

Canada-US Interdependence in Climate Policy:
The California Effect vs. the Washington Effect

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Introduction

Canada and the United States are not only interdependent economically but also environmentally. States, provinces, and countries often are reluctant to adopt environmental regulations to reduce emissions unilaterally since, in the absence of matching actions from other jurisdictions, they will hinder the competitiveness of local industries. In the case of the global problem of climate change, however, the additional complication is that actions taken in isolation also will have a negligible impact on global warming. In this context, it is hardly surprisingly that two such closely integrated polities have also been closely tied in their responses to climate change. However, there are in fact two quite distinct Canada-US relationships in the case of climate change – one at the state/provincial level and the other at the federal level. Although the arrow of influence runs decidedly northward in both cases, to date the US' influence on Canadian climate policy has been positive at the sub-national level, but negative on balance at the national level.

Among US states, California is the clear leader in responding to climate change. The state government has adopted a number of innovative and bold climate policies that have spread to other US states. The impact of California's leadership has also spilled across the border, most notably to British Columbia, which has in turn advanced policy innovation and diffusion among Canadian provinces. While this dynamic has been positive to be sure, both within each of the two federations and from the US to Canada, the potential of sub-national governments to address a national, and indeed global, problem is ultimately limited. States and provinces inclined toward action but merely reluctant to 'go it alone' willingly follow the leaders, but those protective of highly greenhouse gas-intensive local industries simply decline to do so.

At the national level, Canada and the US adopted common positions in international climate negotiations throughout the 1990s, but Canada asserted policy independence in ratifying the Kyoto Protocol in 2002, despite the US' withdrawal from the treaty a year earlier. However, five "action plans" later, Canada has yet to adopt any significant regulatory measures at the national level as needed to meet its very demanding Kyoto Protocol target. While there are ample homegrown obstacles to adoption of greenhouse gas control measures in Canada, many of them the same as in the US, the marginal impact of the US on Canada has been decidedly negative. With 80% of Canada's exports going to the US, and 70% of imports coming

from the US, Liberal and Conservative governments alike have dragged their feet with respect even modest regulatory targets for Canadian industry.

The prospect of a long-awaited US national response to climate change promises to transform the US' impact on Canadian climate policy. Not only will it be politically easier for Canada to regulate industrial greenhouse gas emissions if Canada's standards are harmonized with those of its closest trading partner, but it could be difficult not to do so lest the US impose trade sanctions on imports with a larger carbon footprint than allowed in the US. Moreover, US states and some members of Congress have indicated willingness to pressure Canada to make even deeper cuts than Canada seems inclined to do for highly greenhouse-gas intensive sectors, most notably Canada's tar sands.

The California Effect

California is the clear leader among US states with respect to climate policy, though it is by no means the only state government showing leadership. California has played a critical role in three interstate dynamics: innovation and diffusion, "follow the leader," and coordination.

Innovation and Diffusion

The first dynamic exemplifies US Supreme Court Justice Louis Brandeis' ideal of "laboratories of democracy," in which diversity among states facilitates policy innovation and, in turn, diffusion of the best policy ideas to other states within the federation. Illustrative of this dynamic, California was the first state, indeed the first jurisdiction world-wide, to adopt a "low carbon fuel standard." The approach limits the life-cycle emissions per unit of transportation fuel, but gives fuel distributors flexibility in meeting the standard by mixing low carbon-intensity bio-fuels, conventional fuels, and high greenhouse gas-intensive fuels such as those derived from tar sands and shale oil. California announced its intention to adopt a low carbon fuel standard in 2007 and subsequently finalized a standard in January 2010 that require a 10% reduction in emissions intensity of transportation fuels by 2020. California's innovation has since spread to other states, including Oregon and eleven Northeast and mid-Atlantic states who have committed to adopting a joint low carbon fuel standard, and Washington, which is considering adoption.

Follow the Leader

While other US states have undoubtedly benefited from California's and other "green" states' novel policies, state leaders' influence arguably is less often a result of their good ideas than of their political will. Leading states' willingness to adopt climate action measures unilaterally can serve to allay other states' fears that their adoption of regulatory measures will place local industries at a competitive disadvantage. The mechanism by which states "follow the leader" differs in the case of product standards, which apply to all goods sold within the state regardless of

where they are produced, and process standards, which apply only to emitters within the state.

Political scientist David Vogel coined the term “the California effect” to describe an intergovernmental dynamic in which adoption of strict *product* standards by a green jurisdiction with a large economy prompts other jurisdictions to match the leader’s standards.¹ Vogel argues that when producers in other jurisdictions are lured by the large market of the green state’s to meet stricter product standards, they often enter into “Baptist-bootlegger” alliances with environmentalists, lobbying for equally strict standards in their home jurisdictions in order to secure a competitive advantage by virtue of their prior compliance.

The “California effect” is most clearly evident in the case of motor vehicle emissions standards. In 2004, California was the first US State to establish greenhouse gas emission standards for motor vehicles (“tailpipe standards”). In fact, it was the only state in a position to do so. In recognition of the unique air quality challenges faced by California, it is the only state authorized by the US Clean Air Act to adopt tailpipe standards stricter than the national standards. Although it must first request a waiver from the Environmental Protection Agency (EPA), if EPA grants the request, not only can California depart from national standards, but all other states have the option of matching the California standard. The US Clean Air Act thus institutionally reinforces the California effect, though only in the case of motor vehicle emission standards.

California formally submitted a request for a waiver to regulate tailpipe greenhouse gas emissions in 2005, and in the intervening years before EPA’s response, 14 other states with a combined population of 80 million (in addition to California’s 30 million) matched the California standard.² EPA denied the request in December 2007 in the final days of the Bush Administration. However, that decision was not only reversed by the Obama Administration, but in 2008 the Administration proposed a comparable national standard to take effect in 2012, effectively completing the diffusion of California’s policy innovation nation-wide.

In addition to tailpipe standards, California has also been a leader in adoption of emissions standards for electricity production. In 2006, California passed a law (SB 1368) that prohibits utilities from entering into long-term contracts for the purchase of electricity, the production of which resulted in emissions greater than those of a combined cycle natural gas plant. The restriction applies regardless of where the electricity is produced (i.e., in state or out of state). Again following

¹ David Vogel. 1995. *Trading Up: Consumer and Environmental Regulation in a Global Economy*. Cambridge MA: Harvard University Press.

²

http://www.pewclimate.org/what_s_being_done/in_the_states/vehicle_ghg_standard.cfm

California's lead, Oregon and Washington have adopted the same emissions standard for electricity generation.

Product standards based on production methods have both environmental and political advantages. Environmentally, they reduce the risk of "leakage," which can occur if consumers in the jurisdiction in question simply switch from regulated local goods to unregulated goods from out of state. (However, in the context of sub-national regulation within a single country, it is quite plausible that "dirty" electricity that cannot be sold to California will simply be sold to another state.) Perhaps more important in practice is the political advantage of leveling the playing field for in-state and out-of-state producers and, at the limit, exporting compliance costs out of state. To the extent that the goods in question are "imported," even though costs will be borne in-state in the form of higher consumer prices, concentrated costs typically will be felt most keenly by the manufacturing sector in another state. Thus, while the unique air quality challenges of the Los Angeles basin undoubtedly have contributed to California's leadership with respect to regulation of motor vehicle emissions, it has not hurt that the vehicles in question are manufactured out of state. Similarly, California's electricity emission standard effectively bans coal-derived power, but coincidentally there are no coal-fired utilities in California. Moreover, California includes the emissions associated with all electricity used in-state in its emissions inventory, and thus claims the environmental benefits associated with those largely out-of-state costs.

That said, California also has shown political will to regulate emissions in-state via *process* regulations. Regulations that limit emissions from in-state sources are politically more challenging than product standards, both because the costs are directly borne in-state and because local producers invariably raise the prospect of impacts on economic competitiveness should other jurisdictions not match "local" standards. While the prospect of a "race to the bottom" in which jurisdictions seek to maximize local employment by undercutting their neighbours' environmental standards (a form of prisoner's dilemma) is often raised, a more realistic scenario is that jurisdictions are merely reluctant to act alone lest they *lose* jobs to jurisdictions with lower standards (a form of assurance game.)³ Leadership by a green state will not resolve a prisoner's dilemma since a laggard state eager to steal jobs will follow suit; it can go a long way, however, in reassuring states that are merely reluctant to "go it alone."

In this context, California's actions have exerted an influential "pull from the top" among US states. In 2006, California passed the Global Warming Solutions Act (AB32), which sets a binding target of returning California's emissions to 1990 levels by 2020, equivalent to a 30% reduction below the business-as-usual projection. While California will rely significantly on its tailpipe standards and low carbon fuel standards to meet its target, it has also committed to regulate local

³ Kathryn Harrison. Ed. 2006. *Racing to the Bottom? Policy Interdependence in the Canadian Federation*. Vancouver: UBC Press.

sources under a cap-and-trade program that will cover 85% of in-state emissions sources. Two dozen other states have adopted binding economy-wide emissions targets, in most cases following closely on California's example.

Coordination

Of course, a state's *willingness* to regulate unilaterally need not imply that the state *prefers* to go it alone. Coordination among like-minded states can reduce the risk of emissions leakage, lessen competitiveness impacts, and reduce abatement costs through emissions trading in a larger market. The Northeast and mid-Atlantic states were the first to coordinate their climate policies in establishing the Regional Greenhouse Gas Initiative (RGGI). Ten RGGI member states agreed to cap greenhouse gas emissions from power plants at 2009 levels by 2015 and thereafter to achieve a 10 percent reduction by 2018. RGGI established a cap and trade program that has been operating since 2007.

California built on the example of RGGI in promoting coordination among Western states in a more far reaching program that seeks to reduce emissions economy-wide (as opposed to power plants only as in RGGI). The Western Climate Initiative, which was launched by 5 Western states in February 2007, now includes 7 states and 4 Canadian provinces, all of whom have committed to an economy-wide cap and trade program and a target to reduce emissions to 15% below a 2005 baseline by 2020.

While State leaders have been willing to act unilaterally, it is noteworthy that they are not seeking to replace national standards. Rather, the leading time and again have pressed the federal government to establish baseline national standards to "level the playing field." In the US context, the leading mechanism to achieve that goal has been through litigation. For example, California thus joined a coalition of state and local governments and environmental groups in a lawsuit challenging EPA's refusal to regulate greenhouse gas emissions from motor vehicles. That case led to a landmark victory in the Supreme Court's 2007 "MA v. EPA" decision, in which the court ruled that EPA does have the requisite regulatory authority under the existing statute, and directed the Agency to reconsider its position. (Several other states subsequently sued EPA seeking to overturn the resulting "endangerment finding" it issued as a prelude to regulatory action.)

The British Columbia Effect?

Barry Rabe has observed both the dynamism of climate policy among US states in the last decade,⁴ and that state initiatives emerged earlier and have advanced

⁴ Barry Rabe. 2004. *Statehouse and Greenhouse: The Emerging Politics of American Climate Change Policy*. Washington, DC: Brookings.

further than among Canadian provinces.⁵ Rabe attributes the difference to several factors, including Canadian provinces' more limited experience with emissions trading, and, ironically, the fact that Canada ratified the Kyoto Protocol. In a context of anticipated federal action, which did not exist in the US, Rabe argues that Canadian provinces delayed both to coordinate their measures with expected federal actions and to negotiate for federal funding.

Provincial initiatives did increase in both number and scope, however, with a resurgence of public attention to the environment over the course of 2006. To a large degree this represented a spillover of the California effect across the border. This was most notable in the case of British Columbia. In the fall of 2006, BC Premier Gordon Campbell and California Governor Arnold Schwarzenegger had a phone conversation to discuss potential areas for collaboration. The Governor's longtime environmental advisor, Terry Tamminen, happened to be in the room, and when the conversation turned to climate change, he joined in the conversation by speakerphone. Within weeks Tamminen was dispatched to British Columbia to advise the province on California's plans to implement AB32, which had been passed the previous fall.

To the surprise of observers of BC politics, in February 2007 the Liberal government, which was not known for its environmental leadership, announced in its throne speech that climate change henceforth would be a central focus of its agenda. The throne speech clearly reflected California's influence. The provincial government set a target to reduce its emissions 33% below 2007 levels (roughly 10% below 1990 levels) by 2020, a target subsequently enacted in a binding (US-style) statute. Also echoing California's initiatives, the throne speech committed to matching California's tailpipe standards, adoption of a low carbon fuel standard, and collaboration with Washington and California on greenhouse gas reductions in the Pacific Coast Region. Two months later, in April 2007, BC became the first Canadian province to join the nascent Western Climate Initiative.

Other provinces soon followed. By the end of 2008, Manitoba, Quebec, and Ontario also had joined the Western Climate Initiative. Ontario also committed to adopting a low carbon fuel standard, and Manitoba is considering the measure. (It is, however, noteworthy that BC's low carbon fuel standard, unlike California's, does not take into the greater emissions intensity of production of oil from tar sands.) In addition to BC, Manitoba, Nova Scotia, New Brunswick, and Quebec (the other provincial leader on climate change) all committed to matching California's tailpipe standard. Quebec was the first province to implement the measure in late 2009.⁶

⁵ Barry Rabe. 2007. "Beyond Kyoto: Climate Change Policy in Multilevel Governance Systems." *Governance* 20: 423-44.

⁶ David Suzuki Foundation. *Provincial Power Play: Breaking away from Federal Inaction on Climate Change*. Vancouver: David Suzuki Foundation, 2008.

In 2008, BC took a bold next step in adopting North America's first revenue-neutral carbon tax. Although Quebec adopted a small carbon tax the previous year the level (roughly \$3/tonne CO₂) is not expected to generate significant emissions reductions. Indeed, the province asked the industry *not* to pass the costs on to consumers, which is the whole point of a carbon tax. BC's tax also begins at a modest level, \$10/tonne, but is scheduled to increase \$5/tonne annually. Of note in comparison to other carbon taxes worldwide, the BC tax applies at the same level to industrial sources and households alike, thus earning the province enthusiastic support of its longtime critics in the environmental movement.

While BC's importation of other California climate policy measures spread to other provinces, and initially some predicted that the carbon tax would as well, that has not been the case. Voters handed the federal Liberal party's a resounding defeat when it offered a proposal for a revenue-neutral carbon tax at the national level as the centerpiece of its 2008 election campaign. Since then the carbon tax has been described as the new "third rail of Canadian politics: Touch it and die."⁷

The Limits of Sub-National Policy Diffusion

State and provincial governments have not only been a source of good ideas in climate policy, but their initiatives have served as a partial substitute in light of federal inaction in both countries to date. However, in the end state and provincial policies are just that, a *partial* substitute. While states that were inclined to act but reluctant to do so unilaterally have followed California's lead, those preoccupied with shielding greenhouse gas-intensive local industries, such as oil, coal, and auto manufacturing have not. Thus, California's tailpipe standard has been widely adopted on both coasts, but not in the manufacturing heartland, and certainly not by the state of Michigan, which leads US auto production. Given different natural resource endowments, the emission profiles of US states differ quite dramatically, by a factor of 12 from Rhode Island (10 tonnes CO₂eq from energy consumption per person in 2007) to Wyoming (124 tonnes/person) (see Table 1). Figure 1 compares the number of climate policy initiatives adopted by states as a function of per capita emissions. While there is a great deal of noise in the figure, it is suggestive that the states that have adopted the largest number of climate policy measures tend to be those with relatively low per capita emissions, while those with the fewest measures tend to have the highest emissions intensity.

A similar variation in greenhouse gas intensity is evident among Canadian provinces, with per capita emissions in hydro-rich Quebec less than one sixth those of Alberta and Saskatchewan, which both produce oil and also rely heavily on coal for electricity generation (Table 2). It is telling that the two provincial leaders on climate change, British Columbia and Quebec, also have the least greenhouse gas intensive economies – as well as potential for further expansion of hydro-electricity production. Moreover, although five provinces unilaterally committed to matching

⁷ Simpson J. 2009. Time for a little Mea Culpa. *Globe and Mail*, January 3: A15.

California's tailpipe standards and four others registered support for a Canada-wide standard at that level, the lone holdout was Ontario, which relies heavily on auto manufacturing – and accounts for 40% of the Canadian population and their motor vehicles.⁸ Indeed, Ontario only joined the WCI after reaching agreement that it would not have to join other WCI members in committing to adopt California's tailpipe standard.⁹

Similarly, although nine provinces called for development of a national cap and trade program, the lone holdout in that case was Alberta, which accounts for the largest, and most rapidly growing, share of Canada's emissions.¹⁰ Alberta has adopted intensity-based targets that would yield emissions 58% above 1990 levels in 2020, and still 15% above the 1990 baseline in 2050. (In 2050, Alberta's projected emissions would be equivalent to one third of Canada's 1990 emissions, thus rendering the federal government's target for 2050 mathematically impossible through reliance on provincial governments alone.)

Although four provinces, which collectively account for 80% of Canada's population, have committed to joining the WCI cap and trade program, they are among the least greenhouse-gas intensive (Figure 2), thus accounting for just under half of Canada's emissions. While green provincial leaders have engaged in policy coordination, both with each other and with US states, Canadian provinces have not lobbied for federal standards to the same degree as their US counterparts. Indeed, in stark contrast to California's participation in lawsuits demanding US federal regulations, the province of Quebec, which was one of only two provinces to support Canada's ratification of the Kyoto Protocol in 2002, argued in support of Alberta that a Canada-wide cap and trade program should not be imposed on any province.¹¹

National Interactions

While US states have had a positive, if truncated, impact on Canadian provinces' climate policies, the same cannot be said of US influence at the national level, at least in the last decade. Throughout the 1990s, the US and Canada closely coordinated their positions in international negotiations. It is no accident that Canada's target in the Kyoto Protocol, to reduce its emissions to 6% below 1990s levels by the commitment period of 2008 to 2012, was very similar to the US' target of 7% below 1990 emissions: Canadian negotiators were directed by the Prime

⁸ Murray Campbell. Rich provinces trade hot air in emissions debate. *Globe and Mail*. 10 August 2007, A4.

⁹ Karen Howlett, Greg Keenan. Compromise lets Ontario join climate-change initiative. *Globe and Mail*. 4 August 2008, A4.

¹⁰ Murray Campbell. Rich provinces trade hot air in emissions debate. *Globe and Mail*. 10 August 2007, A4.

¹¹ *Ibid.*

Minister to stay 1% behind the US.¹² Canadian and US targets were not only comparable in nominal terms, but also relative to business-as-usual emissions projections. However, in committing to reductions on the order of 30% below business-as-usual, both Canada and the US undertook much more demanding targets than other Annex 1 countries.¹³

The two also faced similar political challenges in meeting those targets. With among the highest per capita greenhouse gas emissions in the world, Canada and the US are both dependent economically on a combination of fossil fuel production and manufacturing that relies on inexpensive energy from those fossil fuels. In effect, the industrial sectors that need to make the deepest emissions reductions are economically significant and, thus, politically influential on both sides of the border. The business community presented formidable and unified opposition at the time of both countries' ratification decisions. Moreover, the regionally diverse economy in both countries found institutional avenues for expression— via the Senate in the US and the provinces in Canada.

While the US' ratification of the Kyoto Protocol seemed improbable in light of Senate opposition well before the 2000 Presidential election, President George W. Bush's announcement, soon after his inauguration, that the US would not ratify the Kyoto Protocol dramatically changed the stakes for Canada. It was one thing to commit to a more demanding target than other industrialized countries when it would be met in lockstep with Canada's major trading partner, and quite another to forge ahead in isolation. Business and provincial opposition to ratifications that had been voiced privately during ongoing negotiation of Canada's action plan soon moved to the front pages.

In this context, Canada's improbable ratification of the Kyoto Protocol in December 2002 reflected the influence above all of one person, Prime Minister Jean Chretien, who was privileged by the concentration of authority in Canada's parliamentary system to "make the call." However, with the symbolic act of ratification accomplished, Canada still faced the same challenge of delivering deep emissions cuts relative to business as usual despite persistent opposition from the business community and most provinces. A series of Liberal and Conservative governments have failed not only to meet Canada's Kyoto Protocol target, but to undertake any significant measures to reduce Canada's greenhouse gas emissions.

¹² The rationale for Canada to commit to a slightly less demanding target was that Canada's emissions would increase in response to increasing production of natural gas for US markets

¹³ Kathryn Harrison and Lisa McIntosh Sundstrom. Forthcoming. "Conclusion: The Comparative Politics of Climate Change," in Kathryn Harrison and Lisa McIntosh Sundstrom, eds. *Global Commons, Domestic Decisions: The Comparative Politics of Climate Change*. Cambridge, MA: MIT Press.

Five national plans later,¹⁴ there still are no national regulations or taxes in place for either motor vehicles or industrial sources. And while the US ' non-ratification was by no means the only factor at play, arguments about economic competitiveness have loomed large, time and again.

Change on the Horizon

In 2010, it appears that significant changes to US climate policy are on the horizon, with developments on two fronts. First, the Democratic Party's victory in both chambers of Congress in 2006, and the strengthening of Democratic majorities in 2008, has transformed Congressional attention to climate change. Prompted by activist leadership (from California), in 2009 the House passed the Waxman-Markey bill calling for creation of a national cap and trade program. However, adoption of a comparable measure in the Senate is far from a foregone conclusion given the practical requirement of 60 votes to avoid a filibuster.

Second, the election of President Barack Obama has transformed executive branch activity on climate change. In its first year in office, the Obama Administration granted the California tailpipe standard waiver, extended California's standard nationally, and issued an "endangerment finding" in a long-awaited response to the *MA v. EPA* Supreme Court decision. This last action opens the door to regulation under the Clean Air Act not only of motor vehicles but also stationary sources. And since the existing statute represents a less-than-ideal vehicle for regulation of greenhouse gases, because it does not readily facilitate either trading nor an exclusive focus on large sources, the prospect of executive action also maintains pressure on Congress to devise a more efficient legislative response.

The prospect of US movement represents both an opportunity and a threat for Canada. On one hand, it will be much easier politically for Canada to regulate greenhouse gas emissions in harmony with the US. Despite Canada's initial overture inviting the Obama Administration to collaborate in developing joint North American standards, the Canadian government now openly acknowledges that Canada will simply have to wait for, then match, the US. The long-promised "made-in-Canada plan" will, in the end, be made in the USA, and likely with minimal attention to Canada.

While US movement on greenhouse gas emissions will ease the political challenges of regulation in Canada, it may also create new challenges. Congress' apparent preference for "border adjustments" for goods manufactured in countries that do not match US standards raises the prospect that Canada may be required to make deeper reductions, particularly in certain sectors, than it might choose of its

¹⁴ This includes the 2002 National Plan, the 2005 Project Green, the 2006 "Made in Canada" Plan, Turning the Corner (2007), and the current plan to harmonize with the US.

own accord. Already, California's low carbon fuel standard and the prospect of its emulation by other states has sent a chill through the oil sands sector in Alberta. While at present California imports virtually no Canadian oil, Midwest states and, of course, the entire US market that would be covered by national legislation are another matter. Canadian environmentalists have seized this opportunity to lobby the US to end its reliance on "dirty oil" from Canada's tar sands.

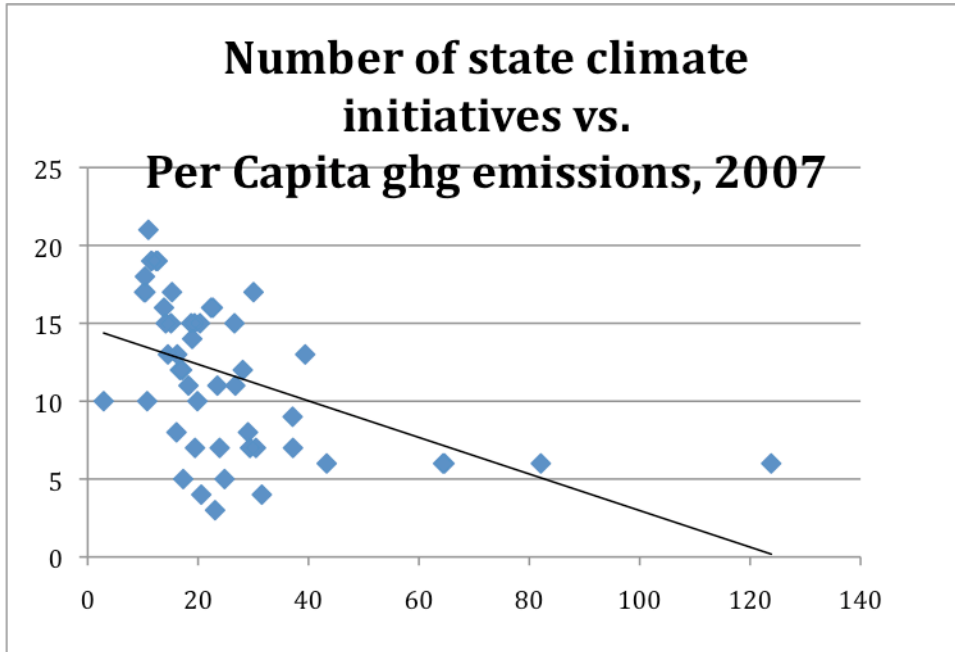
However, the context for national decisions is different than the state level in one critical respect. While California or other states have the discretion to selectively include certain out-of-state sources in their state-level inventories (and to count on reductions from those sources in meeting their targets), at the national level the US is constrained by international reporting rules, which attribute emissions to the country in which they occur. In other words, while a national low carbon fuel standard would impose costs on refiners and some equipment manufacturers, especially in the mid-West (which may explain its removal from the Waxman-Markey bill), it is not clear that the US could get credit for any associated emissions reductions.

Table 1: State Per Capita Greenhouse Gas Emissions

State	2007 Greenhouse Gas Emissions from Combustion, tonnes CO ₂ eq/person
DE	3
RI	10
NY	10
VT	10
ID	11
CA	11
CT	12
OR	12
MA	12
WA	13
MD	14
FL	14
NH	15
ME	15
NJ	15
AZ	16
NV	16
VA	17
NC	17
SD	17
MI	18
WI	19
IL	19
HI	19
MN	19
GA	19
SC	20
CO	20
TN	21
PA	22
AK	23
MS	23
OH	23
MO	24
NE	25
UT	27
TX	27
IA	28
KS	29
DC	29
NM	30
OK	30
AL	32
IN	37
KY	37
MT	39
LA	43

AK	64
WV	65
ND	82
WY	124
National Average	21

Figure 1

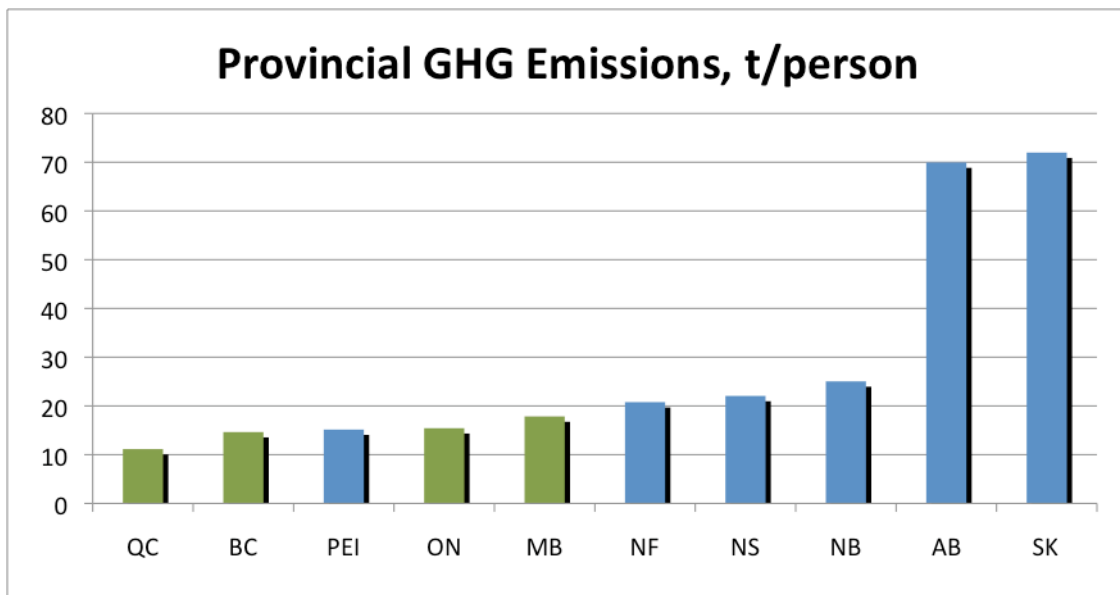


Source: Pew Center on Global Climate Change

Table 2 – Provincial Greenhouse Gas Intensities, per capita

	Per Capita Emissions, tonnes CO ₂ eq/person, 2007
SK	72
AB	70
NB	25
NS	22
NF	21
MB	18
ON	15
PEI	15
BC	15
QC	11
Canada	23

Figure 2 – Provincial Greenhouse Gas Intensities, per capita



Note: WCI members are noted in green.

Source: Canada, Greenhouse Gas Inventory, 2007.