial reduction potential exists among GHG producers that will not be targeted as “points of obligation” (the actual entity that is required to report GHG emissions for a given sector)<sup>107</sup> other players in the sectors’ chain of production

<sup>104</sup> This, along with the inherent turbulence of carbon markets under cap and trade systems is among the major reservations of economists and the basis for advocacy for carbon taxes. See Nordhaus, *supra*.

<sup>105</sup> See several publications and the powerpoints of Charles Komanoff and Dan Rosenblum’s power point at the Carbon Tax Center web-site: [www.carbontax.org](http://www.carbontax.org).

<sup>106</sup> Suzi Kerr and Murray Ward, “Emissions Trading in New Zealand: Introduction and Context”, Paper prepared for New Zealand Climate Change Policy Dialogue, 20 September, 2007.

<sup>107</sup> “In any industry, there is a vertical chain of production and consumption, with several ‘layers’ from initial production to final consumption. When a legal obligation to hold rights is placed on one such layer, the economic burden of that obligation will usually be shared by all parties in the chain of value.” John Small, Suzi Kerr, “Emissions Trading in New Zealand: Points of Obligation”, Paper prepared for New Zealand Climate Change Policy Dialogue, September 2007.

may not end up shifting technologies or internalizing GHG emission reduction costs.

Yet another reason why the country should not limit its greenhouse gas efforts to “cap and trade” regimes is the plausible expectation that the present “cap” that is to be set, based on the Kyoto Protocol’s 1990 base-line target for New Zealand, will be substantially lower than that negotiated in the future rounds of talks at the UNFCCC. There exists a consensus that Kyoto constituted an interim agreement, but that considerably more ambitious measures will have to be taken to truly address GHG emissions if the international community is going to seriously mitigate the threat caused by climate change. There seemed little doubt at the recent Conference of the Parties in Bali that the national ceilings will need to drop even further<sup>108</sup> with the 2009 conference in Copenhagen likely to realise such an expectation.<sup>109</sup>

Finally, New Zealand has a number of successful experiences in addressing environmental challenges through conventional “command and control” legislation.<sup>110</sup> Among the more conspicuous are waste water treatment systems as well as controls on air pollution and noise. Such achievements could well be replicated under regulatory programs in a variety of areas to produce meaningful GHG emission reductions that also offer so-called “no regrets” generic benefits, beyond those associated with reduction in greenhouse gas emissions.

## V. Translating “Wedges” Into Public Policy: A Brief Review of Recent Legislation

In the next section we will consider four potential greenhouse gas reductions – or efforts to identify “carbon wedges” in a variety of sectors in New Zealand, based on the magnitude of present GHG emissions and the legislative experience in other jurisdictions. These include interventions to promote greater:

- Appliance Efficiency;
- Building Standards;
- Sustainable Energy; and
- Transportation Management

It is argued that many of these opportunities should be further explored

<sup>108</sup> Pierre Friedlingstein, A steep road to climate stabilization, (2008) *Nature* 451.

<sup>109</sup> For updated information on the upcoming COP15 agenda in Copenhagen see the event’s website at: [www.cop15.dk](http://www.cop15.dk).

<sup>110</sup> Ian Valentine, Evelyn Hurley, Janet Reid and Will Allen, “Principles and Processes for Effecting Change in Environmental Management in New Zealand”, (2007) (3) *Journal of Environmental Management*, 82, 311-318; also Tony Jackson and Jennifer Dixon, “The New Zealand Resource Management Act: An Exercise in Delivering Sustainable Development Through an Ecological Modernisation Agenda”, (2007) (34) *Environment and Planning* 107-120.

and pursued as part of a comprehensive national climate change policy for New Zealand.

These areas of public policy were selected not only because the technologies existed, but because legislation and regulation internationally had already begun to take hold. By contrast, such technologies as hydrogen power, clean coal or coal capture storage may not yet be commercially viable. Legislation to reduce methane reductions from livestock would go a long way to addressing the predominant component of New Zealand's GHG profile, especially given the delayed integration of the agricultural sector into the local trading system. Because livestock are a relatively small percentage of most country's emissions sources,<sup>111</sup> research to address the sector is only now beginning to emerge.<sup>112</sup> To date, no meaningful models of legislation exist internationally for inducing reductions from livestock that might provide a sound basis for emulation.

### *Standby Electricity and Upgrading Appliances*

One of the most unnecessary and unfortunate wastes of energy involves "standby power" in electrical appliances. Studies have shown that electrical appliances often use as much energy when they are turned "off" or in a "standby mode" as when they were "on". The magnitude of the phenomenon emerged in a 1993 local report which could not identify meaningful difference in electricity costs in vacation homes during periods of use and vacancy.<sup>113</sup> "Phantom loads" or "leaking electricity" was soon recognized as a major source of inefficiency which could readily be amended through engineering and technology diffusion via legislation. The phenomenon is common in a plethora of standard household appliances (televisions, stereos, VCRs, DVD player/recorders, microwave ovens and computers) which remain inactive most hours of the day. Most households would be delighted to purchase appliances which continue to perform their key functions while consuming less electricity.

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<sup>111</sup> The agriculture sector in Ireland is responsible for 28% of total GHG emissions, and while there are general targets for reduction, this has not translated into regulatory measures. Ireland National Climate Change Strategy 2007-2012 [www.environ.ie/en/PublicationsDocuments/FileDownload,1861,en.pdf](http://www.environ.ie/en/PublicationsDocuments/FileDownload,1861,en.pdf) accessed 18/01/08.

<sup>112</sup> For example, as part of a related initiative in Australia, the Queensland Dairy Farmers Association has enlisted twenty dairy farms in a pilot effort to reduce methane emissions. The project enlists other stakeholders such as meat companies and major private land owners. Developing a Strategic Framework for GREENHOUSE and AGRICULTURE An Issues Paper [www.greenhouse.gov.au/agriculture/publications/framework.html](http://www.greenhouse.gov.au/agriculture/publications/framework.html) accessed 18/01/08.

<sup>113</sup> Energy Efficiency and Conservation Authority, *Energy Use in New Zealand Households. Report on the Year Ten Analysis for the Household Energy End Use Project (HEEP)*. Wellington, New Zealand (2006) at 59.



Internationally, some two percent of total electricity (which translates into one percent of total carbon emissions) is associated with “standby” power. A shift in OECD countries to appliances that are designed to reduce standby demands could already provide these developed countries on average with three percent of the reductions they need to make under the Kyoto Protocol.<sup>114</sup> In New Zealand, the phenomenon appears to be extremely acute, with as much as five percent total household electricity use attributed to these “phantom loads”. The potential savings from switching appliances “off” rather than into a standby mode reaches 100 million dollars every year.<sup>115</sup>

The United States, which typically is not thought of as a “climate change policy” innovator has begun to take advantage of the extraordinary energy conservation potential associated with home appliances. An internal Executive Order promulgated by the President in 2001 placed restrictions on electrical products which did not meet efficiency standards that included minimum “stand by” levels.<sup>116</sup> California has emerged as one of the more conscientious US jurisdictions in the area of climate change legislation and standby power is no exception. Its Energy Commission adopted a comprehensive three watt standard for standby for electrical appliances which came into force on January 1, 2006.<sup>117</sup>

Australia began its “standby program” with a voluntary initiative where funding for promotional policies was made available on a product-specific basis. It established a National Appliance and Equipment Energy Efficiency Committee that soon set a goal of having all electrical appliances meet a one watt standard no later than 2012. The Committee was authorized to facilitate state-wide initiatives in the field. The EU has begun to address the energy savings potential in its general 2005 directive regarding eco-design requirements for energy using products.<sup>118</sup>

Technology advancement is only one part of the policy challenge. Ensuring appropriate individual behavior and expediting energy efficient product diffusion is necessary to achieve the potential reduction. Studies show that “replacement” rather than energy considerations motivate

<sup>114</sup> Lebot, Benoit, Meier & Anglade 2000. “Global Implications of Standby Power Use” In the *Proceedings of ACEE Summer Study on Energy Efficiency in Buildings*. Asilomar (Calif.): American Council for An Energy Efficient Economy (Washington DC). (Also published as Lawrence Berkeley National Laboratory Report No. LBNL-46019; June, 2000).

<sup>115</sup> Energy Efficiency and Conservation Authority website <http://www.eeca.govt.nz/labelling-and-standards/industrial-and-commercial/standby-power.html>.

<sup>116</sup> Executive Order 13221. See: Bertoldi P, Aebischer B, Edlington C, & Hershberg, C (2002) *Standby Power Use: How big is the Problem? What Policies and Technical Solutions Can Address It?* In the proceedings of the ACEE Summer Study on Energy Efficiency in Buildings, American Council for an Energy-Efficient Economy, Washington, D.C. <http://acee.org/conf/blindex.htm>.

<sup>117</sup> *Ibid.*

<sup>118</sup> EU Directive, 2005/332/EC.

most appliance purchases.<sup>119</sup> Providing rebates to consumers who replace old, inefficient appliances with newer, energy conserving ones may be an effective way to move consumers in the right direction. This is much like the air quality programs that became popular in the US and particularly in Italy which paid owners to take old, polluting vehicles off the roads so that they might buy newer, cleaner cars.<sup>120</sup> Accordingly, the American state of Delaware initiated a program that paid as much as five hundred dollars per household for retiring old models of appliances and buying new, “approved” ones. The program included the purchase of qualified refrigerators, freezers and washing machines while retiring the older models.<sup>121</sup> European appliance producers argue that if such incentive programs were adopted by the EU, it could lead to the replacement of 188 million appliances, with a carbon reduction equivalent of 18 million tons by 2020.<sup>122</sup>

Such subsidies need not be limited to government. BC Hydro, a major Canadian electricity utility offered its consumers 30 dollars apiece along with convenience of collection for replacing old refrigerators. Research illustrated that many of these old models are utilized solely as storage containers yet oddly remain plugged in and largely unused in holiday cribs.<sup>123</sup>

There are many reasons why such legislative provisions are promising for New Zealand. To begin with, the country already has a strong statutory and institutional base for upgrading its present standards.<sup>124</sup> The Energy Efficiency and Conservation Act 2000 created an Authority (the EECA) to promote energy efficiency programs. Beyond advising the minister, the EECA is authorized to promulgate regulations that promote energy efficiency, conservation and the use of renewable sources of energy in New Zealand.<sup>125</sup> In 2005, the EECA established a local “Energy Star

<sup>119</sup> Stammering, Prof Dr Rainer) “*Analysis of a small consumer investigation in Germany. Stand-by and other low power modes on dishwashers*”. IEC: International Electrotechnical Commission, 2005. <http://www.aham.org/ht/a/GetDocumentAction/i/1474> Association of Home Appliance Manufacturers.

<sup>120</sup> US Office of Technology Assessment Retiring old cars: Programmes to save gasoline and reduce emissions. GPO 052-003-01288-0, Washington DC, 1992. See also Doron Lavie, Nir Becker, Vered Ben-Shlomo, *Economic Analysis of the Feasibility of Vehicle Scrapage Programmes in Israel*, Final Report, Jerusalem, Ministry of Environment (In Hebrew), 2003.

<sup>121</sup> US Department of Energy: <http://www.energy.gov/taxbreaks.htm>.

<sup>122</sup> Gow, David (2007) ‘*Electrolux Urges EU to Offer Cash for Buyers of Green White Goods*’ In the *Guardian Unlimited*, Stockholm. <http://www.guardian.co.uk/environment/2007/dec/10/energyefficiency.climatechange>.

<sup>123</sup> *Ibid.*

<sup>124</sup> Office of the Parliamentary Commissioner for the Environment “*Outcome Evaluation: Getting more for Less: A review of progress on energy efficiency and renewable energy initiatives in New Zealand*” (2005), 4.

<sup>125</sup> Energy Efficiency Conservation Act s 336 specifically allows the EECA to create regulations for the purpose of prescribing minimum

program". The program endorses products with low energy demands – including "standby" and "sleep" functions.<sup>126</sup> This voluntary labelling scheme is currently being phased in, starting with home electronics, domestic refrigeration appliances and office equipment.<sup>127</sup> In addition, Energy Efficiency (Energy Using Products) Regulations 2002 require products to meet *Minimum Energy Performance Standards and Mandatory Energy Performance Labelling* which are harmonised with Australian standards.<sup>128</sup> By the end of 2008, fourteen product classes will require mandatory labels enabling consumers to include energy efficiency in their consumer decisions.<sup>129</sup> Dishwashers and washing machines must show information regarding standby power,<sup>130</sup> but clearly these demands could easily be expanded.<sup>131</sup>

A new legislative initiative in the area of reducing standby power and diffusion of energy saving appliances appears to be promising. Implementation costs are modest and the requisite technologies are available. Even as this policy technically is applied at the "household" level, the associated burden is trivial. Individuals stand to save money from adopting standby electricity standards in the mid to long term. Hence, political barriers to "command and control" regulation should be minimal. Industries do not stand to lose competitive advantages. Indeed, subsidies for encouraging the replacement of old appliances would surely be popular. Most importantly for the present context, it

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energy performance standards for energy-using products (s36a), require the labelling of products in relation to their energy efficiency abilities (s36(b)), and to stipulate the form and manner of testing the performance efficacy of energy-using products and services. Energy Efficiency and Conservation Authority *Energy Efficient Strategies: Standby Power*, January 2005, p 45, <http://www.eeca.govt.nz/eeca-library/products/report/Standby%20Power%20Report%20April%202005.pdf>.

<sup>126</sup> Energy Efficiency and Conservation Authority *"New Zealand Energy Efficiency and Conservation Strategy: Action plan to maximise energy efficiency and renewable energy"* October 2007 p 24, <http://www.eeca.govt.nz/eeca-library/eeca-reports/neecs/report/nzeecs-07.pdf>.

<sup>127</sup> International Energy Authority, "Energy Efficiency: Appliance Standards and Labelling" in "Energy Policies of IEA Countries: New Zealand 2006 Review" p 75-76, <http://www.iea.org/textbase/nppdf/free/2006/newzealand2006.pdf>.

<sup>128</sup> Energy Efficiency and Conservation Authority *"Appliance and Equipment Energy Efficiency Forward Programme 2004-05"*, June 2004, p 3.

<sup>129</sup> Energy Efficiency and Conservation Authority *"New Zealand Energy Efficiency and Conservation Strategy: Action plan to maximise energy efficiency and renewable energy"*, October 2007 p 24, <http://www.eeca.govt.nz/eeca-library/eeca-reports/neecs/report/nzeecs-07.pdf>.

<sup>130</sup> "Energy Level": the Authority on Sustainable Building, BRANZ <http://www.level.org.nz/energy/appliances/>.

<sup>131</sup> Manufacturers, importers and retailers do not have to comply with these standards if they are selling second-hand items or if their inventory of a given appliance does not exceed fifty. See Energy Efficiency (Energy Using Products) Regulations 2002 s12(1)(a).

would appear that appliances would not be immediately influenced if at all by New Zealand's proposed greenhouse gas trading scheme. Alternative regulatory measures would be important.

### *Building Standards and Energy Efficiency*

It is estimated that the operation of residential and commercial buildings accounts for roughly 40 percent of all energy consumed in industrial societies.<sup>132</sup> This remarkable proportion does not even include the energy consumed in the production of buildings and their materials, or the transportation energy required for material transport and urban travel – both of which are influenced critically by architectural decisions. Improving energy-efficiency of buildings is an area where direct regulation could reduce energy use and GHG emissions significantly.<sup>133</sup> In New Zealand, conservative estimates suggest that 12.6 percent of total energy use is associated with residential buildings.<sup>134</sup> Yet, this is another area which largely falls outside the present emissions trading programme and where impressive energy savings might be missed. It is therefore clear that increasing the overall energy-efficiency of buildings could have a significant impact on energy consumption and greenhouse gas emissions world wide.

Improving the energy efficiency of buildings is not only technically attainable, it is also generally cost-effective. Numerous aspects of a building's design and environmental systems affect its ultimate energy consumption, and in each of these areas there is a vast potential for savings in most countries. The recent report by the United Nations' International Panel on Climate Change<sup>135</sup> confirms earlier estimates that energy use in the building sector could be reduced by 30-50 percent.<sup>136</sup>

The potential for energy reductions in buildings in New Zealand is enormous. For example, some 61 percent of the country's 1.5 million homes were built prior to the promulgation of present building standards

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<sup>132</sup> US Energy Information Administration (2006) *Annual Energy Review 2005* Report No. DOE/EIA-0384, posted July 2006, available at: <http://www.eia.doe.gov/emeu/aer/contents.html>.

<sup>133</sup> GM Garcia, "The Rise of the Green Building", *The Economist* December 2, 2004.

<sup>134</sup> T Roulleau and CR Lloyd, "International policy issues regarding solar water heating, with a focus on New Zealand", at 2.

<sup>135</sup> MD Levine, K Ürge-Vorsatz, L Blok, DL Geng, S Harvey, G Lang, A Levermore, S Mongameli Mehlwana, A Mirasgedis, J Novikova, H Rilling, H Yoshino, (2007) *Residential and commercial buildings. In Climate Change 2007: Mitigation. Contribution of Working Group III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change* [B. Metz, O.R. Davidson, P.R. Bosch, R. Dave, L.A. Meyer (eds)], Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, (2007).

<sup>136</sup> SL Nadel, M Rainer, M Shepard, M Suozzo, and J Thorne, *Emerging Energy-Saving Technologies and Practices for the Buildings Sector*, Washington, DC: American Council for an Energy-Efficient Economy. Report A985, (1998).

when insulation became mandatory.<sup>137</sup> While building standards worldwide were initially focused on protecting public health and safety, they are becoming more energy conscious.<sup>138</sup> Existing New Zealand building codes could be far more rigorous about energy efficiency and offer far more incentive or assistance to existing homes to improve energy performance. Beyond installation of ceiling and wall insulation, they should include such measures as utilization of double glazed windows, heat pumps/ ceiling fans, lowering ceiling heights, etc.

Internationally, “Green Buildings” have been promoted world-wide through voluntary standards. The most famous of these – the LEED (Leadership in Energy and Environmental Design) labelling scheme was designed by the US Green Building Council, an interdisciplinary non-profit body of architects, engineers, academics, product manufacturers and public institutions. The first pilot version was published in 1998, and two additional versions have been introduced since. LEED is essentially an environmental performance rating system, which may be applied to new or existing commercial, institutional and residential buildings.<sup>139</sup> LEED was envisioned as a non-governmental program which could be implemented on a voluntary basis. Through the program projects are submitted for LEED certification as “green buildings”, usually by large companies seeking to incorporate green practices as part of their corporate agenda or concern for their public image.<sup>140</sup>

The LEED program ranks building projects according to four certification levels which purport to rate the overall environmental performance of a building according to a “point system”. A building at the most basic level can be classified as Certified (26-32 points) with Silver (33-38 points), Gold (39-51 points) and Platinum (52-69 points) incrementally improving performance. Among the areas for which points are awarded are: Sustainable Sites (including questions of transportation access), Water Efficiency, Energy and Atmosphere, Materials and Resources, and Indoor Environmental Quality. Four additional points can be attained if design is particularly innovative. Prerequisites for each area exist for which buildings do not receive points, but without which, certification will not be granted.

In the present context, the category “Energy and Atmosphere”

<sup>137</sup> “Final Report: Home Energy Rating Scheme Consultancy”, Energy Consult Australia, pp 34.

<sup>138</sup> D Harris *Professional Practice Information Note, Note 2: Building Codes and Standards*, International Union of Architects, Kuala Lumpur, Malaysia, (2004).

<sup>139</sup> KE Bland *The Impact of LEED 2.1 on Wood Markets*, American Forest and Paper Association, Washington DC, 2003.

<sup>140</sup> E Bondareva A Buttell, F Egan A Fox, C Piper, *Environment by design: the LEED green building rating system in student research portfolio*, Environmental Strategies, Department of Natural Resources, Cornell University, (S Wolf, ed), fall 2003. Available at: <http://www.dnr.cornell.edu/saw44/431students.html>.

offers the greater benefits for greenhouse gas reduction. It contains three “prerequisites”: 1) fundamental commissioning of the building energy systems, 2) minimum energy performance and 3) fundamental refrigerant management.<sup>141</sup> Specifications relating to the energy efficiency of the building envelope, heating, ventilation, air-conditioning and refrigeration (HVAC&R), lighting and other systems are all based on American engineering standards.<sup>142</sup> While it has done an excellent job of public relations, in practice the actual impact of the LEED program is smaller than would be expected given its reputation as the world’s leading building rating scheme.<sup>143</sup>

One of the first statutory efforts to reduce GHG emissions through construction standards was undertaken by the European Union. In an effort to mobilize a community strategy to meet the Kyoto Protocol’s emission goals, the European Commission enacted the European Climate Change Program in 2000. Among the key “cost-effective” components of the strategy that it identified was the potential improvement in the energy performance of buildings, considered to be among the more cost effective measures for reducing GHG emissions.<sup>144</sup> Consequently, a Energy Performance of Buildings Directive (EPBD) was enacted in order to expedite energy efficiency in buildings within the 27 EU member states. While great effort was invested in emphasizing the cost-effective nature of the modifications,<sup>145</sup> stalled implementation has belied the ease of the transition.<sup>146</sup>

The EPBD relies on the calculation of a broad range of building characteristics.<sup>147</sup> These include a structure’s thermal qualities, building

<sup>141</sup> LEED-NC, Green Building Rating System for New Construction and Major Renovations, version 2.2, October 2005.

<sup>142</sup> The ASHRAE 90.1-1989 standard was developed by the *American Society of Heating, Refrigerating and Air-Conditioning Engineers*, (the first version and first published in 1975). See: WK Chow and PCH Yu *Controlling building energy use by overall thermal transfer value (OTTV)*, *The Hong Kong Polytechnic University, Energy* 25(5):463-478, HK, China, 2000.

<sup>143</sup> As of May 2007, only 900 building projects were fully LEED certified or labelled in the US and around the world. Many more have begun the certification process bolstering its status internationally.

<sup>144</sup> Directive 2002/91/EC of the European Parliament and of the Council of 16 December 2002 (04.01.2003) on *The Energy Performance of Buildings*, Official Journal of the European Communities.

<sup>145</sup> Horst P Schettler-Kohler, *Implementation of the European Performance of Buildings Directive*, Germany Country Report, EPBD Building Platform, Federal Office for Building and Regional Planning, 2006. See also: Zirngibl J *European Energy Performance of Buildings Directive – A Holistic Legal Instrument For an Environmental Break Through*, CSTB, France 2007.

<sup>146</sup> C Maby, A Pither, *The Impact of Home Energy Performance Certification on the Energy Advice Industry*, Energy Efficiency Partnership for Homes, UK, March 2007.

<sup>147</sup> Environmental Protection Agency (2005), *Energy Performance Assessment for Existing Dwellings EPA-ED At: <http://www.epa-ed.org/results/upload/Document/Task/edb/EPA-ED/english.pdf>*.

position and orientation, heat recovery systems, hot water supply, and lighting. The Directive also allows for consideration of renewable energy applications and the bioclimatic design if these exist.<sup>148</sup> The EPBD contains specific expectations with regards to minimal energy performance requirements in new buildings while existing structures are expected to undertake substantial renovations. Buildings are to undergo energy certification that includes the periodic inspection of air conditioners and boilers. Heating installations are to be replaced when boilers are older than 15 years.<sup>149</sup>

The Directive also includes considerable reporting requirements. Real estate owners are expected to report a variety of building parameters and calculation of energy values. These include the type of dwelling, efficiency rating, date of construction, floor area, and energy consumption per square metre, including the kinds of fuels consumed.<sup>150</sup> As is generally the case with EU Directives, the EPBD constitutes a generic framework, with the expectation that member countries will develop their own, site-specified methodology. To improve consistency, the European Commission has recently launched an initiative to establish a single EU building standard.

Other examples of energy driven building codes include the German energy performance certificate and a voluntary standard in Israel (*SI 5281*) designed by a local NGO.<sup>151</sup> Yet, these programs, while more ambitious than the present New Zealand standards do not ensure the long-term maintenance of the building and its energy conservation systems nor address the predominant energy demands of older buildings.

As mentioned, New Zealand has a long-standing framework for construction standards<sup>152</sup> and more recently has introduced a building

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<sup>148</sup> Zirngibl J, *supra*.

<sup>149</sup> Schettler-Kohler, *supra*.

<sup>150</sup> Maby, *supra*. Energy values are based on reference values indicating building energy efficiency levels.

<sup>151</sup> Israel Standard "Buildings with reduced environmental impact" ("green buildings" – (SI) 5281:) was formally promulgated in November 2005 by the Israel Association for the Initiative for a Sustainable Built Environment (IAISBE). The Israeli Ministry of Environment was extremely active in promoting the standard, which is not as comprehensive as the LEED labeling system. <http://iis.newsnet.co.il>.

<sup>152</sup> A generic framework was established under the Building Act 2004 which updated New Zealand's building code, with regards to its energy efficiency requirements (amended in April 2005). The Act sets forward parameters for the construction, alteration as well as the maintenance and the destruction of new and existing buildings, with a general objective of seeking to "improve the control of, and encourage better practices in, building design and construction." It regulates constructing, altering, demolishing and maintaining new and existing buildings throughout New Zealand. It sets standards and provides procedures for people involved in building work to ensure buildings are built properly the first time.

code promulgated pursuant to the 1992 Building Regulations<sup>153</sup> that contains provisions that promote energy conservation. The code wisely relies on a performance standard rather than a design standard which mandates a given construction technique or technology. As of November 2007 new homes are to meet geographically specific energy performance standards under sH1.3.2A of the Building Regulations.<sup>154</sup> The Department of Building and Housing has been preparing a more comprehensive code for three years, which would significantly upgrade requirements for building energy efficiency. Although their promulgation has been delayed, certain components, such as the mandatory adoption of double-glazed windows and expanded wall and roof insulation became mandatory as of October 2008. Yet, these provisions do not address the energy inefficiency of the existing older buildings that so dominate the country's urban and rural landscapes.

This dynamic has surely not been ignored by the legislature. For instance, the *Energy Efficiency and Conservation Act, 2000* has a defined purpose of promoting energy efficiency, energy conservation and renewable energy.<sup>155</sup> The law indeed moved the government to propose a national energy efficiency and conservation strategy which states that by 2016 all homes built before 1977 be retrofitted with cost-effective energy measures. In order to implement the strategy, however, it would be well to consider successful initiatives from other countries.

A variety of legislation has begun to emerge throughout the world to create incentives to improve energy conservation in existing structures. For example, the Danish Act to Promote Energy Savings in Buildings 2005 seeks to promote energy efficiency in all buildings by putting the issue on the table during sales.<sup>156</sup> Even small structures are required to attain an energy rating and draft an energy plan.<sup>157</sup> When houses are sold, house owners must make these plans available to buyers, allowing energy performance to become a meaningful consideration in purchasing decisions. Accordingly, when selling a building, the seller must make sure that buyers have access to and are aware of the energy rating and conservation plan prior to finalizing the terms of sale.<sup>158</sup> (A similar approach has successfully raised public awareness of radon in buildings in the US by requiring radon measurements as a standard element in the

<sup>153</sup> Department of Building and Housing, <http://www.dbh.govt.nz/building-law-and-compliance>.

<sup>154</sup> Building Regulations 2007 H1.3.2A (a-b). The regulations recognize that New Zealand is divided into different regions according to climate conditions. The building performance index is set according to the specific conditions with a maximum allowable grade of 1.55 set for climate zone 3 with a 0.13 ceiling set in climate zones 1 and 2.

<sup>155</sup> Energy Efficiency and Conservation Act 2000 No 14 (as at 03 September 2007).

<sup>156</sup> Act to Promote Energy Savings in Buildings 2005, chapter 1, s 6.

<sup>157</sup> Act to Promote Energy Savings in Buildings 2005, chapter 3, s 3.

<sup>158</sup> Act to Promote Energy Savings in Buildings 2005, s 6.



disclosure required of house sellers.)<sup>159</sup>

The US state of Alaska has linked its energy conservation requirements to house purchases through finances and mortgages. Favorable financing terms are offered to vendors if they purchase homes with a “five star rating or better”. More importantly, financing is specifically offered to low-income families who upgrade energy performance in existing homes.<sup>160</sup>

The building code in Australia ultimately, is not unlike that of New Zealand’s but statutorily it has begun to address the problem of poor energy performance in existing structures more aggressively. After the enactment of the Act to Promote Energy Savings in Buildings 2005,<sup>161</sup> the Australian building code now mandates energy efficiency in housing – including roof, walls and floor resistance to heat transfer. States are required to comply with a National Home Energy Rating Scheme with a general goal of having all homes achieve a “five star” ranking pursuant to it. But the Act also offers homeowners a rebate for undertaking measures to improve energy performance.<sup>162</sup>

New Zealand already has most of the critical regulatory infrastructure in place for upgrading the energy efficiency of its buildings. It should consider integrating measures like those highlighted above into existing building codes. Moreover, by using financing of homes as a point of leverage for improving the energy performance of existing buildings, it can significantly improve awareness and implementation of energy conservation measures in old structures with attendant reductions in GHG emissions. It would seem that energy-efficient construction and retrofitting is another example of a “no regrets” – “win-win” initiative that a market driven policy cannot guarantee.

### *Renewable Energy*

The ban on new coal-fired electricity plants will of course help freeze GHG emissions from the energy sector. Meanwhile electricity utilities are likely to take full advantage of cap and trade systems to offset their emissions as well as improve their own energy efficiency. At the same time, the present legislative signals in New Zealand do not take advantage of the potential public support to develop alternative energy sources. Unlike several countries, New Zealand has wisely resisted pursuing a path of emission free energy from nuclear sources<sup>163</sup>. Ultimately, if alternative,

<sup>159</sup> US EPA, *Home Buyer’s and Seller’s Guide to Radon*, Washington, D.C. November, 2006.

<sup>160</sup> Alaska Housing Finance Corporation < [www.ahfc.state.ak.us/energy/energy.cfm](http://www.ahfc.state.ak.us/energy/energy.cfm) > updated 21/12/2007.

<sup>161</sup> Chapter 1, s 1.

<sup>162</sup> These include an energy wise home energy audits, photovoltaic rebate programme, rainwater tank rebate, and solar hot water rebate.

<sup>163</sup> Ian Llewellyn, “NZ Isolated Over Nuclear Energy”, *New Zealand Herald*, September 18, 2008, [http://www.nzherald.co.nz/nz/news/article.cfm?c\\_id=1&objectid=10461951](http://www.nzherald.co.nz/nz/news/article.cfm?c_id=1&objectid=10461951).

clean energy sources do not become available during the 10-year ban period, the aforementioned “security” exemption for coal-fired plants will surely be triggered as the political pressures to provide reliable electricity to consumers will become intolerable.

The aforementioned Energy Efficiency and Conservation Act 2000 has encouragement of renewable energy as one of its primary objectives. The Act even establishes an Energy Efficiency and Conservation Authority (EECA) as a crown entity.<sup>164</sup> This offers a critical institutional basis for more aggressive initiatives. The EECA enjoys a mandate “the main body responsible for helping to deliver the government’s extensive energy efficiency agenda”.<sup>165</sup> And undoubtedly the 10-year ban on fossil-fuelled thermal electricity generation under the Climate Change (Emissions Trading and Renewable Preference) Bill will trigger expanded renewable energy initiatives in New Zealand at the macro-level.<sup>166</sup> It is not clear, however, whether the present normative framework is free from institutional complications and competing interests. Nor will present legislation necessarily expedite the progress which is so important to maintaining economic growth without compromising GHG emissions reduction goals.

For example, the Electricity Commission, established under the Electricity Act 1992 is motivated by a different and potentially conflicting mandate than the EECA.<sup>167</sup> Solar and wind energies are far more modular and decentralized than conventional energy sources. In several countries, electrical utilities and their government allies have squelched meaningful development of such alternative energy sources which were perceived as strategic threats. In order to avoid such a potential institutional clash, a Memorandum of Understanding was drafted between the Electricity Commission and the EECA.<sup>168</sup>

It is not clear that solar powered electricity is the best strategic decision for New Zealand. Even now, photovoltaics are not considered to be cost-effective relative to other options. Moreover, New Zealand lacks natural conditions for optimal solar electrical generation. While there is considerable geographic variation, table 1 reflects the relatively modest sunshine in some areas of New Zealand compared to that available in other climates.<sup>169</sup>

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<sup>164</sup> Section 20.

<sup>165</sup> [www.eeca.govt.nz/about/index.html](http://www.eeca.govt.nz/about/index.html).

<sup>166</sup> *Ibid* part 2, ss 66-67.

<sup>167</sup> Memorandum of Understanding. [www.eeca.govt.nz/about/index](http://www.eeca.govt.nz/about/index).

<sup>168</sup> <http://www.eeca.govt.nz/about/index.html>.

<sup>169</sup> Source: <http://www.emigratenz.org/NewZealandSunshine.html>, (2008).

Table 1: Hours of Sunshine/year

| Country (city)              | Average annual sunshine hours |
|-----------------------------|-------------------------------|
| USA (San Diego, California) | 3000                          |
| Germany (Freiburg)          | 1700                          |
| Japan (Tokyo)               | 1800                          |
| Israel (Jerusalem)          | 3300                          |
| New Zealand (Blenheim)      | 2500                          |
| (Invercargill)              | 1600                          |

Aggressive efforts to promote photovoltaic roofs, such as the government programs and subsidies in Germany and Japan (see below) may have symbolic value, but these are expensive and produce a trivial percentage of national electricity.<sup>170</sup> And yet, the technology available for passive solar water heating, offers one example of solar energy that is clearly cost-effective. Unfortunately, progress in this area remains slow, belying legislative inadequacies. On the one hand, ostensibly the government has made solar water heating a priority including it as part of its second five-year Energy Efficiency and Conservation Strategy for New Zealand. The strategy envisions an additional 15,000 to 20,000 solar water heating systems installed by 2010, and calls for subsidies to expedite the transition to solar power systems.<sup>171</sup> These can contribute

<sup>170</sup> Runci Paul, "Renewable Energy Policy in Germany: An Overview and Assessment" Joint Global Change Research Institute, January 2005. [www.globalchange.umd.edu/energytrands/germany/1/](http://www.globalchange.umd.edu/energytrands/germany/1/). Accessed January 2008. Also, Maycock, Paul "Japanese PV Residential Dissemination Programme Exceeds Goals" *Photovoltaic News*, January 2004. Japan launched its programme by declaring a 70,000 roof objective and by providing subsidies to home owners via local municipalities to purchase photovoltaic panels for their roofs. Legislation required utilities to connect photovoltaic roof owners connect to the electricity and to sell electricity at a relatively high "feed-in" tariff. In the first stage of the programme 50 percent of the costs of the photovoltaic panels were provided as grants. With an annual market growth of 27 percent, subsidies were cut to 10 percent. Eventually, over 150,000 roofs would join the programme. Germany began its initiative in 1990 with a "1000 roofs programme". Within a decade the programme expanded to "100,000 roofs". Subsidies of 35% of total costs were provided with favorable loan terms provided by the Federal Ministry of Research. Subsidies continued through a very high "feed-in tariff of 0.51 € per kWh, the programme has been formalized through the Renewable Energy Act (EEG) (2000, Amendment in 2000). Yet, it is not at all clear that this is a programme is worthy of emulation. By 2003, electricity derived from PV systems still only represents 0.05% of Germany's overall electricity production.

<sup>171</sup> <http://www.eeca.govt.nz/about/national-strategy/nzeecs-index.html>. The 2006 *Solar Water Heating Programme* contains 15.5 million dollars that is to be spent over the next five years to assist households who wish to

as much as 500 dollars towards the costs of installation.<sup>172</sup> Participation in solar water heater installation courses are also subsidized, at half the cost.

In practice, the New Zealand Solar Industries Association (SIA) is the dominant stakeholder in the area. The Association offers a rare and encouraging case of cooperation between the sundry players in a diverse industry (manufacturers, importers and installers of solar water heating systems) who managed to organize themselves in a single agency.<sup>173</sup> The EECA works with the SIA to help develop the solar water heating industry. To ensure the technical integrity of local installations, the SIA drafted the Solar Water Heating Manufacturing and Installation Code of Practice for New Zealand. In addition, an accreditation system was established to ensure that customers receive water heaters that meet industry standards.<sup>174</sup>

Yet, these standards do not enjoy formal legal status and do not prevent unauthorized dealers from entering the market. Moreover, the New Zealand Building Code requires that prior to installation, all solar water heaters must receive a local government building consent. It is estimated that this bureaucratic hurdle adds an extra 10 percent to the actual cost of a solar heater, despite the fact that most solar water heaters utilize existing hot water cylinders within the building envelope.<sup>175</sup>

Other countries have been far more aggressive in ensuring the diffusion of solar water heating technologies. For example, almost 40 years ago, Israel decided to make the solar water heaters a standard part of residential and commercial buildings. The regulations preceded the “energy crisis” of 1973-74 but were adopted as an important step towards economic self-reliance. Regulations under the country’s Planning Building Law required that any building of eight stories or less contain a solar water heater system.<sup>176</sup> The regulations recognize the potential aesthetic problems associated with these facilities on roofs, and specify that they be concentrated together on the roofs and blend into the structure to the extent possible. Water tanks are to be white unless a planning commission specifies otherwise. It is important to note that the default assumption is that installation of the systems is standard procedure; intervention is required for exemptions or permission to change basic specifications.<sup>177</sup>

As a result of the regulations, Israel came to lead the world in per

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install solar water heaters.

<sup>172</sup> <http://solar.energywise.govt.nz/consumers/funding-options/volume-build>.

<sup>173</sup> <http://www.eeca.govt.nz/renewable-energy/solar/index.html>.

<sup>174</sup> The relevant standard is AS/NZS 2712.

<sup>175</sup> [http://www.solarindustries.org.nz/info\\_solar.html#saqs](http://www.solarindustries.org.nz/info_solar.html#saqs).

<sup>176</sup> The Planning and Building Regulations (Request for Permit, Conditions and Fees) 1970 See: regulation1.09 Obligation to Install a Solar System. (In Hebrew).

<sup>177</sup> *Ibid* s 109(b).

capita hot water heating from the sun. By 1995, solar-water heaters saved some 620 kilowatt hours nationally a year – approximately 3.2 percent of country's total usage.<sup>178</sup>

Promotion of wind-generated electricity may prove to be a far more logical strategy for New Zealand. While wind mills have been a source of energy for centuries, present technologies with two or three blade horizontal-axis systems show operational efficiency above 45 percent – far greater than that of present coal technologies.<sup>179</sup> The costs associated with generation have also plummeted to 10 percent of what wind power cost a decade ago – making wind energy competitive with conventional sources of energy today.<sup>180</sup>

It is important to stress that wind power has emerged as a major source of electricity in Europe due to the setting of clear, quantitative objectives and enabling legislation. More and more countries are setting ambitious statutory goals for wind-powered infrastructure. For instance in the United Kingdom, a goal was set for 10 percent wind power by the year 2010<sup>181</sup> with legislation and tax incentives enacted to expedite the technological transition.<sup>182</sup> While delays in the planning process will probably prevent its realization,<sup>183</sup> progress remains impressive. The US national energy strategy calls for 20 percent wind power (even as present levels hover around one percent).<sup>184</sup> For some countries, implementation is running ahead of schedule, with nine percent of power in Spain and seven percent in Germany coming from wind power. Indeed, industry reports a new wind turbine installation taking place every four hours world-wide.

The high German rates were achieved through the provision of 25 percent subsidies for investment in wind farms. As early as 1991, its Electricity Feed Law required suppliers to purchase electricity from small generators at 90 percent of the full domestic rate. The price was later raised as part of Renewable Energy Law of 2000, regardless of market price for conventionally generated electricity. The market was quick to

<sup>178</sup> Israel Ministry of Energy, *Energy 95*, Jerusalem, 1995. See also Alon Tal, Shoshana Lopatin, Gidon Bromberg, *Sustainability of Energy Related Development Projects in the Middle East Peace Region*, Washington DC US AID's Energy Project Development Fund, March, 1995.

<sup>179</sup> *Wind Farm Basics* <<http://www.windenergy.org.nz/FAQ/factsheet1basics.htm>> accessed 18/01/08.

<sup>180</sup> See generally: "The Future of Energy" *The Economist*, June 19, 2008.

<sup>181</sup> *Countdown to 10% renewable electricity by 2010* <<http://www.bwea.com/>> accessed 19/1/08.

<sup>182</sup> *Energy Bill 2007-08* <<http://www.publications.parliament.uk/pa/cm200708/cmbills/053/08053.i-v.html>> accessed 21/1/08.

<sup>183</sup> *UK wind industry calls for key actions on planning: Faster decisions needed to meet renewable energy targets*: BWEA Press Release, Friday 6 August 2004 <<http://www.bwea.com/media/news/planningdelays.html>> accessed 23/1/08.

<sup>184</sup> In order to meet this objective, a wind-powered facility will need to be created every 15 minutes for the next 25 years.

respond.<sup>185</sup> Aesthetics are generally considered to be one of the main obstacles in the planning process which delays implementation and discourages investment. By giving wind farms “preferred development status” under its planning law, Germany avoided some of the traditional delays.

Denmark has distinguished itself as the unquestioned world leader in producing electricity from wind, and so it is well to consider what legislation led to this unexpected result. Today more than 20 percent of Danish energy is generated by wind and the country has deemed 50 percent as its next step on the road to energy independence.<sup>186</sup> Like many countries, the process began with a law defining clear quantifiable medium-range objectives: a commitment in 1990 to reduce carbon emissions to 20 percent of 1998 levels by 2005.<sup>187</sup> A national strategy entitled “Energy 21” called for development of renewable energy so that by 2005 it would constitute 13-14 percent of total production. At the same time, Denmark was among the first country to call a moratorium on coal-fired power plants.

Like the German experience, requiring feed-in tariffs from electrical utilities was a critical component of the national strategy. This enabled the Danish energy program to seriously engage its public and encourage their investment in wind facilities. Some 150,000 citizens have invested in wind turbines so that of the country’s 5,500 active wind turbines, 75 percent are owned by local co-operatives. It is little wonder that some 86 percent of the public expresses support for the government’s energy policies. (Germany followed with a similar policy so that today a third of its wind infrastructure is owned farmers, households, small businesses and co-operatives.<sup>188</sup>) Economically, both countries have been rewarded for their conscientiousness. Danish wind turbines dominate the world market – with an 80 percent market share. This brings three billion Euros in foreign currency and provides employment for 20,000 Danish workers.

Adopting such measures makes sense in New Zealand. As part of its new energy strategy, the government has endorsed a strategy that

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<sup>185</sup> While installation costs are uniform across the country, the actual tariffs paid by the German government are dependent on the level of wind farm performance. All generators receive a fixed price on installation in order to ensure a broad diffusion of facilities, and not only in areas with a natural advantage in terms of wind conditions. Prices are guaranteed for 20 years, although initial prices are being ratcheted down in order to encourage innovation and efficiency. *Review of Renewable Energy Development in Europe and the US* <[www.berr.gov.uk/files/file22073.pdf](http://www.berr.gov.uk/files/file22073.pdf)> accessed 21/01/08.

<sup>186</sup> [http://www.esru.strath.ac.uk/EandE/Web\\_sites/01-02/RE\\_info/denmark.htm](http://www.esru.strath.ac.uk/EandE/Web_sites/01-02/RE_info/denmark.htm).

<sup>187</sup> *Energy 2000* <<http://www.ens.dk/sw12333.asp>> accessed on 22/01/08.

<sup>188</sup> *Advanced Renewable Tariffs & Electricity Feed Laws* <<http://www.wind-works.org/FeedLaws/ARTSbackground.html>> accessed 23/01/08.

calls for 90 percent of its energy to come from renewable sources by 2050. To that end, recently the Government released the final New Zealand Energy strategy 2025.<sup>189</sup> As of the year 2005 less than three percent of New Zealand's total power came from wind farms; if most of the proposed wind farms are actually implemented, that percentage will change present energy profiles for the better. Providing the kind of feed-in tariffs and other economic incentives that have so changed the energy profiles of countries like Denmark would help ensure that even more ambitious clean-energy objectives are met.

In a country as scenic as New Zealand, conflicts between the twin environmental values of aesthetics and clean energy production are ineluctable. The Resource Management Act's planning and consent process recognizes this and establishes "outstanding landscape" as a legitimate legal basis for objecting to wind farms. Yet, by engaging local communities in the planning process, the "pros" associated with clean energy can be better communicated. Spain has increased public support for wind farms by requiring them to invest a proportion of their profits into the local communities. New Zealand firms, such as Meridian Energy's 136 wind turbine Central Otago's Project Hayes, have begun to implement this approach, making grants to local medical and educational services. Yet, these benefits should be better communicated and the law should offer a clearer basis for compensating these companies.

### *Transportation Management*

Given present technologies and current reliance on the internal combustion engine for everyday transportation, reducing the use of vehicles on New Zealand roads should be an integral part of an attempt to lower the nation's overall GHG emissions. Present estimates suggest that while vehicles contribute some 15 percent to global GHG emissions, this proportion could triple over the coming decades if present transportation patterns and motor vehicle technologies do not drastically change.<sup>190</sup> The relative contribution of vehicular travel in New Zealand to the local GHG portfolio is remarkably similar: in 2005 77.2 million tons of carbon dioxide equivalents or 15 percent of greenhouse gas emissions came from land transport – roughly two-thirds of which came from passenger vehicles.<sup>191</sup> But transport is the fastest growing "sector" in the GHG inventory and present policies may need to be supplemented.

There may be no "wedge" where a "no regrets" justification for policy interventions is greater than that of reduced vehicular emissions, in particular from demand for management for traffic. Some 399 premature mortalities each year in New Zealand have been associated pollution

<sup>189</sup> New Zealand Energy Strategy to 2050-Powering Our Future. <[www.med.govt.nz/upload/52164/nzes.pdf](http://www.med.govt.nz/upload/52164/nzes.pdf)> accessed 23/01/08.

<sup>190</sup> *Carbon Dioxide Emissions from World Passenger Transport*, p 21.

<sup>191</sup> <http://www.mfe.govt.nz/issues/climate/about/greenhouse-gas-inventory.html>.

from mobile sources.<sup>192</sup> In cities, especially Auckland, gridlock and congestion substantially impairs urban quality of life. Given the general dispersion of the population geographically, local vehicle ownership rates are high. In 2007, there were 2,775,717 privately owned cars in New Zealand, roughly a third of which are in the greater Auckland area.<sup>193</sup> This rate is higher than in most European countries.

Reduction of GHG emissions can be achieved through two basic strategies: improved vehicle performance or demand management. Basic emission and fuel efficiency standards are important steps which have been adopted in a variety of jurisdictions. The recent dramatic rise in petrol prices has begun to influence preference for more efficient vehicles<sup>194</sup> and it can be argued that the market has provided a greater incentive for reduced fuel consumption than any direct carbon tax ever would have.

At the same time, there is a world-wide move to improve the fuel efficiency of new vehicles. Many countries, like the United Kingdom have adopted EU targets of upgrading the fuel efficiency in new cars by 25 per cent by 2009.<sup>195</sup> The stringency of these standards is likely to continue to increase. Because New Zealand has such a relatively small fleet of vehicles and no automotive industry to speak of, it is unlikely that domestic legislation would make a meaningful impact on the quality of available vehicles. Nonetheless, there is no reason why the increasingly efficient European performance levels cannot be imposed as import standards.

### *High Occupancy Vehicle Lanes*

A full characterization of the numerous policy options associated with demand management is beyond the scope of this article. Among the more obvious is the expansion of High Occupancy Vehicle (HOV) Lanes, congestion fees for entrance into cities, carpool facilitation, subsidies and expansion of bicycle lanes and limiting urban parking, the first two of which will be briefly reviewed.

HOV lanes are specially designated motorway lanes on which vehicles can only travel if they contain more than two or three passengers.<sup>196</sup>

<sup>192</sup> *Health & Air Pollution in New Zealand: Christchurch Pilot Study* Health Research Council.

<sup>193</sup> Land Transport New Zealand, *New Zealand Motor Vehicle Registration Statistics, 2007*, Palmerston North, New Zealand, 2008.

<sup>194</sup> Kyle Bush, "With High Gas prices – America's New Best-selling Car is..." *Automotive Examiner*, <http://www.examiner.com/x-244-Automotive-Examiner>, September 8, 2008.

<sup>195</sup> The Department of the Environment, Transport and the regions, *Climate Change: the UK Programme Summary* (2003).

<sup>196</sup> "High Occupancy Vehicle (HOV) lanes are designed to discourage single or low occupancy car use by providing priority to vehicles with more than a minimum number of occupants (usually two or three) and to buses. They encourage car sharing or public transport use, or both, by allowing users to reduce their journey times relative to single-occupant



Among their attendant benefits is expanded ride sharing and overall trip reductions. There are numerous ways to encourage HOV lanes. The most common is mandating their integration in major motorways either directly or through local authorities. For example, in Ontario, Canada, policy makers decided that 450 new kilometres of HOV lanes would ease local congestion. New legislation<sup>197</sup> and subsequent regulations<sup>198</sup> empowered the provincial police to enforce the two-passenger minimum standards.<sup>199</sup> The assumption is that HOV lanes should be established based on specific traffic patterns on the ground and that implementation should be site-specific.<sup>200</sup> Accordingly, the Ontario Minister of Transportation is empowered to promulgate regulations pursuant to s154(1) of the Highway Traffic Act, s154(2) to determine the types of vehicles to whom the regulations apply.<sup>201</sup>

Implementing lanes is not sufficient in and of itself. Thus Ontario has established a series of supplementary infrastructure improvements to ensure benefits to those who respond to the incentives and fill their car with more than one person. These include:

- Establishing continuous highway-to-highway ramps for HOV lane users to expedite transition from one highway to another for HOV lane vehicles;
- Creating special access lanes or ramps dedicated exclusively to HOV use; and
- Establishing special “carpool parking lots” close to highway interchanges facilitating carpooling among commuters.<sup>202</sup>

Many US states have also begun to aggressively expand HOV lanes and special, federal funding has been made available to this end. The federal government has been moderately supportive through legislation

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vehicles, particularly when the general purpose lanes are congested. This in turn reduces the number of cars on the network and this reduction in the demand for road space can reduce overall congestion, fuel consumption and environmental impacts.” *Transport Strategy, A Decision Maker’s Guidebook*, Institute for Transport Studies, University of Leeds, [http://www.konsult.leeds.ac.uk/public/level0/10\\_hom.htm](http://www.konsult.leeds.ac.uk/public/level0/10_hom.htm) last visited, September, 2008.

<sup>197</sup> *The Highway Traffic Act* RSO 1990, cH8.

<sup>198</sup> *Ontario Regulation 620/05*. Regulation 620/05 provides that “no person shall operate a motor vehicle in a high occupancy vehicle lane”, unless “certain circumstances exists”.

<sup>199</sup> *The Highway Traffic Act* in s 154(3) specifies a penalty of \$110 and 3 demerit points, while infractions on the arterial HOV’s range between \$80 and \$100.

<sup>200</sup> HOV lanes can also be utilized by buses, provincial authorities and emergency vehicles, s 144 of *The Highway Traffic Act* RSO 1990.

<sup>201</sup> c 26, Sched A, s 25 of *The Highway Traffic Act*, RSO 1990, cH8.

<sup>202</sup> Ontario, Ministry of Transportation Website, “*Ontario’s High Occupancy Vehicle Lane Network Summary of the Plan for the 400-Series Highways in the Greater Golden Horseshoe*” <http://www.mto.gov.on.ca/english/traveller/hov/summary2007.htm> 2008.

such as Title 23 of the United States Code of Federal Regulations that defines carpool projects<sup>203</sup> including passenger requirements for vehicles utilizing HOV lanes.<sup>204</sup> Funding for their development is derived from the Federal-Aid Highway Fund, which was established by Congress to assist states in improving highways and developing special purpose projects.<sup>205</sup>

For almost forty years, the State of Washington has attempted to encourage carpooling, investing over a billion dollars in approximately 360 kilometers of HOV lanes.<sup>206</sup> Local authorities are entitled to allocate any portion of highway funding for the creation of lanes for public transportation vehicles and HOV lanes “carrying no fewer than two passengers”.<sup>207</sup> Frequently, lanes are declared “HOV” for specific hours to reduce congestion, although if the ultimate goal is to reduce trips of vehicles and emissions, clearly, full-time lanes are preferable.<sup>208</sup> Moreover, Washington State legislation has moved municipalities to fill up HOV lanes through facilitating carpooling. For instance, over ten years ago, Whatcom County (Washington State) promulgated by-laws requiring employers with more than 100 workers arriving to work between 6:00 and 9:00 in the morning to prepare and implement programs that would reduce their employee “drive-alone” trips.<sup>209</sup> A database of commuters was created to facilitate carpooling<sup>210</sup> with emergency rides and cash incentives provided for proven carpooling efforts that reduced fuel use and pollution.<sup>211</sup> In its first year, over 5,000 residents registered 395,407 trips which ultimately saved 5,074.28 tons of CO<sub>2</sub> from being emitted into the atmosphere. Since then, the state legislature has imposed a duty to prepare such initiatives among all local governments through the Commute Trip Reduction Efficiency Act. Municipalities with high levels of mobile source induced air pollution and congestion must implement plans to reduce single-occupant vehicle trips by 10 percent, and vehicle miles travelled by 13 percent by 2011.

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<sup>203</sup> 23 CFR Part 656.

<sup>204</sup> 23 USC s102(a)(1), Also, the Safe Accountable Flexible and Efficient Transportation Equity Act 2005, s 1121(a).

<sup>205</sup> The principal statute establishing the Federal-Aid highway programme is found in Title 23, United States Code (23 USC). Regulatory requirements for the development of HOV lanes is contained in Title 23, of the Code of Federal Regulations (23 CFR).

<sup>206</sup> <http://www.wsdot.wa.gov/hov/>.

<sup>207</sup> 46.61.165 of the Revised Code of Washington (RCW) (RCW 46.61.165) <http://apps.leg.wa.gov/RCW/default.aspx?cite=46.61.165>.

<sup>208</sup> Pursuant to RCW 46.61.165, any violation of a restriction on highway usage is deemed to be a traffic infraction. RCW 47.52.025 also authorizes highway authorities to regulate, restrict or prohibit the use of HOV lanes by various classes of vehicles or traffic.

<sup>209</sup> *Commute Trip Reduction Ordinance*. For general motor vehicles, there must be “at least two persons occupying seating positions” of vehicle no less than 6.5 metres. WCC 16.24.

<sup>210</sup> See <http://www.rideshareonline.com/>.

<sup>211</sup> See <https://www.whatcomsmarttrips.org/login.aspx?msg=plsLogin>.

### *Congestion Charges*

Placing a tax on vehicle travel into cities has proven to be a highly effective way for reducing congestion and trips. If set at an appropriate level, they can provide clear incentives to drivers to either delay trips, cancel them or opt for the cheaper alternative of public transportation. The most famous example of such an intervention involves the congestion charges imposed for entry of vehicles into London.

The United Kingdom has been a conscientious signatory to the Kyoto Protocol, setting its greenhouse gas reduction objectives to 20 percent below 1990 levels, a full 12 percentage points above the EU's eight percent Kyoto obligation.<sup>212</sup> To meet this goal, improving vehicle efficiency and reducing congestion have been identified as key components of a 10-year program.<sup>213</sup> In 1998, a "White Paper" issued by the UK Ministry of Transport laid out a thoughtful strategy for encouraging public transport and reducing car usage.<sup>214</sup>

With over 7.5 million residents (or more than 14 percent of the UK population), nowhere were traffic problems more acute than in London. The local government was granted broad authority to address its traffic pathology under the Greater London Authority Act 1999 (GLAA). The mayor is required to draft and implement a transportation program consistent with the strategy articulated in the White Paper. Originally, London's congestion charge was designed to improve traffic flow and mobility as its paramount objective. Yet, as global warming became a more salient issue, its "climate change" benefits were recognized and increasingly highlighted. The charge also sought to move drivers from single occupancy private cars to public transport or HOV alternatives.<sup>215</sup>

Specifically, drivers in London are now required to pay £8 if they enter the 21 square kilometre circumference surrounding the heart of London between the hours of 7 am and 6 pm. This area is primarily commercial. Compliance is monitored through a complex CCTV camera system and a fine ranging from £60 to £180 is imposed on vehicles for non-payment.<sup>216</sup> Discounts are available to residents who live within the charge area and

<sup>212</sup> Cinnamon Carlarne "Climate Change Policies an Ocean Apart: EU & US Climate Change Policies Compared", (2006) 14 *Penn State Environmental Law Review* 435.

<sup>213</sup> *Ibid.*

<sup>214</sup> [http://www.dft.gov.uk/about/strategy/whitepapers/previous/aneu\\_dealfortransportbetterfo5695?page=5#a1012](http://www.dft.gov.uk/about/strategy/whitepapers/previous/aneu_dealfortransportbetterfo5695?page=5#a1012).

<sup>215</sup> <http://www.parliament.uk/documents/upload/postpn255.pdf>.

<sup>216</sup> The principal legal basis for the scheme is found in *Greater London (Central Zone) Charging Order 2001* which has since undergone a series of variations instigated by TFL and made in pursuance to the *Transport Act 2000* and the *Greater London Authority Act 1999* and consolidated by the Mayor. The order is made up of two parts and four annexes: Congestion-Charging-Order-Explanatory-Notes-2006. Greater London (Central zone) Charging Order 2004, annex 2, s 3.

exemptions are granted for large passenger vehicles holding over nine passengers and discounts provided for electric or alternative fuel cars.

From the position of revenue generation, the congestion charge has been deemed an unmitigated success. The system generates over £240 million a year – prior to expenses.<sup>217</sup> The Act in its fourth Annex designates that the funds cannot be diverted for other general purposes. Rather money collected by the fee must be utilized to improve London's public transportation system as well as its efficiency and accessibility. This "closed system" helps to assuage public concern or indignation at the new "tax".

Of course the bottom line is the impact of the surcharge on traffic patterns themselves. According to local evaluation, with a 70,000 trip reduction per year, congestion has dropped by a full 30 percent. Among the drivers who make up the 70,000 trip reduction, 50 to 60 percent report that they have simply opted to travel via public transportation. Estimates suggest that the modal shift has led to a 20 percent drop in carbon emissions from the area's transport sector.<sup>218</sup> A proposed increase in the congestion fee for high polluting vehicles that would have increased the fee to £25 per trip was recently abandoned. Following a legal challenge by the Porsche car manufacturer, new London mayor Boris Johnson abandoned his predecessor's proposal, which would have made visits to London in cars with high carbon emissions, five times more expensive than they presently are.<sup>219</sup> Nonetheless, the London experience may be highly relevant for a city such as Auckland.

Perhaps the most long-term, ambitious transportation driving-fee program can be found in Singapore where since 1970, planners have followed a Land Transportation Strategy.<sup>220</sup> Because of the country's diminutive dimensions, its subsequent legislation has been a model for Europe as well as the London initiative. Of particular interest is the country's "Electronic Road Pricing" which since 1998 has served to reduce vehicle trips. Electronic sensors read the licence plate numbers when they enter a priced zone and charges vehicle owners accordingly.<sup>221</sup> Fees are set to reflect the contribution to traffic congestion (time of day) as well as to the vehicle class, rather than according to the number of passengers travelling. Fees produce a profit of \$40 million (US)

<sup>217</sup> Lindsay Beyerstein, "London Bridge is not falling after congestion plan", *The Villager*, Volume 76, Number 53, May 30 – June 5, 2007. See generally: Todd Litman, *London Congestion Pricing, Implications for Other Cities*, Victoria, British Columbia, *Victoria Transport Policy Institute*, 2006.

<sup>218</sup> <http://www.newrules.org/de/archives/200706.html> \_.

<sup>219</sup> BBC News, "Mayor Quashes £25 C-charge Hike", July 8, 2008. <http://news.bbc.co.uk/1/hi/england/london/7494495.stm>.

<sup>220</sup> Piotr S Olszewski, *Singapore Motorisation Restraint and Its Implications on Travel Behaviour And Urban Sustainability*, Published online: 13 March 2007. Springer Science & Business Media BV 2007.

<sup>221</sup> [http://www.lta.gov.sg/motoring\\_matters/index\\_motoring\\_erp.htm](http://www.lta.gov.sg/motoring_matters/index_motoring_erp.htm)

annually,<sup>222</sup> which is estimated to be three times higher than the cost of road maintenance.<sup>223</sup>

Reports from Singapore about the effectiveness of the policy (or the elasticity of passenger preferences) are also encouraging. Following the imposition of the fees, the number of vehicles has dropped by almost 20 percent (from 270,000 to 235,000) sparking a rise in car pooling.<sup>224</sup> As early as the 1970s data showed that beyond changing the times of their travel, many drivers shifted to public transport, which saw a sudden increase to 46 percent of all trips by 1974. By today, that rate has increased to over 60 percent public transport usage. While there have not been estimates of the net carbon equivalent reductions due to the forgone emissions, clearly congestion fee programs can provide a meaningful cut in the contribution of traffic to overall GHG burden.<sup>225</sup>

These measures are not new to New Zealand. Indeed HOVs are already functioning in a very limited area of Auckland's North Shore. Under the Land Transport Road User Rules 2004 "Transit Vehicle Lanes" are defined as: "a lane reserved for the use of passenger service vehicles, cars carrying not less than the number of persons (including driver) specified on the sign, cycles and motorcycles". Rule 2.2(1) proscribes driving in these lanes for vehicles which do not meet the sign's requirements. The Local Government Act 2002 authorizes the promulgation of bylaws to facilitate the establishment of transit vehicle lanes.<sup>226</sup>

At present, the government has no immediate plans to adopt congestion fees. There is a consensus that traffic congestion constitutes an economic externality. For example, New Zealand Round Table, estimates that road congestion is costing Auckland around \$750 million per year.<sup>227</sup> When the costs of the carbon emissions reduction credits that will need to be purchased to offset these GHG emissions are figured in, the overall costs are surely higher. And with projected demographic increases of 1.5 percent per annum forecasted, the number of car trips is expected to rise proportionally. While there have been isolated calls for legislative reform

<sup>222</sup> [http://www.environmentaldefense.org/documents/6116\\_SingaporeTraffic\\_Factsheet.pdf](http://www.environmentaldefense.org/documents/6116_SingaporeTraffic_Factsheet.pdf).

<sup>223</sup> *Singapore motorisation restraint and its implications on travel behaviour and urban sustainability*, Piotr S Olszewski, Published online: 13 March 2007. Springer Science & Business Media BV 2007.

<sup>224</sup> [http://en.wikipedia.org/wiki/Electronic\\_Road\\_Pricing](http://en.wikipedia.org/wiki/Electronic_Road_Pricing).

<sup>225</sup> <http://www.worldbank.org/transport/utstr/budapest/mar1am/breitanx.pdf>.

<sup>226</sup> In addition, transit lanes have been adopted by Transit New Zealand through the *Transit NZ Transit Lanes Bylaw 2005/4* which designates the affected area and requires appropriate signage and regulation of the lanes.

<sup>227</sup> Zealand Business Roundtable, Submission on *Tackling Congestion in Auckland*, the Auckland Road Pricing Evaluation Study, April 2006. <http://www.nzbr.org/documents/submissions/submissions-2006/060428aklcongestion.pdf>.

to utilize economic instruments to control traffic demand,<sup>228</sup> present policies appear to prefer to accommodate the increase in fleet size, rather than to manage traffic demand and reduce GHG emissions.<sup>229</sup>

## VI. Conclusions

New Zealand is paying an economic price for its relatively high level of environmental performance in 1990. Had it not had such highly developed hydroelectric power during the “base-line year”, finding ways to reduce GHG emissions to international expectations would be far easier. The targets set under the Kyoto Protocol and the new 2009 standards anticipated under the UNFCCC place an unfortunate price-tag on the country’s steady economic growth. These circumstances constitute a new reality, and the level-headed decision to ambitiously move forward with new legislation is a good one. Ultimately, the resulting reduction in GHG gases will improve quality of life locally, beyond contributing to global climatic stability. The cap and trade statutory solution which appears to be the current government’s response constitutes both a worthy and creative response that should be implemented expeditiously. At the same time, legislators should not see passage of the Climate Change (Emissions Trading and Renewable Preference) Bill as the last word on the subject.

There are no shortage of additional regulatory interventions that can save the country money and move it more expeditiously towards its international commitment. As the least costly reductions will be made initially, future additional reductions will have higher marginal associated costs. Hence, it is well to take advantage of promising opportunities and adjust accordingly. This is the climate change policy equivalent of picking the proverbial “low hanging fruit”.

This article has briefly looked at four possible areas of legislation and regulations where other countries appear to have made progress. But of course there are many other categories of carbon “wedges” which might provide reductions in emissions and long-term economic benefits. As GHG emissions are so linked to individual behavior and because millions of individual decisions contribute to the overall energy demands, climate change policy is an area where legislation needs to be particularly creative and sensitive to sociology, economics and values.

For over a decade, New Zealand was the only country in the southern

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<sup>228</sup> Ministry of Transport officials developed a report for Annette King in September 2006, which was approved by central parties such as Transit NZ and Land Transport New Zealand. The report suggests that the *Land Transport Management Act* is amended to allow road charges (<http://www.transport.govt.nz/assets/NewPDFs/Auckland-Road-Pricing/Auckland-Road-Pricing-Release-of-Submissions-Analysis-and-Further-Work-Sept-06.pdf>).

<sup>229</sup> (<http://www.nzbr.org.nz/documents/submissions/submissions-2006/060428aklcongestion.pdf>) NEW Zealand Business Roundtable, *supra*.

hemisphere to embrace the Kyoto Protocol. Its ambitious legislative packages for carbon taxes and more recently “cap and trade” programs has thrust it into the international lime-light as a leader and innovator. But there is much to be learned from other countries’ experience. Indeed, it would be well to take advantage of “tried and true” legislation and regulatory programs from around the world where without imposing excessive economic costs, energy conservation has improved and GHG emissions have been meaningfully reduced.