Memorandum to CERT:
July 29th CERT Meeting Information and Materials

To: CERT members
From: Ross Strategic
Date: July 24, 2014
Subject: July 29th Meeting Information and Materials

We are looking forward to the next CERT meeting on Tuesday, July 29th from 10:00-3:00pm at Puget Sound Energy, 10885 NE 4th Street, Bellevue, WA. Please note that lunch will be provided.

This is a pivotal CERT meeting where your perspectives on the policy options under consideration can substantially contribute to policy formulation going forward. Building on the presentations provided at the last meeting by California and British Columbia carbon emission reduction program representatives, the contractor team will present information on design options of a cap and trade system and a carbon tax system with initial tailoring for Washington State. Material covered with the CERT thus far has mainly focused on how these systems have been implemented in other jurisdictions. This meeting begins the process of bringing a Washington State-specific focus to how these policy design options could be implemented.

Meeting Objectives

- Deepen understanding of how both a linked cap and trade and carbon tax could meet our objectives in WA.
- Provide an opportunity for a thorough debate of key policy design options.
- Provide input on the next iteration of the Governor's Office starting point proposal.
- Identify policy design needs which will be used to inform further economic and other analytical analyses.

Meeting Materials

Attached to this email you will find materials to aid our discussions next week. These materials include:

- Meeting agenda.
- PowerPoint presentation that the contractor technical team will be giving at the meeting - a synthesis of the two background papers described below.
- "Program Features and Options for a Washington State Linked Cap-and-Trade System and Carbon Tax" - *To better understand the implications of linkage for the design of a cap and trade system, what broad options exist to tailor either cap and trade or a tax to WA, what aspects are relatively fixed, and what key design decisions need to be made*.
- Review of the Evaluation Framework Version 2 - *To better understand the key differences and similarities of linked cap and trade and carbon tax in terms of how they can address each of the topics identified by the Taskforce as the areas of primary concern.*

We understand Taskforce members have appreciated receiving limited number of advance materials for past meetings. We recognize this packet contains a considerable amount of information. The Power

Point is the primary reference, but we encourage you to refer to the two supporting documents for greater detail. You will note that our agenda includes a substantial allotment of time for CERT discussion.

Policy Options for Discussion

Reflecting our understanding of the CERT's interests, we have structured materials and an agenda that provide for balanced consideration of policy options that include cap and trade and carbon tax systems, even as the Governor's Office, at the previous CERT meeting, signaled its emergent preference for a cap and trade approach. You will note we have presented the cap and trade approach in a context linked with the California and Quebec market. There are several factors that have contributed to using this model (explained below), and it is the case that any decision to link a Washington State program with other jurisdictions will substantially influence the design elements of the program. This has made it imperative to bring the linked approach into play early for the CERT discussions. The reasons/assumptions for considering a linked context will be covered in greater detail during the presentations.

The factors contributing to presenting the cap and trade system in a linked context include the following.

- Market size: to function well, cap and trade systems need a sufficiently large number of market participants. By joining with other jurisdictions, Washington would have better access to the number of market entities needed for a well-functioning market.
- Administrative and implementation costs: Washington could leverage already established investments in institutions and trading platforms (CITSS, auction platforms, offset registries, etc.), thereby significantly reducing administrative requirements and implementation costs.
- Level playing field: By joining with other jurisdictions, and harmonizing design features, Washington would better support similar industries facing similar carbon costs and incentives.
- Ability to expand participation: The linked system could be readily expanded to include additional jurisdictions, thereby enhancing these and other benefits.

Please let us know if you have any questions leading up to the July 29th meeting. As with the June meeting, there will be one week after the CERT meeting, until August 5th, to provide additional feedback. This date will be crucial as the contractor technical team will be performing analysis during August in order to have initial information for the September CERT meeting. More information on this will be provided after the July 29th CERT meeting.

Carbon Emissions Reduction Taskforce: *Meeting 4*

July 29, 2014, Tuesday, 10:00 am–3:00 pm
Puget Sound Energy, 10885 NE 4th Street, Bellevue, WA

Agenda

10:00 **Welcome and Introductions (Co-Chairs)**

10:15 **Agenda Review (Rob Greenwood)**

10:25 **Presentation: Considerations for WA of WCI-Linked Cap and Trade and Carbon Tax & Applying the Evaluation Framework (Contractor Technical Team)**

11:05 **Questions and Discussions from CERT**

12:00 **Lunch *(Provided)***

12:15 **Presentation: Governor's Office Perspective on Policy Design Approaches (Governor's Office)**

12:35 **Questions and Discussions from CERT**

2:20 **Information Needs of the CERT and Planning for Analytical Work (Contractor Team)**

2:50 **Next Steps (Co-Chairs/Rob Greenwood)**

3:00 **Adjourn**

Next Meeting: September 9, (Time TBD), Seattle (Location TBA)

Linked Cap-and-Trade and Carbon Tax:

Comparison of Design Features and Options

Michael Lazarus, SEI
Jan Mazurek, PhD, ICF
CERT Meeting #4, July 29, 2014
Bellevue, WA

Presentation Overview

A. Program design features and options of
   i. Cap-and-trade program linked with CA/QC market
   ii. Carbon tax
B. Application of evaluation framework

Draws heavily on meeting handouts

Goal of presentation and discussion:

A common understanding of

- Aspects of linked cap-and-trade and carbon tax are relatively fixed vs. flexible; key design decisions would need to be made.
- Differences and commonalities of linked cap-and-trade and carbon tax across seven areas of focus
- CERT member perspectives on the policy options and areas for further inquiry

The principal distinctions

	Cap & Trade	Carbon Tax
Coverage	Both have the ability to cover the same emissions sources and gases (*tax is most commonly used for fossil fuel CO_2 only)*	
Intended Certainty	Emissions - provides a ceiling / cap on aggregate emissions and less certainty on carbon price level	Price – sends clear carbon price signal but offers less certainty in GHG reduction over time
Price	Determined by market; may be stabilized by price floor and ceiling	Determined by regulation; can set scheduled tax increases

A. Linked Cap-and-Trade and Carbon Tax

PROGRAM FEATURES AND OPTIONS, AND IMPLICATIONS OF LINKAGE

Linked cap-and-trade: Implications

Effective linkage with the CA/QC market will require specific design and operational features to be either:

- Identical: Same across all jurisdictions.
- Harmonized: Can be tailored to some degree, but must be equivalent and/or consistent in outcome.
- Flexible: Significant room to further tailor to WA's considerations and priorities.

Linked cap-and-trade: Features that would likely need to be harmonized or identical

- Program start date: harmonized
- Compliance periods: identical
- Emission reduction limits/targets: harmonized
- Coverage (sectors, sources, gases, threshold): harmonized
- Point of regulation: harmonized
- Setting the cap level: harmonized

Linked cap-and-trade: Features that would likely need to be harmonized or identical

- Cost containment / price collar: identical
- Market rules (e.g. banking): identical
- Offset eligibility: harmonized
- Offset use limits: harmonized
- Administrative systems: harmonized/identical
- Compliance and enforcement systems: harmonized

Linked cap-and-trade: Features that offer greatest flexibility

- Allowance distribution:
  - Energy-intensive, trade-exposed industries
  - Electricity/gas suppliers/distributors
  - All other
- Use of allowance proceeds

Carbon tax:

- In the absence of linkage and its requirements for a cap-and-trade program, a carbon tax would have considerable flexibility in design
  - Program start date
  - Setting the tax levels
  - Coverage
  - Exemptions
  - Etc…

B. Comparison of Linked Cap-and-Trade and Carbon Tax using the

EVALUATION FRAMEWORK

Evaluation Framework Topics

1. Reach WA's emissions reduction limits 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
8. *Influence and catalyze national and international action*

1. Reach WA's emissions reduction limits with high confidence….

a) Certainty of achieving ***emissions limits***

Linked cap-and-trade

- Provides greater certainty (and accountability) for the 80%+ of WA's emissions covered
- To maximize certainty of meeting State limits, the cap would need to account for expected emissions in uncapped sectors (the other ~20%)

Carbon tax

- Inherently designed to maximize price certainty; not emissions certainty
- In theory, tax could be adjusted over time to help meet limit

1. Reach WA's emissions reduction limits with high confidence…

b) Certainty of achieving ***emission reductions***

Linked cap-and-trade

- Depends on:
  - how cap is set
  - presence of price floor if cap are set too high
  - integrity of alternative compliance options
  - extent of any leakage
- Flexibility provides potential for greater reductions at a given carbon price

Carbon tax

- Depends on: a) level of tax; b) extent of any leakage

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

Linked cap-and-trade

- Offers less price stability and certainty than tax; price floor and allowance reserve can help to bound prices.
- WA prices would match those in CA and QC
- CA/QC markets may stay near floor price ($15-20 per ton) through 2020.

Carbon tax

- Tax would provide high level of price certainty
- WA could need to select a carbon price trajectory
- For example, BC increased from $10 to $30 CAD per ton from 2008 to 2012; no further change anticipated through 2020

3. Minimize implementation (compliance) costs and competitiveness impacts

Linked cap-and-trade

- Trading, banking, offsets, allowance price containment and three-year compliance periods can help to minimize compliance costs
- Provision of free allowances to energy-intensive and trade-exposed industry (using output-based benchmarks) can limit competitiveness impacts (leakage)

Carbon tax

- In general, because there is no trading, tax does not offer same cost containment design features (in principle, a tax could allow for offsets)
- Provision of tax breaks/credits to trade exposed industry can can limit competitiveness impacts (leakage)

4. Maximize economic benefits and opportunities for job growth

Linked cap-and-trade **Carbon tax**

- Proceeds from C&T allowance auctions, as with carbon tax revenues, can be used to mitigate cost increases and create jobs through a number of options, e.g.
  - Investments in energy efficiency, public transportation, and other cost-saving, emission-reducing activities
  - Reductions in other taxes or tax rebates
  - Job training programs

5. Minimize consumer cost and low-income community impacts

Linked cap-and-trade **Carbon tax**

- C&T auction proceeds and carbon tax revenues can be used to reduce cost impacts to consumers and protect low-income communities from energy costs using similar approaches, such as:
  - Lump sum rebates on electricity and natural gas bills
  - Energy efficiency and public transportation programs
  - Reductions in other taxes or tax rebates
  - Job training

6. Reduce public health risks

Linked cap-and-trade **Carbon tax**

- May reduce public health risks of climate change if widely adopted
- Conventional pollutant emissions should decrease along with CO2 from lower abatement cost sources
- Revenues can be used reduce pollution in communities at disproportionate risk.

7. Allow for effective administration

Linked cap-and-trade

- WA could benefit from resources already developed for CA/QC market: e.g., allowance tracking tools, auction platform, and offset registries

Carbon tax

- WA could use existing state tax structures to administer
- In principle, simpler to administer than a cap-and-trade system, though in practice integration into existing tax code can be complex.

8. *Influence and catalyze national and international action*

(Suggested additional topic based on CERT input received)

- Adoption of either C&T or carbon tax could enable WA to influence and catalyze broader action
- C&T presents clearer linkage opportunities; builds on many other markets in operation and consideration in US and internationally
- Carbon taxes also gaining favor in a number of jurisdictions; linkage opportunities less clear

Summary

- While, in theory, a cap-and-trade system and a carbon tax may appear to differ significantly, in practice they can be designed to perform in similar ways, e.g:
  - Cost containment mechanisms (e.g. price floors, banking, offsets, or allowance price containment reserves) can enable a cap-and-trade program to achieve some of price stability and certainty associated with a carbon tax
  - Proceeds from either allowance auction proceeds and revenues from taxes can be used to minimize cost impacts and maximize job growth
  - Free allowances or tax exemptions can each be used minimize competitiveness concerns

WA CERT Evaluation Framework
Review of Topics: Version 2

As listed below, seven evaluation framework topics were developed in consultation with the Washington Governor's Office by incorporating the key questions for the Taskforce, the guiding criteria for Taskforce deliberation, and Taskforce member feedback. As discussed at the June 24th CERT meeting, these evaluation framework topics are designed to support Taskforce deliberations on program design options. An eighth evaluation framework topic has been suggested and is listed below.

Version 1 of this review of the evaluation framework topics, distributed at the June 24 CERT meeting, described and compared a number of the key, widely-recognized attributes of carbon market instruments across the topic areas of the CERT Evaluation Framework.[1] This material, updated to incorporate additional information and assessments of the California and Quebec C&T programs, BC carbon tax, and other market mechanisms, constitutes the first subsection under each topic, entitled *Discussion of Topic*.

Version 2, for distribution in advance of the July 29 CERT meeting, builds on this framework by adding a second subsection for each topic entitled *Comparison of Options for WA*. These subsections present comparison tables that summarize how the design and operation of a California and Quebec-linked cap-and-trade (C&T) program and a carbon tax might address each of these topic areas. The tables draw on information provided in the accompanying handout on *Program Features and Options for a Washington State Linked Cap-and-Trade System and Carbon Tax* as well in preceding discussions.

[1] 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 limits with high confidence and consideration of WA's emissions and energy sources

1.1. Discussion of topic

The Governor's Executive Order and the Taskforce 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 of reaching WA's emissions reduction limits and reducing GHG emissions

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 need to decrease over time; whereas a tax imposes a pre-determined price on fuels and activities that emit greenhouse gases when combusted but does not ensure that emissions will be reduced to a specific level. Although in theory a cap provides more environmental certainty, there are factors in practice that have the ability to affect the extent of this certainty.

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). 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. 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."

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). Low allowance prices, if sustained over time, can be a sign that the C&T program may not be leading to significant emission reductions, even though it is helping to ensure that emissions stay at or below cap levels. In other words, due to other factors, such as slowing of economic growth or higher than expected production of low-carbon energy (e.g. a high hydroelectricity production due to higher than normal precipitation), the emissions cap might have been met even in the absence of the cap-and-trade program. Low allowance prices if sustained over time can be indication that the cap is not set stringently (low) enough to yield significant emissions reduction. Some cost containment mechanisms, discussed in greater detail below, can help to temper a cap's price variations, thus leading the C&T system perform more like a tax. Under a carbon tax, and absent any adjustment mechanisms, the carbon price will remain unaffected by economic swings or other factors that might lead to short-term increases or decreases in emissions.

Ramseur and Parker (2009) remark that carbon tax supporters often maintain that short term increases or decreases in greenhouse gas emissions are more preferable than price volatility. They also 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 have suggested the use of independent board or agency to adjust carbon tax levels as needed (Murray, Newell, and Pizer 2008).

Another factor that can affect environmental certainty is leakage. Leakage can occur when emissions increase outside the geographic boundary of C&T program or carbon tax due to companies relocating to regions with a lower (or no) carbon price in order to avoid the costs of compliance. As discussed below (Topic 3), steps can be taken to minimize this effect.

Coverage of WA's emissions and energy sources

Washington's emissions goals are based on all emissions reported to the State's greenhouse gas inventory. Therefore, another key aspect of environmental certainty, or confidence in achieving a given emissions target, is "coverage", the breadth of sources and sectors that are subject to a cap or tax. For example, a cap-and-trade or tax system that includes only large emitters such as electricity generators or industrial facilities would cover roughly a quarter of Washington's emissions (U.S. Environmental Protection Agency 2013; Washington State Department of Ecology 2012). Expanding a cap or tax to include other users of natural gas and petroleum products, including most transportation fuels, would increase coverage to over three-quarters of the State's emissions (Washington State Department of Ecology 2012).

The coverage of various tax and cap-and-trade systems varies, ranging from as little as a tenth (Swiss ETS) to three-quarters of a region's emissions (BC and South Africa carbon taxes). (See also, Figures 1 and 2, and the handout on summary of emission trading systems). The planned expansion of the California and Quebec emissions trading systems to cover transportation and other fuel distributors in January 2015 would increase their coverage to a similar level.

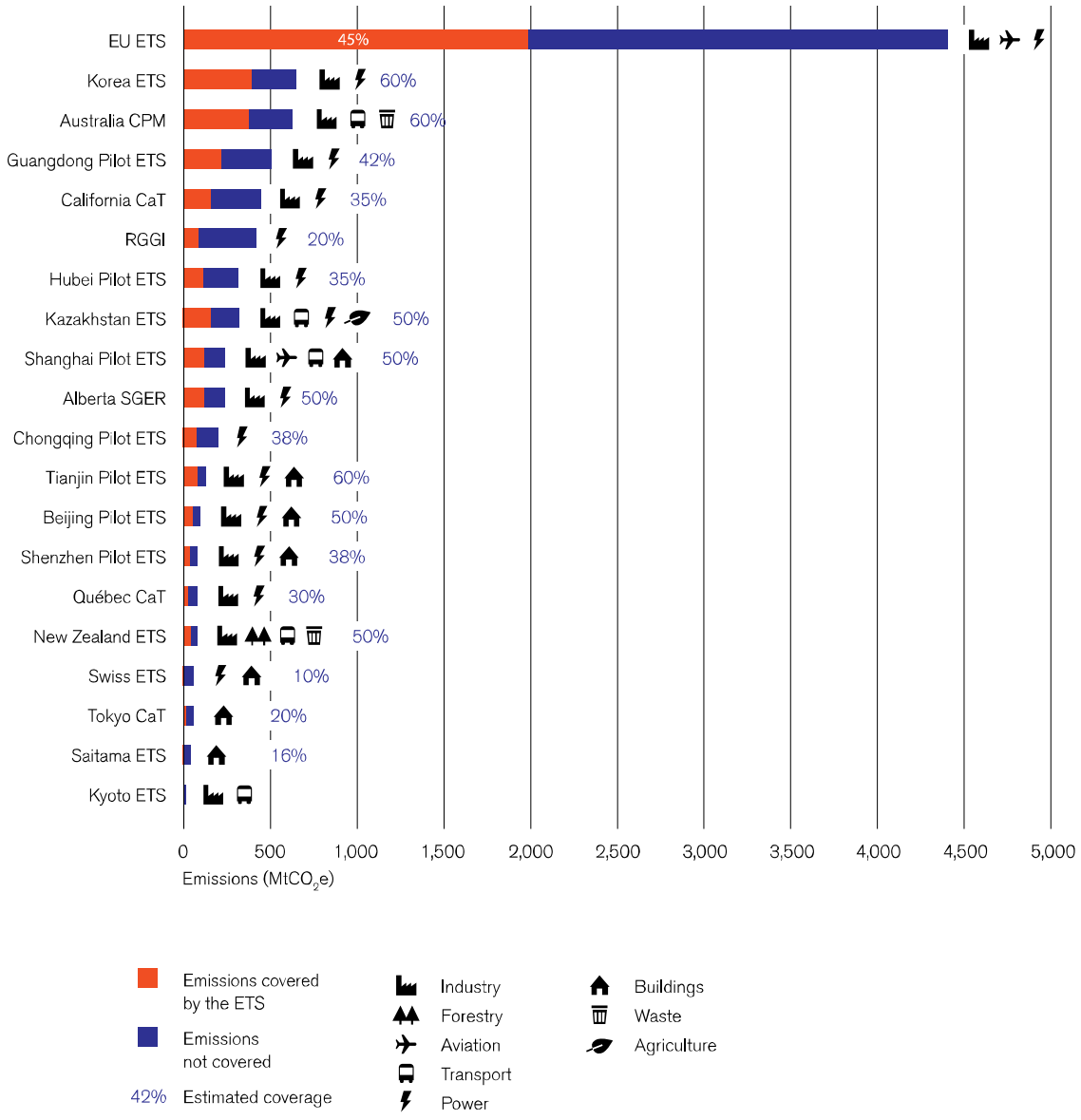
1.2. Comparison of options

Building from the discussion above, Table 1 outlines key differences and commonalities across the two principal policy options with respect to reaching WA's emissions reduction limits with high confidence and consideration of WA's emissions and energy sources.

Table 1. Comparison of linked cap-and-trade program and carbon tax with respect to Topic 1: Reach WA's emissions reduction limits with high confidence and consideration of WA's emissions and energy sources.

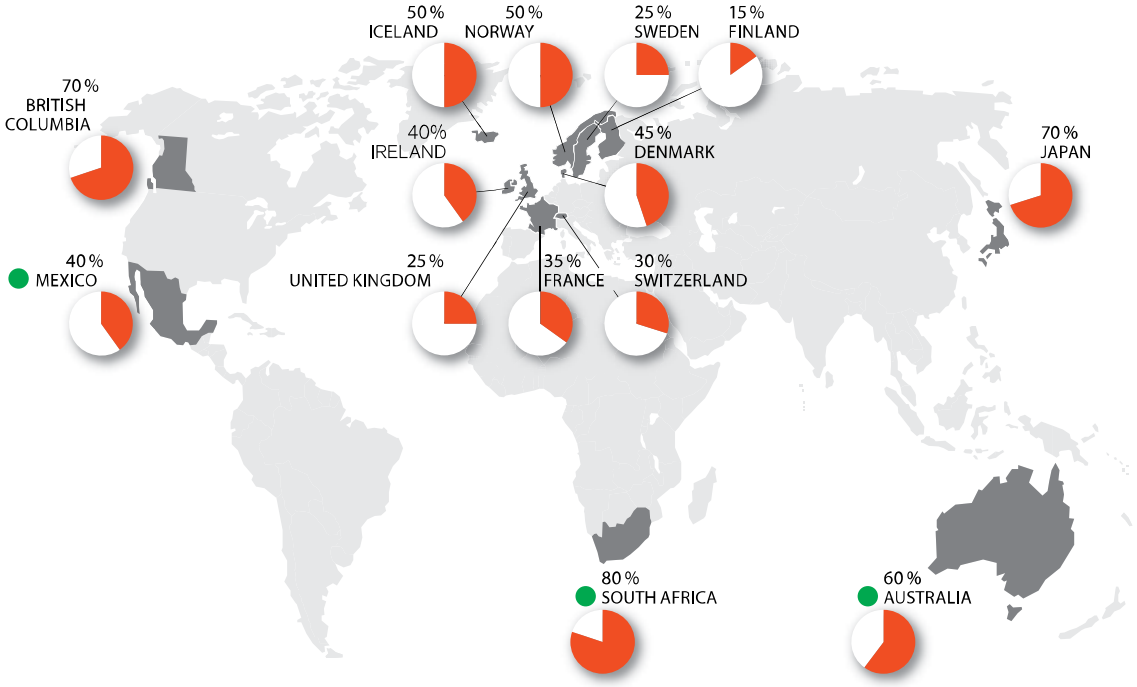
Evaluation Framework Topic #1	Cap-and-trade program linked with CA and QC	Carbon Tax
Certainty of reaching WA's emissions limits	By covering and setting an enforceable cap on over 80% of WA's emissions, C&T would offer greater certainty of achieving limits. In order to maximize this certainty, the cap would need to account for expected emissions in uncapped sectors (the other 20% or so of emissions), to ensure that the economy-wide target is met.	A tax is not inherently designed to provide certainty with regards to meeting a specific emissions limit In theory, tax levels could be adjusted (beyond any scheduled changes) to achieve a desired emissions target, but such adjustments could be difficult to implement in practice. As noted below, a key rationale for carbon tax is the predictability of its price signal.
Certainty of reducing GHG emissions (as compared with a no policy case)	Depends on: a) the extent to which cap is set lower than emissions levels that would have occurred without the C&T program; b) the presence of a price floor (in case caps are set too high); c) the integrity of alternative compliance options (e.g. offsets), and d) the extent of leakage Participation in a linked C&T system creates the potential for more flexibility in location and timing of emission reductions.	In principle, a tax may provide some certainty that GHG emissions would be reduced beyond what would have occurred in absence of a carbon price. The relative magnitude of emissions reductions achieved by a C&T vs. tax will depend on factors in addition to the carbon price (and cap level) from the availability and quality of offsets to the extent of leakage or positive spillovers.
Coverage of WA's emissions and energy sources	Greater coverage leads to greater confidence in achieving an economy-wide target (assuming cap is set appropriately), as well as, in principle ability to deliver greater emission reduction.	Coverage of a tax can be similar to that of cap-and-trade.

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



Note 1: Symbols stand for the sectors covered. Blue bars represent emissions. Orange bars indicate how much of the total emissions are covered by the ETS. Some schemes could cover more sectors than shown in the figure due to the way liable entities are defined. The total emissions covered by the Kyoto ETS are not provided as it is a voluntary ETS.

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



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

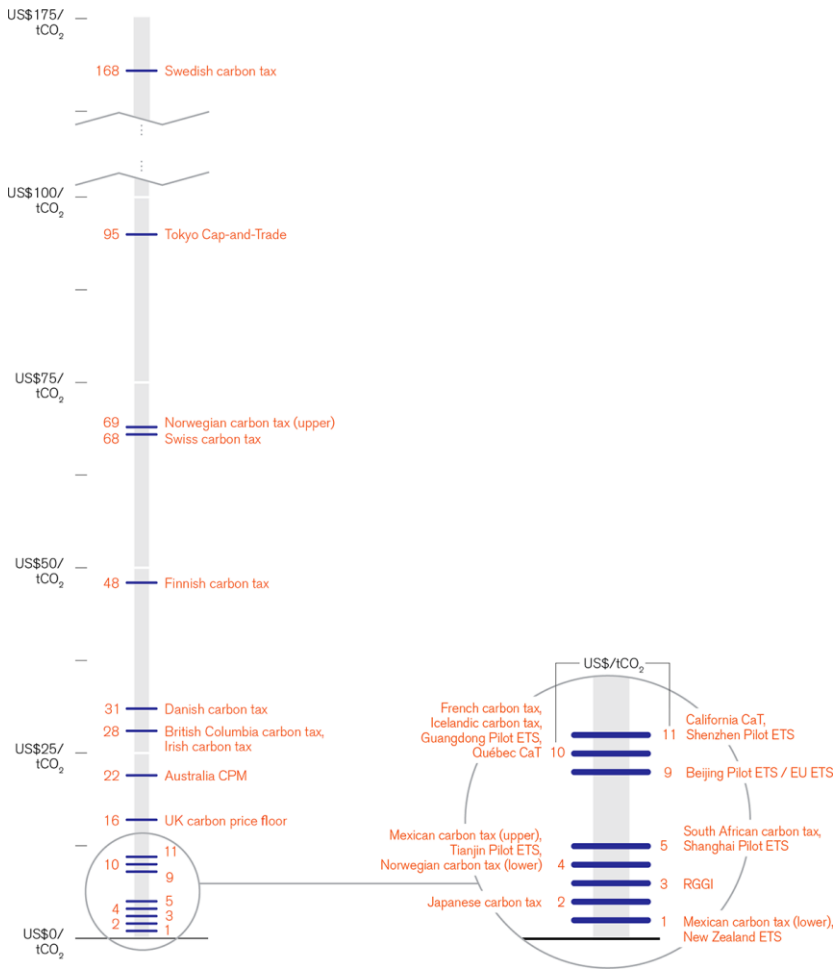
2.1. Discussion of topic

"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 systems. (World Bank 2014, p.32)



Price certainty

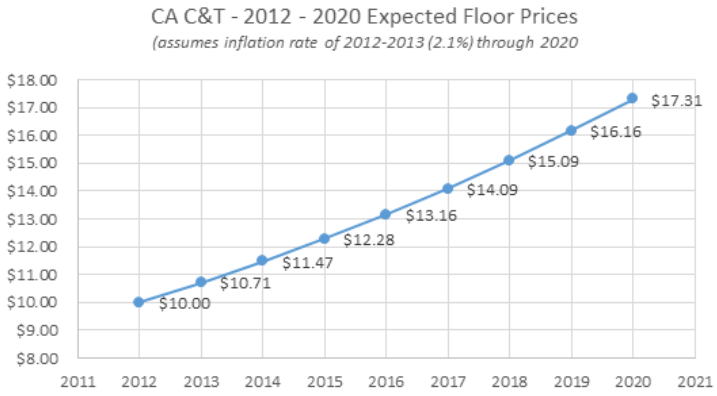
Price certainty, or the ability of emitters to know in advance how much it will cost to cut their emissions, is another key attribute of carbon market mechanism design. Signaling future prices can be particularly helpful. "The more certainty and advance notice policymakers provide in the tax [or cap-and-trade] 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).

Taxes make carbon prices knowable with relative certainty well in advance of the compliance period. By contrast, under a cap and trade system, carbon prices, as reflected in allowance trading prices, will vary over time as a function of a number of factors that can be difficult to predict such as economic conditions, relative fuel prices, the performance of complimentary GHG reduction measures, and the availability of offsets. "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). However, 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 soft ceiling for prices (such as minimum auction prices or allowance reserves that become available only over a threshold market price). The CA-QC linked C&T has adopted many of these price containment mechanisms, as described in the Table 2 below. 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 technologies.

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).

Table 2. California cap-and-trade: Allowance Prices & Cost Containment Mechanisms

<table>
<tr><td>Projected Allowance Prices</td><td>Original 2010 estimate - $21-$25 by 2020[2]
Updated 2014 estimate - ~ $17 by 2020[3]
Under most scenarios, the most likely 2020 market price will be very close to the auction reserve price floor.[4] To date the market prices have held at or near the lower bound “floor” prices established by the allowance auction reserve price. [5]</td></tr>
<tr><td>Cost Containment Mechanisms</td><td>Limited price-collar mechanisms that place soft lower and upper bounds of allowance prices:
Floor Price The floor or minimum price per allowance is set in the regulation at $10 in 2012, and increases by 5% plus the rate of inflation as measured by the Consumer Price Index (CPI) for all urban consumers each year thereafter
Price Stability The Allowance Price Containment Reserve (APCR) is designed to have a restraining effect on prices on the high end by adding a pre-specified number of allowances to the pool when prices exceed pre-specified levels.[6]
To ensure that prices do not spike drastically, a percentage of allowances from 2013–2020 are set aside at the beginning of the program into the APCR. If needed, these allowances are offered for sale through a reserve auction at three pre-set price tiers: $40, $45, and $50, which also increase by 5% annually plus the rate of inflation. Once all of the allowances in the first price tier are sold, allowances will then be sold at the second tier price and so forth.
 
</td></tr>
</table>

[2] California Air Resources Board. March 2010. “Updated Economic Analysis of CA's Climate Change Scoping Plan”. Pg. 33, 42. http://www.arb.ca.gov/cc/scopingplan/economics-sp/updated-analysis/updated_sp_analysis.pdf.

[3] California Air Resources Board. May2014. “First Update to AB32 Scoping Plan”. Pg. 122 http://www.arb.ca.gov/cc/scopingplan/2013_update/first_update_climate_change_scoping_plan.pdf.

[4] UC Berkeley Hass Working Paper. July 2014. “Report of the Market Simulation Group on Competitive Supply/Demand Balance in the California Allowance Market and the Potential for Market Manipulation”. July 2014. Pg 3. http://ei.haas.berkeley.edu/pdf/working_papers/WP251.pdf

[5] California Air Resources Board. “Auction Information.” Last modified December 2, 2013. http://www.arb.ca.gov/cc/capandtrade/auction/auction.htm

[6] Environmental Defense Fund. 2014. “California Carbon Market Watch 2012-2013”. Pg.5. http://www.edf.org/sites/default/files/CA_Carbon_Market_Watch-Year_One_WebVersion.pdf

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).

2.2. Comparison of options

Building from the discussion above, Table 3 outlines key differences and commonalities across the two principal policy options with respect to establishing a carbon price signal sufficient to stimulate a shift in investment patterns.

Table 3. Comparison of linked cap-and-trade program and carbon tax with respect to Topic 2: Establish a carbon price signal sufficient to stimulate a shift in investment patterns. ***Note: Here and in subsequent tables, where the implications for WA under a linked cap-and-trade and carbon tax differ they are included in separate columns, where they are the same the columns are merged and apply to both policy options.***

Evaluation Framework Topic #2	**Cap-and-trade program linked with CA and QC**	**Carbon Tax**
Price levels	Projections suggest that CA/QC allowances could remain near price floor levels (around $15-$20/tCO2) though difficult to predict; linkage would mean that prices in WA would match those in CA and QC. The effect of inclusion of WA in the CA/QC market could affect prices, depending on the relative stringency of its cap, though such effects are likely to be limited given WA's contribution to total covered emissions.	There are several options for how the price level of a carbon tax could be set: • Set rate schedule (flat or increasing over time, as in BC) • Pegged to other jurisdictions' current or expected carbon prices (e.g. CA/QC, BC, or other) • Adjusted automatically or by a panel as needed to help meet statutory limits • Other In BC the current carbon tax price is $30 CAD per ton (US$28/tCO2e) in 2012.
Price certainty	While price uncertainty and volatility are greater than under a tax, they are limited by banking, the price floor, and allowance reserve which would create "price collar" between, very roughly, $15 and $50 through 2020. The allowance reserve, however, has yet to be tested in practice, and modifications could be considered.	Price certainty tends to be high with a carbon tax. It would decrease to the extent there are provisions that enable (unscheduled or unspecified) adjustment of prices.
Program certainty	Some argue that a C&T program would be more difficult to repeal than a carbon tax (see above).	

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

3.1. Discussion of topic

Minimize implementation (compliance) costs

Policy makers have a number of tools at their disposal to stabilize the costs of market mechanisms to cut greenhouse gases. Because taxes state prices explicitly, most cost containment tools apply to cap-and-trade. Market tools, such as allowing emitters to bank allowances over time (so they have more allowances available for compliance when the cap declines, and compliance becomes costlier), setting price floors, and allowance reserves provide greater price certainty to emitters. 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).

Minimize competitiveness impacts to our businesses and industries

When a single jurisdiction such as a state imposes a cap-and-trade system or carbon 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 allowances in a manner that rewards greater 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).

3.2. Comparison of options

Building from the discussion above, Table 4 outlines key differences and commonalities across the two principal with respect to minimizing the implementation costs and competitiveness impacts to our businesses and industries (flexibility).

Table 4. Comparison of linked cap-and-trade program and carbon tax with respect to Topic 3: Minimize the implementation costs and competitiveness impacts to our businesses and industries (flexibility).

Evaluation Framework Topic #3	Cap-and-trade program linked with CA and QC	Carbon Tax
Minimize implementation (compliance) costs	Several features are designed to reduce carbon prices, increase flexibility, and minimize compliance costs, e.g. banking, multi-year compliance periods, offsets, and allowance reserves.	In general, carbon taxes do not allow for the flexibility and multiple compliance instruments found in a C&T program. However, in principle, offsets can also be used under a carbon tax.
	Free allocations or rebates (C&T) or partial exemptions (tax) can be used to reduce compliance costs for specific entities.	
	Energy efficiency and other programs supported by allowance auction or carbon tax revenues, as well as through complementary policies, can help to reduce costs to affected businesses.	
Minimize competitiveness impacts to our businesses and industries	Free allowances can be provided to energy-intensive and trade-exposed industries to minimize leakage risks. Both CA and QC use production/ efficiency-based benchmarking approaches are used to determine the free allowance allocations.	Tax exemptions, credits or rebates can have the same function as free allowances; similar production/efficiency-based benchmarks could be used to address competitiveness of industries.
	Border adjustments, or border taxes, could be applied to products imported to WA so that they face a similar effective carbon price.	

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

4.1. Discussion of topic

Cap-and-trade systems and carbon taxes reduce greenhouse gases by making them more costly to emit. In many cases, emitters can pass some or all of these added costs along to consumers including other businesses and households. Both cap-and-trade systems and carbon taxes can be designed to help mitigate cost increases to emitters and to consumers of their products. One way is by recycling revenues from a cap-and-trade system or a tax back to businesses and to households. For a tax, directing revenues back to the economy is fairly straightforward. A cap-and-trade system by contrast only raises revenue if policymakers opt to sell or auction trading allowances. 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 that are applicable to 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-and-trade system or tax would bring (Regional Economic Models, Inc. (REMI) 2014). They could also be redirected towards small business and corporations by reducing other taxes such as payroll tax. Alternatively, revenues can be invested in projects that further reduce emissions and also create jobs. Revenue investments include green infrastructure development, such as 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).

In 2010, when the California Air Resources Board updated the economic analysis of the Climate Change Scoping Plan (C&T program), they modeled impacts to labor sectors and households of the cap-and-trade program along with other complementary policies (RPS, etc.). The results suggested that California's emissions target for 2020 could be achieved with limited economic impact, as indicated in Table 5. "At the labor sector level, results were largely as expected: the sectors with the greatest negative impacts are those that distribute fossil fuels such as the utilities; or those that consume large amounts of fossil fuels such as the Energy Intensive Industrials and Transportation and Warehousing. However, all sectors see some reduction in total value added labor demand" (CARB, 2010, p.54, 58).

Table 5. Projected impact of C&T and complementary policies (AB-32 Scoping Plan) on California GSP, labor demand, and income, 2020 (Scoping Plan Policy Case relative to Business As Usual (BAU) Case) (CARB, 2010)

(**2007** Dollars)	**BAU Case (no climate policy)**	**AB 32 Scoping Plan Case (cap and trade)**	**AB 32 Scoping Plan Case (% change from BAU)**
Gross State Product ($ Billions)	2,502	2,498	-0.2%
Personal Income ($ Billions)	2,027	2,029	0.1%
Income Per Capita ($ Thousands)	46.06	46.09	0.1%
Labor Demand (Millions)	18.41	18.42	0.1%
Allowance Price in 2020	NA	21	NA
Annual Average Growth (2007-2020)			
Gross State Product	2.4%	2.4%	
Personal Income	2.4%	2.4%	
Income Per Capita	1.2%	1.2%	
Labor Demand	0.9%	0.9%	

4.2. Comparison of options

Building from the discussion above, Table 6 outlines key differences and commonalities across the two principal policy options under consideration with respect to maximizing the economic development benefits and opportunities for job growth.

Table 6. Comparison of linked cap-and-trade program and carbon tax with respect to Topic 4: Maximize the economic development benefits and opportunities for job growth in WA.

Evaluation Framework Topic #4	**Cap-and-trade program linked with CA and QC**	**Carbon Tax**
Maximize the economic development benefits and opportunities for job growth in WA	Revenues from either allowance auction proceeds (C&T) or carbon tax can be used to: • mitigate cost increases for businesses and households via lump-sum payments (e.g. to electricity ratepayers, as in CA) or reductions in other taxes (e.g. B&O), • invest in projects that reduce emissions and create jobs (e.g. green infrastructure development, public transportation, energy efficiency retrofits), • fund training programs for disadvantaged and low-skill workers, as a complement investment in infrastructure projects, or • stimulate economic and job growth through targeted tax credits or reduction of distortionary taxes, among other options.	

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

5.1. Discussion of topic

As just noted, cap-and-trade systems and carbon taxes can be designed to mitigate impacts to businesses and households. However, 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 systems to aim more revenues at those disproportionately impacted by price increases.

Drawn directly from Morris and Mathur (2014), Table 7 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. 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.

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).

Economic analysis of conducted in 2010, when the California Air Resources Board updated the economic analysis of the California C&T program, household income impacts were modeled for five scenario cases (similar to labor). Table 8 below presents the results of this sensitivity analysis (CARB, 2010, p.59). To mitigate any potential negative impacts, CARB designed their C&T policy to ensure that households are protected from the carbon pollution cost in electricity that is passed onto consumers. Investor owned utility companies, electric service providers and community choice aggregation providers are required to send a check or "Climate Credit" to customers twice a year to offset these costs. These funds are provided by the State through a portion of the allowance auction.[7]

[7] California Public Utilities Commission. California Climate Credit – FAQ. http://www.cpuc.ca.gov/PUC/energy/capandtrade/climatecreditfaq.htm

Table 7. Possible uses of carbon tax or allowance revenue and their economic effects, distributional impacts, and compensation recipients from a national perspective (Morris and Mathur 2014)

REVENUE USE	EFFECTS ON ECONOMY	PROGRESSIVE[8]	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.

[8] A progressive tax is one that places a greater burden on higher-income than on lower-income taxpayers; conversely, a regressive tax places greater burden on lower-income than on higher-income taxpayers.

Table 8. Projected impact of C&T and complementary policies (AB-32 Scoping Plan) on California household income levels, 2020 (Scoping Plan Policy Case relative to Business As Usual Case) (CARB, 2010)

Thousands of 2007 dollars *Income Tax Bracket:*	**BAU Case (no climate policy)**	**AB 32 Scoping Plan Case (cap and trade)**	**AB 32 Scoping Plan Case (% change from BAU)**
$0	24.4	24.4	0.3%
$0 - $6,622	11.3	11.3	0.1%
$6,622 - $15,698	33.0	33.1	0.1%
$15,698 – $24,776	58.3	58.4	0.1%
$24,776 – $34,394	85.0	85.1	0.1%
$34,394– $43,467	118.8	118.9	0.2%
$43,467– $200,000	197.4	197.6	0.1%
$200,000– $1,000,000	1,258.2	1,256.2	-0.2%

5.2. Comparison of options

Building from the discussion above, Table 9 outlines key differences and commonalities across the two principal policy options with respect to minimizing cost impacts to consumers and protect low-income communities from increased energy costs.

Table 9. Comparison of linked cap-and-trade program and carbon tax with respect to Topic 5: Minimize cost impacts to consumers and protect low-income communities from increased energy costs

Evaluation Framework Topic #5	**Cap-and-trade program linked with CA and QC**	**Carbon Tax**
Minimize cost impacts to consumers and protect low-income communities from increased energy costs	Under either policy, WA would have the flexibility to minimize costs to consumers and protect low-income communities from increased energy costs by using allowance proceeds or tax revenues to, among other options: • make lump-sum or other forms of payment to electricity and natural gas ratepayers or other fuel consumers • reduce taxes (e.g. sales, business and occupation, property) • funding the working families rebate[9] • increase WA general funds available for education or social services • to enable lower electricity or natural gas rates to targeted consumer classes • invest in job training and infrastructure projects to improve access to high-paying employment	

[9] See for example, the proposal by Carbon Washington, http://carbonwa.org/policy/

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

6.1. Discussion of topic

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 heat stress, 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.

6.2. Comparison of options

Building from the discussion above, Table 10 outlines key differences and commonalities across the two principal policy options under consideration with respect to reducing the public health risks associated with carbon pollution, especially for vulnerable populations.

Table 10. Comparison of linked cap-and-trade program and carbon tax options with respect to Evaluation Topic #6: Reduce the public health risks associated with carbon pollution, especially for vulnerable populations.

Evaluation Framework Topic #6	**Cap-and-trade program linked with CA and QC**	**Carbon Tax**
Reduce public health risk of climate change	To the degree that cap-and-trade or carbon tax directly leads to emissions reducing activities, and contributes to broader adoption of carbon pricing by other jurisdictions, cap-and-trade will contribute to reducing the public health risk of climate change.	
Reduce public health risk from conventional air pollution	As market-based approaches, cap-and-trade and carbon tax can be expected to reduce GHGs (and thereby conventional pollutants often emitted together with GHGs) where the cost of abatement is lowest. An approach used in CA, that WA would have the flexibility to follow, is the allocation of allowance (or tax) revenue to improve air quality in disadvantaged communities with a high burden of pollution.	

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

7.1. Discussion of topic

For a market mechanism to perform well, the cost to administer the program must not exceed the benefits gained. 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 concern 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 have suggested 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-and-trade system 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 (A. Morris and Mathur 2014). 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.

7.2. Comparison of options

Building from the discussion above, Table 11 outlines key differences and commonalities across the two principal policy options with respect to allowing for effective administration (oversight, regulation, monitoring, evaluation, and adjustment) of the program and markets created or affected by it.

Table 11. Comparison of linked cap-and-trade program and carbon tax options with respect to Evaluation Topic #7: Allow for effective administration (oversight, regulation, monitoring, evaluation, and adjustment) of the program and markets created or affected by it.

Evaluation Framework Topic #7	Cap-and-trade program linked with CA and QC	Carbon Tax
Allow for effective administration (oversight, regulation, monitoring, evaluation, and adjustment) of the program and markets created or affected by it	WA could use the allowance tracking, auction and offset registries already used by CA and QC to streamline administrative requirements[10] and well as common trading platforms.[11] CA and QC have instituted a number of measures, such as requirements that capped entities keep a certain amount of allowances in "holding" accounts, rather than accounts used for compliance, to reduce the ability of any one actor to hoard excess allowances (i.e., manipulate the market).[12] As markets link and become larger in geographic scope the risk of manipulation decreases.	In principle, a carbon tax would be simpler and easier to administer, and would present less need for market oversight. In practice, integration of a carbon tax into existing tax code can be complex and challenging. WA could use existing tax collection structures to administer a carbon tax.

[10] http://www.arb.ca.gov/cc/capandtrade/markettrackingsystem/markettrackingsystem.htm

[11] http://www.arb.ca.gov/cc/capandtrade/auction/auction.htm

[12] http://www.arb.ca.gov/cc/capandtrade/holding_limit.pdf

8. Influence and catalyze national and international action

(A suggested additional topic based on input received at and since last CERT meeting)

8.1. Comparison of options

Building from the discussion above, Table 12 outlines key differences and commonalities across the two principal policy options with respect to influencing and catalyzing national and international action.

Table 12. Comparison of linked cap-and-trade program and carbon tax options with respect to suggested Evaluation Topic #8: Influence and catalyze national and international action.

Evaluation Framework Topic #8	Cap-and-trade program linked with CA and QC	Carbon Tax
Influence and catalyze national and international action	Either could enable WA to influence and catalyze	
	C&T presents clearer linkage opportunities; builds on many other markets in operation and consideration in US and internationally	Carbon taxes also gaining favor in a number of jurisdictions; linkage opportunities less clear

9. 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 enable a cap-and-trade program to achieve some of the price certainty associated with a carbon tax. Also, proceeds from allowance auctions and revenues from taxes can be used to minimize cost impacts to low-income communities or maximize job growth through funding for green infrastructure development. Under either approach, benchmarked allowance distribution or tax exemptions can be used minimize competitiveness concerns to energy-intensive and trade exposed industries.

10. References

Aldy, Joseph E., and William A. Pizer. 2009. The Competitiveness Impacts of Climate Change Mitigation Policies. Pew Center on Global Climate Change and Resources for the Future. http://www.c2es.org/docUploads/competitiveness-impacts-report.pdf.

Bianco, Nicholas. 2009. Stacking Payments for Ecosystem Services. WRI Fact Sheet. Washington D.C.: World Resources Institute. http://pdf.wri.org/factsheets/factsheet_stacking_payments_for_ecosystem_services.pdf.

Broekhoff, Derik, and Kathryn Zyla. 2008. Outside the Cap: Opportunities and Limitations of Greenhouse Gas Offsets. Climate and Energy Policy Series. Washington, DC: World Resources Institute. http://www.wri.org/publication/outside-the-cap.

Burtaw, Dallas, and Ian W.H. Parry. 2011. Options for Returning the Value of CO2 Emissions Allowances to Households. RFF Discussion Paper 11-03. Washington D.C.: Resources for the Future. http://www.rff.org/Publications/Pages/PublicationDetails.aspx?PublicationID=21471.

Burtaw, Dallas, Margaret Walls, and Joshua Blonz. 2009. Distributional Impacts of Carbon Pricing Policies in the Electricity Sector. Discussion Paper RFF DP 09-43. Washington, D.C.: Resources for the Future. http://www.rff.org/documents/RFF-DP-09-43.pdf.

California Air Resources Board. March 2010. Updated Economic Analysis of CA's Climate Change Scoping Plan. Pg. 33, 42. http://www.arb.ca.gov/cc/scopingplan/economics-sp/updated-analysis/updated_sp_analysis.pdf.

California Air Resources Board. Auction Information. Last modified December 2, 2013. http://www.arb.ca.gov/_cc/capandtrade/auction/auction.htm

Center for Climate and Energy Solutions. 2012. Market Mechanisms: Understanding the Options. U.S. Policy. Arlington, VA: Center for Climate and Energy Solutions. http://www.c2es.org/publications/market-mechanisms-understanding-options.

Dhanda, Kanwalroop Kathy. 1999. "A Market-Based Solution to Acid Rain: The Case of the Sulfur Dioxide (SO2) Trading Program." Journal of Public Policy & Marketing 18 (2): 258–64. http://www.jstor.org/discover/10.2307/30000545?uid=3739960&uid=2&uid=4&uid=3739256&sid=21104198246957

Durning, Alan, Anna Fahey, Eric de Place, Lisa Stiffler, and Clark Williams-Derry. 2009. Cap and Trade 101: A Federal Climate Policy Primer. Sightline Report. Seattle, WA, US: Sightline Institute. http://sightline.wpengine.netdna-cdn.com/wp-content/uploads/downloads/2012/02/Cap-Trade_online.pdf.

Environmental Defense Fund. 2014. California Carbon Market Watch 2012-2013. http://www.edf.org/sites/default/files/CA_Carbon_Market_Watch-Year_One_WebVersion.pdf

Greene, David L., and Steven E. Plotkin. 2011. Reducing Greenhouse Gas Emissions from U.S. Transportation. Pew Center on Global Climate Change. http://www.c2es.org/publications/reducing-ghg-emissions-from-transportation.

Grubb, Michael, Thomas L. Brewer, Misato Sato, Robert Heilmayr, and Dora Fazekas. 2009. Climate Policy and Industrial Competitiveness: Ten Insights from Europe on the EU Emissions Trading System. Climate & Energy Paper Series 09. Washington. DC: The German Marshall Fund of the United States. http://www.gmfus.org/doc/GMF%20Grubb%2035.pdf.

Kollmuss, Anja, Michael Lazarus, Carrie Lee, Maurice Lefranc, and Clifford Polycarp. 2010. Handbook of Carbon Offset Programs: Trading Systems, Funds, Protocols and Standards. Earthscan. http://sei-us.org/publications/id/203.

Kruger, Joseph, and Melanie Dean. 1997. "Looking Back on SO2 Trading: What's Good for the Environment Is Good for the Market." Fortnightly. http://www.fortnightly.com/fortnightly/1997/08/looking-back-so2-trading-whats-good-environment-good-market.

Morgenstern, Richard D., Joseph E. Aldy, Evan M. Hernstadt, Mun Ho, and William A. Pizer. 2007. Competitiveness Impacts of Carbon Dioxide Pricing Policies on Manufacturing. Issue Brief CPF-7. Washington D.C.: Resources for the Future. http://www.rff.org/rff/Publications/upload/31811_1.pdf.

Morris, Adele, and Aparna Mathur. 2014. A Carbon Tax in Broader U.S. Fiscal Reform: Design and Distributional Issues. Arlington, VA: Center for Climate and Energy Solutions. http://www.c2es.org/publications/carbon-tax-broader-us-fiscal-reform-design-distributional-issues.

Morris, Daniel L., and Clayton Munnings. 2013. "Progressing to a Fair Carbon Tax Policy Design Options and Impacts to Households". Resources for the Future. http://www.rff.org/RFF/Documents/RFF-IB-13-03.pdf.

Murray, Brian C., Jan V. Mazurek, and Timothy H. Profeta. 2011. Examination of the Carbon Fee Alternative for the State of California. Policy Brief NI PB 11-04. Nicholas Institute for Environmental Policy Solutions, Duke University. http://nicholasinstitute.duke.edu/sites/default/files/publications/examination-of-carbon-fee-for-california-paper.pdf.

Murray, Brian C., Richard G. Newell, and William A. Pizer. 2008. Balancing Cost and Emissions Certainty: An Allowance Reserve for Cap-and-Trade. Discussion Paper RFF DP 08-24. Washington, DC: Resources for the Future. http://www.rff.org/RFF/Documents/RFF-DP-08-24.pdf.

Newell, Richard G., William A. Pizer, and Daniel Raimi. 2014. "Carbon Market Lessons and Global Policy Outlook." Science 343 (6177): 1316–17. doi:10.1126/science.1246907. Available at: http://www.governor.wa.gov/issues/climate/resources.aspx

Nicholas Institute for Environmental Policy Solutions. 2009. "Conquering Cost: Evaluating Optimal Policy Approaches to the Cost of Climate Change." Nicholas Institute at Duke University. http://nicholasinstitute.duke.edu/events/conquering-cost-evaluating-optimal-policy-approaches-to-the-cost-of-climate-change#.U6C_mvlSZKV.

Offset Quality Initiative. 2008. Ensuring Offset Quality: Integrating High Quality Greenhouse Gas Offsets into American Cap-and-Trade Policy. Portland, OR and Washington, DC: The Climate Trust, Pew Center on Global Climate Change, California Climate Action Registry, Environmental Resources Trust, Greenhouse Gas Management Institute and The Climate Group. http://www.offsetqualityinitiative.org/pdfs/OQI_Ensuring_Offset_Quality_7_08.pdf.

Parry, Ian W.H., and William A. Pizer. 2007. Emissions Trading Versus CO2 Taxes Versus Standards. Issue Brief 5. Washington D.C.: Resources for the Future. http://www.rff.org/rff/Publications/upload/31809_1.pdf.

Pew Center on Global Climate Change. 2009. Climate Policy Memo #1 - Cap and Trade v Taxes. Arlington, VA: Pew Center of Global Climate Change. http://www.c2es.org/publications/cap-trade-vs-taxes.

———. 2010. Carbon Market Design & Oversight: A Short Overview. Arlington, VA: Pew Center on Global Climate Change. http://www.c2es.org/docUploads/carbon-market-design-oversight-brief.pdf.

Ramseur, Jonathan, and Larry Parker. 2009. "Carbon Tax and Greenhouse Gas Control: Options and Considerations for Congress". Congressional Research Service. http://fas.org/sgp/crs/misc/R40242.pdf.

Regional Economic Models, Inc. (REMI). 2014. Environmental Tax Reform in California: Economic and Climate Impact of a Carbon Tax Swap. Washington, D.C.: Prepared for Citizens Climate Lobby. http://citizensclimatelobby.org/wp-content/uploads/2014/03/REMI-CA-Carbon-Tax.pdf.

Schneck, Joshua, Brian C. Murray, Jan Mazurek, and Gale Boyd. 2009. Protecting Energy-Intensive Trade-Exposed Industry: Nicholas Institute Discussion Memo on H.R. 2454 American Clean Energy and Security Act of 2009. Nicholas Institute for Environmental Policy Solutions at Duke University. http://nicholasinstitute.duke.edu/climate/costsandpolicy/protecting-energy-intensive-trade-exposed-industry#.U6DP1SimV4U.

Snover, A.K., G.S. Mauger, L.C. Whitely Binder, M. Krosby, and I. Tohver. 2013. Climate Change Impacts and Adaptation in Washington State: Technical Summaries for Decision Makers. State of Knowledge Report Prepared for the Washington State Department of Ecology. Seattle, WA: Climate Impacts Group, University of Washington. http://cses.washington.edu/db/pdf/snoveretalsok816lowres.pdf.

UC Berkeley Hass Working Paper. July 2014. Report of the Market Simulation Group on Competitive Supply/Demand Balance in the California Allowance Market and the Potential for Market Manipulation. http://ei.haas.berkeley.edu/pdf/working_papers/WP251.pdf

U.S. Environmental Protection Agency. 2013. "Facility Level Information on Greenhouse Gases Tool (FLIGHT)." United States Environmental Protection Agency. http://ghgdata.epa.gov/ghgp/main.do.

Washington State Department of Ecology. 2012. Washington State Greenhouse Gas Emissions Inventory 2009 - 2010. Publication no. 12-02-034 (Revised September 2013). Olympia, WA: Air Quality Program. https://fortress.wa.gov/ecy/publications/publications/1202034.pdf.

World Bank. 2014. State and Trends of Carbon Pricing 2014. Washington, DC: World Bank. http://www-wds.worldbank.org/external/default/WDSContentServer/WDSP/IB/2014/05/27/000456286_20140527095323/Rendered/PDF/882840AR0REPLA00EPI2102680Box385232.pdf.

Yale Environment 360. "Putting a Price on Carbon: An Emissions Cap or a Tax?" Yale Environment 360: Yale School of Forestry & Environmental Studies, 2009. http://e360.yale.edu/content/feature.msp?id=2148.

Program Features and Options for a Washington State Linked Cap-and-Trade System and Carbon Tax

This document consists of two tables that describe key program features and options for Washington State. The first table addresses a linked cap-and-trade system, and is relatively extensive, given that linkage with the California and Quebec markets would require that a number of features be either identical or harmonized, and thus linkage would broadly define many of the general parameters of a WA cap-and-trade program. In contrast, a carbon tax as described in the second table, would not be directly linked with any other program, and therefore the design options would be relatively wide open (within the bounds of WA statutes). As a result, the second table is much briefer than the first.

Design Options and Implications of a Linked Washington State Cap-and-Trade Program

If Washington State were to implement a cap-and-trade (C&T) emissions program that is fully linked with California and Quebec, the existing design and operational features of the CA-QC system will influence many features of a WA C&T program. It is important to note in turn that the design features of CA and QC programs are based upon the Design for the Western Climate Initiative (WCI) Regional Cap-and-Trade Program,[1] developed in partnership with WA and other regional jurisdictions.

Building upon the structure of the emissions trading systems handout (meeting #2), the following table lists the key policy design features of the CA-QC system, and describes their implications for the design and operation of a linked WA C&T program.

For each design feature listed below, the third column begins by indicating whether a linked WA C&T would likely need to be either:

- **Identical:** Features that need to be absolutely the same across all jurisdictions. That said, they do not necessarily need to be identical to the current design, as CA and QC regulations could be modified to incorporate WA considerations.
- **Harmonized:** Features that can be tailored to WA to some degree; while they do not need to be identical, they must be equivalent and/or consistent or have a similar outcome.
- **Flexible:** Features that allow significant room for WA to further tailor design and operational features to its unique considerations and priorities.

This assessment aims to account for potential stakeholder concerns (e.g. competitiveness and fairness across jurisdictions, perceived integrity of compliance instruments) in addition to regulatory and operational considerations and constraints. This assessment is based on conversations with representatives from California and Quebec, as well as the review of documentation related to each jurisdictions requirements for linkage.[2]

Feature	California and Quebec C&T (WCI design)	Implications & options for a linked WA C&T
Program start date and compliance period	CA and QC regulations took effect in 2012 (e.g., practice auctions) with compliance obligations starting in 2013. QC and CA linked on Jan. 1. 2014 Three-year compliance periods 1st period- 2013-2014 2nd period 2015-2017 3rd period 2018-2020	Start date would likely need to be **harmonized** Compliance periods would likely need to be **identical** Aligning linked WA program start date with the start of a compliance period (e.g. Jan. 1, 2018) is likely to be the most straightforward option. It allows market actors to plan their compliance strategies across the full 3-year period. Joining the CA/QC system in the

[1] http://www.westernclimateinitiative.org/the-wci-cap-and-trade-program/program-design; http://www.westernclimateinitiative.org/the-wci-cap-and-trade-program/design-recommendations

[2] For information regarding California's regulatory requirements for linkage, please see: the ARB Linkage Webpage (http://www.arb.ca.gov/cc/capandtrade/linkage/linkage.htm), as well as CA Governor's Office webpage on SB 1018 Request for Cap-and-Trade Program Equivalency Findings (http://gov.ca.gov/news.php?id=17933). In particular, it may be useful to review the ARB's Discussion of Findings Required by Government Code section 12894 (http://gov.ca.gov/docs/ARB_Discussion_of_findings_SB_1018-Attachment_4.pdf).

Feature	California and Quebec C&T (WCI design)	Implications & options for a linked WA C&T
	At the end of the period (in the fall of the following year), covered entities must surrender allowances and offsets to cover their compliance obligations (i.e. their emissions over that period).[3]	middle of a compliance period (e.g. in 2016 or 2017) could pose challenges for existing market actors owing, e.g., to corresponding changes in allowance markets, though such challenges might be surmountable.
Emission Reduction Targets/ Limits	CA: 1990 levels by 2020 (statutory requirement); 80% below 1990 by 2050 (not in statute) QC: 20% below 1990 levels by 2020	Would likely need to be **harmonized** (though with some significant room for flexibility) WA's statutory limits are 1990 levels by 2020, 25% below 1990 by 2035, and 50% below 1990 by 2050 (WA RCW 70.235). CA statute requires that any linked jurisdiction's program be as stringent (or more stringent) than the California program. Given that WA's limits for 2020 are numerically identical to CA's, and WA's overall level of effort needed to meet such limits (due to its emissions profile and other considerations) could be deemed equally or more strict (similar to finding for QC), this requirement appears likely to be met. At the same time, such an evaluation may depend upon when it is conducted, proposed start date of linkage, and whether post-2020 targets/limits are relevant at that time. For linkage with QC, a signed linkage agreement is the sole requirement.
Coverage: Sources/ Sectors	(CA/QC) As of 2015, the following sectors will be covered: • Electricity generators and importers • Industrial process facilities • Distributors of transportation fuels • Distributors of natural gas • Distributors of other fuels including liquefied petroleum gas and carbon dioxide suppliers • (QC only) Some sources of high-GWP gases (see below under "gases") • (QC only) Natural gas pipeline transportation (fuel use) These sources/sectors cover ~85% of total GHGs in both CA and QC. Sources excluded from cap coverage include: • Agricultural methane (CH_4) and nitrous oxide (N_2O) • Landfill methane (covered by regulation (and offsets for smaller landfills in QC only) • Carbon dioxide (CO_2) from biomass and biomass fuel components	Would likely need to be **harmonized** (though with some significant room for flexibility) WA program would likely need to cover most if not all of the same sources and sectors included in CA/QC either within the cap or via direct regulation. WA would have the option to cover additional sectors, though doing so could be challenging.

[3] In addition, entities must annually submit allowances and offsets equal to 30 percent of the prior year's emissions.

Feature	California and Quebec C&T (WCI design)	Implications & options for a linked WA C&T
	• Aviation and shipping fuels • CH_4 from coal storage • High GWP gases (direct regulation instead) (CA only)	
Coverage: Gases	CO_2, CH_4, N_20 gases for all sources under the cap. QC includes HFCs, PFCs, SF_6, as well as nitrogen trifluoride (NF_3), from electricity, industrial and manufacturing sectors under the cap. CA covers HFCs, PFCs, SF_6, as well as nitrogen trifluoride (NF_3), and other fluorinated GHGs through direct regulation, and not under the cap.	Would likely need to be **harmonized** Linkage would likely require that WA also cover the same gases and sources either under the cap or through direct regulation. QC covers industrial process emissions from aluminum production under the cap; CA has no aluminum production so these are not covered. QC stakeholders may want to see WA aluminum producers covered in a similar manner.
Coverage: Threshold	Sources that emit at least 25,000 MT CO_{2e} per year are covered. CA (only) allows sources between 10,000 and 25,000 MT CO_2e to elect to "opt-in" for coverage.	Would likely need to be **harmonized.** Linkage would likely require that the threshold of coverage be at or below 25,000 MT CO2e per year. WA could set a lower threshold than 25,000 MT CO_2e (emissions reporting is currently required for facilities at or above 10,000 MT CO_2e per year); in doing so, competitiveness/fairness concerns – across jurisdictions as well as within WA – arising from inclusion of additional entities (between 10,000 and 25,000 MT CO_2e per year) in WA would need to be considered. WA could also consider an opt-in provision similar to CA.
Point of Regulation	• Electricity generators (w/in CA/QC) • Electricity importers, first entity delivering imported electricity • Industrial facility operators • Fuel distributor	Would likely need to be **harmonized.** Linkage would likely require that WA follow the first deliverer approach[4] for the point of regulation for electricity suppliers, as laid out in the WCI Essential Requirements. CA regulation was designed with potential linkage to other transmission-linked jurisdictions, and excludes imported power from sources in another [capped/linked] jurisdiction, thereby avoiding double counting of emissions and allowances from bother jurisdictions. Linkage with WA might thus require that CA would need to reduce the number of free allowances issued to utilities to cover imports from WA, requiring changes to the CA regulation.
Setting the Cap	CA: • 162.8 MMT CO_2e in 2013 (about 2 percent	Would likely need to be **harmonized.** WA's cap would need to follow WCI

[4] In the electricity sector, the regulated entity is defined as the "First Deliverer" or the entity that first delivers electricity to the CA grid. First delivers consist of operators of in-state generation facilities and electricity importers. Only the electricity that is delivered to and consumed in CA is included in the cap, while electricity that is wheeled through CA is not regulated. Additionally, electricity generated in another jurisdiction with a linked cap and trade system is not regulated. For more information, please see http://www.rggi.org/docs/ProgramReview/LearningSession1/Presentation_Scott_Murtishaw_CA_PUC.pdf

Feature	California and Quebec C&T (WCI design)	Implications & options for a linked WA C&T
	below the emissions level forecast for 2012) • 394.5 MMT CO_2e in 2015 (includes all covered sectors) • 334.2 MMT CO_2e in 2020 (15% reduction between 2015 and 2020) QC: • 23.7 MMT CO_2e in 2013 • 63.3 MMT CO_2e in 2015 (includes all covered sectors) • 51 MMT CO_2e in 2020	recommendations, the basis for the CA and QC caps. It would need to consider expected emissions levels in the first year of compliance, the State's emission reduction targets, and the coverage of cap-and-trade system. Cap would also need to be set in light of projected emissions in uncapped sectors. Alignment may be needed between the way in which electricity is treated in the state's inventory (consumption-basis) and statutory limit and in a linked C&T program (first jurisdictional deliverer basis).
Cost Containment and Price floor for Allowances	CA and QC use an identical allowance price containment reserve (APCR) to contain prices[5]. The reserves are filled with 4.9% of total emission allowances in the program. Sale of allowance reserves is available only to covered entities. QC has a slightly stricter policy than CA; QC entities cannot purchase allowances from the reserve if they already have allowances in their general holding account. There is no similar restriction in CA. Both CA and QC have a price floor, which started at $10 per metric ton in 2012and rises 5% per year (plus inflation) starting in 2013.	Would likely need to be **identical** Linkage would require that WA have an identical approach to the price floor and allowance price containment reserve as in CA and QC. However CA/QC may make further adjustments to the reserve design feature, and may welcome WA input in this regard.
Allowance Distribution: Energy-Intensive and Trade-Exposed Industries	CA allocates free allowances to energy intensive industries for leakage prevention and transition assistance, at a declining rate over time.[6] Allocation is based on a production-based or energy-based benchmark per unit of production for covered entity or opt-in covered entity. Projections of production in the coming year are used to determine the amount of free allocation. CA uses an ex post true-up of free allowance allocation based on actual reported production.[7] QC allocates free allowances to the specific industries to address global competitiveness concerns.[8]	**Flexible** Linkage does not specifically dictate how WA would need distribute allowances (e.g. either through free allocation or auction). However, program participants are keenly aware of any differences in allocation across jurisdictions (i.e. if one jurisdiction does something they come to the other and ask why that same thing is not done there etc.). As a result, it is critical for jurisdictions to know and understand approaches in each jurisdiction. In a few cases, if WA takes a different approach it would likely raise a political or stakeholder-related concern rather than a technical impediment with respect to linkage.

[5] To ensure that prices do not spike, a percentage of allowances from 2013–2020 are set aside at the beginning of the program into the APCR. If needed, these allowances are offered for sale through a reserve auction at three pre-set price tiers: $40, $45, and $50, which also increase by 5% annually plus the rate of inflation. Once all of the allowances in the first price tier are sold, allowances will then be sold at the second tier price and so forth.

[6] Industries that receive allowance allocation in CA include: petroleum refineries; crude petroleum and natural gas extraction; cement manufacturing; industrial gas manufacturing; mineral mining and lime manufacturing; fruit and vegetable canning; glass manufacturing; paper manufacturing, dairies; iron, steel and aluminum processing; chemical, biological and pharmaceutical manufacturing; breweries, wineries and juice manufacturing. See http://www.arb.ca.gov/cc/capandtrade/allowanceallocation/sector_based_industrial_allocation.pdf

[7] If production is lower than expected, then a benchmarked entity must return some allowances; if it is higher, then they receive added allowances.

[8] Aluminium; Lime; Cement; Chemical and petrochemical industry; Metallurgy; Mining and pelletizing; Pulp and paper; Petroleum Refining; Others: manufacturers of glass containers, electrodes, gypsum products, and some agri-food establishments. See http://www.mddelcc.gouv.qc.ca/changements/carbone/SPEDE-description-technique-en.pdf

Feature	California and Quebec C&T (WCI design)	Implications & options for a linked WA C&T
	Similar to CA, allocation is based on efficiency benchmarks. Between 2012 and 2014, allowances will be freely allocated based on an entity's average historic emissions intensity between 2007 and 2011 and adjusted for production output, with 100% allocation for process emissions, 80% for combustion emissions, and 100% for emissions from other sources.[9] Beginning in 2015, free allocation to these industries will gradually decline and more allowances will be auctioned.	The options that WA could select from include similar or alternative approaches to addressing: • leakage prevention and transition assistance for specified industries (different benchmarking methods, approaches to determining eligibility, and whether and how to "true up"); • electricity and natural gas distributors (extent of free allocation) and ratepayers (lump sum vs. usage based rebates; eligible ratepayer categories); and, • transportation fuel distributors and consumers. At the same time, significant differences with approaches used in other jurisdictions may create concerns there. For example, CA (ARB) does not support free allocation for transportation fuels, as there is viewed to be no consumer benefit from doing so.
Allowance Distribution: Electricity (and Natural Gas) Supply	CA: Free allowances allocated to electric distribution utilities on behalf of ratepayers. Electric distribution utilities must use the value associated with the allowances for the benefit of retail ratepayers. All residential and commercial customers receive a climate rebate based on this value. For residential customers the rebate is per electric meter, for commercial customers it is usage based. There are some differences in allocation approach for POUs vs. IOUs.[10] A similar approach is planned for natural gas distribution utilities once they are covered in 2015. QC: Free allowances may be allocated to thermal power producers with long-term supply contracts signed prior to Jan. 1, 2008, and to compensate for electricity imports already covered by the RGGI system. No free allowances are provided to electricity or natural gas distribution utilities.	
Allowance Distribution: Transportation Fuels and Other	All remaining allowances are auctioned, including for transportation fuels, through quarterly auctions. (CA and Quebec will hold their first joint auction in November 2014.) In 2015 this will include all allowances for transportation fuels.	
Use of Auction Proceeds (Revenue)	In CA, all auction proceeds and allowance price containment reserve sales are deposited into the CA Greenhouse Gas Reduction Fund.[11] Based on goals for use of revenue,[12] the legislation requires that: • At least 25% of revenues must be allocated to projects that benefits	**Flexible** Linkage does not restrict how WA uses the revenue from the sale of allowances. The WCI developed a long and broad list of guidelines, but there are no strict guidelines for linked jurisdictions. Could aim for revenue-neutrality (by reducing other taxes), support low-carbon investment, or achieve

[9] http://www.ieta.org/assets/ieta_quebec%20cap%20and%20trade%20summary.pdf
[10] See http://www.arb.ca.gov/cc/capandtrade/allowanceallocation/allowanceallocation.htm for more information
[11] For more detailed information see http://www.arb.ca.gov/cc/capandtrade/auctionproceeds/auctionproceeds.htm
[12] CA has established the following goals for use of revenues: Maximize economic, environmental, and public health benefits to the state; Foster job creation by promoting in-state GHG emissions reduction projects carried out by California workers and businesses; Complement efforts to improve air quality; Direct investment toward the most disadvantaged communities and households in the state; Provide opportunities for businesses, public agencies, nonprofits, and other community institutions to participate in and benefit from statewide efforts to reduce greenhouse gas emissions; Lessen the impacts and effects of climate change on the state's communities, economy and environment.

Feature	California and Quebec C&T (WCI design)	Implications & options for a linked WA C&T
	disadvantaged communities;[13] and • At least 10% of revenues must be allocated to projects located in disadvantaged communities. Aside from these restrictions the legislation identifies the following eligible investments for the use of revenue:[14] • Low-carbon transportation and infrastructure • Strategic planning for sustainable infrastructure • Energy efficiency and clean energy • Natural resources and solid waste diversion In QC, revenues are entirely allocated to funding the Quebec 2013-2020 Climate Change Action Plan[15] (mitigation, adaptation, and awareness raising). These include: • Supporting initiatives to reducing emissions mainly from transportation, industrial (including manufacturing), and building sectors • Establishing partnerships with communities and civil society, including sustainable land-use planning and public outreach. • Supporting innovative enterprises • Supporting climate adaptation efforts.	other objectives.
Market Rules	CA allows banking of allowances for unlimited time, with holding limits for entities based on a multiple of an entities annual allowance budget. No direct borrowing of allowances from future periods is allowed. Limited, indirect borrowing may occur due to provisions for shortfalls in the QC strategic allowance release in early years or due to incurring non-compliance penalties in CA. CA and QC have various mechanisms in place to prevent market manipulation (e.g. holding limits, purchase limits, instrument transfer requirements, account registration requirements).	Would likely need to be **identical.** Some differences may arise in detailed provisions such as those noted to the right.
Offsets Eligible	Offsets issued by CA/QC are fully fungible in both jurisdictions and valid for compliance.	Would likely need to be **harmonized.** Linkage would require that WA accept offsets issued

[13] In CA, CalEPA has identified disadvantaged communities based on areas disproportionately affected by environmental pollution and negative public health effects, exposure or environmental degradation; and areas with concentrations of people that are of low income, high unemployment, low levels of home ownership, high rent burden, sensitive populations or low levels of educational attainment. CA used the CalEnviroScreen tool to identify the zip codes in the top 10% with regards to burden of pollution and applicable population characteristics.

[14] In CA, programs funded through the use of revenues can be implemented by the state of CA, local and regional agencies, local and regional collaboratives, and nonprofit organizations coordinating with local governments.

[15] For more information see http://www.budget.finances.gouv.qc.ca/Budget/2012-2013/en/documents/climate.pdf

Feature	California and Quebec C&T (WCI design)	Implications & options for a linked WA C&T
	Offset projects must follow compliance offset protocols approved by respective governments. In CA, compliance offset protocols have been approved for improved forest management, urban forests, livestock manure management, ODS and coal mine methane. A methane rice protocol is pending. Projects using these protocols must be located in the US. In QC, compliance offset protocols have been approved for livestock waste digesters, small landfill, and ODS destruction. Projects must be located in Canada. CA and QC differ in how they deal with the invalidation of offsets after they have been used for compliance. In QC invalidated offsets are replaced with credits from a buffer pool that is filled by applying a 3% buffer discount to all issued credits. In CA, the entity that has used the invalidated offset credit for compliance is required to replace the credits. The liability rests with the offset owner.	by CA/QC using their respective approved protocols for compliance. WA would have the ability to work with CA and QC to develop new protocols, following WCI guidelines and requirements.[16]
Offset Limits	Both CA/QC limit the use of offsets to 8% of an entity's compliance obligation. Consistent with WCI design recommendations, the limit was originally set at 4% of an entity's compliance obligation, based on the notion that offsets could provide no more than 49% of total emission reductions yielded by the C&T program. When CA and QC agreed to put 4% of allowances into an allowance reserve (per above), an additional 4% of offsets was made available, thus resulting in the 8% limit.	Would likely need to be **harmonized** (though with some room for flexibility may exist). Linkage might require that WA limit the use of offsets to no more than 8% of an entities compliance obligation (or 49% of total emission reductions), assuming that 4% of allowances were placed in a reserve consistent with CA and QC. It would be difficult to justify an offset limit greater than 8%. There might be flexibility for WA to have a more stringent offset limit or to allow no offsets whatsoever. However, WA entities may express concern that doing so could reduce their compliance options (and increase costs) as compared with CA and QC entities.
Administrative Systems	Market rules are identical in CA and QC. QC and CA both use the CITSS system for all tracking of allowances and offsets by program participants. QC and CA both use the same auction platform to manage auctions and the reserve price containment mechanism. CA relies on third party registries (including the	Would likely need to be **harmonized/identical.** Linkage would require that WA have: • identical market rules to CA and QC to ensure equitable treatment of all program participants and prevent unintended market distortions that could disrupt market functioning. • close coordination of the management and release of market sensitive information all program participants must have equal opportunity to access market sensitive

[16] See http://www.westernclimateinitiative.org/wci-committees/19-offsets-committee

Feature	California and Quebec C&T (WCI design)	Implications & options for a linked WA C&T
	American Carbon Registry and the Climate Action Reserve).	information at the same time. Linkage would allow WA to use the CITSS system and the WCI auction platform. The program requirements that define the tracking system and auctions would consequently need to be identical. WA could also use the same third party registries for offsets as CA.
Reporting and Verification	Sources that emit at least 10,000 MT CO2e per year must report emissions. Capped entities (at least 25,000 MT CO2e per year) have more rigorous annual reporting requirements CA/QC reporting requirements and verification programs (based on ISO standards) and are consistent with WCI's Essential Requirements document. CA/QC both prescribe similar, but slightly different, methods for estimating data that is missing. Both approaches are consistent with U.S. EPA reporting requirements and WCI recommended methods	Would likely need to be **harmonized.** WA already uses reporting requirements and verification procedures that are also consistent with WCI's Essential Requirements document.
Compliance & Enforcement mechanisms	Both CA and QC have the authority to enforce the program and impose penalties. In CA, ARB has the authority to impose penalties for violations of any aspect of the program regulation. In QC, the Ministry of Environment (governing body of C&T) has the ability to impose monetary penalties and penal proceedings to entities found to be in violation or non-compliance of regulatory requirements. Also, in either jurisdiction if a deadline for surrendering allowances and offsets is missed, or there is a shortfall, four allowances must be provided for every ton of emissions that was not covered in time (3 for 1 penalty plus shortfall).	Would likely need to be **harmonized.** Linkage could require that WA have the ability to enforce the cap-and-trade system and that the enforcement capabilities be consistent with approaches in CA and QC.

Options for Washington State under a carbon tax approach (BC Carbon Tax as a reference)

Policy Design Features	BC Carbon Tax	Options for WA
Program start date	2008 (Started 5 months after legislation passed)	Might be as soon as months after legislation approved.
Emission Reduction Targets/Limits	In BC, legislated targets to reduce GHG emissions from 2007 levels: • -6% by 2012 (interim target) • -18% by 2016 (interim target) • -33% by 2020 (legislated) • -80% by 2050 (legislated)	See prior (linked C&T) table above.
Coverage: Sources/Sectors/ Fuels	Carbon tax applies to virtually all fossil fuels, including gasoline, diesel, natural gas, coal, propane, home heating fuel and of peat and tires combusted for heat or energy. Covered fuels/sources account for approx. 70% of total GHG emissions in British Columbia. [17] Emissions not covered include: • Non-energy agricultural sources (e.g. enteric fermentation, manure management, and agricultural soils) and waste (landfills) (10% of BC emissions); • Fugitive emissions that cannot currently be accurately measured (~10%) • Industrial process emissions (6%) Net deforestation (5%)	Many coverage options possible: • Same as or similar to CA/QC (see above – broader inclusion of high GWP gas sources) • Same as or similar to BC (broader range of fuels) • Other
Coverage: Gases	CO_2, CH_4, N_2O	
Point of Regulation	At the wholesale level, e.g. where motor fuel taxes are collected.[18]	Options for point of regulation (tax collection) include: • Same or similar to CA/QC (sources over 25,000 tCO2e per year, including electricity and fuel suppliers and distributors) • Same or similar to BC (as indicated to the right) • Other
Setting the Tax Level	BC has specific carbon tax prices set by fuel type. The price began at $10 CAD per ton, and rose in $5 annual increments to the final price of $30 CAD (currently US$28) per ton CO_2e in 2012. $30 CAD per ton CO2e is equivalent to $0.26 US per gallon for gasoline and $0.29 per gallon for diesel and home heating oil.[19]	Many tax level options are possible: • Set rate schedule (flat or increasing over time, as in BC) • Pegged to other jurisdictions' current or expected carbon prices (e.g. CA/QC, BC, or other)

[17] British Colombia Ministry of Finance (2008). Budget and Fiscal Plan: 2008/09 – 2010/11. http://www.bcbudget.gov.bc.ca/2008/bfp/2008_Budget_Fiscal_Plan.pdf
World Bank Group. (2014). State and Trends of Carbon Pricing. Page 79. http://www.ecofys.com/files/files/world-bank-ecofys-2014-state-trends-carbon-pricing.pdf
[18] British Colombia Ministry of Finance (2008). Budget and Fiscal Plan: 2008/09 – 2010/11. http://www.bcbudget.gov.bc.ca/2008/bfp/2008_Budget_Fiscal_Plan.pdf, p.12
[19] British Columbia Ministry of Finance. How the Carbon Tax Works. http://www.fin.gov.bc.ca/tbs/tp/climate/A4.htm. Using current exchange rates of 1.07 CAD/USD (7/16/14).

Policy Design Features	BC Carbon Tax	Options for WA
	The BC Government has committed to freezing the tax rate for five years, but may be revise it if other jurisdictions, especially in North America, introduce similar carbon pricing instruments.[20]	• Adjusted automatically or by a panel as needed to help meet statutory limits • Other One proposal[21] for WA suggests a $25/tCO2 tax on fossil fuels consumed in WA, with $15/tCO2 phase-in price for the first year.
Exemptions/ Concessions	80% exemption to the carbon tax on natural gas and propane for heating and CO2 production for greenhouse growers, and exemption for (dyed) gasoline and diesel purchased by farmers from January 2014.[22]	Many exemption options are possible.
Use of Revenue	The BC carbon tax is revenue neutral. All revenue generated by the carbon tax is returned to individuals and businesses through reductions to other taxes. The carbon tax is forecast to generate an estimated $1.8 CAD billion over three years.[23] • Designed to protect low wage earners who are the least able to absorb the cost of the carbon tax and least able to benefit from cuts on personal income tax. • The credit provides an annual maximum of $115.50 CAD for each adult and $34.50 for each child ($115.50 for the first child in a single-parent household.) • Independent research has found that if the carbon tax is maintained in its current form, the average household in BC will be better off by $121 per year in 2020 than if the tax had not been implemented.[24]	Options for use of tax revenue would be the same (or similar) to those outlined under "use of auction proceeds" in the C&T table above. Could aim for revenue-neutrality (by reducing other taxes), support low-carbon investment, or achieve other objectives.
Banking/ Borrowing	Not relevant	
Offsets Eligibility and Limits	Not allowed	Some jurisdictions (e.g. Mexico and South Africa) are considering offsets as an alternative compliance option (instead of tax payment).
Reporting	Administratively, the carbon tax is applied and collected in essentially the same way that motor fuel taxes are currently applied and collected, except natural gas which is collected at the retail level, in order to minimize administration and compliance costs.[25]	
Verification	Government holds the right to (1) inspect, audit and examine accounting records; (2) inspect,	

[20] World Bank Group. (2014). State and Trends of Carbon Pricing. Page 86. http://www.ecofys.com/files/files/world-bank-ecofys-2014-state-trends-carbon-pricing.pdf
[21] Carbon Washington, http://carbonwa.org/policy/, as accessed 7/16/14.
[22] World Bank Group. (2014). State and Trends of Carbon Pricing. Page 79. http://www.ecofys.com/files/files/world-bank-ecofys-2014-state-trends-carbon-pricing.pdf
[23] British Columbia Ministry of Finance. B.C.'s Revenue-neutral Carbon Tax. http://www.bcbudget.gov.bc.ca/2008/backgrounders/backgrounder_carbon_tax.htm
[24] British Columbia Ministry of Finance. B.C.'s Revenue-neutral Carbon Tax. http://www.bcbudget.gov.bc.ca/2008/backgrounders/backgrounder_carbon_tax.htm
[25] British Columbia Ministry of Finance. How the Carbon Tax Works. http://www.fin.gov.bc.ca/tbs/tp/climate/A4.htm

Policy Design Features	BC Carbon Tax	Options for WA
	ascertain the quantities of, and take samples of fuel.[26]	
Compliance & Enforcement mechanisms	Uses existing tax authority. Imposes a penalty equal to 100% of the amount not remitted or paid.[27]	
Governance and Institutions	Ministry of Finance	

[26] BC Bill 37 – 2008: Carbon Tax Act. Inspection and audit powers. http://www.bclaws.ca/Recon/document/ID/freeside/00_08040_01#part6

[27] BC Bill 37 – 2008: Carbon Tax Act. Penalties. http://www.bclaws.ca/Recon/document/ID/freeside/00_08040_01#part6