Western Climate Initiative

Final Complementary Policies White Paper

May 20, 2010

Table of Contents

1 Background and Purpose

The Western Climate Initiative (WCI) Partners have recommended a comprehensive regional effort to reduce emissions of global warming pollution, combining a broad cap-and-trade program with complementary policies to achieve the WCI 2020 regional emissions goal.[1] Complementary policies can address market barriers that would otherwise limit the use of low-cost greenhouse gas (GHG) emission-reduction options and reduce emissions from sources excluded from the cap-and-trade program. Thus, complementary policies can lower the overall cost of reducing GHG emissions. This view is supported by the 2008 economic analysis of WCI's cap-and-trade design, which incorporated complementary policies related to energy efficiency and tailpipe emission standards. The analysis found that the WCI 2020 reduction goals can be achieved with small overall net savings due to reduced energy expenditures exceeding the direct costs of greenhouse gas emission reductions.[2]

As part of the WCI 2009-2010 Workplan, the WCI Partner jurisdictions formed the Complementary Policies Committee. The charge of the Committee is to recommend to the WCI Partner jurisdictions those policies which, if harmonized across multiple states and provinces both within and outside the WCI Partner jurisdictions, would help achieve the regional emissions reduction goals and assist with the transition to a low-carbon economy. By harmonizing complementary policies, the WCI Partner jurisdictions intend to foster increased market certainty, encourage trade among participating jurisdictions, reduce administrative costs and streamline regulatory procedures.

As a first step, the Committee prepared this white paper to solicit input from stakeholders on:

- the policies it recommends for further evaluation as outlined in its workplan;
- the Committee's recommended evaluation criteria;
- key issues or barriers to harmonization; and
- benefits that could accrue to the Partner jurisdictions and businesses that operate in more than one jurisdiction, if implementation is harmonized.

The Committee submitted the draft white paper for public review on December 1, 2009. The Committee held a webinar on December 7, 2009 to present the paper to stakeholders and clarify any questions they might have. At the end of the 60-day comment period on January 29, 2010, a total of 17 comments had been received. WCI carefully considered all public comments and amended the initial draft to produce a final white paper. Appendix 2 discusses

[1] The WCI GHG reduction goals, established in 2007, call for an aggregate reduction in the region of 15 percent below 2005 levels by 2020 and, over the long term, a reduction that significantly lowers the risk of dangerous threats to the climate. *See* http://www.westernclimateinitiative.org/component/remository/general/Emission-Reduction-Goal-Aug-2007/.

[2] *See* WCI, Appendix B: Economic Modeling Results, Sept. 23, 2008, at: http://www.westernclimateinitiative.org/component/remository/Economic-Modeling-Team-Documents/.

the comments received and provides WCI's responses. The specific comments can be reviewed at http://www.westernclimateinitiative.org/public-comments/document/14.

This paper also discusses why and when policies complementary to a cap-and-trade program are useful, how complementary policies help achieve the WCI's GHG reduction goals, and which policies would affect emissions under the cap and which would affect emissions from sectors and sources outside the cap.

1.1 The Role of Complementary Policies

The WCI Partner jurisdictions have designed an economy-wide, cap-and-trade program to reduce emissions in accordance with the WCI GHG reduction goals, while maximizing market efficiency in achieving those reductions. Putting a price on GHG emissions will result in investments in technologies and other actions that will reduce emissions. However, some activities that reduce emissions cost-effectively do not respond to this price signal: so-called market barriers prevent or impede the diffusion of cost-effective technologies and practices that could mitigate GHG emissions. The distribution of the costs and benefits of improving a building's energy performance is an instructive example of a market barrier. In commercial buildings, the cost of improvements is typically borne by the owners, however, the benefits are enjoyed by the tenants through lower energy bills. Because building owners do not realize directly the financial benefit from their efficiency investments, they are less likely to make those investments. A well designed energy efficiency program can provide the needed incentive to make those investments.

Complementary policies achieve a variety of objectives in addition to reducing GHG emissions and removing market barriers. They can:[3]

- Achieve reductions outside (or below) the cap
- Encourage investments in low-carbon technologies
- Lower the cost per metric ton of reductions in GHG emissions covered by the cap-and-trade program
- Lower the cost of transitioning to a low carbon economy
- Prevent emissions and economic leakage
- Create and retain clean energy jobs

Given the role complementary policies play in the transition to a low-carbon economy, a comprehensive program that combines a cap-and-trade program with targeted complementary policies will deliver emissions reductions at a lower cost to consumers, measured as the cost per ton of avoided GHG emissions.[4]

[3] Western Climate Initiative 2009-10 Workplan, updated June 23, 2009, p, 36.

[4] *See* Testimony of Richard Cowart, Regulatory Assistance Project, Before the Committee on Energy and Commerce Subcommittee on Energy and Environment, U.S. House of Representatives, April 23, 2009, "The Consumer

Complementary policies will interact with the GHG emissions cap differently at the start of the program than after it has begun. Prior to the commencement of the cap-and-trade program, complementary policies may reduce emissions at sources covered by the program, decreasing the overall emissions reductions required to be achieved by the cap-and-trade mechanism. As the cap-and-trade program begins in 2012, each partner's allowance budget will effectively incorporate prior reductions achieved through complementary policies.[5] Following the start of the cap-and-trade program, complementary policies can play an important role in helping facilities operate under the program in a cost-effective manner while also moderating allowance prices. For example, energy efficiency programs can address barriers to cost-effective investments and include programs that offer the following types of assistance:

- Information, education, marketing and technical assistance to make consumers aware of energy efficiency opportunities and the technical means to achieve energy reductions
- Grants and rebates to reduce the cost to the consumer of investing in energy efficiency products and services
- Financing to provide consumers with positive cash flow and the means to retrofit buildings or replace inefficient equipment that achieve future reductions and associated savings

The WCI Partners would also like to consider the potential benefits of harmonizing complementary programs among not only WCI jurisdictions, but also states and provinces that are not part of the WCI. This would require having them participate with the WCI organization as it moves forward in its evaluation of selected complementary policies.

1.2 Evaluating and Prioritizing Policies

The Committee's next step will be to more fully evaluate selected policies based on the following criteria, which are intended to help the Committee determine whether and how each policy should be harmonized and how each policy will help achieve WCI's emissions reduction goals:[6]

- The policy will reduce GHG emissions.
- The policy is expected to reduce costs associated with achieving the WCI goals for covered facilities.
- Administrative costs are expected to be manageable.
- Impacts on low-income communities or small businesses can be mitigated.
- Meaningful benefits to harmonizing implementation have been identified.

Allocation for Efficiency: How Allowance Allocations Can Protect Consumers, Mobilize Efficiency, and Contain the Costs of GHG Reduction," at http://energycommerce.house.gov/Press_111/20090423/testimony_cowart.pdf.

[5] Each jurisdiction's allowance budget will be calculated by using the best estimate of expected emissions for sources covered in the cap-and-trade program considering both voluntary and mandatory emission reductions through 2011, thus reductions achieved due to complementary policies will be reflected in each jurisdiction's starting allowance budget.

[6] Refinement of criteria in Western Climate Initiative 2009-2010 Workplan, p. 38.

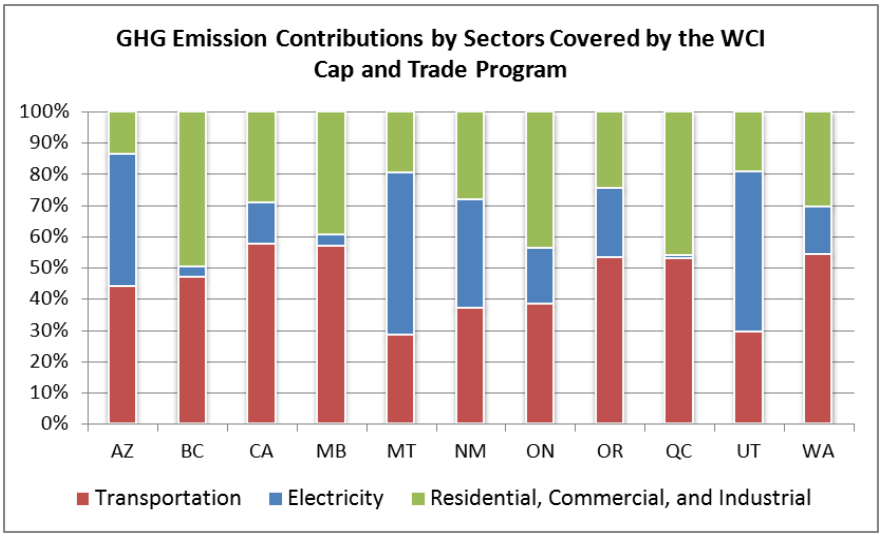
- Identified barriers to harmonizing implementation can be overcome.
- The policy addresses a perceived market failure.
- An opportunity to achieve collateral benefits (e.g., conserving water) has been identified.
- No collateral detriments (e.g., increased use of electricity that results in increased GHG emissions,[7] increased fine particulates or air toxics pollution) have been identified.
- The policy does not encourage leakage outside the cap.
- The policy has the potential to create or retain clean energy jobs or otherwise transition to a low-carbon economy.

These criteria are intended to help the Committee determine whether and how each policy should be harmonized and how each policy will help achieve WCI's emissions reduction goal.

After identifying an initial set of policies for further consideration, the Committee prioritized them using three tiers to assist with scheduling the Committee's work. Policies in the highest tier (Tier 1) will be evaluated first. The tiering of policies is based on the benefits of cross-jurisdictional harmonization, total GHG reduction benefits, and immediacy and ease of implementation (based on current or required efforts by jurisdictions). Tier 1 policies represent priority actions for the WCI Partners to consider because of their immediate impact in reducing GHG emissions and producing benefits from harmonization, and because they are currently underway or in development by multiple jurisdictions.

1.3 Policies Recommended for Evaluation

The accompanying graph shows for each WCI Partner jurisdiction the relative contribution of GHG emissions by each sector to be covered under the WCI cap-and-trade program.



Each of the WCI Partner jurisdictions has a climate action plan that delineates various policy instruments needed to achieve the jurisdiction's own emissions reduction goals or targets. The Committee used these plans to identify policies for consideration in this white paper. Listed below are the policies the Committee recommends for further evaluation.

[7] Where electricity substitutes for higher GHG-emitting transportation fuels, its increased use would be a benefit.

Energy Production

- Small-scale renewable energy resources (Tier 1)
- Combined heat and power (Tier 1)
- Hydropower (Tier 1)
- Emissions performance standards for electric generating units (Tier 1)
- Tradable renewable energy credits (Tier 2)
- Carbon capture and sequestration (Tier 2)

Energy Efficiency

- Energy efficiency targets (Tier 1)
- Energy efficiency programs and incentives (Tier 1)
- Energy savings credits (Tier 2)

Transportation

- Low-carbon fuel standard (Tier 1)
- Freight transportation infrastructure (Tier 1)
- Pay-as-you-drive insurance (Tier 2)
- Heavy-duty vehicle equipment (Tier 2)
- Electric and alternative fuel vehicle infrastructure (Tier 2)
- Vehicle emissions labeling (Tier 3)
- Medium- and heavy-duty vehicle hybridization (Tier 3)
- Transport refrigeration units (Tier 3)

Industrial Sector

- Emissions performance standards for major industrial sources (Tier 3)

High Global Warming Potential (GWP) Gases

- Regulatory measures for high GWP gases (Tier 1)

Agriculture

- Agricultural anaerobic digesters (Tier 2)

Waste Management

- Measures for landfill methane reduction (Tier 2)

Appendix A shows which of these complementary policies, if implemented, would reduce emissions from capped sources and sectors, and which policies would reduce emissions from uncapped sources and sectors.

It is important to note that many important complementary policy initiatives are not proposed to be evaluated by the Committee because they are being fully examined and developed in other venues. These other important policies are described briefly in Section 5 of this paper.

1.4 Next Steps

The Complementary Policies white paper was reviewed and approved by the WCI Partners on May 20, 2010 at their meeting in Seattle, Washington. The Complementary Policies Committee will next begin to evaluate the policies that are included in this paper to more fully identify the key issues and benefits. The Committee will evaluate necessary and available resources for next steps to address as many policies as practicable beginning with Tier 1 recommendations.

The Committee will also attempt to identify other related issues, such as needed jobs or skill sets to effectuate the policies. The outcome of the evaluation process will be design recommendations to facilitate regional harmonization of the policies.

The Committee will continue to engage stakeholders in future work and is currently developing an outreach plan to consider a number of options for doing so based on comments from stakeholders. The Committee also will produce reports that address two additional policy areas: 1) workforce transition, job creation, job retention and mitigation of community impacts associated with climate-related policies; and 2) climate change adaptation.

2 Tier 1 Policies

2.1 Energy Production

- Small-scale renewable energy resources
- Combined heat and power
- Hydropower
- Emissions performance standards for electric generating units

2.1.1 Small-Scale Renewable Energy Resources

Small-scale renewable resources include solar photovoltaic systems, solar water heating systems, community-scale wind turbines, geothermal systems, biomass digesters, micro-hydro systems, and generating systems that run on wood waste, agricultural waste, or waste gas from landfills or water treatment plants. These systems can help meet power and thermal energy needs and reduce GHG emissions. They can be installed at homes and businesses to supply on-site energy needs. In addition, utilities and third parties can build small-scale generating facilities as system resources for all customers.

Potential Policies. State/provincial policy options to address the barriers to small-scale renewable energy sources – many of which have been adopted in one or more WCI Partner jurisdictions – include the following:

Workforce training – Support for local and regional training programs may help ensure sufficient numbers of trained installers. Equipment and installer certification programs and random inspection of installations promote quality workmanship.

Public outreach and education – Public information can help consumers understand the benefits of small-scale renewable energy resources, how to undertake a project, and available assistance and funding options.

Uniform interconnection processes - Uniform technical standards, procedures and agreements can remove barriers and simplify the interconnection of small generators with utility systems, where appropriate. For projects with complex interconnection needs, reasonable timelines, fees and other requirements can be put in place for additional technical review and equipment that may be needed.

Power arrangements with the utility – Among the options:

- "Net metering" is a billing arrangement where the utility bills the customer only for the difference between the energy consumed at the premises and the energy produced by a qualifying system at the site. Any excess energy produced flows onto the utility grid for use by other customers, eliminating the need for the customer to have on-site storage or to to arrange for power sales to third parties. While net metering programs are

widespread, many do not require all utilities in a state to participate or include all customer classes. Programs also may be constrained by low limits for individual project size and aggregate capacity, payment provisions for excess energy, insurance and equipment requirements, standby rates, and restrictions on third-party ownership of systems.[8]

- The Public Utility Regulatory Policies Act (PURPA)[9] requires utilities in the U.S. to interconnect with and purchase all capacity and energy from "Qualifying Facilities" up to 80 megawatts (MW) that use eligible renewable resources[10] at rates equal to the cost of the utility's avoided resource (for example, market purchases or a natural gas-fired power plant). States have broad discretion in implementing PURPA. Among the provisions for successful state programs are long-term contracts with fixed rates, standard avoided cost rates, commission-approved standard contract forms for small-scale projects, and methods for determining avoided costs that fully account for the value of the renewable energy to the utility system.
- Feed-in tariffs (FITs), also known as Advanced Renewable Tariffs, can provide rates that make it attractive for electricity to be produced by third parties (non-utilities) using renewable resources. Rates may vary by technology, geographic location and project size. FITs can encourage development of a variety of renewable energy projects. Like PURPA, FITs guarantee the right to interconnect and a buyer for the electricity, and payment is based on actual production. However, FIT rates are based on the cost of renewable energy generation, not the utility's avoided resource. Typically included in FIT rates is a return on investment sufficient to make the project worthwhile for investors.
- Targeted procurement of small-scale renewable energy resources that recognizes their unique benefits can incorporate many of the same features as a FIT, such as a must-take obligation and standard contract terms, but allow for market-based pricing through a reverse auction or similar mechanism.

Standby rates – Practices include cost-based rates, providing customer-generators choices for firm and non-firm service, including daily rates, allowing them to self-supply reserves and assure instantaneous load reductions to avoid standby charges, and providing supplemental power and maintenance service – with appropriate advance notice – at the customer's otherwise applicable tariff rate.

Utility resource planning and procurement – Utility resource planning and procurement often does not evaluate and include small-scale renewable resources for meeting generation and transmission needs. Similarly, the value of distributed generation typically is not considered in distribution system planning. Including distributed generation in utility

[8] A third party pays the upfront cost of the system; builds, installs and owns it for a specified term; takes advantage of tax, depreciation and other financial incentives; and sells the energy to the consumer hosting the system. The consumer reduces its bills through a net metering agreement with the utility. This financing model is especially important to local governments, schools, churches and others that cannot raise the capital for the project or take advantage of some government incentives.

[9] U.S. Public Utility Regulatory Policies Act, 16 U.S.C. § 824a-3.

[10] And qualifying cogeneration facilities of any size.

planning and acquisition processes helps states and provinces examine whether and how to use these resources to meet energy, capacity, distribution and transmission system needs.

Decouple utility sales from utility profits - "Decoupling" removes the link between utility sales and revenue so that the utility is indifferent to, rather than financially harmed by, customer-side distributed generation and efficiency measures.[11] Under decoupling, retail customer rates established to recover fixed utility costs are adjusted periodically to keep utility revenue at the level allowed by regulators.

Key issues to consider in developing small-scale renewable energy resources include:

- **Interconnection** – In the U.S., states generally have jurisdiction over interconnection (and sales) between customer-sited generation and retail electric utilities.[12] Utility interconnection processes may result in undue delays in gaining approval of applications, as well as undue costs associated with insurance and equipment which, upon closer examination, regulators may find unnecessary.

- **Power sales** – Utility procurement generally does not adequately consider small-scale distributed systems, despite their potential advantages, such as more rapid deployment and lower development risk compared to large projects. Small systems may not meet the minimum bid size for utility competitive bidding processes and wholesale markets, and the market for aggregation of small systems is immature. In addition, the prices utilities pay for renewable energy may be too low to drive significant development of small-scale systems.

- **Standby rates** – Unless prohibited by regulation, utilities may charge customer-generators special rates for back-up power when their on-site generator isn't running and for supplemental power to meet the customer's energy needs beyond the generator's capacity. Unless properly designed, standby rates can render a project uneconomic.

- **Utility planning** – Utility resource planning typically does not adequately evaluate and include small-scale renewable resources for meeting generation and transmission needs. Nor is the value of distributed generation typically considered in distribution system planning, where it could have especially high value in deferring costly upgrades to meet capacity needs in specific locations. Furthermore, those locations are not revealed to consumers or the marketplace.

[11] *See* National Action Plan for Energy Efficiency, *Aligning Utility Incentives With Investment in Energy Efficiency*, November 2007, at http://www.epa.gov/cleanenergy/energyprograms/napee/resources/guides.html; Regulatory Assistance Project, *Revenue Decoupling Standards and Criteria: A Report to the Minnesota Public Utilities Commission*, June 2008, at http://www.raponline.org/Pubs/MN-RAP_Decoupling_Rpt_6-2008.pdf.

[12] The Federal Energy Regulatory Commission has jurisdiction over interconnection of generating facilities for wholesale sales.

- **Utility disincentives** – Utilities recover a large amount of their fixed costs through volumetric rates. When customers develop on-site generation, utility revenue declines. Because so many of the costs of providing utility service do not change in the short run, a small reduction in sales due to customer-side resources can result in a disproportionately large reduction in utility earnings. Also, utilities typically do not earn a return on non-utility resources, nor can they make profits on them through operational efficiencies.

- **Cost** – Homeowners, businesses, local governments and others may have difficulty securing financing at favorable terms. And without subsidies, it may take too long for the investment to pay back.

- **Trained workforce** – Successful programs require a trained workforce to properly size, select and install equipment. If installers are in short supply, the consumer's interest in developing a project may pass.

- **Consumer awareness** – Most consumers are not aware of the benefits of small-scale renewable energy resources, how to undertake a project, and available assistance and funding options.

Benefits to harmonizing. Harmonizing these policies could build a larger market for small-scale renewable energy resources. It also would allow manufacturers to build equipment to meet a uniform set of standards accepted across a large region, make it easier for installers operating in multiple jurisdictions to understand interconnection and program requirements, and facilitate regional marketing of renewable energy systems.

2.1.2 Combined Heat and Power

This section was added after review of stakeholder comments.

About two-thirds of the energy content of the fuel used to generate power in the U.S. is wasted through conversion and line losses.[13] Combined heat and power (CHP), or cogeneration, sequentially produces both electric power and thermal energy.[14] Compared to traditional thermal electricity production, CHP can be viewed as an energy production or energy efficiency measure to reduce GHG emissions. Located at customer sites, CHP improves energy efficiency in two ways:[15]

1. Increasing fuel-use efficiency – Heat produced in the electric generation process that otherwise would be wasted is used for process or other thermal needs.

[13] Anna Shipley, Anne Hampson, Bruce Hedman, Patti Garland and Paul Bautista, *Combined Heat and Power: Effective Energy Solutions for a Sustainable Future*, Oak Ridge National Laboratory, Dec. 1, 2008, at http://www1.eere.energy.gov/industry/distributedenergy/pdfs/chp_report_12-08.pdf.

[14] Related, "waste energy recovery" generates additional electricity from waste heat from industrial processes.

[15] According to the U.S. Department of Energy, separately producing heat and power has a typical combined efficiency of 45 percent. CHP systems can operate at efficiency levels as high as 80 percent. *See* http://www1.eere.energy.gov/industry/distributedenergy/chp_basics.html.

2. Eliminating energy lost in delivering power – Electricity is produced on-site, so none is lost over transmission and distribution lines.

Compared to producing and delivering power from a remote power plant and separately producing steam or heat, overall energy required to produce the same amount of electric and thermal energy is reduced by about a third.[16] That efficiency savings translates into significant carbon savings.[17] Some states participating in the Regional Greenhouse Gas Initiative (RGGI) explicitly recognize the CO_2 emissions avoided by CHP units and reward them with allowances.[18]

CHP units are fueled by natural gas, other fossil fuels or local, renewable biomass resources. The units come in a wide range of sizes and technologies, including reciprocating engines, combustion or gas turbines, steam turbines, microturbines and fuel cells. The vast majority of CHP installations are in the industrial sector, but CHP also is used in commercial buildings and homes.

To advance CHP, WCI Partner jurisdictions can consider the policies discussed in this paper for small-scale renewable energy resources:

- Net metering programs can be applied to small-scale CHP.
- Federal PURPA law applies to CHP facilities of any size that meet efficiency requirements, as well as to renewable resources.
- Feed-in tariffs or targeted procurement could provide higher power purchase rates and long-term contracts for CHP, recognizing its energy efficiency and CO_2 benefits.
- Improvements in standby rates and interconnection processes are just as important for CHP as for renewable resources.
- CHP can be explicitly considered in utility planning and acquisition processes for energy, capacity, transmission and distribution.
- Decoupling can mitigate the disincentive for utilities to facilitate customer- or third party-owned CHP, which reduces utility sales and profits.

In addition, WCI Partner jurisdictions can consider including CHP as an eligible resource for meeting energy efficiency resource standards[19] and including waste energy recovery as an eligible resource for renewable portfolio standards – already the practice in some states.

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[16] *See* http://www.energy.ca.gov/distgen/equipment/chp/performance.html.

[17] One analysis found that a small, energy-efficient gas-turbine CHP unit could reduce CO_2 emissions by about half, compared to generating power at the average U.S. fuel mix plus and separately producing heat from a natural gas-fired boiler. *See* Shipley, *et al.*

[18] For example, a certain amount of allowances are directly awarded or sold at a fixed price in Connecticut (5 percent) and Maine (13 percent). *See* section 22a-174-31, Control of Carbon Dioxide Emissions, at http://www.ct.gov/dep/lib/dep/air/regulations/mainregs/22a-174-31.pdf, and Chapter 156: CO_2 Budget Trading Program, at http://www.maine.gov/dep/air/greenhouse/rggi.htm. The RGGI model rule contains no formula for quantifying useful steam from CHP systems. Instead, a showing to environmental regulators is made in accordance with section XX-8.8 of the model rule. *See* http://www.rggi.org/docs/model_rule_corrected_1_5_07.pdf.

[19] *See* page [31].

Key issues to consider in promoting CHP resources include the same issues for small-scale renewable resources, such as:

- Interconnection barriers
- Difficulty selling power to utilities
- Standby rate design
- Lack of consideration in utility planning
- Utility financial disincentives to facilitate CHP
- Compatibility with non-industrial land uses and zoning

A number of issues are somewhat unique to CHP applications in the industrial sector and point to the need for financial incentives:[20]

- Cost – Industrial projects generally require a very short payback, and upfront costs for CHP are high compared to short-term savings. Installing CHP interrupts industrial processes, another project cost.
- Competition with other capital needs - Corporate capital budgeting processes place CHP in direct competition with investments that expand production, increase throughput or maintain overall plant reliability.
- Financing – Industrial companies often cannot finance CHP investments in-house and have limited outside financing options.

Benefits to harmonizing. CHP-related policies are similar to those for small-scale renewable resources. In addition, because most CHP is installed in industrial facilities, improving uniformity of regulatory and incentive programs across jurisdictions would facilitate CHP adoption by companies operating in multiple states and reduce competitiveness issues among states and provinces.

2.1.3 Hydropower

This section was added after review of stakeholder comments.

Hydropower uses stream flows and gravity to propel water through a turbine to generate electricity. Hydropower is typically a very low-cost form of electricity because there are no fuel costs and low operating costs, and it produces low or no emissions. However, due to the nature of dam construction and the potential disruption of natural stream flows, there are challenges regarding impacts to local populations, fish, wildlife and ecosystems are and must continue to be considered.

Hydropower plays a prominent role in the energy portfolios of many of the WCI jurisdictions. Emissions and economic benefits can be increased by acquiring incremental capacity from existing dams, improving efficiency at current hydropower facilities and examining the potential for new, small-scale or low impact, run-of-the-river facilities. In response to stakeholder

[20] *See* Bob Hinkle and Steve Schiller, *New Business Models for Energy Efficiency*, CalCEF Innovations whitepaper, March 2009, at http://eec1.ucdavis.edu/techsummit2-0/NewBusinessModelsforEE-WhitePaper.

comments, the Committee felt that a recommendation on hydropower should be included in this white paper for further consideration.

Potential Policies. Potential state/provincial policy options to address barriers to increased efficiency and production from hydropower facilities in an environmentally responsible manner include the following:

- Evaluate expanding eligibility for low-impact hydropower for state/provincial renewable portfolio standards; for example, including installing generation capability at dams that do not produce power today, increasing electricity generation efficiency at current hydropower facilities and developing small-scale, run-of-the-river facilities.
- Enhance coordination between state resource agencies issuing certifications under Section 401 of the U.S. Clean Water Act and the Federal Energy Regulatory Commission's licensing/exemption proceedings. Licensing of Canadian hydroelectric facilities will continue under processes administered by the Provinces.
- Consider the climate change benefits of hydropower projects when permitting agencies evaluate or consult on such projects.
- Consider a task force of state/provincial agencies on licensing for certain low-impact hydropower projects. For example, the task force could make recommendations regarding the addition of power generation to an existing non-hydroelectric dam, closed-loop hydropower storage and other types of projects deemed low impact by the state or province. The task force could facilitate state/provincial agency participation in any applicable state permitting processes and the federal licensing process.

Key issues to consider in developing these policies include:

- Mitigating adverse impacts to ecosystems and wildlife
- Administrative or legislative changes that may be needed to expand hydropower eligibility for state/provincial RPS and other renewable energy programs
- A coordinated approach with federal permitting agencies to ensure a consistent and streamlined process
- The potential impacts to hydropower from increased or decreased water supply due to climate change
- Potential options for low-impact hydropower and the potential role for organizations that certify such projects

Benefits to harmonizing. Harmonizing state/provincial policies on hydropower will provide a consistent market signal to potential developers on its role in programs such as RPS and securing low carbon renewable electricity to meet GHG reduction targets. The streamlining and standardizing of permitting requirements will reduce barriers to projects and the overall time needed for project completion. Forming a state/provincial task force to develop parameters and expectations for low-impact hydropower projects can help to identify innovative and

transferable solutions to increasing hydropower production and efficiency in a manner that minimizes environmental impact.

2.1.4 Emissions Performance Standards for Electric Generating Units

An emissions performance standard (EPS) sets a maximum level of GHG emissions per unit of output. An EPS for electric generating units is designed to "raise the bar" for the emissions performance of each power plant, analogous to efficiency standards for appliances. Through the use of an EPS requirement, the construction of high-emitting generating resources with long expected useful lifetimes may be avoided. Similarly, new long-term contracts with existing high-emitting generating resources may be prevented. As a consequence, an EPS may reduce ratepayers' financial and reliability risks associated with plant retirements, retrofits and emission allowance and offset costs under future emission control regulations. An EPS can also promote technological innovation to advance new power generation systems and to modify existing facilities in order to meet the standard.

An EPS should be considered in conjunction with a cap-and-trade program if:

1. Market prices for electricity increase to an unacceptable level to change the generation dispatch order or to induce new investments and technological advancements in clean generation at a sufficient rate or magnitude to meet GHG emissions reduction goals.
2. The level of carbon "leakage" outside the cap-and-trade region is unacceptable.

Key issues to address in designing an EPS for electric generating units include:

- The appropriate EPS performance level (emissions rate)
- The point of regulation e,g, generators or distribution companies that serve load;
- How broadly the EPS should be applied, e.g. electricity produced within the jurisdiction only or imported power as well
- The type of facility or commitment that should be subject to the EPS
- Whether it applies to new construction only, and/or new investments in existing facilities that expand rated capacity for their effective useful life
- Whether it applies only to facilities underlying long-term contracts or also to short-term contracts
- Determining the facility threshold, i.e. MW size or capacity factor
- The state of technology and the degree to which it can be pushed
- Start date and implications of building current-technology power plants that will not qualify under the EPS
- Calculation of net emissions for combined heat and power and biomass facilities
- Potential for carbon capture and storage

Benefits to harmonizing. Harmonized EPS policies and standards design would promote consistent signals to the market across a broad geographic region concerning GHG emissions performance for generating units. This would drive technological advancement in low-carbon solutions within a specific timetable linked directly to the carbon reduction goals for the electricity sector.

This policy has already seen a great deal of harmonization in the Western jurisdictions of the WCI. The states of California, Oregon and Washington have enacted similar EPS laws.[21] In addition, Montana has adopted a law imposing restraints on emissions from new coal plants in certain cases.[22] British Columbia requires carbon capture and storage for any new coal-based generating facility.[23]

2.2 Energy Efficiency and Conservation

- Energy efficiency targets
- Energy efficiency programs and incentives

2.2.1 Energy Efficiency Targets

Energy efficiency targets are used by policy makers to set performance goals – binding or voluntary – for energy efficiency investments and savings. The targets may apply to states or provinces, utility companies or third-party administrators of programs.

Energy efficiency targets take various forms. Energy Efficiency Resource Standards (EERS) establish long-term efficiency targets that are typically expressed as a percentage reduction compared to retail energy sales over a baseline period. Both annual and cumulative energy savings targets may be included. Standards may apply to both electricity and natural gas, and they may target reductions in peak electricity demand as well as energy usage overall. EERS are already in place in many states and federal standards have been proposed.[24]

Energy savings generally are achieved through end-use efficiency programs. In some states, savings from building codes, appliance efficiency standards, combined heat and power facilities, and distribution system efficiency improvements also may count toward meeting the standard.

Instead of expressing savings targets as percentages or absolute (e.g., megawatt-hour) savings figures, some states and provinces have made a commitment to acquire all cost-effective

[21] California SB 1368: http://www.energy.ca.gov/emission_standards/documents/sb_1368_bill_20060929_chaptered.pdf; Oregon SB 101: http://www.leg.state.or.us/09reg/measpdf/sb0100.dir/sb0101.en.pdf; and Washington SB 6001: http://apps.leg.wa.gov/billinfo/summary.aspx?year=2007&bill=6001.

[22] 69-8-421 MCA: http://data.opi.mt.gov/bills/mca/69/8/69-8-421.htm

[23] Bill 31: http://www.leg.bc.ca/38th4th/3rd_read/gov31-3.htm.

[24] In the U.S., for example, the American Council for an Energy-Efficient Economy (ACEEE) reports that 19 states have adopted an EERS requiring achievement of specified energy savings targets. In addition to strict EERS requirements, ACEEE includes states with Commission-ordered efficiency targets, states that allow efficiency to count toward renewable energy standards, and states with a rate cap triggering a relaxation of EERS requirements. *See* Laura A. Furrey, Steven Nadel, and John A. "Skip" Laitner, ACEEE, *Laying the Foundation for Implementing a Federal Energy Efficiency Resource Standard*, March 2009, at http://aceee.org/pubs/e091.htm. Bills pending in the 111th U.S. Congress would establish a national EERS. The United Kingdom and several Australian states are among jurisdictions outside the U.S. that have mechanisms similar to an EERS.

energy efficiency or achieve zero load growth through energy efficiency programs. Such efficiency targets can be articulated as part of a utility's integrated resource planning process and incorporated into applicable regulations. The suitability of subsequent utility acquisitions would be measured against that goal.

Energy efficiency targets also can be articulated in contracts or informal proceedings between the jurisdiction and a third-party efficiency provider. In some cases, the third-party provider is remunerated, in part, for achieving savings above the specified targets.

Key issues to consider in setting and achieving energy efficiency targets include:

- Savings potential (as assessed by a resource potential study)[25]
- Performance levels (e.g., percentage rate of savings)
- Baseline measurement (i.e., the starting point)
- Cost-effectiveness tests in screening individual efficiency programs or a portfolio of programs
- Utility disincentives to achieving stated goals[26]

Benefits to harmonizing. Energy efficiency targets include helping promote consistent signals to a broader market. Standardized requirements could be expected to reduce implementation barriers and costs for companies operating in multiple states.

2.2.2 Energy Efficiency Programs and Incentives

Energy efficiency programs are business plans or market mechanisms that address barriers to cost-effective investments. Programs can be run by the utility, the state or province, or a third-party administrator. Program costs can be integrated into the utility's cost of service, such as other resources, or be paid for through a separate charge on customer bills. The goal of a well-designed program is to motivate action by the targeted decision-makers – consumers, suppliers, stores or contractors – while minimizing program costs.

Energy efficiency investments can reduce total utility system costs[27] and avoid the use of fossil fuels and associated GHG emissions. Studies continue to find a vast potential of cost-effective

[25] A resource potential study assesses the technical and market potential for energy efficiency efforts and lays the foundation for developing appropriate savings targets. Results generally show achievable potential far in excess of current program scope.

[26] *See* decoupling discussion on page 7 and Regulatory Assistance Project, "The Role of Decoupling Where Energy Efficiency Is Required by Law," September 2009, at http://www.raponline.org/Pubs/RAP_Schwartz_IssuesletterSept09_2009_08_25.pdf.

[27] Preliminary research by ACEEE indicates average program costs of about 3 cents per kilowatt-hour saved and 29 cents per therm saved. (*See* Steven Nadel, ACEEE, Replies to Questions at the April 22, 2009, Hearing on Energy Efficiency Resource Standards, May 12, 2009, at http://aceee.org/tstimony/NadelQuestions04.22.09.pdf.) That's far less than the cost of new generating facilities. Efficiency investments also can avoid expensive upgrades to transmission and distribution systems.

efficiency remaining to be tapped.[28] Securing this potential could dramatically reduce electricity demand and significantly reduce the cost of meeting emissions reduction goals.

Policies include providing programs that offer the following types of assistance:[29]

- **Information, education, marketing and technical assistance** – Information on-line and at point of sale, branding (e.g., Energy Star), phone hotlines, workshops, multi-media advertising, on-site audits, field visits, training, certification and inspections are among the ways programs can increase awareness, knowledge and confidence among consumers, vendors and contractors.
- **Grants and rebates** – Financial incentives can reduce the cost to the consumer of investing in energy efficiency products and services. The incentive amounts are justified by a benefit-cost analysis and can be linked to the desired effect – for example, the number of targeted products installed by a certain date.
- **Financing** – Long-term financing of energy efficiency investments can provide consumers with positive cash flow. Financing strategies may focus on "lost opportunities," such as new buildings and new equipment, or they may provide consumers with the means to retrofit buildings or replace inefficient equipment. For example, some programs allow homeowners to add the cost of certain efficiency improvements to their mortgage, extending the repayment period.

Energy efficiency programs can include some form of "market transformation" – changing the way people make energy-related decisions or making efficient products and services widely available. Some programs are devoted exclusively to these purposes. Other programs focus on hard-to-reach sectors, such as multi-family housing and low-income households.

Programs to reduce energy consumption may be more compatible with a utility business structure that decouples utility sales from utility profits and includes performance incentives. Decoupling removes a utility's inherent *disincentive* to sell less of its product. Decoupling does not provide an *incentive* for the utility to acquire energy efficiency in lieu of supply-side alternatives that earn a return on investment. Where aggressive energy efficiency goals are in place, regulators may consider providing financial incentives to utilities for exceptional performance. Many utility commissions have adopted decoupling, incentive mechanisms, or both for electric and natural gas utilities.[30]

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[28] For example, the recent McKinsey study found the U.S. has the potential to cost-effectively reduce non-transportation energy consumption roughly 23 percent by 2020. *See* www.mckinsey.com/USenergyefficiency. The Northwest Power and Conservation Council recently estimated achievable, cost-effective conservation in the four-state region (Idaho, Montana, Oregon and Washington) at 21percent of 20-year forecasted (medium-case) electric load – an amount that would meet about 85 percent of load growth in the region while significantly reducing both system cost and risk. *See* http://www.nwcouncil.org/energy/crac/Default.htm.

[29] Building codes, appliance standards, and new energy efficiency technologies are addressed briefly at the end of this paper.

[30] For maps showing status of decoupling in the U.S., *see* http://www.raponline.org/docs/NRDC_Decoupling%20Maps%20US_2009_08.pdf. For examples of incentive mechanisms and modeled results, *see* Chuck Goldman, Peter Cappers, Michele Chait, George Edgar, Jeff Schlegel and Wayne Shirley, "Financial Analysis of Incentive Mechanisms to Promote Energy Efficiency: Case Study of a Prototypical Southwest Utility," report to the Ernest Orlando Lawrence Berkeley National Laboratory, March 2009, at http://eetd.lbl.gov/EA/EMP/ee-pubs.html.

Key issues to consider in developing these policies include:

- High upfront cost, long payback on investment, and limited financing options
- Short windows of investment decision-making opportunity are easy to miss
- Trained workforce may be in short supply
- Limited public awareness, information and knowledge
- "Split incentives" between builders/building owners and tenants who pay the utility bills
- Resource planning and acquisition processes that don't evaluate energy efficiency on a par with supply-side alternatives
- Utility disincentives to encouraging energy efficiency

Benefits to harmonizing. Energy efficiency programs among the WCI jurisdictions and other states and provinces include reducing costs, helping to transform markets for energy efficiency products, technologies and practices, and achieving greater energy savings and GHG reductions. Regional programs can achieve economies of scale that are not possible with isolated programs. Working together, utilities and other program administrators can leverage personnel and funds for resource potential studies, regional marketing and training, developing a broad supply chain of products and services, robust evaluation of programs, and verification of estimated energy savings. Consistent program features and requirements also make it easier for vendors and contractors to participate.

Many programs rely on a common set of product and service specifications developed by the ENERGY STAR program. Some states already coordinate on energy efficiency assessments, strategy, model standards, programs, and common protocols for evaluating, measuring and verifying program results through such organizations as the Northwest Power and Conservation Council[31] and Northwest Energy Efficiency Alliance[32]. These efforts could be expanded to include a broader set of jurisdictions. Multi-state utilities offer similar programs throughout their service areas.

2.3 Transportation

- Low-carbon fuel standard
- Freight transportation infrastructure

2.3.1 Low-Carbon Fuel Standard

A Low Carbon Fuel Standard (LCFS) is a GHG emissions standard for transportation fuels. An LCFS provides a method for calculating the carbon intensity of fuels and requires fuel providers to reduce over time the carbon intensity of the fuels they sell. The carbon intensity calculation is typically based on *life-cycle carbon emissions* for each fuel type. An LCFS is designed to be technology-neutral across alternative transportation fuels, including electricity, biofuels and hydrogen, provided that it facilitates a reduction in GHGs (relative to a baseline target). Fuel

[31] http://www.nwcouncil.org/Default.htm
[32] http://www.nwalliance.org/

providers have the flexibility to provide the lowest priced mix of low-carbon fuels that achieves the intensity standard. This approach differs from a renewable fuel standard, which mandates production volumes of certain renewable fuels instead of a specified carbon intensity reduction target.

The State of California has adopted an LCFS program. Oregon recently passed legislation directing the Department of Environmental Quality to develop an LCFS. British Columbia's Greenhouse Gas Reductions (Renewable and Low Carbon Fuel Requirements) Act will be implemented through two regulations: 1) the Renewable Fuel Requirement Regulation, which requires fuel suppliers to meet an annual, provincial average of 5 percent renewable content for gasoline and diesel fuels; and 2) the proposed Low Carbon Fuel Requirement Regulation (LCFRR), which would require that the carbon intensity of transportation fuel sold in the province be reduced 10 percent by 2020. The LCFRR would require suppliers to provide transportation fuels with average carbon intensity less than or equal to annual target values beginning in 2010. The State of Washington is evaluating whether a LCFS should be adopted there.

Key issues to consider in designing an LCFS include:

- Carbon intensity reduction goals and schedule
- Interaction of an LCFS with the regional cap-and-trade system, including issues such as consistency of signals to industry under the two systems, potential for double counting of emissions reductions, and within-region vs. outside-region emissions reductions;
- Point of regulation (for example, should fuel companies be held responsible for increasing use of electric vehicles?)
- Cost to the public and businesses
- Current and expected regional capacity to produce sufficient low-carbon alternative fuels and opportunities for increasing capacity[33]
- Potential for commercialization of vehicles that can use low- or no-carbon fuels
- Development of a regional low-carbon fuel credit program
- Consistency in estimating lifecycle carbon intensities, considering fuel mixes, land use issues and other factors
- Options for minimizing the cost of compliance
- Potential use of compliance deferrals to address issues such as fuel shortages, fuel quality problems and significant spikes in fuel costs
- Refueling infrastructure to support an LCFS
- Environmental and health impacts beyond GHG reductions
- Local needs and conditions
- Fuel standards, certification and other product fungibility issues
- International trade agreements
- Coordinating with national mandates such as the revised U.S. Renewable Fuel Standard

[33] Regional capacity may be important from an economic impact perspective.

Benefits to harmonizing. LCFS policies and program design include consistent requirements among states and provinces that participate in the same fuel markets. Looking at the future needs for regional low-carbon fuel capacity may promote coordinated investment and economic opportunities. Regional harmonization could also provide a useful model for any national LCFS program.

2.3.2 Freight Transportation Infrastructure and Heavy Duty Vehicles

West Coast ports are North America's links to the rapidly growing Asian economies. The amount of goods imported and exported through these ports will continue to grow. Similarly, transborder freight transportation is a significant component of the economies of the WCI jurisdictions as U.S.-Canada surface transportation trade totalled $29.2 billion in May 2009. The continued growth in marine, air, rail and road transport activity poses a challenge to policy makers seeking to reduce GHG emissions. In addition, overlapping jurisdictions among many levels of government results in regulatory challenges for operators.

Many transport sectors have agreed that the solution lies in coordinating, rather than competing, on environmental issues. This is particularly relevant for areas such as the West Coast, where shippers have a choice among numerous air and marine ports of entry and land-based carriers. Through coordinated improvements and standards, states, provinces, port authorities and private carriers can justify investment in environmental improvements, without the fear that business will be lost to a higher-emitting, but lower cost competitor.

Examples of potential regional coordination on freight transportation and heavy-duty vehicles include the following:

- Jurisdictions could adopt requirements such as the U.S. Environmental Protection Agency (EPA) model rule to reduce heavy-duty truck idling during rest stops to facilitate a uniform approach. Outreach and financial assistance programs could promote energy-efficient and cost-effective alternatives such as auxiliary power units and truck stop electrification. A viable electrification network requires action by multiple jurisdictions to be effective.
- Ocean- and river-going vessels at dock usually run onboard diesel generators for "hotel" power. Using power from the electric utility grid is less expensive, but it may be necessary for multiple ports to provide connection facilities on-shore to make it cost-effective for vessels to install capability to connect to those facilities. WCI members California, Washington and British Columbia have installed on-shore power facilities using the best available and most compatible technology. A regional approach also could help eliminate competitiveness concerns among ports providing on-shore power.
- Smaller engines to provide hotel power, new engine technologies, and electronic start/stop controls are available to reduce pollution from locomotives, which often idle for extended periods of time. A regional approach could coordinate incentives and address jurisdictional issues for cleaning up switchyards and long haul locomotives.

- Most trucks built during the last decade are equipped with a speed limiter – an integrated circuit that allows for regulating maximum vehicle speed. Policies could include the mandatory use of speed-limiting devices, equipment for aerodynamic efficiency, supporting the introduction of new energy-efficient and GHG-reducing technologies, and instituting an inspection and maintenance program for heavy-duty trucks in jurisdictions throughout the WCI jurisdictions and in other states and provinces.

Key issues to consider for freight transportation infrastructure and heavy-duty vehicles include:

- Competitiveness among ports for docking of ocean and river-going vessels
- Lack of consistent regulations, penalties and funding programs among states and provinces with respect to anti-idling to encourage investment while avoiding impacts on trade competitiveness
- Standards for port electrification under development by the International Maritime Organization and their broader use with increasing certainty regarding the final standards
- High upfront cost, long payback on investment, and limited financial resources and incentives to fund research, development and implementation of new technologies
- Need for public-private partnerships and investments to develop a network of low-carbon fuel and electrififcation instrastructure to support heavy-duty trucks and port operations
- Programs developed by the American Trucking Association to reduce GHG emissions from freight movement, which can be implemented and enhanced through coordinated action by states and provinces
- The burden posed by differing requirements on the majority of heavy-duty vehicles, which travel between states and provinces or issues that may raise interstate commerce concerns
- Cost impacts of potential policies on individuals and small companies that own heavy-duty vehicles

Benefits to harmonizing. Policies include improving uniformity of regulatory and incentive programs, reducing competitiveness issues among states and provinces, leveraging incentives, and addressing jurisdictional issues with interstate freight movement. Because many trucking companies, trains and marine vessels operate between WCI Partner jurisdictions, regional coordination could also help identify or prevent instances where one jurisdiction's compliance mechanism may cause emissions increases in other jurisdictions. A regional approach to on-shore power would allow for pricing strategies to encourage its use, without affecting the competitive balance. Regional strategies to reduce GHG emissions from the freight transportation sector would produce multi-pollutant benefits, reducing toxins, sulfur dioxide, nitrogen oxides and fine particulates.

2.4 High Global Warming Potential (GWP) Gases

2.4.1 Regulatory Measures for High GWP Gases

High GWP gases are of growing concern due to their increasing rate of emissions and persistence in the atmosphere. These gases from anthropogenic sources are released as byproducts of industrial operations, primarily from electric power transmission and distribution, aluminum smelters, semiconductor manufacturing, production of insulating foam, and magnesium smelters and die-casters. High GWP chemicals also are used in many applications such as refrigeration, air conditioning and fire suppression. Typically, emissions of high GWP gases from processes and products are individually too small to be covered by the WCI cap-and-trade program. Nevertheless, just a few pounds of these materials can have the equivalent effect on global warming as several *tons* of CO_2.

Voluntary partnerships between EPA and industry are substantially reducing emissions of high GWP gases. For example, 81 utilities are participating in a voluntary program to reduce emissions from SF_6 used for insulation of electric transmission and distribution equipment. EPA publishes lists of acceptable substitutes for high GWP gases.

Key issues to consider for reducing emissions of high GWP gases include:

- Long timeframe for transitioning to safe and acceptable substitutes that offer lower overall risks to the environment and human health
- Removal and disposal of high-GWP gases
- Voluntary nature of existing programs
- Sizable expansion that is occurring in many industries that emit high-GWP gases

Benefits to harmonizing. Measures to reduce high GWP gases include reducing burdens on consumers and manufacturers while encouraging a broader market for lower-emitting substitutes. Regional programs can achieve economies of scale that are not possible with isolated programs. Regional harmonization may promote coordinated investments for research and development of alternatives. Harmonized policies could include design and funding of programs for capturing and disposing of high GWP gases, incentives for upgrading to newer products in order to more rapidly remove products with high GWP gases from circulation, and establishing specifications for the use of high GWP gases in newly manufactured products.

3 Tier 2 Policies

3.1 Energy Production

3.1.1 Carbon Capture and Sequestration

Carbon capture and sequestration (CCS) is a key technology that may for sustained emissions reductions in the electricity sector.[34] It involves four five steps: 1) separating CO2 before or after combustion of fossil fuels; 2) compressing the CO2 stream; 3) transporting it to an injection site; and 4) pumping it into underground geologic formations in a manner that prevents its release into the atmosphere and 5) long term monitoring and insurance to certify the sequestration.

Given the technical, institutional and legal risks, putting a price solely on CO_2 emissions may be insufficient to advance CCS deployment. Additional policies for the capture, transport, injection, monitoring and liability of the sequestered CO_2 are needed. Utility resource policies that mandate or promote CCS may be appropriate – such as emissions performance standards[35] – as well as innovative policies for siting and permitting, financing and rate-making.[36] State and provincial policy options to advance CCS include the following:[37]

Managing transport and sequestration – Current rules for transport and injection of CO_2 are for enhanced oil recovery and CCS pilot projects, not large-scale CCS deployment. Existing pipeline laws must be adapted for CO_2 transport. A standard template, such as the one produced by the Interstate Oil and Gas Compact Commission,[38] may be useful for the development of rules for geologic sequestration of CO_2. Further options could accelerate CCS deployment, such as pre-screening and pre-qualifying the best CO_2 pipeline and injection sites and simultaneously reviewing permit applications for the power plant, CO_2 pipeline and injection infrastructure.

Limiting liability for CO_2 releases – Large-scale CCS may not be deployed unless companies are able to manage liability associated with the escape or migration of CO_2 from pipelines and storage sites following permanent capping of the site and decommissioning of the injection facilities.[39] Policies designed to address liability must balance the goals of shielding companies from excessive liability, while maintaining a strong incentive for companies to minimize the chances of CO_2 release after decommissioning. In the absence of national legislation, states and provinces are beginning to address this issue on their own.

[34] Other strategies for sequestration also have been suggested, such as sequestration in biomass or in solid minerals.
[35] See pages 9-10.
[36] Jurisdictions also should consider whether any waivers may be warranted for power plant need determinations and competitive bidding requirements.
[37] For a complete discussion, see Richard Cowart and Shanna Vale, Regulatory Assistance Project, and Joshua Bushinsky and Pat Hogan, Pew Center on Global Climate Change, "Coal Initiative Reports: State Options for Low-Carbon Coal Policy," February 2008, at: http://www.pewclimate.org/docUploads/StateOptions-02-20-08.pdf.
[38] *See* http://iogcc.publishpath.com/Websites/iogcc/pdfs/Road-to-a-Greener-Energy-Future.pdf.
[39] Where those actions were taken in conformance with an approved plan for the cessation of operations.

Liability for releases during transport and injection (prior to decommissioning) also is an important issue. Insurance may adequately address liability during the operational period of a sequestration project, but clarifying legislation also could be beneficial. Other measures might be needed to compel the surrender of allowances for any CO_2 release.

Subsidies for CCS projects at fossil-fuel[40] plants – Among the options for funding are:

- A fee levied on generators or utilities on a per-megawatt-hour basis, or just on the portion attributable to fossil fuels
- A "feebate" system that charges fossil-fuel plants without CCS technology a per-megawatt-hour fee and distributes the funds collected for CCS equipment
- Direct expenditures or tax credits for CCS investments

Other financial incentives – Utilities could potentially receive higher rates of return or accelerated depreciation for CCS investments. Regulatory commissions or legislatures could grant bonding authority for CCS projects. Besides simply providing access to funds, such bonds could provide a lower interest rate.

Cost recovery support – Most regulatory commissions do not pre-approve power plants. Instead, they determine what costs may be included in a utility's retail rates only after the plant has reached commercial operation. Regulators can provide some type of cost recovery assurance for CCS projects even before construction begins, employing such strategies as:[41]

- Preapproval of CCS projects;
- Guaranteed buyer or must-take requirements for CCS-generated power;
- Cost recovery for power supply during unplanned outages of the CCS plant;
- Cost recovery even if the CCS plant is cancelled;
- Cost recovery for early retirement of existing coal plants if replaced with a CCS substitute.

Key issues to consider for CCS policies include the following:[42]

- *Acceleration:* Will it produce investment in CCS that would not otherwise occur?
- *Deterrence:* Will it deter investment in high-emitting technology options?
- *Prudence and accountability:* Will it promote prudent project management? Will those with responsibility be held accountable for performance?
- *Power supply costs:* Does it help to lower the cost premium for CCS power?
- *Administrative costs:* Does it help to lower administrative and regulatory costs for developers, government and other parties?
- *Risk and cost balance:* How well does it balance the interests of ratepayers and investors?

[40] Coal, natural gas, biomass, petroleum coke and other fossil fuel plants are candidates for CCS.
[41] State "used and useful" requirements (mandating that a plant be functioning and necessary to be included in the utility's revenue requirement) may need to be modified by statute to implement the last three options in this list.
[42] *See* Cowart, *et al.*

- *Innovation:* Will it promote further CCS research and technical innovation?
- *Standardization:* Will it promote CCS projects that could be replicated elsewhere?
- *Performance:* Does it secure significant carbon reductions? Are any incentives scaled to real-world performance, measured in tons of CO_2 permanently sequestered?

Benefits to harmonizing. Harmonizing CCS policies across jurisdictions might make sense for a number of reasons. First, successful CCS efforts require significant research, development and demonstration funding that is best spent in a coordinated manner. For example, coordinated mapping of potential sequestration sites and pipeline locations may reduce the need for redundant studies. Second, CCS projects may be developed by multi-state utilities, or developed jointly by utilities in multiple states and provinces, in order to achieve economies of scale and spread the costs and risks. Third, long-distance transmission lines for coal plants with CCS, as well as pipeline transport of CO_2 for sequestration at a remote location, may require cooperation among states and provinces.

In addition, consistent CCS policies could promote replicable CCS projects and reduce administrative costs for utilities and other project developers as well as stakeholders participating in regulatory processes. Further, absent a national policy, consistent policies across the region to address liability risks associated with potential CO_2 leakage could facilitate CCS projects where participating utilities, CO_2 pipeline transport and sequestration sites involve multiple jurisdictions.

3.1.2 Tradable Renewable Energy Certificates

This section was added after review of stakeholder comments.

To facilitate compliance with a Renewable Portfolio Standard (RPS), most jurisdictions allow renewable energy certificates[43] procured separately ("unbundled") from the associated electricity to satisfy at least a portion of the renewable resource obligation. These tradable certificates can reduce the cost of RPS compliance. However, differing requirements for certificates that may be used for RPS compliance hinder trading. Key differences across jurisdictions include:

- Eligible fuels and technologies
- The qualifying vintage of the generating unit (the date it began operation)
- Whether incremental power production at an existing unit qualifies
- Eligible project size
- Whether the power must be generated within – or delivered to – the jurisdiction
- Whether customer-sited resources are eligible
- Cost caps and alternative compliance mechanisms
- Limits on using certificates without also procuring the associated electricity
- The certificate definition itself, including any conveyed environmental attributes

[43] One certificate represents one megawatt-hour of electricity from a renewable energy generating unit.

Not all of these differences must be harmonized to make renewable energy certificates more fungible across WCI partner jurisdictions. And there are alternatives to developing common certificate requirements. Under multi-lateral agreements, for example, participating jurisdictions could accept certificates that qualify under each others' requirements on a reciprocal basis. A related approach would accept certificates that qualify in participating jurisdictions, but at a pre-determined discount instead of at par. In addition, jurisdictions could agree to expand geographic eligibility or relax energy delivery requirements under specified conditions indicating tight supplies of renewable resources.[44] Further, under any of these approaches, jurisdictions could limit the amount of otherwise non-qualifying certificates that may be used to meet renewable resource obligations.

States and provinces already have collaborated to establish a West-wide certificate tracking system. The Western Renewable Energy Generation Information System issues, registers and tracks all renewable energy certificates in the Western Interconnection. The system protects against multiple-counting and selling of certificates and verifies compliance with both RPS and voluntary renewable resource programs. The system can import (and export) certificates from (and to) other tracking systems in the U.S. and Canada. It provides the necessary infrastructure for certificate trading, but it is not a trading platform. Trading is generally through bilateral agreements.

Both of the major energy bills before Congress – the American Clean Energy and Security Act of 2009 (H.R. 2454) and the American Clean Energy Leadership Act of 2009 (S. 1462) – preserve the integrity of state renewable portfolio standards. Under both bills, federal renewable energy certificates would be entirely separate from state certificates and would have no purpose other than compliance with federal requirements. Federal certificates could be used nationwide for that purpose, but their use toward meeting state standards would be bound by individual state definitions and eligibility. H.R. 2454 includes explicit provisions for states to establish renewable energy certificate trading under higher state standards. Further, neither bill includes any apparent prohibitions against trading renewable energy certificates with Canadian provinces.

Key issues to consider in making renewable energy certificates more fungible include:

- Administrative or legislative changes that may be needed[45]
- Competing interests, e.g. renewable resource and economic development within the jurisdiction vs. lower RPS compliance costs through improved certificate trading
- Whether reducing climate change is among the jurisdiction's goals for its RPS program – CO_2 emissions reductions anywhere help meet that goal

[44] For a detailed review of potential approaches, *see* Edward A. Holt, *Increasing Coordination and Uniformity Among State Renewable Portfolio Standards,* prepared for Clean Energy States Alliance and the Northeast/Mid-Atlantic RPS Collaborative, December 2008, at http://www.cleanenergystates.org/Publications/CESA_Holt-RPS_Policy_Report_Dec2008.pdf.

[45] If an RPS was enacted through voter initiative, there may be restrictions on the legislature's ability to modify its provisions.

- Reduced local environmental benefits due to any reduction in local renewable energy development because the benefits of avoided air pollutants from a fossil-fuel power plant accrue primarily where *that* plant is located – except for for CO_2 – not necessarily in the vicinity of the renewable energy facilities that displace fossil-fuel generation
- The ability of jurisdictions to meet their highest RPS targets under today's differing certificate requirements
- In renewable-rich areas, the effect of increased use of unbundled certificates on the cost of balancing reserves, power prices, generation dispatch, and acquisition costs for RPS-qualifying resources[46]

Benefits to harmonizing. Trading renewable energy certificates across a broad region can increase competition and liquidity in the marketplace, lower prices for renewable resources and reduce the cost of RPS compliance.[47] In turn, lower prices may increase renewable energy development, leading to further reductions in greenhouse gas emissions. Because high-quality renewable resources are not dispersed evenly, trading among jurisdictions may increase the diversity of renewable resources that are developed. And tapping areas with better solar or wind potential, for example, may reduce acquisition costs. Renewable energy developers would benefit from increased certificate trading because their projects could comply with more RPS programs. Even if requirements for tradable certificates are not harmonized among WCI partner jurisdictions, the reciprocity approaches described above can provide significant benefits along these lines.

3.2 Energy Efficiency and Conservation

3.2.1 Tradable Energy Savings Credits

This section was added after review of stakeholder comments.

Energy savings credits[48] can be used like renewable energy credits.[49] They are issued, registered, tracked and retired. However, rather than representing one megawatt-hour (MWh) of renewable generation, an energy savings credit constitutes one MWh of energy not used. Energy savings credits present a greater challenge because their output cannot be metered. Instead, energy savings are estimated by comparing energy use after an energy savings

[46] The Northwest Power and Conservation Council is undertaking a study to examine the implications of an unbundled certificate market in western North America for meeting renewable resource obligations, focusing on implications for the Northwest.

[47] For example, a study for the Western Electric Industry Leaders Group on the transmission that will be needed to meet RPS and carbon requirements in the Western Interconnection estimated that certificate trading could reduce renewable resource procurement costs in 2020 by $351 million. Study by Energy and Environmental Economics, Inc. at http://weilgroup.org/E3_WEIL_Complete_Study_2008_082508.pdf. A study by Lawrence Berkeley National Laboratory also found large savings from this approach. *See* http://eetd.lbl.gov/ea/EMP/reports/lbnl-3077e.pdf.

[48] Also called energy savings certificates or "white tags," a term trademarked by Sterling Planet.

[49] See page 29.

measure is taken with business-as-usual energy use — i.e., assuming the measure had not been taken.[50]

Energy savings credits generally are used in conjunction with energy efficiency requirements, such as energy efficiency resource standards.[51] A central reason for the adoption of energy savings credits is that they monetize savings from energy efficiency projects and allow those savings to be traded. Trading creates the opportunity to not only track compliance but also to lower its cost, because credits can migrate to the highest valued use and provide additional funding for efficiency programs.

To be effective, a trading program for energy savings credits should meet the following prerequisites:[52]

- **Measures, projects and programs –** Credits should be based on savings claimed by approved measures, projects and programs.
- **Measurement of energy savings –** Programs should have approved measurement protocols, typically established by a utility commission or other regulator.
- **Verification and certification –** Savings claims should be verified by an independent entity and be consistent with established protocols for measures, projects and programs. While not requiring the action of a single entity, the process must be credible.
- **Issuance of credits –** Energy savings credits (and the attributes they represent[53]) must be issued in a way that ensures they are not double-counted by another entity or in another place, and that they are issued to the lawful recipients – e.g., the home owner or program administrator.
- **Tracking –** Systems must be in place to track and account for traded and retired credits, including the degree to which attributes vary among jurisdictions.
- **Price determination –** Because pricing of energy savings credits is a key element in trading, the pricing process should be transparent.

Key issues to consider in developing energy savings credits include the following:

- Whether energy savings credits will help meet the goals of energy efficiency requirements – One of the purposes of trading is to lower the cost of compliance, because trading locates and mobilizes reductions from less expensive measures, practices and programs in order to sell them to places where reductions are more expensive. However, if the goal of state or provincial energy efficiency requirements is saving energy locally (and lowering local energy bills), reducing air pollution in the area, or relieving electric system congestion within the jurisdiction, using energy savings credits may not be effective in matching resources and desired benefits. To the degree that there is a closer connection between the region from which energy savings credits

[50] Joe Loper, Steve Capanna and Rodney Sobin, Alliance to Save Energy, "Energy Savings Credits: Shining a Light on the Measurement Challenge," 2009 draft.
[51] See page 18
[52] *See* Loper, *et al*.
[53] For example, carbon emissions reductions or demand reductions for a specified time period.

are purchased and the place where the benefits are being sought, this problem would be less pronounced.

- Costs associated with credit certification, tracking and trading – While these costs can be significant, the incremental costs would be limited to the degree that states and provinces already participate in tracking systems for renewable energy credits. Costs include upgrade of existing systems to certify and track energy savings credits and personnel training associated with regulatory oversight.
- Stringency of energy efficiency requirements – Trading energy savings credits can make weak energy efficiency requirements even weaker. To the degree that energy efficiency requirements produce more business-as-usual savings (and credits) than one utility requires, a second utility can purchase the credits in lieu of meeting the requirements with more stringent measures. The purchasing utility also complies with the requirements, but with weaker savings – i.e., savings that utility one would have made anyway. This problem is exacerbated to the degree that credits from a jurisdiction with a weaker program are sold to a jurisdiction with a more stringent program. However, where programs are equally stringent, energy savings within the jurisdictions would not necessarily be compromised by trading of energy savings credits.[54]
- Combining energy savings credits with renewable portfolio standards – Because energy efficiency is cheaper, if combined with renewable portfolio standards, energy savings credits could dilute renewable resource obligations. From a least-cost strategy point of view this would be beneficial for consumers. To the degree that a renewable energy policy is designed with additional goals, such as promoting the local renewable energy industry, this interaction should be considered. Regardless, if the renewable resource obligation is based on a percentage of overall sales to retail customers (MWh), *any* energy efficiency gains will reduce that obligation. Therefore, there is no need to explicitly combine renewable energy and energy efficiency obligations to get those least-cost benefits.

Benefits to harmonizing. Establishing a system of tradable energy savings credits across WCI Partner jurisdictions may reduce the cost of compliance with energy efficiency requirements. If such requirements are stringent and lead to deep reductions in energy use, energy savings credits also may reduce the cost of meeting renewable portfolio standards – if renewable resource obligations are based on a percentage of overall retail sales or combined with energy efficiency requirements.

[54] Loper, *et al.* at 24.

3.3 Transportation

3.3.1 Pay-as-You-Drive Insurance

This section was added after review of stakeholder comments.

Pay-as-you-drive insurance (PAYD) bases vehicle insurance rates on miles driven. PAYD is typically a voluntary program designed to offer lower rates to drivers that drive below a mileage target for a given period, which provides an economic incentive to drivers to reduce their vehicle miles traveled (VMT). Because the program is voluntary, high-mileage drivers have the option to purchase conventional insurance policies. If properly structured, a PAYD program provides insurance companies with a more accurate correlation between individual policies and risk.

Key issues to consider in developing programs:

- Identifying qualitative and quantitative metrics to accurately quantify risk
- Ensuring that privacy is not infringed upon in tracking or verifying driving habits

Benefits to harmonizing. By coordinating state/provincial efforts with insurance companies, standard policies and procedures can be developed to encourage large-scale availability of PAYD policies.

3.3.2 Electric and Alternative Fuel Vehicle Infrastructure

Development of electric and alternative fuel vehicle infrastructure can take a variety of forms including:

- Consumer outreach and education
- Direct purchases of charging stations and alternative-fuel refueling stations by businesses and local, state/provincial or regional governments
- Addressing utility system impacts
- Development and implementation of policies that streamline the permitting and installation of alternative fuel vehicle infrastructure
- Creation of grant, loan or loan guarantee programs to help finance infrastructure
- Enactment of tax incentives to reduce the cost to developers of installing infrastructure

Key issues to consider in developing programs to accelerate the deployment of alternative fuel vehicle infrastructure include:

- How to pay for infrastructure, including revenue-positive public and commercial cost models
- Electric system impacts
- Removing service provider disincentives to supplying additional electric load and alternative fuels through such means as providing additional emissions allowances
- Policies to ensure interoperability of refueling across utility service territories and jurisdictions

- Coordination of these programs with a regional low-carbon fuel standard, if implemented
- Whether public agencies should provide free electric vehicle charging
- Public and private partnerships
- Deployment simultaneously with (or in advance of) alternative-fuel vehicle sales
- Distance between stations for charging/fueling

Benefits to harmonizing. By coordinating the development of electric and alternative fuel vehicle infrastructure, the WCI jurisdictions could foster sufficient market penetration of electric and alternative fuel vehicles to attain significant reductions in GHG emissions, create jobs, foster economic growth, reduce reliance on foreign fuels and reduce air pollution.

3.4 Agriculture

3.4.1 Agricultural Anaerobic Digesters

Anaerobic digesters capture the gases created as agricultural waste materials break down into methane and CO_2. Anaerobic digesters:

- Capture methane, a potent GHG that would otherwise be released into the atmosphere
- Displace CO_2 emissions by producing carbon-neutral electricity, pipeline-quality natural gas, transportation and boiler fuels, feedstocks for commercial chemicals (such as ammonia and methanol), and digested fiber that can be used as a substitute for mined peat moss
- Provide a valuable economic resource to farmers through renewable energy production and cogeneration

Key issues to consider in harmonizing policies to facilitate on-farm anaerobic digesters are:

- The level of necessary capital investment and ongoing transaction costs as well as payback periods, which depend in part on:
    - The amount of financial assistance available
    - The rates available from electric and natural gas utilities for sale of digester-produced power and gas
- The ease with which small independent power producers are able to meet the interconnection requirements of electric and natural gas utilities
- The proportion of agricultural and non-agricultural wastes allowed on-farm by government agencies for the purpose of anaerobic digestion
- Environmental regulation by state and local governments
- Local government requirements on the movement of agricultural and non-agricultural waste
- The degree to which energy production is accepted as a normal farming practice by the public and relevant government agencies, including:
    - Whether there are special rules about what activities can take place on farmland

- Whether energy production will remain ancillary to other types of agricultural production.

Benefits to harmonizing. Anaerobic digestion offers significant potential for permanent, real, additional and verifiable GHG emissions reductions. Removing permitting barriers and providing clarity and consistency in regulations would increase accessibility for states and provinces to realize these reduction opportunities.

3.5 Waste

3.5.1 Landfill Methane Reduction

Methane gas from landfills is a significant source of GHG emissions due to its high global warming potential and the sheer number of landfills. According to Environment Canada, landfill emissions account for more than a quarter of the anthropogenic methane in the atmosphere.[55] Landfills generate methane as the anaerobic bacteria break down organic waste, a process that usually begins within the first year of landfill operation and can continue for 50 years after landfill closure.

The U.S. EPA defines "large" municipal solid waste landfills and requires that they collect landfill gas and combust it.[56] The regulations do not mandate secondary energy recovery processes. The B.C. Government passed a Landfill Gas Regulation under the Greenhouse Gas Reduction Statutes Amendment Act, which requires that by Jan. 1, 2016, all landfills that are above a certain size and methane threshold must install (and properly operate) landfill gas management facilities.[57]

Collected landfill gas can be used for electricity, heat production and other applications. Beneficial use of collected landfill gas offers potentially significant benefits, including further reductions of GHG emissions by offsetting fossil fuels and producing energy from a renewable source. The EPA estimates that more than 450 municipal solid waste landfills in the U.S. operate landfill gas-to-energy programs, and approximately 520 more landfills could effectively do so, providing enough electricity to power 700,000 homes.[58] Environment Canada estimates that 600,000 homes could be powered by electricity generated from Canadian landfill gas sources.

The EPA operates a voluntary Landfill Methane Outreach Program (LMOP) to facilitate and provide assistance for landfill methane capture and conversion to energy. Canada and the U.S.

[55] *See* "Harnessing the Power of Landfill Gas" at http://www.ec.gc.ca/Science/sandemay99/article1_e.html.
[56] *See* 2006 Standards of Performance for New Stationary Sources and Guidelines for Control of Existing Sources, and 2003 National Emission Standards for Hazardous Air Pollutants.
[57] *See* http://www.bclaws.ca/Recon/document/freeside/--%20e%20--/environmental%20management%20act%20%20sbc%202003%20%20c.%2053/05_regulations/28_391_2008.xml.
[58] *See Landfill Methane Outreach Program: Benefits of LFG Energy* at http://www.epa.gov/lmop/benefits.htm.

participate in the Methane to Markets partnership with 28 other countries that have interest or expertise in developing methane projects.

Key issues to consider in developing programs to capture landfill methane include:

- Identifying the entire inventory of potential methane-generating landfills;
- Closed landfills may be difficult to identify, but still have emissions;
- The type of outreach and targeting needed to successfully maximize program participation and how to coordinate that effort regionally
    - Targeting larger landfills that may qualify to participate in the LMOP but aren't yet taking action
    - Targeting a different population of landfills than federal programs
    - Quantifying the amount of methane produced to select target landfills using consistent procedures
- Funding of methane recovery projects, particularly for closed landfills or small municipal landfills
- Availability of electrical infrastructure and proximity of landfills to transmission lines
- Establishing effective and timely monitoring of landfill gas to identify problems or potential problems, including in the area between waste disposal sites and neighboring properties
- Difficulty of determining the percentage of landfill gas captured through a collection of wells and headers, with many uncertainties and variables
- Additional considerations that may explicitly address:
    - Organic waste diversion programs
    - Emission credits
    - Non-methane organic compounds (odors and air quality)
    - Recycling programs to recover energy-intensive materials, such as aluminum
    - Methane management opportunities for non-landfill organic waste – from dairies and pig farms, for example

Benefits to harmonization. Reaching out to landfills not subject to U.S. or Canadian regulations could further reduce landfill methane emissions and encourage energy recovery. Guidance for outreach at the regional level – possibly modeled after EPA's Landfill Methane Outreach Program – would reduce the level of jurisdictional effort necessary and provide a consistent message for the goals, benefits and procedures for a program that reduces landfill methane emissions reduction and promotes electricity production from landfill gas.

4 Tier 3 Policies

4.1 Transportation

4.1.1 Vehicle Emissions Labeling

Emissions labels provide consumers with information on GHG emissions from vehicles. This approach has the potential to influence vehicle market decisions by providing information for consumers who might have a preference for purchasing vehicles with lower GHG emissions. Harmonizing the content of emissions labels would provide standardized information for consumers while reducing burdens for manufacturers and regulators.

4.1.2 Medium- and Heavy-duty Vehicle Hybridization

Medium- and heavy-duty vehicles account for a significant portion of GHG emissions from the transportation sector. Hybridization reduces GHG and other emissions from these vehicles through greater fuel efficiency. Hybrid trucks and buses would likely achieve the greatest benefits in urban, stop-and-go applications, such as parcel delivery, transit and other short-range travel. A harmonized program of standards and incentives could help encourage a broader market for medium- and heavy-duty vehicle technology.

4.1.3 Transport Refrigeration Units

Transport Refrigeration Units (TRUs) are gasoline- or diesel-powered cooling units that are installed on containers used to transport produce, meat, dairy and other perishable goods. TRUs are capable of both cooling and heating and are found on refrigerated vans, trucks, trailers, railcars and shipping containers. Although TRU engines are relatively small, ranging from 9 horsepower to 36 horsepower, significant numbers of these engines congregate at distribution centers, truck stops and other facilities. Some companies use TRUs for extended cold storage and store overflow goods in TRU-equipped trucks and trailers for several weeks before holiday periods, or for more than a 24-hour period throughout the year. Harmonized policies and standards design would encourage more energy-efficient operations that reduce GHG emissions from systems using internal combustion engines. Harmonization also would encourage advancements in electrically driven refrigeration systems and cryogenic systems.

4.2 Industrial Sector

4.2.1 Emissions Performance Standards for Major Industrial Sources

Emissions performance standards for industrial facilities would set a maximum level of GHG emissions per unit of product produced.[59] These standards would be established by sector, by product, or in some cases by industrial process within a sector.

[59] For example, tons of CO_2 equivalent emitted per unit of product produced at the facility. For energy-related emissions, both direct use of fossil fuels on-site as well as off-site production of electricity consumed at the plant would be included.

5 Important Policies Addressed in Other Venues

A comprehensive program to achieve significant GHG emissions reductions and transition to a low-carbon economy will require a broad range of actions and investments by business, consumers and all levels of government. In addition to the three tiers of policies discussed above, other important initiatives are being examined and developed in other venues. These policies are expected to make critical contributions to achieving the WCI Partner jurisdictions' goals for greenhouse gas reductions. These other polcies, not being evaluated by the Complementary Policies Committee, include the following:

- **Renewable portfolio standards in the electricity sector.** Already adopted by each of the WCI Partner jurisdictions, renewable portfolio standards direct retail electricity providers to generate or purchase a portion of their power from renewable sources. These requirements promote multiple objectives, including diversifying electricity supply and encouraging deployment of low-carbon technology in the electricity sector. Included in this paper for further consideration is improving the ability to trade renewable energy certificates across WCI Partner jurisdictions.

  This section was added after review of stakeholder comments.

- **Transmission for renewable and other low-carbon resources.** Several regional efforts are underway to identify and prioritize necessary transmission lines to facilitate increased electric generation from renewable resouces. A substantial amount of these resources are located in areas remote from load centers. The Federal Energy Regulatory Commission (FERC) has jurisdiction over transmission of electric power in the U.S., however, states retain authority over siting transmission facilities. The Western interconnection serves all or portions of 14 U.S. states; Alberta; British Columbia; and the northern portion of Baja California, Mexico. The Western Electricity Coordinating Council (WECC) is responsible for coordinating and promoting bulk electric system reliability and open and non-discriminatory transmission access, subject to oversight by FERC and Canadian authorities. Advisory groups to WECC, the Western Governors' Association (WGA) and its energy arm, the Western Interstate Energy Board, support cooperative reliability and transmission efforts. The Western Renewable Energy Zones initiative promotes the efficient development, procurement and delivery of energy from renewable-rich zones to population centers while balancing other state objectives. In addition, with funding from the U.S. Department of Energy, WECC is developing 10-year and 20-year regional transmission plans – due in 2011 and 2013, respectively – to provide guidance for decisionmakers and facilitate expansion of needed transmission infrastructure, including transmission to accelerate development of renewable and other low-carbon resources.

- **Energy efficiency standards for new buildings and appliances.** State and provincial building and appliance standards ensure that manufacturers and builders bring energy-

saving products to market. These standards have proven to be highly effective for reducing energy consumption and GHG emissions. Moreover, their implementation in a similar manner across jurisdictions is key to building larger markets for energy-saving products and green building techniques. States and provinces regularly update building standards. Most of the WCI Partner jurisdictions have adopted residential and commercial building codes consistent with the 2006 model International Energy Conservation Code, which itself provides a degree of harmonization. Most appliance standards in the U.S. are set by the federal government, including recent updates under the Energy Independence and Security Act of 2007. Pending U.S. Congressional bills would raise energy efficiency standards in building codes and increase energy efficiency requirements for lighting and appliances. Depending on any federal preemption provision, building codes and appliance standards in WCI Partner states may exceed these requirements.

- **Smart grid.** Smart grid infrastructure is under development in several of the WCI Partner jurisdictions in order to facilitate the dynamic transfer of information and electricity between the electric grid and retail customers. The smart grid will enable greater integration of intermittent renewable generation, demand-side resources and energy efficiency into the grid while improving reliability. Using funding authorized under the American Recovery and Investment Act of 2009, the U.S. Department of Energy is awarding some $4.5 billion to utilities, equipment suppliers, regional transmission organizations, states and research organizations to jump-start smart grid on a massive scale.[60] The National Institute for Standards and Technology is developing a framework, including protocols and model standards for information management, to ensure smart grid devices and systems work effectively with the many interconnected elements of the electric power grid. The Western Electricity Coordinating Council is likely to have a role in developing harmonized standards for the western states and provinces.

- Light-duty vehicle emissions standards. Light-duty vehicle emissions standards. In June 2009, EPA granted a waiver to California to proceed with implementation of its GHG emission reduction standards for new passenger cars, pickup trucks and sport utility vehicles beginning with the 2009 model year. This opened the way for the other 13 states and the District of Columbia that have adopted those standards to also proceed. Shortly thereafter, the Obama Administration announced its intent to adopt these emission standards at the national level. The final joint rule between EPA and the Department of Transportation's National Highway Safety Administration (NHTSA) was announced on April 10, 2010. In Canada, 2 Provinces that participate in the WCI have adopted these standards and the national government has committed to developing national vehicle GHG standards for 2011 and subsequent model year light duty vehicles

[60] *See* http://www.energy.gov/recovery/smartgrid_maps/SGIGSelections_State.pdf and http://www.energy.gov/news2009/documents2009/SG_Demo_Project_List_11.24.09.pdf.

that will mirror the US federal standards to create a more harmonized regulatory environment for automakers.

- **Vehicle miles traveled reductions.** Several WCI Partner jurisdictions have undertaken initiatives to encourage reductions in vehicle miles traveled (VMT) by fostering transit-oriented development or integrating climate change into transportation and land use planning. Pay-as-you-drive insurance, which will be evaluated as a Tier 2 policy as noted in this document, may indirectly impact VMT. VMT reductions can be an effective strategy to enhance mobility efficiency while reducing GHG emissions from the transportation sector.

- **Government leading by example.** Each WCI Partner jurisdiction has adopted goals or policies to save energy and reduce GHG emissions in its own operations. These policies build markets for low-GHG materials and equipment and set an important example for the private sector. By demonstrating exceptional emissions reductions in various areas, WCI Partner jurisdictions provide a laboratory for the development of innovative approaches.

- **Assistance for low-income households.** Results from the WCI economic analysis released in September 2008 indicate that the WCI emissions targets can be met through a broad based cap-and-trade program and complementary policies with a net savings to the economy. However, the WCI Partner jurisdictions are committed to understanding and addressing potential impacts on low-income households that, for example, spend a relatively high portion of their income on energy. Each WCI Partner jurisdiction is examining how best to address this issue, relying on the programs and approaches most suitable to each Partner's circumstances.

Appendix 1: Complementary Policies: Capped vs. Uncapped Sources and Sectors[61]

Policies to Reduce Emissions From Sources and Sectors Capped in 2012 *Energy Production* • Small-scale renewable energy resources (Tier 1) • Combined heat and power (Tier 1) • Hydropower (Tier 1) • Emissions performance standards for electric generating units (Tier 1) • Carbon capture and sequestration (Tier 2) • Tradable renewable energy certificates (Tier 2)
Energy Efficiency • Energy efficiency targets (Tier 1) • Energy efficiency programs and incentives (Tier 1) • Tradable energy savings credits (Tier 2)
Industrial Sector • Emissions performance standards for major industrial sources (Tier 3)
Policies to Reduce Emissions From Sources and Sectors Capped in 2015 *Transportation* • Low-carbon fuel standard (Tier 1) • Freight transportation infrastructure and heavy-duty vehicles (Tier 1) • Electric and alternative fuel vehicle infrastructure (Tier 2) • Pay-as-you-drive insurance (Tier 2) • Vehicle emissions labeling (Tier 3) • Medium- and heavy-duty vehicle hybridization (Tier 3) • Transport refrigeration units (Tier 3)
Policies to Reduce Emissions From *Uncapped* Sources and Sectors *High-Global Warming Potential Gases* • Regulatory measures for high-global warming potential gases (Tier 1)
Agriculture • Agricultural anaerobic digesters (Tier 2)
Waste Management • Measures for landfill methane reduction (Tier 2)

[61]This table only includes policies the Committee will evaluate for further consideration; it does not include policy initiatives underway in other venues.

Appendix 2: Stakeholder Comments on Draft White Paper

The Complementary Policies Committee prepared a draft of this white paper to solicit input from stakeholders on:

- *Recommended Policies:* Which policies should be recommended for further evaluation, how those policies should be prioritized, key issues associated with the policies, and benefits to harmonizing policies across WCI Partner jurisdictions, as well as other states and provinces
- *Evaluation Criteria and Indicators:* How the Committee's recommended evaluation criteria and qualitative indicators can be used to verify that criteria have been met
- *Continued Stakeholder Engagement:* How the Committee can best engage with stakeholders as the evaluation process evolves

The Committee received 17 sets of written comments on its draft white paper during the 60-day public comment period. Some comments were submitted on behalf of numerous organizations. The Committee carefully reviewed all comments. Following is an overview of the public comments received and WCI's responses, including changes in this final paper.

Comments on Policy Recommendations

Energy Production

Renewable portfolio standards (RPS) and tradable renewable energy credits. One stakeholder recommended that WCI Partners procure out-of-state renewable resources – or renewable energy credits from out-of-state projects – to meet state RPS requirements. Another commenter recommended that WCI Partners establish a system of tradable energy efficiency credits, in combination with tradable renewable energy credits. Other stakeholders recommended that all WCI Partner jurisdictions have strong RPS requirements, or that WCI Partner jurisdictions harmonize RPS requirements. On RPS generally and treatment of out-of-state resources, each WCI Partner already has established an RPS that specifies renewable resource obligations, geographic or deliverability requirements, and other standards in accordance with state objectives. However, WCI agrees that the concept of improving trading of renewable energy credits should be further explored. A section on this topic has been added to the final paper. We discuss energy efficiency credits under "Energy Efficiency," below.

Hydropower. Several comments were received on the economic and GHG benefits of hydropower. WCI agrees that acquiring incremental capacity from existing dams and potentially new, small-scale, run-of-the-river facilities present a valuable opportunity. A section on this topic has been added to the final paper.

Emissions performance standards. Some stakeholders are opposed to emissions performance standards for electric generating units, maintaining that they do not comport with a cap-and-trade system and that low-carbon solutions may not exist for a number of generating technologies. In its white paper, the Committee notes several key issues related to implementation and technology availability. Further, this paper is the Committee's initial review of policies for consideration. As described in the "Next Steps" section, WCI will evaluate these policies in more depth in the future, beginning with tier 1 policies.

Transmission. Several stakeholders recommended that the Committee explore policies related to the expansion of interstate transmission to access low-carbon resources. WCI acknowledges that this is a priority action for consideration, however, several interjurisdictional efforts are already underway to address this need. A section describing these efforts has been added to the paper under "Important Policies Addressed in Other Venues."

Combined heat and power facilities. Several stakeholders recommended that WCI consider policies to promote combined heat and power (cogeneration) facilities. They noted that many of the policies considered in the white paper for small-scale renewable resources also could apply to combined heat and power. WCI agrees that policies to promote combined heat and power facilities should be a high priority. A section on such policies has been added to the final paper.

Energy Efficiency

Building codes and appliance standards. Some stakeholders recommended that WCI Partners coordinate on building energy codes and appliance standards that exceed national requirements. WCI agrees that these are important efforts, but notes that they are being addressed through other avenues. See revisions in this paper under "Important Policies Addressed in Other Venues."

Industrial efficiency measures. The Committee received a comment that the policies proposed for consideration put insufficient emphasis on industrial energy efficiency measures, noting in particular energy efficiency audits for large industrial emitters. In response, the Committee points out that the policies described under "Energy Efficiency Targets" and "Energy Efficiency Programs and Incentives" span all sectors of the economy, including industry. Regarding audits specifically, large industrial facilities typically have in-house energy expertise. For small- and medium-size manufacturers in the U.S., the Department of Energy provides free, in-depth assessments of facilities, services and manufacturing operations. The audits examine potential savings from energy efficiency improvements, waste minimization and pollution prevention, and productivity improvement.[62]

[62] *See* http://iac.rutgers.edu/.

Energy savings credits. As described above, one stakeholder recommended that WCI Partners establish a system of tradable energy efficiency credits. WCI agrees to further explore this concept. This potential policy has been added to the final paper.

Smart grid. The Committee was asked to address policies to develop a "smart grid." WCI recognizes that smart grid technologies can enable GHG emissions reductions, if the requisite complementary policies are in place, e.g., policies that promote energy efficiency, renewable energy and clean distributed resources. However, WCI believes its appropriate role in this area is education and outreach that supports the significant federal and regional efforts already underway. The "Important Policies Addressed in Other Venues" section has been revised to further describe these federal and regional efforts.

Transportation

Stakeholders noted significant opportunities for reducing GHG emissions in the transportation sector through a reduction in Vehicle Miles Traveled (VMT) and increased efficiencies in driving habits. The WCI economic analysis affirmed that these policies will be critical to meeting GHG reduction goals.

Pay-as-you-drive insurance. Several jurisdictions are pursuing policies that promote pay-as-you-drive insurance. WCI agrees to further consider this policy and has added an initial discussion to this paper.

Reduced speed limits. One stakeholder suggested reducing highway speed limits as a strategy to reduce GHG emissions. Lower speed limits and mandatory use of speed regulators for heavy duty trucks are among the possible policies included in this paper for further consideration by WCI.

Low-carbon fuel standard (LCFS). Some stakeholders recommended that transportation fuels be included in the WCI cap-and-trade program or that alternative policies, such as a federal renewable fuel standard, should be considered. When it approved its cap-and-trade program design, WCI determined that transportation fuels will come under the cap beginning in 2015. Other stakeholders stated their concerns about implementation and economic impacts of an LCFS. WCI will continue to explore these issues as it moves forward with evaluating an LCFS.

Vehicle efficiency. Stakeholders recommended WCI Partner jurisdictions adopt vehicle efficiency standards. On April 1, 2010, EPA and the Department of Transportation's National Highway Safety Administration (NHTSA) announced a joint final rule establishing a national program to reduce greenhouse gas emissions and improve fuel economy for new cars and trucks sold in the United States. These standards were simultaneously adopted by the Canadian national government.

Electrification of the transportation sector. Some stakeholders suggested that the white paper include the electrification of transportation as a tier 1 policy. There are a number of options for

diversifying the transportation fuel mix in WCI Partner jurisdictions. The draft white paper included development of electric and alternative-fuel infrastructure for freight transportation and vehicles as Tier 2 policies for further evaluation. Several WCI Partner jurisdictions, particularly on the West Coast, already have efforts underway to develop infrastructure for electric vehicles.

Another stakeholder recommended that the Committee consider additional transportation policies such as replacement tire standards, feebates for highly efficient vehicles, and an accelerated vehicle retirement program. Several WCI jurisdictions currently offer incentives for high-efficiency or alternative-fuel vehicles and have other programs underway to reduce emissions from the transportation sector.

High-Global Warming Potential Gases

Some stakeholders suggested that ozone-depleting substance destruction should be eligible under the WCI cap-and-trade program as a GHG offset. Because this recommendation deals specifically with offsets under the program, the Complementary Policies Committee referred this recommendation to the Offsets Committee.

Waste Management

One stakeholder suggested that the Complementary Policies Committee should drop from further consideration policies on anaerobic digesters and landfill methane reductions, and that these policies instead be addressed by the WCI Offsets Committee as it develops offset protocols. The white paper has been amended to clarify that the proposed complementary policies for anaerobic digesters are targeted towards streamlining permitting processes and increasing the accessibility of this technology. In the case of landfills, the proposed policy is coordinated regional outreach to landfills that are not subject to U.S. or Canadian regulations for methane reduction. The Complementary Policies Committee will coordinate with the Offsets Committee in any further evaluation of such outreach.

Other stakeholders asked the Committee to explore *additional* policies that address emissions from the waste sector, including mandating landfill gas-to-electricity (or landfill gas-to-fuel) processes for large landfills; requiring small landfills to collect and combust waste gas; and flaring methane from other organic waste sources, such as dairies, pig farms and food processing facilities. To address large waste sources, some stakeholders recommended using waste gas to generate electricity and produce transportation fuels, and increasing recycling of aluminum and other discarded materials.

The white paper includes a variety of policy approaches to help coordinate and encourage broader adoption of methane management practices to reflect the diversity of landfills (e.g., size, construction and composition); the variability in methane yields among regions (e.g., wet vs. dry); and the various complex and, in some cases, novel technologies employed for methane capture and flaring/electricity generation. Such policy tools include funding of methane

recovery projects, particularly for closed landfills or small municipal landfills; evaluation of requisite electrical infrastructure; outreach to maximize program participation; and improved inventorying.

Other Sectors

Forestry. Some stakeholders recommended that WCI Partners require standardized, sector-wide accounting of forest carbon, including flows between sectors and permanent conversion of forest land to other uses. Stakeholders also recommended that WCI use state and provincial inventory information to develop a regional forest carbon policy that includes no net loss or a "floor" for forest carbon and continued sequestration at or above current levels, with a goal of maintaining forest carbon stores in natural forests and increasing total terrestrial carbon stores in the forest sector over time. The Committee referred these recommendations to the WCI Partners for consideration. The Partners determined that these recommendations address areas beyond the Committee's scope, as outlined in its workplan.

Other land uses. WCI should consider developing a regional mitigation program, potentially implemented at the state or provincial level, for the net climate impact of emissions from other land uses (e.g., peat extraction) and conversion of natural and working landscapes to developed or other uses. While the Committee is aware of the potential impact of land use changes on greenhouse gas emissions, it also recognizes that land use is typically a local government decision.

Workforce strategies. The Committee received a comment that any strategy proposals to address workforce issues related to the cap-and-trade program should align state assets, such as community colleges and apprenticeship, rather than create new and perhaps duplicative programs. The Committee appreciates this advance comment for its future report in this area.

Evaluation Criteria

Stakeholders provided comments on the draft criteria for evaluating recommended policies for harmonization, suggesting either revisions to the criteria or additional criteria. The Committee has revised the criteria to include "The policy addresses a perceived market failure" and to clarify that the increased use of electricity is not a collateral detriment, unless it results in higher GHG emissions. Other revisions recommended by stakeholders were deemed to be similar to those already put forth by the Committee.

Stakeholders provided the following suggestions for how policies should be prioritized (tiered) and evaluated:

- The ranking of some policies, including small-scale renewable resources and development of algae biofuels, should be lowered. In the case of biofuels, a stakeholder commented that "supporting research of a single technology does not seem to be the proper role for the WCI complementary policies committee."

- Carbon capture and sequestration, transportation electrification, smart grid, and industrial emissions performance standards should be tier 1 policies.

The Committee agrees that barriers to algae biofuels fall under the purview of a broader policy, such as an LCFS. With regard to the other comments, the Committee re-evaluated the tiering of policies before publishing the final white paper to ensure consistency with the evaluation criteria.

Stakeholder Engagement

Stakeholders were asked to provide suggestions as to how the Complementary Policies Committee can better engage stakeholders and increase participation. The Committee sincerely appreciates these suggestions and will take them up as it continues its work.

General Comments

GHG reductions from complementary policies vs. cap-and-trade program. Some stakeholders maintain that GHG reductions from complementary policies should be counted towards the emissions cap under the cap-and-trade program. Additions to the white paper under "The Role of Complementary Policies" further clarify the interaction between GHG emission reductions from complementary policies and the cap-and-trade program.

Vehicle emissions labeling. The Committee received a comment that the benefits of vehicle emissions labeling would be nullified by combining that program with tradable credits for vehicle emissions. The purpose of vehicle emission labeling is to provide consumers with information about the particular vehicle. It does not purport to share information about overall greenhouse gas emissions. In an emissions trading program, emission reductions achieved in one sector may indeed be traded to another sector that is unable to make reductions. However, the declining cap will ensure the needed reductions are made.

WCI focus. One stakeholder recommended that WCI focus its efforts on its core directives – particularly the implementation of the regional cap-and-trade program – and limit its engagement in complementary policies to those critical to the cap-and-trade program's success, at least until after the program's implementation in 2012. The section "The Role of Complementary Policies" explains the importance of both efforts to achieve WCI's GHG emissions reduction goals at least cost.

Regulatory and trade agreement conflicts. One commenter recommended that the Committee evaluate potential conflicts between complementary policies under consideration and regulations and trade agreements. That type of analysis is envisioned in the next phase of the Committee's work, as explained in further detail in the amended "Next Steps" section of this paper.

Appendix 3: List of Acronyms

CCS	Carbon capture and sequestration
CHP	Combined heat and power
EERS	Energy efficiency resource standard
EPA	U.S. Environmental Protection Agency
EPS	Emissions performance standard
FIT	Feed-in tariff
GHG	Greenhouse gas
GWP	Global warming potential
LCFRR	Low Carbon Fuel Requirement Regulation
LCFS	Low carbon fuel standard
LMOP	Landfill Methane Outreach Program
MW	Megawatt
MWh	Megawatt-hour
ODS	Ozone depleting substances
PAYD	Pay-as-you-drive
PURPA	Public Utility Regulatory Policies Act
RPS	Renewable portfolio standard
TRU	Transport Refrigeration Units
WCI	Western Climate Initiative
VMT	Vehicle miles traveled