CERT June through September Meetings: *Proposed Path Forward*

Extended Duration July and September Meetings: The June, July, and September meetings will support CERT members' opportunity to respond to and provide input into increasingly detailed policy design proposals prepared by the Governor's Office. In the interest of providing adequate time for full participation by all CERT members at these critical meetings, we would like to extend the duration of the July and September meetings by two or three hours each (the June meeting will remain as scheduled for three hours). The plan would be to start the meetings at 9:00, accommodate a working lunch, and wrap up by 2:30.

Policy Starting Point: The Governor has articulated certain core **objectives** that were laid out in the Executive Order and must be satisfied by any policy he advances to the legislature. Beyond these objectives, the Governor's team has developed some preliminary **interests** regarding the design of the specific policy. While these interests tend toward a preference for a system with a cap and trade approach as its foundation in contrast to one centered on a carbon tax, no design decisions have been made. The CERT is encouraged to discuss a wide range of market based mechanisms to meet the goal.

At the June 24 meeting, the Governor's Office will provide a presentation focused on objectives and interests to facilitate the CERT's initial discussions of policy options and to gather input to advance an increasingly detailed policy design for subsequent discussion in July and September. Each iteration will be informed by and responsive to input from the CERT. CERT members will have the opportunity to not only provide input at the CERT meetings but also in the week following the June, July, and September meetings respectively to facilitate more thorough reflection on information presented at these meetings. Some degree of one-on-one discussions with CERT members is also anticipated.

Meeting Objectives:

The June 24 CERT meeting will seek to:

1. Continue the process of increasing the understanding of CERT members about market-oriented, carbon emissions reduction approaches with presentations by two representatives of carbon price systems on the choices they made and why (CA/WCI system and BC) and background information presented by the contractor (through the Evaluative Framework").
2. Present the Governor's Office initial thinking on the design of a carbon emissions reduction program for Washington State.
3. The concept is to equip the CERT members to provide perspectives and formulate questions relative to the initial thinking by the Governor's Office, and thereby inform the next iteration of the Governor's Office's design.

The July 29 CERT meeting will:

1. Review the comments and perspectives that CERT members have provided.

2. Present a more detailed Governor's Office policy design that will seek to show responsiveness/awareness of the CERT input.
3. This meeting will initially explore design specifics and will request specific CERT feedback and analytical needs/interests both during the meeting and afterwards.

<u>The September 9 CERT meeting will:</u>

1. Review the comments and perspectives that CERT members have provided.
2. Present analysis conducted as guided by the CERT input coming out of the July 29 meeting.
3. Roll out a nearly complete policy design by the Governor's Office for detailed discussion, and invite a final round of perspectives both during and immediately following the meeting.
4. Discuss the approach to and form and content of the CERT's written product.

Carbon Emissions Reduction Taskforce: *Meeting 3*

June 24, 2014, Tuesday, 10:00 am–1:00 pm
U.S. EPA Region 10: 1200 6th Avenue, Seattle, WA 98101

Agenda

Welcome and Introductions (Co-Chairs) – 15 minutes

- CERT members give brief introductions.
- Contractor Team introduces themselves to the CERT – describe their role during the process and how CERT members can engage with them.

Roadmap and Process for CERT Meetings (Co-Chairs/Rob) – 15 minutes

- Reiterate and confirm CERT scope and objectives (based in the Executive Order).
- Topics for upcoming meetings.
- Process for CERT member engagement before, during, and after meetings.

CERT Evaluation Framework (Contractor Technical Team) – 10 minutes

- Describe the purpose of the evaluation framework for June meeting (confirm topic areas of high interest and relevance to CERT members building from revised guiding criteria for Taskforce deliberation, provide review of evaluation framework topics), and subsequent meetings (capture key information that characterizes policy design options).
- Answer clarifying questions about the Evaluation Framework and invite comments to be submitted after the meeting.

Existing Programs – (Michael Gibbs, CA ARB discussing CA/WCI systems and then Tim Lesiuk, BC) 20 minutes each, 20 minutes for Q&A, 60 minutes total

- Presentations from two representatives of carbon price systems on the choices they made and why based on the criteria in the evaluative framework.
- Q&A between CERT members and program representatives.

Governor's Office Policy Starting Point – 70 minutes

- The Governor's Office will provide a presentation focused on principles and interests for a market-based approach to carbon emissions reduction for Washington State.
- Discussion between CERT members and Governor's Office representatives.

Next Steps (Co-Chairs/Rob) – 10 minutes

- Emphasis on how CERT members can engage between the June and July meetings, especially related to any questions they would like the Governor's Office to answer/clarify as well as providing their direct perspective on the initial design direction.
- Any specific feedback on the policy design presented by the Governor's Office or questions should be submitted by July 1, in order to be incorporated into preparation of materials for the July 29th meeting.

Next Meeting: July 29, (Time TBD), Seattle (Location TBA)

Materials

To be distributed prior to the meeting:

- Agenda
- Taskforce Evaluation Framework
- Proposed Path Forward

To be distributed at the meeting:

- Review of evaluation framework topics including background information on how key, widely-recognized attributes of two principal market-based mechanisms – cap-and-trade systems and carbon taxes- can be designed to address concerns and opportunities under each topic area.
- Governor's Office Starting Point materials

WA Taskforce Evaluation Framework

Evaluation framework topics have been developed in consultation with the Washington Governor's Office by incorporating the seven key questions for the Taskforce, the guiding criteria for Taskforce deliberation, and Taskforce member feedback. Evaluative framework topics will serve as the basis for the Taskforce deliberations on program design options. The contractor team will provide the Taskforce with a review of evaluative framework topics at the June 24th meeting, which will include information on how programs can be designed to address concerns and opportunities under each topic area. The review will describe and compare how a number of the key, widely-recognized attributes of two principal market-based mechanisms – cap-and-trade systems and carbon taxes – can align or differ with respect to these topics.

Topics		**Program Design #1**	**Program Design #2**
1	Reach WA's emissions reduction targets with high confidence and consideration of WA's emissions and energy sources		
2	Establish a carbon price signal sufficient to stimulate a shift in investment patterns		
3	Minimize the implementation costs and competitiveness impacts to our businesses and industries (flexibility)		
4	Maximize the economic development benefits and opportunities for job growth in WA		
5	Minimize cost impacts to consumers and protect low-income communities from increased energy costs		
6	Reduce the public health risks associated with carbon pollution, especially for vulnerable populations		
7	Allow for effective administration (oversight, regulation, monitoring, evaluation, and adjustment) of the program and markets created or affected by it		

WA Taskforce Evaluation Framework
Review of Topics

This backgrounder briefly describes and compares a number of the key, widely-recognized attributes of carbon market instruments across the topic areas of the Taskforce evaluation framework. It indicates how the two principal instruments – cap-and-trade systems and carbon taxes – can align or differ with respect to these topics. To help compare the two instruments, this backgrounder draws heavily from existing literature through quotes and citations. For readers interested in a fuller discussion, this backgrounder provides links and a reference list. As an introduction to the evaluation framework, this document treats these topics at a very general level, and does not seek to describe or evaluate the specific attributes of specific policies currently under implementation nor does it cover all policy approaches that the Taskforce may wish to consider. (For good reviews of specific design attributes, please see the summary of emission trading systems and the World Bank's State and Trends of Carbon Pricing (2014)).

1. Reach WA's emissions reduction targets with high confidence and consideration of WA's emissions and energy sources

The Governor's Executive Order and the Taskforce both have articulated the importance of a carbon market instrument to help Washington state reach its emission reduction targets with confidence, while taking into account the State's unique energy profile and mix of emissions sources.

Certainty

The ability to reduce greenhouse gas emissions with confidence is often cited as a reason to favor cap-and-trade systems over carbon taxes (Please see Box 1 below). "By setting a cap [on emissions] and issuing a corresponding number of allowances, a cap-and-trade system achieves a set environmental goal, but the cost of reaching that goal is determined by market forces. In contrast, a tax provides certainty about the costs of compliance, but the resulting reductions in [greenhouse gas (GHG)] emissions are not predetermined and would result from market forces" (Pew Center on Global Climate Change 2009, p.2).

Indeed, the choice between cap-and-trade and carbon tax has often been cast as a decision over whether to prioritize **environmental certainty** or **price certainty.** In simple terms, a declining cap specifies exactly how much emissions will decrease over time, whereas a tax imposes a gradually rising price on fuels and activities that emit greenhouse gases when combusted. However, as systems have evolved in practice, it has become increasingly clear that, "there are multiple design elements that can be included with a cap-and-trade program that blur the distinction between price and quantity control. Similarly, a carbon tax program could include flexible design mechanisms allowing policymakers to alter the tax rate, if they determine that emission reductions are not proceeding at a desirable pace" (Ramseur and Parker 2009, p.5). As Ramseur and Parker (2009, p.5) note in their Congressional Research Service report, with the design options available, policy makers are "presented with a policy continuum, rather than a stark policy dichotomy".

Box 1. Competing views on environmental certainty from an online debate on the Yale Environment 360 (Yale Environment 360, 2009)

Frances Beinecke (President, Natural Resources Defense Council): "With a tax, we are guessing about how much it will reduce carbon emissions, and it may not be sufficient to change the course of global warming. A declining cap gives you firm reduction targets and a system for measuring when you hit them."

Fred Krupp (President, Environmental Defense Fund): "A cap puts a legal limit on pollution. A tax does not. Guessing what level of tax might drive the pollution cuts we need to avert runaway climate change is a risk we simply can't afford to take. Only a cap with strong emissions reduction targets — and clear rules for meeting them — can guarantee that we achieve the environmental goal."

Jeffrey Sachs (Director, Earth Institute, Columbia University): "It's sometimes claimed that cap-and-trade will lead to more certain emissions reductions than a tax. In theory this could be true, but in practice it's likely to be false. In fact, a cap-and-trade system can be more easily manipulated to allow additional emissions; if the permits become too pricey, regulators would likely sell or distribute more permits to keep the price "reasonable."

As Ramseur and Parker (2009, p. 45) observe, policymakers could pair a tax with data on greenhouse gas emissions to increase that tax over time if the price failed to reduce GHG quickly enough. Similarly, cap-and-trade programs can be designed for greater price certainty through use of various price containment mechanisms designed to create a floor and/or a ceiling for prices (such as minimum auction prices or allowance reserves that become available only over a threshold market price).

A related question often arises as to how different policy instruments respond to short-term fluctuations in economic activity or other factors (climate, resource availability) that might lead to swings in emission levels. Under a cap-and-trade system, the price at which emitters trade allowances tends to respond directly to economic activity. When the economy grows, emissions go up and allowance trading prices rise. During recessions, output falls along with allowance prices. "This has certainly been the recent history in both the Regional Greenhouse Gas Initiative (RGGI) and European Union Emissions Trading System (EU ETS) where demand for allowances and market prices have decreased with reduced economic growth"(Center for Climate and Energy Solutions 2012, p. 7). Some cost containment mechanisms, discussed in greater detail below, can help to temper a cap's price variations, making a cap perform more like a tax.

Such cost containment features notwithstanding, carbon tax supporters maintain that short term increases or decreases in greenhouse gas emissions are more preferable than price volatility (Ramseur and Parker (2009, p. 19). They note, however, that increasing a tax when emissions fail to meet reduction targets may be easier said politically than done. In response, some carbon tax supporters suggest creating an independent board or agency (Murray, Newell, and Pizer 2008).

Coverage

Washington's emissions goals are based on all emissions reported to the State's greenhouse gas inventory. Therefore, a key aspect of environmental certainty, or confidence that the State is reducing emissions, involves what sectors are regulated or "covered" by a cap or tax. For example, a cap-and-trade or tax system that includes only large, stationary emitters such as electricity generators or industrial facilities would only cover 27% of Washington's emissions (U.S. Environmental Protection Agency 2013; Washington State Department of Ecology 2012). Expanding a cap or tax to include mobile sources such as transportation would cover an additional 44% of emissions (Washington State Department of Ecology 2012).
The coverage of various tax and cap-and-trade systems varies, ranging from as little as 10% of region's emissions (Swiss ETS) to 70-80% (BC and South Africa carbon taxes, which include transportation (Please see, summary of emission trading systems; Figure 1 and Figure 2). The planned expansion of the California and Quebec emissions trading schemes to cover transportation and other fuel distributors in January 2015 would increase their coverage to a similar level.

In jurisdictions where transportation is the primary source of greenhouse gas emissions, such as Washington, a cap or tax alone fails to provide certainty that emissions goals are being met. As Greene and Plotkin (2011), note, demand for transportation fuels does not respond as much to price increases as other economic activities. Additionally, the private sector historically has underinvested in vehicles that go further on less greenhouse gas-intensive fuels. But paradoxically, cars that go further on less fuel give drivers an incentive to drive further, and use more fuel. Increasing vehicle miles traveled, and attendant emissions from the transportation sector is reinforced by public policies, such as building highways that allow people to travel further to work at lower cost.

Figure 1. Regional, national, and sub-national emission trading schemes: scope. (World Bank 2014 p. 52)

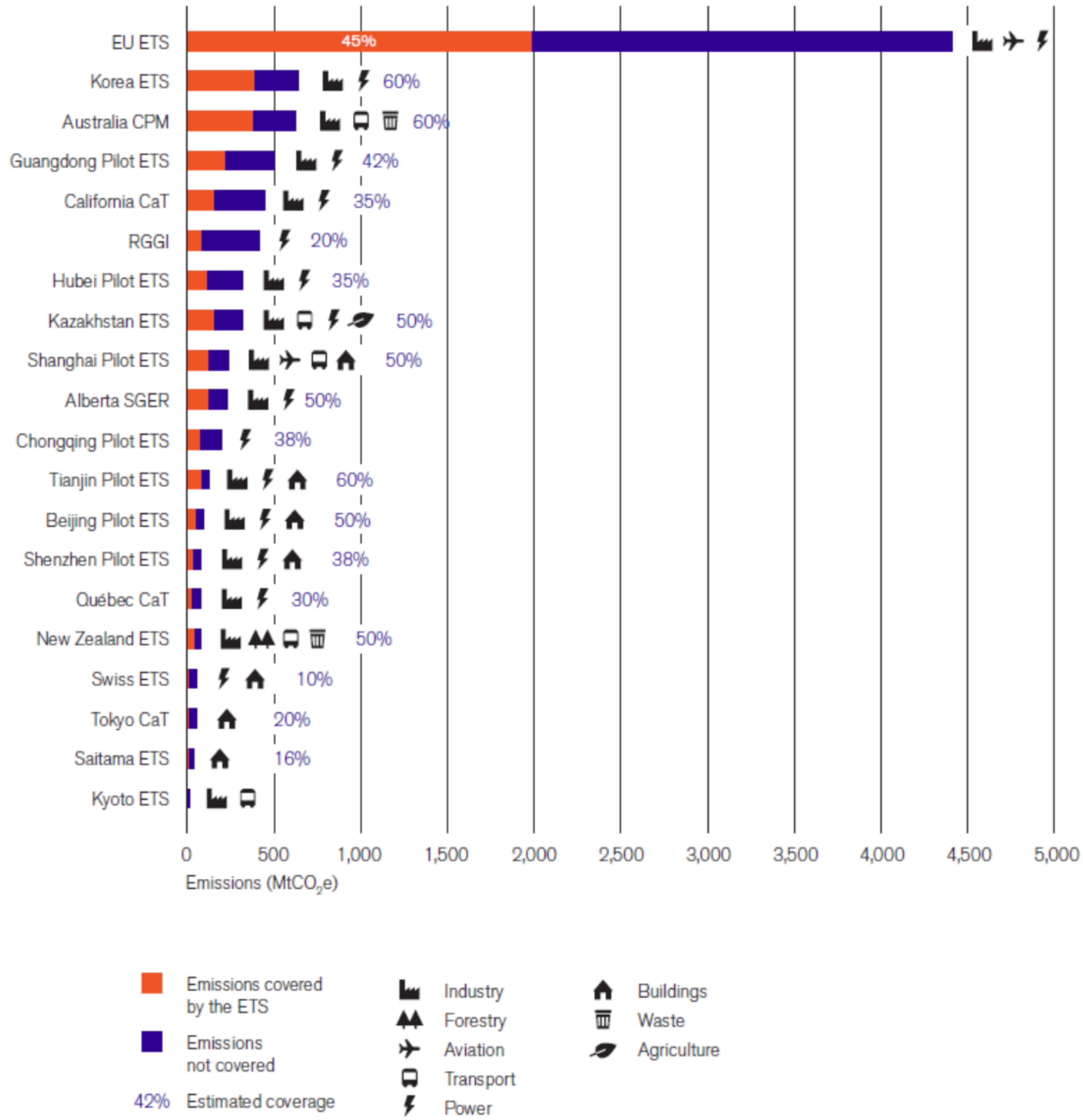
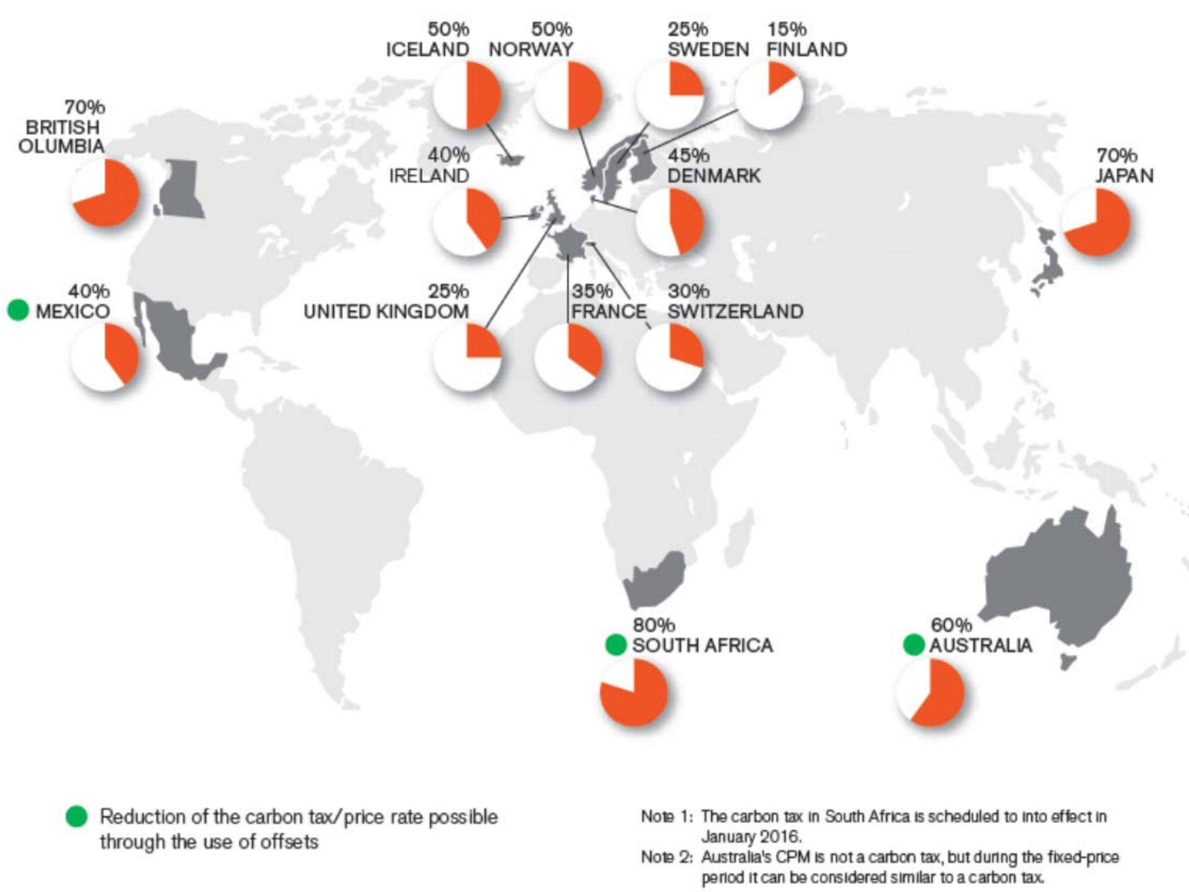


Figure 2. Carbon taxes around the world and the estimated share of CHC emissions covered in their jurisdiction. (World Bank 2014 p. 78)



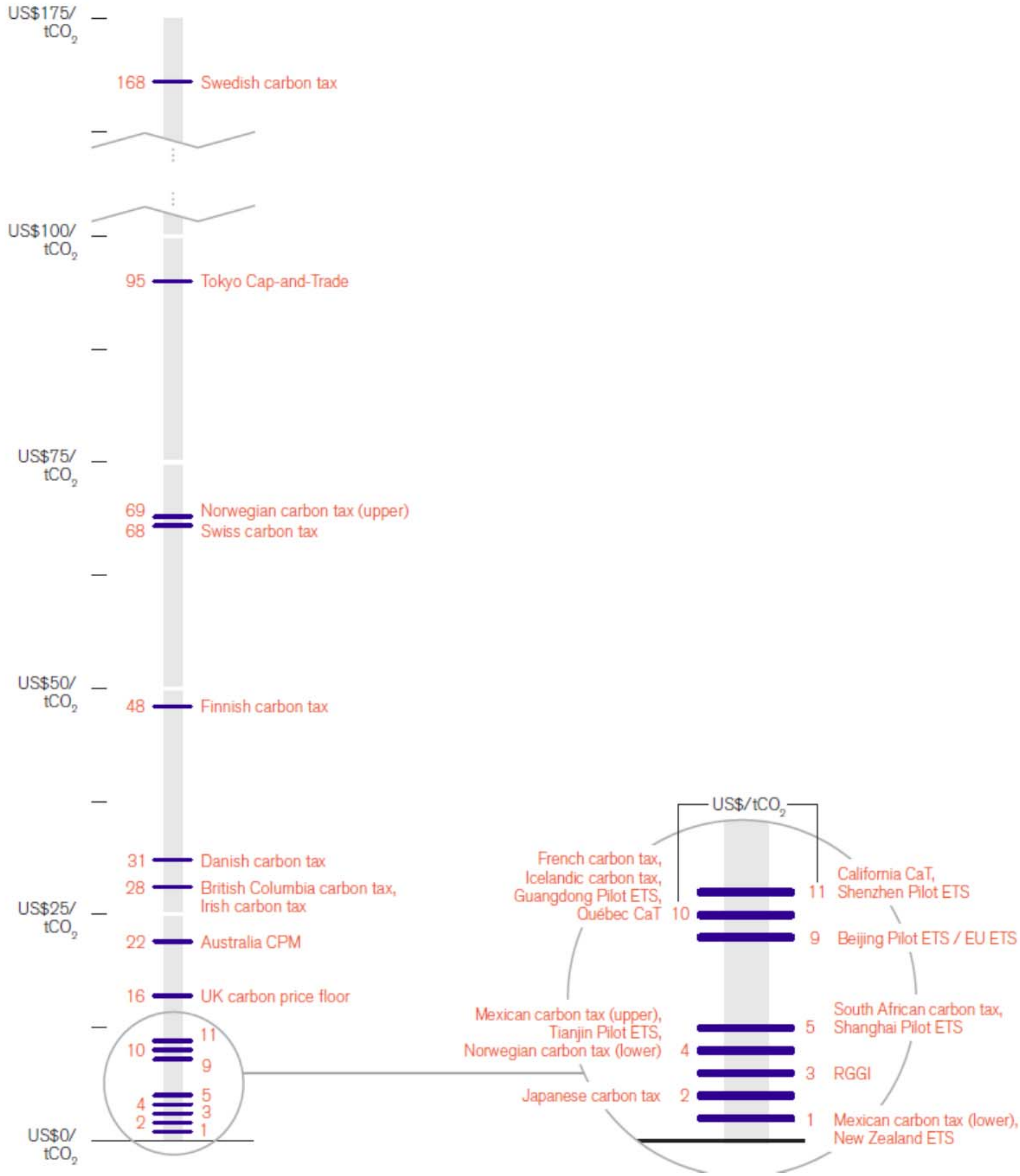
2. Establish a carbon price signal sufficient to stimulate a shift in investment patterns

"The main objective [of cap-and-trade or carbon tax policies] is to provide a clear, long-term signal of the price that parties will face for their GHG emissions, and thereby give an economic incentive to investments and other actions taken to reduce these emissions" (Murray, Mazurek, and Profeta 2011, p.1) There are several factors that can affect the strength of this carbon price signal, including the price level, price certainty, and long-term stability of the policy instrument itself.

Price levels

The strength of the price signal is, not surprisingly, a function of its level. As shown in the Figure 3 below, current price levels differ across three orders of magnitude across existing cap-and trade and carbon tax programs, with those in more developed countries tending to be somewhat higher, although there is no clear pattern.

Figure 3. Prices in existing carbon pricing schemes. (World Bank 2014, p.32)



Price certainty

Price certainty, or the ability of emitters to know in advance how much it will cost to cut their emissions, is another key attribute of carbon market mechanism design. In contrast to an emissions cap, taxes make prices explicit. By contrast, abatement cost, as reflected in allowance trading prices tends to fluctuate more with the economy. “With a fixed price ceiling on emissions (or their inputs—e.g., fossil fuels), a tax approach would not cause additional volatility in energy prices. A set price would provide industry with better information to guide investment decisions: e.g., efficiency improvements, equipment upgrades” (Ramseur and Parker 2009).In contrast, some “carbon markets [as created by cap-and-trade programs] face substantial uncertainty over prices” (Newell, Pizer, and Raimi 2014). As they note, most cap-and-trade markets in operation today have experienced relatively modest price levels. But when allowance prices are too low, caps may fail to cut emissions sufficiently. This can occur because low prices fail to spur the development and deployment of cleaner fuels and tools.

As discussed in the cost containment section below, policy makers have a number of tools at their disposal to design caps with greater price certainty. Such tools include the ability for emitters to bank allowances over time (so they have more allowances available for compliance when the cap declines, and compliance becomes costlier). Allowance reserves, which make more allowances available if the price of allowances increase beyond a certain threshold, are another tool to provide price certainty. Price floors, by contrast, are designed to provide price and environmental certainty by preventing prices from becoming too low (Newell, Pizer, and Raimi 2014).

Signaling future prices can be particularly helpful. “The more certainty and advance notice policymakers provide in the tax [or cap-and-trade] design, the more cost-effectively firms and households can adapt to the price changes. Given that electric power plants and major industrial facilities have lifetimes of 50 years or more, it makes sense to provide as much certainty and advance notice as feasible” (A. Morris and Mathur 2014, p.10).

Program certainty

Environmental certainty and price certainty are two important considerations in carbon market design. Another, program certainty, refers to whether or not the government-created program will endure over time. “One critique of a carbon tax, as opposed to a cap-and-trade system, is that taxpayers always have the incentive to repeal it, and the incentive could grow along with the tax rate. Tradable emission allowance systems, in contrast, create a constituency of allowance holders that want to protect the program because it protects the value of their allowance assets” (Morris and Mathur 2014, p.15).

“Cap and trade can create its own durable political constituency. Businesses that have bought and banked carbon permits—and that have invested their resources in the expectation of a fixed declining cap—will oppose actions that reduce the value of those permits… A carbon tax that pays out all its revenue in equal dividends, might also create its own constituency. But because it would not create any property rights in permits, a carbon tax cannot motivate businesses to support it politically. Businesses possessing banked permits or permits for future years (or permits given to them for free) will have a vested interest in protecting the value of these assets by opposing efforts to relax the cap” (Durning et al. 2009, p.27,39).

Policy makers also may seek to adjust the mechanism's stringency—the level of tax or cap—at a later point in time, thus also affecting certainty. "Some have argued that one of the advantages of a carbon tax is the relative ease—compared to a cap-and-trade program—in which the program's stringency could be modified. In contrast, they assert that policymakers would face difficulties if they sought to adjust an emissions cap after the program's initiation. The rationale for this assertion is that covered sources that made or purchased emission allowances beyond those needed in a given year would lose some of the value of these allowances if Congress raised (i.e., loosened) the cap at a later time. Similarly, a covered source may make capital investments based on the assumption of a stringent cap. If policymakers subsequently loosened the cap, these covered sources would take longer to recoup their investments. However, this concern could also apply to a carbon tax. For example, energy producers and consumers may make investments based on an expected carbon tax. If the tax is subsequently altered, the value of such investments may change" (Ramseur and Parker 2009, p.18).

3. Minimize the implementation costs and competitiveness impacts to our businesses and industries (flexibility)

Minimize implementation (compliance) costs

Policy makers have a number of tools at their disposal to stabilize the costs of market tools to cut greenhouse gases. Because taxes state prices explicitly, most cost containment tools apply to cap-and-trade. As noted above, banking, price floors, and allowance reserves are tools to provide greater price certainty. Offsets, or low cost greenhouse gas approaches that are not covered under a cap are another way to reduce a cap's overall cost. A number of documents and presentations (including The Competitiveness Impacts of Climate Change Mitigation Policies (2009), Conquering Cost Evaluation Optimal Policy Approaches to the Cost of Climate Change (2009) and Competitiveness Impacts of Carbon Dioxide Pricing Policies on Manufacturing (2007)) discuss these options in greater detail. A key element of most cost containment options is flexibility: in the location of emissions reductions (e.g. offsets, which allow reduction to be sources from activities and regions not covered by system) or across time periods (e.g. banking). The economic efficiency of offsets, i.e. their ability to deliver lower costs of emission reduction, depends upon the environmental integrity of specific offset credits: i.e. whether they represent reductions that are additional to what would have otherwise occurred, verifiable, and permanent (cannot be reversed, e.g. through future loss of carbon sequestered) (Bianco 2009; Kollmuss et al. 2010; Broekhoff and Zyla 2008; Offset Quality Initiative 2008).

Some recent carbon tax designs (South Africa and Mexico) also have allowed for the use offsets in lieu of tax payments for compliance. While offsets can help to minimize compliance costs, "allowing offsets could result in vastly different investment patterns than would arise in a system that does not. For example, EPA analysis of the American Clean Energy and Security Act of 2009 … estimated that in the early decades under a cap-and-trade system, unfettered access to offsets would induce U.S. firms to spend several times more on imported offsets than on domestic abatement…. Thus offsets, while possibly inducing additional low-cost abatement, could complicate [program] administration and blunt incentives to transform the U.S. energy system" (Morris and Mathur 2014, p.14-15))

Competitiveness of industries

Coverage refers to how many sectors a cap or tax encompasses and regulates. But another key consideration is geographic scope. When a single jurisdiction such as a state imposes a cap or tax, emitters in that state will face higher production costs compared to their uncapped competitors in other states or countries. As Newell, Pizer, and Raimi point out, (2014, p.1317), "Many stakeholders have expressed concerns about economic competitiveness, e.g., that energy-intensive industries facing outside competition will relocate to places without a carbon price." Relocation to regions without taxes or a cap raises questions about environmental certainty. Rather than cut emissions, the ability for industry to simply relocate is known as emissions "leakage." Fortunately, "Evidence seems to indicate that competitiveness impacts and leakage have thus far been small …. The extent of competitiveness and leakage impacts, as well as pressure to address them, will depend on the future size and persistence of carbon price differences across political boundaries." (Newell, Pizer, and Raimi 2014, p. 1317).

One method to minimize emissions migration is to give leakage-prone industries trading allowances that reward more in-state output. Another method is to levy taxes or allowances on imported goods at the border (Grubb et al. 2009; Schneck et al. 2009). Prices can rise slowly in a cap-and-trade system, or a "carbon tax could start modestly, giving energy-intensive, trade-exposed (EITE) firms time to lower their carbon-intensity. [Allowance auction or] carbon tax revenue could fund reduction in other taxes that make U.S. firms less competitive." (Morris and Mathur 2014, p.vii). Carbon pricing, through either a cap or tax, can rise slowly over time to facilitate transitions of the workforce to less energy-intensive industries, additionally transitional assistance for workers in these industries can be funded (Durning et al. 2009).

4. Maximize the economic development benefits and opportunities for job growth in WA

Caps or taxes reduce greenhouse gases by making them more costly to emit. But in many cases, emitters are able to pass some of these costs along to consumers including other businesses and households. Both caps and taxes can be designed to help mitigate cost increases. One way is by recycling revenues from a cap or a tax back to businesses and to households. For a tax, directing revenues back to the economy is fairly straightforward. A cap by contrast only raises revenue if policymakers opt to sell or auction trading allowances to emitters. If they are allocated for free, for example, to reduce leakage potential, then less revenue is available to recycle back into the economy. The discussion below highlights several policy options are considered that can be applicable for either a cap-and-trade system or carbon tax.

Revenues can be used to increase income, by for example, sending households annual checks or rebate to offset higher energy prices that a cap or tax would bring (Regional Economic Models, Inc. (REMI) 2014). Alternatively, they can be redirected towards reducing other taxes such as payroll tax. Alternatively, revenues can be invested in projects that reduce even more emissions and to create jobs. Revenue investments include green infrastructure development, including renewable energy, building energy efficiency retrofits and public transportation. For example revenues could be used for, "Funding public infrastructure … such as transit services; sidewalks and bikeways; and retrofits for public-sector structures such as schools, public buildings, fire stations, and streetlights" as well as directing revenues to "low-income weatherization" (Durning et al. 2009, p.25) . These investments would aim to both reduce energy demand and energy costs for building and homeowners, as well as create job growth in these sectors. Revenues could be used to fund training programs for disadvantaged and low-skill workers in these sectors through "expanded public funding for narrowly focused training programs in community and technical colleges that lead to vocational certificates or degrees in the trades" (Durning et al. 2009, p.26).

5. Minimize cost impacts to consumers and protect low-income communities from increased energy costs

A cap or a tax can be broadly designed to mitigate impacts to business and to households, as the foregoing suggests. But like any tax, carbon market policies have the potential to be regressive, that is, impact lower income households disproportionately. Economists call all the ways people may be made better or worse off as a result of a policy its "economic incidence" or "distributional effects." If a policy burdens lower-income households relatively more than higher-income households as a share of household income or other measure of socioeconomic status, then economists call the policy regressive. The incidence of a carbon tax depends heavily on what happens to the tax revenue (A. Morris and Mathur 2014).

"Distributional impacts from carbon pricing remain a serious concern for legislators investigating the possible benefit from assigning a price to carbon dioxide emissions. A carbon price… can indeed have disproportionate effects on poorer households, but regressivity is by no means guaranteed." (D. L. Morris and Munnings 2013, p.12). One primary reason is policymakers can design carbon pricing schemes to aim more revenues at those disproportionately impacted by price increases.

Figure 4 summarizes some of the options for the use of a cap-and-trade or carbon tax revenues and their broad economic implications, including on low-income communities (i.e. whether they are progressive). In addition to what is listed there, funds can also be used for energy efficiency programs or energy bill support targeted to low income households.

Figure 4. Possible uses of carbon tax or allowance revenue and their economic effects, distributional impacts, and compensation recipients from a national perspective (A. Morris and Mathur 2014, p.viii)

REVENUE USE	EFFECTS ON ECONOMY	PROGRESSIVE	COMPENSATES THOSE WHO BEAR CARBON PRICE?
Lump-sum rebates to households	Does not lower burden of tax system on the economy. Could boost consumption in a slack economy.	Yes	Likely under-compensates higher-income households.
Reduce federal budget deficit	Economy benefits from lower future tax burdens and greater investment now.	Maybe. Depends on structure of future tax system and who benefits from higher investment.	Maybe
Reduce (or prevent increases in) payroll or labor income taxes	Benefits economy to the extent it encourages more work. Benefits could be substantial.	Depends on implementation. Does not help those without earned income.	Depends. Could under-compensate higher-income households.
Give revenue to utilities to lower electricity rates	Increases costs by blunting incentives to conserve and driving abatement to costlier sectors.	Depends on how it is implemented by state utility regulators.	Yes for electricity consumers, but does not benefit consumers of other energy.
Reduce capital taxes (corporate income tax or capital gains tax)	Economic benefits could be substantial. Some think that using some revenue for an investment tax credit may be even better.	Likely not; the evidence on the incidence of corporate taxes is mixed.	Maybe
Fund climate, energy, and adaptation R&D	Could benefit economy if revenue goes to useful research the private sector would not do otherwise. In large sudden volumes it could bid up the price of research inputs. Total revenue is far more than would be appropriate to devote to only this category.	No	Maybe. Could lower costs of abatement in the future.
Give revenue to states or other sub-federal entities	Depends on what states do with it. Could benefit economy if they reduce deficits or other taxes.	Depends on what states do with it.	Depends on what states do with it.

Research suggests that the option of using revenues to reduce existing tax rates "would lower the economy-wide costs of the program. Sweden and British Columbia provide two examples of GHG taxes being used specifically to offset taxes on, respectively, labor and individuals/businesses….However, there may be reasons to use carbon revenue for other purposes. In addition to economic efficiency, policymakers have to concern questions of equity (avoiding burdensome impacts on particular households and businesses). In addition, there are valuable programs that may require funding (e.g., clean energy R&D, adaptation)." (Center for Climate and Energy Solutions 2012, p.4). Burtaw and Parry (2011) discuss how a "tax shift", using revenues to reduce preexisting taxes, would be less costly to the overall economy. Research examining options where an equal per-capita lump-sum rebate is given to all households show, "that while direct rebates to households do benefit all households, they have a progressive effect—they most benefit the lowest 20 percent of households, especially if the rebates are subject to marginal income taxes"(D. L. Morris and Munnings 2013, p.11, Burtaw et al. 2009).

6. Reduce the public health risks associated with carbon pollution, especially for vulnerable populations

The gases implicated in global climate change do not pose the same kinds of health risks as conventional air pollution implicated in urban smog. They mostly create risks indirectly, by collecting in the earth's upper atmosphere, where they trap heat. The warming atmosphere, in turn, may change the weather in ways that harm humans, through flooding, drought, famine and more powerful storms. Although GHGs typically do not pose the same types of risks as conventional pollutants, GHGs and conventional pollutants often are emitted together, through combustion. Reducing GHGs therefore may benefit Washington residents in two ways—one less immediate and driven by global emissions levels and the other, more immediate and more directly linked with in-state emissions.

With respect to the first health benefit, directly reducing the impacts to Washington of climate change a recent Department of Ecology report notes that "Climate change is expected to affect both the physical and mental health of Washington's residents by altering the frequency, duration, or intensity of climate related hazards to which individuals and communities are exposed. Health impacts include higher rates of heat-related illnesses (e.g., heat exhaustion and stroke); respiratory illnesses (e.g., allergies, asthma); vector-, water-, and food-borne diseases; and mental health stress (e.g., depression, anxiety). These impacts can lead to increased absences from schools and work, emergency room visits, hospitalizations, and deaths" (Snover et al. 2013, p.12-1). Some populations, including, "those over age 65, children, poor and socially isolated individuals, the mentally ill, outdoor laborers, and those with cardiac or other underlying health problems (e.g., asthma or reduced immunity due to chemotherapy, illness, or disease)", are "more vulnerable to health impacts" associated with carbon pollution (Snover et al. 2013, p.12-1).

With respect to the second health benefit, reducing conventional air pollution, emissions from a given facility will often correlate with emissions of particulate matter (PM), mercury, ozone, and nitrogen oxides (NOx), solid waste, and outputs that affect water quality (Murray, Mazurek, and Profeta 2011).

The design of a market-based mechanism can affect the location at which GHG and other pollutant emissions and emission reductions occur. Both systems are designed to provide the market with the flexibility to achieve GHG emission reductions at the lowest cost. Under either a carbon tax or cap-and-trade system, emission reductions can be expected where the cost of abatement is lowest.

7. Allow for effective administration (oversight, regulation, monitoring, evaluation, and adjustment) of the program and markets created or affected by it

For a market system to perform well, the cost to administer the program must not exceed the benefits gained from trading. The upfront administrative requirements of a cap-and-trade system, which can include the establishment of new institutions for program administration and market function, are often raised as a concern (Murray, Mazurek, and Profeta 2011). With this axiom in mind, designers of the nation's first market system to combat acid rain explicitly sought to minimize administrative cost (e.g. Dhanda 1999 and Kruger and Dean 1997). Subsequent studies conclude that most market programs can be designed at low cost. "The experience with existing trading programs, such as the U.S. SO_2 trading program, has shown that these institutions can arise quickly and for the most part inexpensively" (Parry and Pizer 2007, p.82).

A cap requires the government to create a regulatory market from the ground up and also to provide ongoing compliance monitoring through reporting, verification, and market oversight. By contrast, a tax may be levied through existing administrative structures. Some contend that a carbon tax also may be more transparent and easier to modify than a cap: "A well-developed administrative structure for collecting taxes already exists in the United States. Moreover, fuel sales are well-documented and are currently taxed (for various reasons) to some degree" (Ramseur and Parker 2009, p.17). This assumes that taxes are based on the carbon-content of fuels, which is relatively easy to calculate. But similar measures do not yet exist to calculate greenhouse gases other than carbon dioxide and would have to be established (Morris and Mathur 2014, p.13)(Morris and Mathur 2014, p. 13). Furthermore in practice, Ramseur and Parker (2009, p.16) note that "Although the concept of a carbon tax is arguably a simpler approach, many argue that the U.S. tax code is complex. … [A] carbon tax framework [can] rival the complexity of a cap-and-trade program."

The administrative burden for both a carbon tax and a cap-and-trade system depends, in part on its coverage and the number of compliance entities implicated. For cap-and-trade this is determined by the minimum size threshold for the inclusion of businesses and if GHGs other than carbon dioxide (CO_2) are included under the cap. The lower the minimum threshold and the greater the coverage of non-CO_2 GHG gases the greater the number of compliance entities. For a carbon tax this is determined based on the point of regulation, which could be collected either upstream from fuel producers or downstream from fuel consumers. The further downstream the tax is collected and the greater the coverage of non- CO_2 GHG gases taxed, the greater the number of compliance entities (Murray, Mazurek, and Profeta 2011).

Unlike carbon taxes, cap-and-trade systems create markets that require oversight to reduce the likelihood of market manipulation. A number of approaches can be used to provide market oversight in cap-and-trade systems. In general, such approaches build on rules and practices used in other financial markets, such as holding restrictions, trading restrictions on associated entities, auction purchase limits, small and medium enterprise provisions, usage restrictions, required use of exchanges, robust information technology (IT) systems, know-your-customer checks, tracking via registry, fraud detection system, independent market monitor and enforceable fines and imprisonment (Pew Center on Global Climate Change 2010). A monitoring, reporting, verification and accreditation framework that is consistent and transparent is used to assist business to comply with both a cap-and-trade system and carbon tax.

Summary

While a cap-and-trade system and a carbon tax may appear to differ dramatically in theory, in practice they can be designed to perform in similar ways. For instance, cost containment mechanisms such as allowance banking, offsets, and allowance price containment reserves can reduce price uncertainty associated with a cap. Also, if policymakers auction or sell allowances instead of give them away for free, a cap can generate revenues that can be used to minimize cost impacts to low-income communities or maximize job growth through funding for green infrastructure development.

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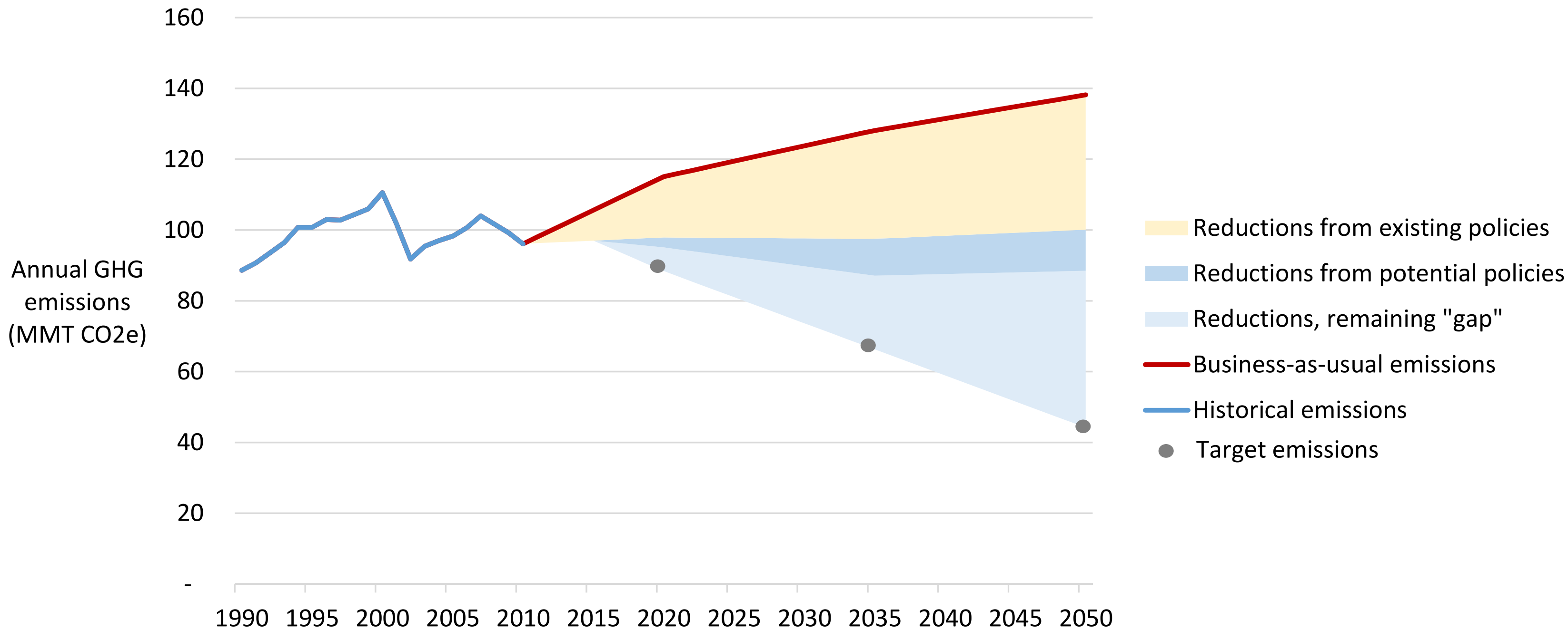
Figure 1. Washington's Historical, Business-As-Usual, and Target Emissions. Annual GHG emissions reductions from existing policies[1], potential policies[2], and the remaining "gap" [3] are indicated with shaded regions.[4]



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[1] *Existing policies include Energy Independence Act (1-937), Washington State Energy Code, GHG Emissions Performance Standards, Energy Efficiency and Energy Consumption Programs for Public Buildings, Purchasing of Clean Cars (Pavley/LEV II), Federal Renewable Fuels Standard, State Renewable Fuel (Diesel) Standard, Purchasing of Advanced Clean Cars (LEV II), Conversion of Public Fleet to Clean Fuels, and the Growth Management Act.*

[2] *Potential policies include Low Carbon Fuel Standard, Zero Emissions Vehicle Mandate, 5% Renewable Fuel Standard (incremental), Public Benefit Fund, Property Assessed Clean Energy, Appliance Standards, Feed-in-Tariff, and 375 MW Cap. Note these policies are NOT yet in place and estimates of emission reduction potential subject to revision.*

[3] *If all proposed policies are implemented, in addition to the existing policies, Washington will not meet its statutory GHG emissions limit, further reductions will be necessary to fill this "gap". Under the Executive Order 14-04, the Taskforce is charged with providing advice and recommendations to the Governor on the design and implementation of a carbon emission limits and market mechanisms program to achieve these reductions.*

[4] *Leidos. 2013. Evaluation of Approaches to Reduce Greenhouse Gas Emissions in Washington State - Final Report. Prepared for State of Washington Climate Legislative and Executive Workgroup (CLEW). Evaluation of Approaches to Reduce Greenhouse Gas Emissions in Washington State - Final Report.*

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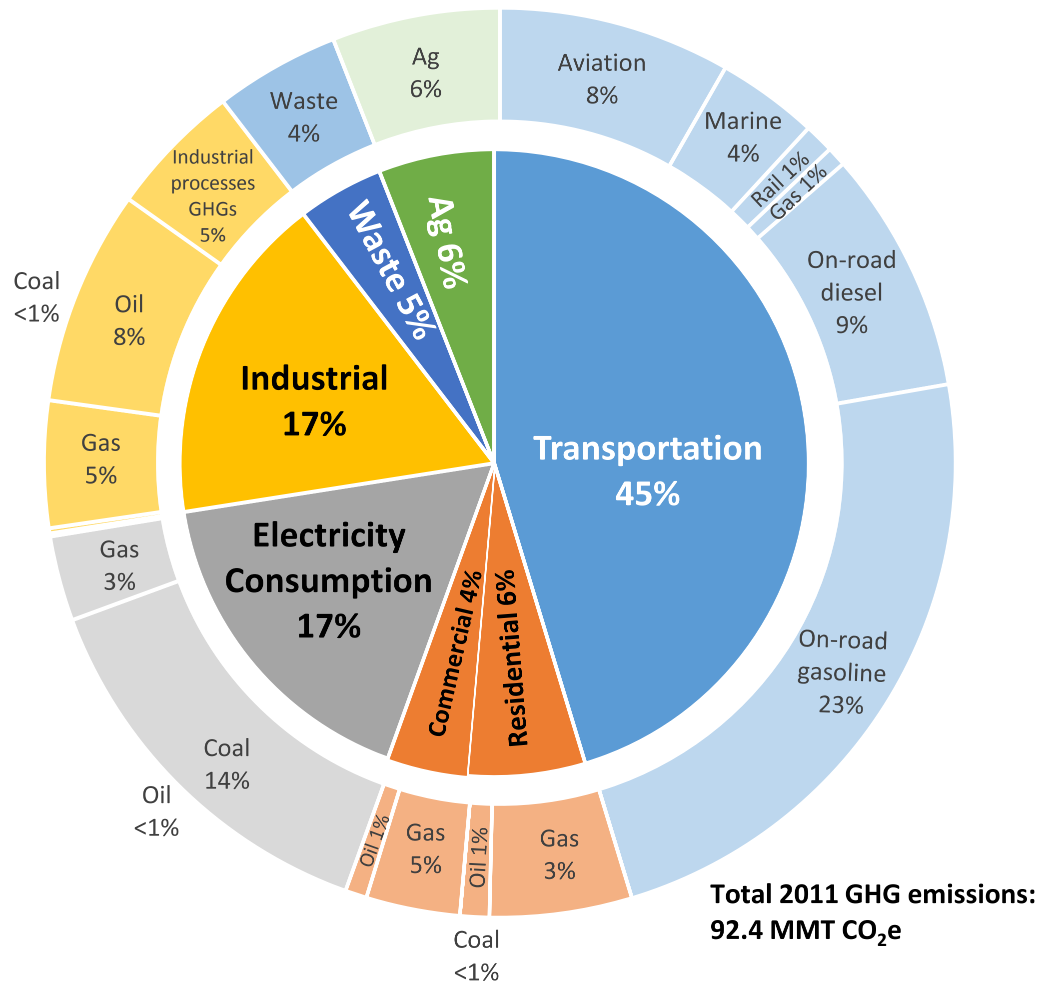
Figure 2. Washington State GHG Emissions, 2010[5]



[5] Industrial includes fossil fuel industry (natural gas), industrial processes (e.g. cement, aluminum production, ODC substitutes, semiconductor manufacturing and SF_6 from electrical power), as well as the industrial component of the RCI sector. Total 2011 GHG emissions are 92.4 million metric tons CO_2e.
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