Clean Energy Jobs Work Groups
Meeting #1 -- Homework Questions
(1000 Friends of Oregon responses)

DIRECTIONS: No later than one week prior to the second work group meeting, please send your responses to the questions below to committee staff (beth.patrino@oregonlegislature.gov or beth.reiley@oregonlegislature.gov). As you prepare your responses, please consult with others in your organization or industry, particularly any located in jurisdictions currently participating in the Western Climate Initiative.

Question 1: What aspects of a cap-and-invest policy as it is being discussed in Oregon are you most concerned about for your organization/industry/constituents/customers?

1000 Friends of Oregon supports the cap-and-invest policy that is being discussed. We particularly support the policy's focus on equity, taking into account that the burdens of climate change fall disproportionately on Oregon's more vulnerable underserved and lower income urban and rural communities and economies.[1] And, by supporting certain investment in these communities, the policy recognizes that significant reductions in greenhouse gas emissions can be achieved. The social and economic needs of rural agricultural and forest communities can benefit from this policy package, through both exemptions and the opportunity to participate in the carbon offset market. Similarly, investment in transit, walkable neighborhoods, safe bicycle infrastructure, and affordable and diverse housing in places served by these reduces greenhouse gas emissions while providing housing and transportation opportunities to vulnerable communities. Oregon's land use planning program is a ready-built system that makes much of these investments not only easier, but also integrates them into one another.

California, in its implementation of AB 32 and SB 535, has demonstrated that investment in affordable housing in transit-served areas significantly reduces greenhouse gas emissions. Lower-income households living near transit drive less than half as many miles as wealthier households. In California, creating 15,000 new affordable homes near transit keeps over 1.58 million metric tons of greenhouse gases out of our air.[2] Therefore, California is investing in building just that – affordable housing near transit.

Oregon should adopt similar investment strategies in affordable and middle income housing, transit, and walking and bicycling facilities that meet several bottom lines: cleaning the air of

[1] "…the brunt of the [climate change] harm is most likely to fall disproportionately on the most vulnerable populations, such as pregnant women, children, the poor, the elderly, minorities, immigrants and people with disabilities." President Obama administration study, as reported in the *Washington Post*, https://www.washingtonpost.com/news/energy-environment/wp/2016/04/04/as-the-climate-changes-risks-to-human-health-will-accelerate-obama-administration-says/?utm_campaign=Sightline%20News%20Selections&utm_medium=web-email&utm_source=Sightline%20Institute&utm_term=.cfe3e70d44ae

[2] *WHY CREATING AND PRESERVING AFFORDABLE HOMES NEAR TRANSIT IS A HIGHLY EFFECTIVE CLIMATE PROTECTION STRATEGY*, TRANSFORM, 2014 http://www.transformca.org/transform-report/why-creating-and-preserving-affordable-homes-near-transit-highly-effective-climate

unhealthy pollutants and helping communities of color and low-income neighborhoods hit hardest by climate change.[3] The benefits from this policy could be even more pronounced in Oregon, where almost 40% of the state's greenhouse gas emissions come out of the tailpipes of automobiles and light trucks, and moreover, where we also have an in-place structure of compact urban growth boundaries that amplify the magnitude of these investments because they are more effective here. Metro's Climate Smart Communities Strategy has documented that Oregon's urban areas can meet their fair share of greenhouse gas emissions by these types of investments.

Preservation of Oregon's carbon-absorbing private, farms, forests, and ranchlands is another one of the most significant carbon mitigation investments the state can make. These investments can take many forms. The Oregon legislature acknowledged this when it passed the Oregon Agricultural Heritage Program in 2017. Two- thirds of Oregon's farms and ranches are expected to change hands over the next 20 years, representing approximately 10 million acres. Oregon must be prepared to invest in working land easements if we are to keep these lands intact and available to feed future generations of Oregonians and others. Investments from the Clean Energy Jobs Act can be an integral source of funding for the working lands easements farmers and ranchers and foresters will need to make as they transfer their land from one generation to Oregon's newest farmers and ranchers.

In developing the market and investment structure, we urge Oregon's legislators and regulators to remain disciplined on focusing resources in a manner that has the greatest enduring impact for generations to come. For example, some of Oregon's greatest emissions come from human and natural caused emissions from forest fires. With lightning strikes increasing by 12.5% for every 1 degree increase in global temperature; we are witnessing the impacts here in Oregon. These include adverse health impacts from poor air quality, particular on more vulnerable populations; disruptions to rural economies; and increasing danger to wild land firefighters.

Fortunately, Oregon's investments in forest collaboratives for over a decade provide the scientific underpinning to scale resiliency actions, such as thinning and prescribed fires, to address the full scope of the need on the 9.5 plus million acres of federal and private lands in the Pacific Northwest. These same forest investments store carbon in wood-based manufactured products and significantly reduce emissions as forests are thinned to the new range of climate variability.

We were both inspired and concerned by the story presented by the Warm Springs tribal members who described their experience with registering carbon offsets for the California market. While we understand that the specifics of the carbon offset market will be determined

[3] *CLIMATE BENEFITS FOR CALIFORNIA: Find out how California's climate investment program is making communities more healthy, sustainable, and fair*, https://www.climatebenefitsca.org/

See also, http://upliftca.org/

largely through rule-making, we hope Oregon's market will consider the limitations and weaknesses of California's current regulatory framework so that validation of carbon offset projects can be streamlined and benefits reach target communities and individuals faster.

Finally, because of our land use system, Oregon has the potential to be a "solar ready" state. Specifically, the Clean Energy Jobs bill can investment in aggregating existing biological information, soils type information, and power grid interconnect information so Oregon can comprehensively and sensibly plan out industrial solar siting by design, to be "shovel ready," which can benefit in particular rural communities in eastern and central Oregon that have faced challenges from changing economies.

Question 2: What changes would you suggest be made to cap-and-invest as it is currently being discussed to address the concerns you have?

Future rule-making efforts should ensure investments are made to remove the burdens of a changing climate from, and bring the benefit of clean energy jobs and economies to, rural and urban underserved and vulnerable communities and communities of color, both directly and indirectly.

We also support additional review of the current regulatory framework for utility-scale renewable energy development so development is directed away from Oregon's most productive farmland and onto less productive land, where it is the highest and best use of the land. We are not sure if this process can be incorporated into the Clean Energy Jobs bill process, but we feel it is important to consider in light of the interaction between Clean Energy Jobs and the RPS program.

Question 3: What opportunities do you believe exist for your organization/industry/constituents/ customers from implementation of a cap-and-invest policy as it is currently being discussed in Oregon?

1000 Friends of Oregon works closely with farmers, ranchers, and forest landowners across the state. We were encouraged to hear discussion about carbon offsets for forest carbon storage projects, grassland conservation, and other projects that will support rural economies. The key to these projects will be to create a regulatory process that is as streamlined as possible. Investment into these types of carbon offset projects is very important because it can help keep rural landowners from having to sell off land as new and younger farmers take over, acquire, or lease ranches, farms, and timberlands. The problems with succession planning for Oregon farmers are well documented, whether to the next generation or to a new farmer. [4] The more strategies and tools that farmers can use to facilitate farm transitions the better. Carbon offset projects can be one of these tools.

[4] See Martin et al, PSU 2016

Similarly, 1000 Friends has worked extensively to ensure that Oregon's land use Goal 10, Housing, is actually implemented. This Goal requires every city and town in Oregon to provide residential land zoned to meet the needs of all Oregonians at every income level in "location, type and density." Oregon is falling short of this Goal – well short in some of our urban areas in ways that disproportionately impact communities of color, older persons, and lower income people. And, 1000 Friends was a leading organization in (finally) achieving a steady funding source for statewide transit, in HB 2017. Investments from the Clean Energy Jobs bill in affordable housing and in transit will mean more Oregonians can live affordably in neighborhoods of opportunity.

Answers to Homework Questions for CEJ Ag Workgroup Meeting #1

Submitted by:
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Question 1: What aspects of a cap-and-invest policy as it is being discussed in Oregon are you most concerned about for your organization/industry/constituents/customers?

The Clean Energy Jobs bill will create little direct cost to Oregon agriculture, because no single agricultural operation in Oregon will exceed the threshold level for covered entities. Indirect costs* may come if other sectors pass through their increased costs for goods and services that are carbon---intensive.

350.org, Renew Oregon, and other coalition members are strong advocates for the Clean Energy Jobs bill and a price on greenhouse gas emissions. Any increased energy costs will encourage energy conservation, efficiency and adoption of renewables by all sectors of the economy, including agriculture. Agriculture operations that implement energy conservation, efficiency and adoption of renewables will have a competitive advantage, because they will not bear these additional costs. This is the intention of the policy.

***T**hese indirect costs are already increasing as a result of climate change. For example, the cost of diesel fuel increased, as a result of the hurricanes this summer and extreme weather events and fires will continue to impact refineries, which are one of the main reasons the price of fuel spikes. So, mitigating climate change can also help to reduce/stabilize these costs.

Question 2: What changes would you suggest be made to cap-and-invest as it is currently being discussed to address the concerns you have?

As a member of the Renew Oregon coalition with expertise in agricultural systems, I will focus these comments on that sector. The bill could be enhanced by allowing incentives for the adoption of practices that mitigate climate change by the agricultural community, especially those that sequester carbon in the soil and conserve energy. These incentives may be particularly important for smaller farm operations. Proceeds could be used to fund incentive programs providing technical and/or financial assistance to producers seeking to lower GHG emission associated with their production systems.

Specifically, we request that the following policy options be considered:

1) Provide funding from reinvestment revenue for GHG mitigation by the agriculture sector. Consider establishing an additional Fund, similar to California's Healthy Soils Program, which would provide grant or other funding to the agriculture sector for projects which mitigate greenhouse gas emissions. Ensure that this funding is available and accessible to farms of all sizes. At the very least, this should be an eligible activity.
2) We recommend adding to Section 14(4)(c) a requirement consideration for projects with multiple environmental and health co-benefits. This appears in Section 16 but probably belongs in both places. This is important for the agriculture sector. Co-benefits can include resistance to both drought and flooding and increased productivity.
3) In Section 16(3)(d): it would be ideal to have representation of someone with experience in natural and working lands. If positions are established there must be representation of both large and small farms.
4) Section 16(6)(c): Allows for provision of technical assistance for women and minority businesses, which we fully support. It is important that small family farms are able to access these investment dollars. We request that we define and add "small" or "family" businesses as eligible for technical assistance as well, so that farms of all sizes can benefit. The concern is that this funding will go mainly to large industrial ag with the resources to write the grants and do the reporting and that small farms will not be eligible.

We were asked to consult with others in our industry, particularly any located in jurisdictions currently participating in the Western Climate Initiative, as we prepared these responses. These recommendations above are based on feedback we received from California Climate Action Network (CALCAN), a statewide coalition that advances state policy to realize the powerful climate solutions offered by sustainable and organic agriculture, which has been highly involved in agriculture policy related to AB 32 and California's Healthy Soils Program.

A common concern among the agricultural community is that early adopters already implementing one or more of these good practices are not rewarded while laggards who have resisted implementing progressive practices receive financial rewards and technical assistance. This is a problem that no one has figured out how to address. We look forward to exploring potential solutions to this challenge. One option is providing incentives for practices that are known to sequester carbon in the soil, through farms already implementing best practices and those who are new to the methodologies.

Question 3: What opportunities do you believe exist for your organization/industry/constituents/customers from implementation of a cap-and-invest policy as it is currently being discussed in Oregon?

The availability of funding from offsets is a great opportunity for Oregon's agriculture community. An offset program would allow "uncapped" sectors—like agriculture and forestry—to generate additional emissions reductions, or offsets, that can be sold to regulated parties. This flexibility lowers the overall cost of the program and creates value for qualified emissions reductions outside of the cap.

I recommend keeping the offset limit at 8%, as it currently stands in 1070. Here is some background, provided by The Climate Trust, about why keeping the offset limit at 8% is important:

Certainty in significant, long-term demand for offsets will mobilize private capital into land-based GHG reduction projects. A reduced offset limit sends a signal of uncertainty to private investors, limiting interest in financing agricultural and forestry GHG reduction. The offset market can motivate agricultural and forestry GHG reductions at a faster pace and greater scale than auction fund reinvestment because it sends a long-term price signal that can be depended upon, makes payments for verified reductions rather than anticipated reductions, and focuses on the most cost-effective reduction opportunities. (For more information about this, see The Climate Trust's brief How the offset market mobilizes investment in emission reductions today, in which they discuss why the offset market leverages more private finance than the programs they have seen from California's Greenhouse Gas Reduction Fund.) Reinvestment of auction revenue is essential (especially for very small or difficult to quantify projects), but the strong demand for offsets created by an 8% limit is key to leverage private finance to achieve the emission reductions we need from agriculture and forestry.

At the appropriate time Oregon will need to create a process for drafting new offset protocols for agriculture that are specific to Oregon. Offsets generate a tradable asset that can meet protocols that prove up a measurable reduction in GHG emissions.

The American Carbon Registry (ACR), has several approved and pending methodologies related to agricultural offset activities, including:
N2O Emissions Reductions through Reduced Use of Fertilizer on Agricultural Crops

Avoided Conversion of Grasslands and Shrublands to Crop Production (ACoGS)

Grazingland and Livestock Management (GLLM)

Methodology for Greenhouse Gas Emission Reductions from Compost Additions to Grazed Grasslands (Version 1.0)

Source: https://www.c-agg.org/voluntary-ghg-registries/

Examples of additional Oregon-specific offsets or new offsets* for agriculture could include:

1) Organic practices
2) Cover crops and crop rotations
3) Organic no-till
4) Conventional no-till and conservation tillage
5) Rotational grazing

Many, but not all, of the practices mentioned above can be implemented by both conventional and organic farms and farms of a variety of sizes/scales.

If anything needs to be specified in the bill, to ensure that Oregon-specific offsets can be established, we request that language be incorporated at this time. The bill language should also ensure that this opportunity is available and accessible to farms of all sizes.

*Offsets have to meet strict standards, such as additionality, durability, verifiable amongst other measures. Developing new offset protocols needs to be science-based to ensure real emissions reductions.

November 1, 2017

Question 1: What aspects of a cap-and-invest policy as it is being discussed in Oregon are you most concerned about for your organization/industry/constituents/customers?

The overriding interest of the American Carbon Registry (ACR) is that climate change is ultimately solved. For Oregon to contribute meaningfully requires three things.

The first is that the state aim for aggressive GHG reductions. Oregon's existing goals and those enshrined in SB 1070 are aggressive. Only this level of ambition, shared widely, offers a chance to stave off the worst effects of climate change.

The second requirement is sustained action. In a democratic society, this requires ongoing public support. Maintaining support is far easier with a strong economy. Climate action that impairs jobs and growth will inevitably be difficult to sustain. Conversely, addressing climate change in ways that actually create economic opportunity will engender positive popular sentiment.

Critics of SB 1070 are right in one respect: Oregon cannot solve climate change alone. This brings us to the third aspect that Oregon climate policy must project: that a climate program can be both successful in achieving GHG reduction goals and compatible with a robust economy. Such a model offers the best hope of inspiring other jurisdictions to join the cause. It is, therefore, fundamental to success that climate action entail limited economic costs, while creating new jobs and opportunities.

Question 2: What changes would you suggest be made to cap-and-invest as it is currently being discussed to address the concerns you have?

ACR is primarily concerned with suggestions that the offsets usage limit be reduced below the eight percent currently specified in SB 1070. Most Oregonians would likely support reaching the GHG reduction goals at least cost. Doing so necessitates that compliance entities are able to avail of low-cost emissions reduction opportunities outside the cap.

Some stakeholders have expressed concern that Oregon may not be able to link with California unless Oregon adopts the lower offset limits California has legislated for 2021 – 2030. If the offsets limit should present a barrier to linkage, the current draft of SB 1070 contains language allowing DEQ to reduce the limit. Any potential for the issue to impede linkage has already been addressed. Based on ACR's experience – having issued almost 2/3 of the offsets against California's compliance protocols – we do not believe a difference in the offsets limit will hinder linkage. California's SB 1018 lays out the requirements for linkage, and nowhere does it say that other jurisdictions must establish the same offsets limit. Equivalent stringency of climate programs, including offsets, is mandated, but offset integrity is normally viewed in terms of ensuring the emissions reductions are real, permanent,

verifiable, enforceable, and go beyond what would otherwise be achieved through regulations and expected behavior. Both Quebec and Ontario have eight percent offsets limits in place. Neither has indicated any intention of adjusting these limits, nor is such a proposal heard anywhere in the WCI dialogue.

Question 3: What opportunities do you believe exist for your organization/industry/constituents/ customers from implementation of a cap-and-invest policy as it is currently being discussed in Oregon?

Along with crucial GHG mitigation, offsets deliver solid economic and environmental co-benefits. Native American tribes are leading the way in adopting forest management practices that increase sequestration of carbon dioxide. At a recent working group meeting, we heard from a representative of the Warm Springs tribe, who passionately endorsed the notion that tribes should be able to receive payment for the ecosystem value they contribute.

Indeed, many other forest land owners would offer a similar sentiment. Projects that improve forest management and avoid loss of forests to development have generated some 60 million of the 85 million offsets for California's program. At today's prices, the forest carbon offsets represent about $780 million in value. By tailoring offset protocols to Oregon forests, the state's landowners could enjoy an opportunity even more compelling than California offers.

Dairy farmers have also benefitted from California's climate progress. Methane emissions that would have an outsize warming effect in the near term have been avoided. By installing digesters, dairy farmers are delivering electricity to the grid. Unfortunately, the technologies are uneconomic unless their green attributes are taken into account.

Finally, Oregon's enlightened movement to construct green buildings could enjoy synergies with offsets. Today, most spray foam insulation is installed with high-GWP propellants. ACR has published a protocol to generate offsets from use of low-GWP propellants. Most refrigeration systems also release potent planet-warming gases. Supermarkets could install advanced refrigeration systems that dramatically reduce or eliminate these emissions, and a new ACR protocol is helping to effect such change. Oregon's leadership in constructing tall wood buildings is to be applauded. The approach essentially uses natural systems to achieve carbon capture and utilization. Offsets could potentially provide financial support for the CO2 sequestration that tall wood buildings achieve.

Clean Energy Jobs Work Groups

Meeting #1 -- Homework Questions

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Question 1: What aspects of a cap-and-invest policy as it is being discussed in Oregon are you most concerned about for your organization/industry/constituents/customers?

That the primary focus be on effective carbon reductions consistent with the State's adopted goals, from a program that is transparent and efficient and flexible as to means but with firm accountability as to ends. A crucial secondary focus must be on cushioning the distributive economic impacts to low income households and trade-exposed businesses.

Question 2: What changes would you suggest be made to cap-and-invest as it is currently being discussed to address the concerns you have?

Comments coming on suggested detailed changes to improve effectiveness and more complete scope (especially in managing forest carbon).

Question 3: What opportunities do you believe exist for your organization/industry/constituents/ customers from implementation of a cap-and-invest policy as it is currently being discussed in Oregon?

The most important opportunity this opens up is for Oregon to manage its total carbon stocks and emissions to optimize for less atmospheric carbon (not just lower Oregon emissions) as a result of Oregon policies. The Global Warming Commission leaves to individuals and businesses to identify the many new personal and business opportunities that will emerge from a clean energy system and a decarbonized economy.

Clean Energy Jobs Work Groups

Meeting # -- Homework Questions

Transportation and Utilities Work

Group

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Question 1: What aspects of a cap-and-invest policy as it is being discussed in Oregon are you most concerned about for your organization/industry/constituents/customers?

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Question 2: What changes would you suggest be made to cap-and-invest as it is currently being discussed to address the concerns you have?

Comments coming on suggested detailed changes to improve effectiveness and more complete scope.

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The most important opportunity this opens up is for Oregon to manage its total carbon stocks and emissions to optimize for less atmospheric carbon (not just lower Oregon emissions) as a result of Oregon policies. The Global Warming Commission leaves to individuals and businesses to identify the many new personal and business opportunities that will emerge from a clean energy system and a decarbonized economy.

Clean Energy Jobs Work Groups

Meeting #1 – APANO's Homework

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Question 1: What aspects of a cap-and-invest policy as it is being discussed in Oregon are you most concerned about for your organization/industry/constituents/customers?

- Offsets: Doesn't actually reduce GHG emissions
  - Unclear metrics: Measuring forest carbon capture is an inexact science,
  - Impermanence: Given the ever-present risk of fire, disease, it is difficult to guarantee that forests will always be around forever
  - Leakage: How can we ensure that funding a forest conservation project in one area of the U.S. doesn't merely move the deforestation to another area?
  - Additionality: Some forests were going to be conserved anyways. How to prove that these forests were going to be logged, and thus, are reducing carbon emissions?
- Free Allowances: too many free allowances mean we won't have any revenue to reinvest
- Joining the Western Climate Initiative: Does joining an international market in carbon allowances mean that we'll have less control over regulating carbon pricing? As the carbon trading market becomes increasingly global, how does the locus of decision-making shift?

Question 2: What changes would you suggest be made to cap-and-invest as it is currently being discussed to address the concerns you have?

- Prohibit use of offset projects
- Limit free allowances to no more than 25% of all allowances
- Broaden use of Highway Trust Funds
- Limit Western Climate Initiative to North American and explicitly say that we won't link to China and other countries.

Question 3: What opportunities do you believe exist for your organization/industry/constituents/ customers from implementation of a cap-and-invest policy as it is currently being discussed in Oregon?

- If we don't give away half of the allowances free, then this could generate revenue to reinvest in most impacted communities, including low-income communities and communities of color

1. What aspects of a cap and invest policy as it is being discussed in Oregon are you most concerned about for your organization/industry/constituents/customers?
Our (Ash Grove Cement Company) concerns are two fold - 1. That a cap would not be achievable while maintaining production at some point. There is no known control technology for our industry. 2. That the tax/cost imposed on industry would not be applied to imports, thereby creating an uncompetitive sales environment for in-state producers. These are both very real aspects of the policy if implemented. We have never heard a satisfactory policy fix beyond a complete and permanent exemption for our industry. Ironically the outcome of the policy if we were not exempted would result in HIGHER global CO2 emissions (from imports) than before.

2. What changes would you suggest be made to cap-and-invest as it is currently being discussed to address the concerns you have?
Don't implement to policy on a state by state basis. This is a national matter.

3. What opportunities do you believe exist for your organization/industry/constituents/customers from implementation of a cap-and-invest policy as it is currently being discussed in Oregon?
There are no opportunities, only probable business ending outcomes. The fact that global climate cannot possibly be affected one way or the other as a result of this policy in Oregon leads us to continue to oppose its implementation.

Question 1: What aspects of a cap-and-invest policy as it is being discussed in Oregon are you most concerned about for your organization/industry/constituents/customers?

Many design elements of a cap-and-invest program can affect the cost of compliance, with that cost ultimately being borne by consumers. Compliance costs will also cause economic dislocation, which can be most severe on rural communities whose economies depend on natural resource-based industries.

Layering cap-and-invest regulation atop the clean fuels program (CFP) has a high likelihood of adding to the aggregate cost of reducing emissions ultimately borne by consumers. The CFP program could undermine the efforts of a natural gas utility to achieve demonstrable reductions when coupled with a cap-and-invest program. Natural gas utilities could displace extracted fuel with biogas/renewable natural gas from such sources as landfills and wastewater treatment plants. However, if the owners of those facilities have a greater financial incentive to participate in transportation sector, then natural gas utilities will be deprived of a means to lower actual emissions. The same would be true if the owner of a landfill decided to generate RPS-eligible electricity by combusting methane in a turbine. Having the natural gas sector compete with the electricity and transportation sectors for renewable natural gas opportunities would have the potential to increase the cost of compliance for natural gas utilities and their customers.

It is also important that a cap-and-invest program be structured on durable and predictable policy. Linkage of a program with the Western Climate Initiative would require that Oregon comply with program "requirements" already established by the WCI's participants and may necessitate that the State adapt its program over time to the dictates of another state (California) and Canadian provinces. This amounts to a delegation of authority to other jurisdictions. In order to preserve the integrity of Oregon's public policy prerogatives and to provide the greatest extent of regulatory certainty, most of the pertinent design elements of a cap-and-invest program, especially those that affect the cost of compliance, should be established by statute, rather than left to rulemaking.

Question 2: What changes would you suggest be made to cap-and-invest as it is currently being discussed to address the concerns you have?

The total efficiency of delivered and consumed natural gas from the point of extraction to the end user is 90% or greater for residential natural gas utility customers. Thus, the opportunities for achieving deep efficiency improvements is somewhat limited. In order to achieve the greatest reductions, a natural gas utility should be able to use proceeds from its sale of allowances to measures to reduce emissions in the electricity and transportation sectors as well. In this regard, they can complement efforts undertaken within the sectors which contribute the most to the state's aggregate emissions to make faster, more aggressive, and more cost-effective reductions.

As we understand the concept of consignment, a natural gas utility may be allocated allowances for free, but then the utility would be required to sell those allowances through the State, and then they may be required to purchase allowances for compliance. If this is how "consignment" would work, it would be administratively inefficient, as there are transaction costs associated with the sale of allocated allowances and the subsequent purchase of allowances. Conceivably, a utility could find itself selling at a low price and buying at a higher one, as well, with obvious implications for utility finances and consumer cost. The effect of "consignment" could be more clearly described in legislation. Nevertheless, natural gas utilities should not be required to purchase allowances for compliance unless the emissions attributed to them exceed an assigned emissions cap, and in that event they should only be obligated to purchase allowances for net emissions that exceed the cap.

The legislation is much too restrictive in prescribing the purpose to which a natural gas utility can expend proceeds from the sale of allowances. Any sums that a utility must dedicate to funding customer bill rebates diminishes amounts they would have to devote to measures to reduce emissions. The emphasis for spending allowance proceeds should be measures to reduce emissions and to aid rural communities in transitioning them to a lower-carbon economy while enhancing the economic potential for those communities. In short, allowances should be allocated to utilities for free without any requirement that utilities then purchase allowances in order to militate against cost impacts on utility customers and natural gas utilities should be able to maximize the use of allowance proceeds by expending them on measures to reduce emissions and promote economic growth.

Furthermore, the legislation is much too restrictive on the use of offsets for compliance.

Finally, emissions from a natural gas utility's "transportation" customers (commercial entities that purchase their own natural gas) should not be attributed to the utility but to the customer itself.

Question 3: What opportunities do you believe exist for your organization/industry/constituents/ customers from implementation of a cap-and-invest policy as it is currently being discussed in Oregon?

It is important that natural gas utilities be allowed broad options for offsetting emissions. It is well known that requiring electric and natural gas utilities to purchase allowances at auction or through a secondary market will translate into higher consumer costs. This requirement has particularly regressive effects on rural communities and low-income consumers. It also has the effect of economically harming businesses that sustain rural economies. Such impacts warrant palliative measures, such as bill rebates to customers. Unfortunately, having to institute measures to mitigate the cost impacts on consumers and the economy as a result of allowance purchasing is inefficient and counterproductive. These impacts can be avoided through a free allocation of allowances to utilities, with a requirement that the utilities auction the allowances and dedicate the proceeds to efforts to reduce greenhouse gas emissions and promote rural

economic development. Utilities subject to the jurisdiction of the PUC could make such investments pursuant to a program/plan approved by the commission.

One approach to establishing discipline in the allowances market to protect consumers is to allow covered entities to use offsets as compliance measures to a greater extent than allowed by California and as set-forth in the legislation. Offset limits could require covered entities to forego cost-effective compliance options and unnecessarily restrict the scope of the environmental benefits sought from a cap-and-invest program. Offsets can lower compliance costs, provide additional liquidity in the secondary allowances market, and create opportunities to achieve emission reductions in sectors not regulated under the program.

Importantly, robust offset opportunities can function to discipline the secondary market and discourage market manipulation. It is our recollection that the WCI's initial program design would have allowed the use of allowances from other greenhouse gas emission trading systems (assuming such linkage was permitted) and offset certificates to 49% of the total emission reductions. California elected, as allowed under the WCI's design, to impose a much lower limit on the extent to which covered entities can use offsets for compliance. Oregon should allow offsets to be used to a much greater extent than California does.

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October 9, 2017

Via Electronic Mail

RE: Clean Energy Jobs Work Groups
Response to Meeting #1 Homework Questions

Thank you again for inviting me to participate in the Clean Energy Jobs Work Group for Regulated Industries. As requested, the following are answers to the "Meeting #1 Homework Questions" circulated at the end of the September 21, 2017 work session. These answers generally focus on interests of independent energy producers, electricity service suppliers and energy marketers operating in Oregon (for convenience referred to herein as the "**Power Services Industries**"). I have consulted with a variety of entities within the Power Services Industries as well as other entities potentially subject to the proposed Clean Energy Jobs Bill, ***but I stress that these answers are my own, and do not necessarily represent the positions of any given industry or entity***.

Question 1: What aspects of a cap-and-invest policy as it is being discussed in Oregon are you most concerned about for your organization/industry/constituents/customers?

1. Oregon Must Avoid Imposing Overlapping Regulatory Obligations for the Same Emissions.

Power Services Industry constituents generally agree that Oregon must establish a price on carbon, and that a cap and invest policy such as that being proposed in the Clean Energy Jobs Bill is the best mechanism to establish such price. However, it is critical that the price be imposed only once for a given emission issuance, and that regulated entities are not subject to multiple, pancaked compliance obligations. As addressed below, Oregon needs to ensure (1) that there is a clearly defined, single point of compliance for a given emission within the state; (2) compliance entities are not required to meet compliance obligations both in Oregon as well as in other states, like California; and (3) that appropriate recognition be given for early action payments made to mitigate carbon as part of other regulatory requirements.

a. *Oregon Should Impose a Single Point of Compliance for Electric Generation within the State*.

The draft Clean Energy Jobs Bill specifies three categories of entities defined as a "source" that will be subject to the cap and invest compliance obligations: (1) an "air contamination source" as defined in ORS 468A.005;[1] (2) any entity that imports, sells, allocates or distributes electricity in the state not created by carbon-free sources; and (3) any person that imports, sells or distributes fossil fuel in the state that generates emissions when combusted. *See, e.g.,* Draft S.B. 1070, Section 9(21). These definitions are not mutually exclusive, and could be interpreted such that a single emission event would trigger multiple compliance obligations. For example, generation of a single kilowatt of power created using natural gas as a fuel source arguably could be subject to a compliance obligation once for the entity importing and delivering the gas, a second time through the emission created by the generator when burning the gas, and a third time by the entity that distributes and sells the power. This same issue may apply to other industries using natural gas in their industrial process.

To resolve this issue, Oregon should move the point of regulation downstream to the entity combusting natural gas and actually creating emissions, and specify there is no compliance obligation with respect to fuel delivered to a covered entity (*i.e*., an Air Contamination Source), or for transmitting the power generated by such source. This is similar to the approach adopted in California, where natural gas suppliers have a compliance obligation for all GHG emissions that would result from combustion of all fuel delivered to end users in California, *save for fuel delivered to covered entities.*

b. Multi-State pricing

Oregon must also ensure that entities subject to compliance obligations under Oregon's proposed Clean Energy Jobs Bill will not be required to pay a carbon price for the same emission

[1] 468A.005(4) "Air contamination source" means any source at, from, or by reason of which there is emitted into the atmosphere any air contaminant, regardless of who the person may be who owns or operates the building, premises or other property in, at or on which such source is located, or the facility, equipment or other property by which the emission is caused or from which the emission comes.

under Oregon's program as well as that of other jurisdictions. Currently, any power generated in Oregon and moved into California is subject to California's existing WCI Cap and Trade Program, regardless of the level of emissions of that entity. If a generator in Oregon is subject to a carbon price for generating power in Oregon, and again when the power is delivered into California, it will be paying twice for the very same emission.

California has indicated a willingness to modify its regulations to avoid pancaking of carbon pricing as other states implement either the Federal Clean Power Plan or their own state carbon pricing mechanisms, but has not yet taken specific action.[2] This issue likely will be directly addressed in any linkage agreement negotiated to the extent Oregon joins the existing California/Quebec/Ontario WCI Market program. Pending any such linkage, Oregon needs to take steps to insure its own industries are not double-charged for the same emissions as a result of programs in other states

c. *Ensure a level playing field for all electricity sellers.*

By statute, electricity sales in Oregon are intended to be competitive, with Electricity Service Suppliers[3] competing directly with regulated utilities to serve commercial and industrial load.[4] The draft Clean Energy Jobs Bill currently provides that utilities be granted a free allocation of allowances to be consigned to the auction platform, with revenue to be used for specified purposes, including "bill assistance for energy intensive industrial customers that, at the time the bill assistance is received, are not covered entities receiving allowances distributed directly and free of charge to address leakage … ." Draft SB 1070 Section 13(1)(b). To the extent the utilities are granted free allowances that will be earmarked to provide bill assistance to industrial and commercial customers, provisions must be added to ensure such action does not provide the utilities with an inappropriate and unintended competitive advantage as compared

[2] *See, e.g.,* Amendments to the California Cap on Greenhouse Gas Emissions and Market-Based Compliance Mechanisms, Final Statement of Reasons, August, 2017, at p. 248, finding changes to the California program to be premature.
[3] See ORS 757.600(16)
[4] *See* Senate Bill 1149, Or Laws 1999, ch 865, compiled, as subsequently amended, at ORS 757.600-757.691.

to other electricity sellers. One mechanism to do so would be for the legislature to direct the utility commission to implement this section in a manner that maintains equality among competing utility and non-utility service providers, such as specifying that all distribution customers of a given utility are eligible to receive bill assistance, regardless of whether they purchase their power directly from the utility or from an electricity service supplier through the competitive market.

d. *Recognition of Early Action*.

All power plants constructed in Oregon in recent years have already paid to mitigate their carbon footprint as required by the Energy Facility Siting Counsel ("EFSC") mechanism set forth in Chapter 469, Section 503. Oregon was a pioneer in carbon policy, and created a mechanism under which all power plants must meet stringent carbon emissions standards in order to be permitted in the first instance. As a result, each of the thermal independent power producers operating in Oregon has already offset, or paid to offset, a significant portion of its carbon emissions for the life of its facility, and should not be required to pay a second time for the same carbon emission reduction. These producers should receive a credit towards their emissions compliance obligations (in the form of free allowances or otherwise) calculated based on the percentage of carbon emissions previously subject to mitigation.

2. The Primary Goal of the Climate Investment Grant Program Should Be Further Reduction in Carbon Emissions

The primary goal of SB 1070 should be to facilitate reduction in overall greenhouse gas emissions in Oregon. To the extent revenue is created, it should be prioritized towards that goal to the extent allowed by law. As currently drafted, Section 16 of the draft Clean Energy Jobs Bill specifies that at least 50 percent of money received in the program be distributed to programs located in impacted communities, and at least 40 percent to programs in economically distressed areas. It is unclear whether these proposals are additive, or exclusive. While these are worthy goals, they should not take complete precedence over projects that will accelerate emission reductions in the state.

An example of an appropriate use of the Investment Grant Program Fund would be to accelerate adoption of carbon reduction technologies by power generators through fund grants or provision of low-cost financing. Having a cap and trade mechanism will help provide financial incentive for generators (and other industrial and commercial emitters) to reduce emissions, but the annual cap reduction and carbon costs may not be sufficient to incent a given entity to make the *major* capital investments necessary to radically reduce its emission profile in the near term. This is especially true if the capital cost of investment in new carbon reduction technology will not be recovered until years into the future. Allowing use of the Climate Investment Grant Program funds to reduce the upfront investment costs through a grant, low interest loan, or otherwise may allow a generator (or other industrial entity) to dramatically accelerate adoption of new technology to reduce emissions, benefitting Oregon and the planet a whole.

Question 2: What changes would you suggest be made to cap-and-invest as it is currently being discussed to address the concerns you have?

I am in the process of consulting with various members of the Power Services Industries and will provide specific recommendations for consideration in the near future.

Question 3: What opportunities do you believe exist for your organization/industry/ constituents/ customers from implementation of a cap-and-invest policy as it is currently being discussed in Oregon?

If properly implemented, a cap and invest policy will provide a variety of opportunities for the Power Services Industries. Examples include:

- Increased opportunity to construct clean, low carbon renewable energy facilities within Oregon.
- Increased opportunities to serve new commercial and industrial load choosing to site in Oregon due to its proactive climate leadership.
- With funding assistance from the program, opportunities to invest in additional technologies to further lower emissions and increase the pace at which emissions are

lowered.

- Opportunities to operate as liquidity providers and market makers in the carbon markets, driving down the overall market costs for all compliance entities.
- Opportunities to participate in the funding and creation of real, verifiable emission reductions through creation of offsets.

I appreciate the opportunity to offer these comments and look forward to discussing these issues at our next work group meeting.

Respectfully,

/Carl Fink/S/
Carl Fink
Managing Counsel
Blue Planet Energy Law, LLC

October 10, 2017

Senate and House Members of Clean Energy Jobs Work Groups
Oregon State Capitol
Salem, Oregon 97301

RE: Clean Energy Jobs Work Group—Meeting #1 Homework Questions

Dear Senate and House Members of the Clean Energy Jobs Work Groups:

Thank you for the opportunity to provide feedback on a cap-and-invest policy for Oregon.

We are writing on behalf of Renew Oregon, Climate Solutions, Oregon Environmental Council, and Natural Resources Defense Council and our members in Oregon to respond to the homework questions presented to stakeholders at the first set of Clean Energy Jobs Work Group meetings on September 21, 2017.

The political and environmental backdrop to completing your work on this important legislation could not be more stark. Wildfires threatens life and property in our rural communities while the rest of the state chokes on smoke for days. Heatwaves kept school kids out of class. Despite a record-breaking amount of rain and snow in the winter, our farmers once again grappled with drought conditions by the end of summer. The impacts of a warming globe are here, harming Oregon, while the federal government rolls back even modest attempts to address a global climate crisis. There is no more time to wait. Without responsible action, we risk handing our children a world much worse than the one we received.

Yet, the technology and workforce to address this challenge are available. The clean energy economy is adding jobs faster than the state average. After more than a decade of work, Oregon has arrived at a policy to both address the main cause of climate change and air pollution, while investing in this booming sector of the economy to create good-paying jobs for Oregonians. The world is rapidly moving forward on commitments to reduce climate pollution. With our greenhouse gas emissions increasing, Oregon is part of the global problem. This policy represents the single best way for our state to be part of the solution while also reaping the many local benefits of acting early to be a leader in the clean energy economy.

While Oregon has taken many laudable, targeted actions to address climate change, the state currently lacks a comprehensive policy, namely an enforceable economy-wide cap on climate pollution. Accounting for the true cost of climate pollution can drive additional investment to our clean energy transition and enhance existing clean energy initiatives, by solving for the market failure of externalized costs from pollution and letting non-fossil energy compete on a fair and even playing field. Doing so will create investment opportunities in the state and reduce harm to Oregon's and the global economy.

Given our strong support for the cap-and-invest program as currently created by SB 1070, we are keeping our comments relatively brief. We would be happy to elaborate on any points below and look forward to further discussion in the coming working groups.

Question 1: What aspects of a cap-and-invest policy as it is being discussed in Oregon are you most concerned about for your organization/industry/constituents/customers?

The program must deliver on its intended purpose: capping, pricing and significantly reducing climate pollution in Oregon, and reinvesting proceeds in activities that further reduce emissions, support impacted communities, and create benefits in the clean energy economy. We believe the bill appropriately represents the critical concern that there be an environmentally-sound and equitable program, with meaningful representation by various impacted communities and stakeholders on decision-making bodies; that decisions including who is regulated and what allocation they receive be made based on good data and science; and that there be accountability mechanisms, including good data collection and publicly available information.

The Clean Energy Jobs bill is critical to Oregon doing its fair share to reduce climate pollution. The bill must not be undermined with loopholes, sunsets that erode market certainty, or creating too much inflexibility in statute. The sooner SB 1070 is adopted, the sooner the benefits of this valuable legislation can start flowing to Oregon, which will already be in 2021 at the earliest after three years of rule-making process. There is real urgency to finally seize the opportunity presented, particularly after this solution has been studied and deliberated upon in Oregon for over a decade.

SB 1070, the working version of a cap-and-invest program for Oregon, has many strong and logical provisions that will benefit the state. Chief amongst them is the directive to create a program that can link with other jurisdictions' carbon markets. Linking provides economy-of-scale benefits like lowest cost compliance and a structured regional trading market that would be less expensive than Oregon setting up and administering one by itself. We are gravely concerned by any conversations that threaten linkage, particularly any that significantly reduce the rigor of Oregon's program. <u>There should be no erosion in stringency from the current bill.</u>

For example, the current bill states that Oregon may use offsets for "no more than eight percent" of compliance, and "in a manner necessary to enable this state to pursue linkage agreements with market-based programs in other states or countries." California recently reduced the number of allowed offsets in their program to increase emission reductions in capped sectors and local communities. <u>Oregon should analyze and consider further limiting the use of offsets</u> as well. We believe this will maintain opportunities for offset projects from – for example – the forestry sector to benefit rural economic development, while protecting the integrity of Oregon's program. If offset limits are not similarly stringent to the linked jurisdictions' requirements, our program will have to strengthen rigor in other sections of the program. We also support the current limit of offset use in areas with pollution hotspots.

Similarly, as the bill currently provides, the cap-and-invest program should be economy-wide (across power, transportation and industrial sectors) and cover all sources of greenhouse gas emissions over 25,000 metric tons CO_2e based on total emissions. This broad scope will drive the most emissions reductions, helping Oregon to meet its state climate goals. It will also ensure a program that is fair, successful and cost-effective, and enable linking with other jurisdictions. In California's experience, their similar economy-wide cap-and-trade program has stimulated significant economic development

within the state. California has continued to attract $48 billion in clean economic investments and created 500,000 jobs in the last 10 years.

We are fundamentally committed to Oregon adopting a policy that is equitable from the outset. This includes ensuring the following:

- Dedicating meaningful proceeds to benefit individuals and communities most impacted by climate change and economically distressed areas. This program offers a real opportunity to deliver investments in communities that need it most across the state while further reducing climate pollution. Proceeds should provide for a just transition for workers in affected industries, in addition to prioritizing job creation in rural and underserved communities.
- Providing technical assistance to businesses, non-profits, and community economic development entities composed of, or that serve, underrepresented communities. It is important that the transition to a clean economy is inclusive and this will help ensure broad participation in applying for investment opportunities.
- Meaningful representation on rule-making and grant committees by communities most impacted by climate change, Tribal members, and other underrepresented groups. The committee structure could be simplified as long as there is meaningful--and not tokenized--representation by communities and businesses most impacted by climate change. There should not be an over-representation of regulated industries.

From an environmental integrity standpoint, the program should ensure entities within regulated sectors over the threshold are kept in the program (i.e., under the cap) and minimize free allocation of allowances to create a true price signal on climate pollution and drive the transition to a clean energy economy. Our organizations are very concerned that free allowances be limited to what is truly necessary to protect the competitiveness of Oregon business and avoid leakage, which should be determined in a rule-making based on best available data. Limiting free allocation may also result in a greater economic benefit. The PSU NERC Carbon Tax report found that exempting industries actually resulted in poorer economic performance overall compared to reinvestment in reducing pollution.[1] Energy waste and negative health impacts are a drag on our economy, which we should be shifting away from by adopting this cap-and-invest policy.

Question 2: What changes would you suggest be made to cap-and-invest as it is currently being discussed to address the concerns you have?

While SB 1070 puts in place an 80% reduction by 2050--an extremely important goal--the reality is that if we continue to fall short of reducing emissions in the mid-term, we may need more aggressive long-term reductions. For this reason, the bill should allow the emission reduction targets to be updated based on best available science and reflective of evolving technology. We have seen the 10 U.S. states with existing cap-and-trade programs strengthen their targets since program implementation because the programs have so successfully decoupled emissions from economic growth. Including this flexibility to strengthen our targets in our program will help ensure that we send strong market signals to encourage smart long-term investment in low-carbon technologies, and reflect the needed urgency of action to decarbonize Oregon's economy. As DEQ's cap-and-trade

[1] LRO & Portland State University's Northwest Economic Research Center, "Economic and Emissions Impacts of a Clean Air Tax or Fee in Oregon (SB306)," December 2014, https://www.pdx.edu/nerc/sites/www.pdx.edu.nerc/files/carbontax2014.pdf

study pointed out, a back loaded trajectory could lead to early investments in higher carbon technologies that make the later aggressive reductions less feasible.

We recommend reducing some of the prescriptive language in SB 1070 around how auctions are held, such as specifying quarterly auctions, time periods, and three-year compliance timelines. Those details are better left to rule-making where modifications and updates can be made more readily to ensure linkage and a well-functioning program over time.

Question 3: What opportunities do you believe exist for your organization/ industry/ constituents/ customers from implementation of a cap-and-invest policy as it is currently being discussed in Oregon?

The bill represents a tremendous opportunity for Oregon. Our organizations are deeply committed to meaningful solutions to stopping climate disruption and investing in clean energy solutions. To that end, an economy-wide program that links to other jurisdictions and can be replicated by other states is widely supported. Adopting a cap-and-invest program that joins the regional carbon market puts Oregon in a position to build on economies-of-scale in the region, implement a program cost-effectively, and create a level playing field. Oregon must choose whether it will secure a first-mover advantage as other jurisdictions move toward prioritizing low carbon products and technologies.

The investment opportunities for the state are also very important. Our organizations believe the proceeds must be used to reduce climate pollution and prioritize creating benefits for most impacted communities and economically distressed rural communities. Our organizations want to see Oregon accelerate clean energy solutions that will create healthy, livable communities, new economic opportunities, and build resiliency into the future. While the bill specifies mitigation and adaptation as twin goals, we believe that mitigation of climate pollution should be the priority for allocating proceeds in the next decade. The longer our economy remains reliant on fossil fuels, the more expensive the transition to clean technologies will be in the future.

We appreciate the sidebars around the use of utilities dollars through consignment--to be used to support low-income and electricity-intensive customers, but also to invest in additional solutions that decarbonize the electric sector. However, some level of local decision-making should be maintained depending on a utility's customer base. We strongly support investments in weatherization, efficiency, demand response, and renewable energy generation that is not already required by law - and think low income customers should be prioritized.

Thank you for consideration of our comments.

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Climate Solutions

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Coalition of Communities of Color

REDEFINE
The Coalition of Communities of Color's Initiative for Climate and Environmental Justice

10.9.17 Equity Recommendations For Clean Energy Jobs Working Group: Environmental Justice and Just Transition

Alan Hipolito (Verde), Hannah Holloway (Urban League of Portland), Khanh Pham (APANO), Raul Preciado Mendez (Latino Network), Akash Singh (Neighbors for Clean Air), and Maggie Tallmadge (Coalition of Communities of Color) have contributed to this document.

In lieu of submitting answers to the homework questions, we outline our concerns and priorities through three principles: **environmental justice, economic equity,** and **public accountability**. Our largest concerns fall under the following categories:

- **C**apping GHG emissions and pollution: Ensure real reductions based on best available science; actively address local and global air quality concerns.
- **A**llowances: Significantly limit free allowances; ensure direct investment to support transition of workers in impacted industries.
- **R**einvestment in most impacted communities: Ensure majority of proceeds and contracting opportunities from each covered sector directly benefit most impacted communities in order to mitigate impacts of carbon price and close existing opportunity gaps.
- **B**roaden use of the Highway Trust Funds: We need flexibility to transition to a renewable economy; ensure transportation proceeds promote equity and climate resilience.
- **O**ffsets: Prohibit use of offsets. Invest revenues directly into forest/agriculture projects in Oregon.
- **N**o price ceiling on emissions allowances; real reductions require a meaningful price on carbon.
-

This document also provides:

- List of potential reinvestment priorities; however, this list is not a substitute for further statewide stakeholder engagement to identify investment and project categories.
- Details of air quality legislation (AB 617) recently passed in CA and applicable to OR
- List of additional resources

Forthcoming documents include:

1. PSU research on most impacted communities
2. Recommended definition for most impacted communities
3. Recommended committee and governance structure
4. Detailed proposed amendments to SB 1070

Climate Change Harms Most impacted Communities

Policymakers and other climate stakeholders must recognize this: Oregon's rural and urban low-income people and people

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of color face the greatest peril from climate change. These communities -- already suffering from clear economic, health and environmental disparities -- also have the fewest resources to adapt to the impacts of climate change, including more severe and frequent heat, fires, storms, droughts and floods. Nonetheless, Oregon's rural and urban low-income people and people of color are underrepresented in climate decision-making. Further, it is important to recognize that all climate change solutions are not created equal, that poorly designed climate solutions can further burden vulnerable communities -- in the era of climate change, *a rising tide does not lift all boats*.

What is Environmental Justice and Equity?

'Environmental justice is equal protection from environmental and health hazards, and meaningful public participation in decisions that affect the environment in which people live, work, learn, practice spirituality and play. "Environmental justice communities" include minority and low-income communities, tribal communities, and other communities traditionally underrepresented in public processes. These communities' health and quality of life are most impacted by environmental hazards and socioeconomic stressors.' - Oregon Environmental Justice Task Force

Equity is the fair distribution of costs and benefits as our state transitions to a new clean, energy economy. Equitable policy prevents additional burdens on most impacted communities while reducing existing disparities and historical inequities. Research shows economic inequality undermines economic development, jobs, grown, and political stability. Promoting equity is also important to ensure durability of policy in a state with rapidly growing communities of color and growing inequality.

Principles for Equitable and Just Legislation

In developing Clean Energy Jobs, we must ask ourselves whether the bill promotes environmental justice (prevents harm), economic equity (provides benefit) and public accountability (ensures inclusive design and implementation). See the following excerpt from "Advancing Equity in California Climate Policy: A New Social Contract for Low-Carbon Transition"[1]:

1. Does the policy promote Environmental Justice?
Climate policy should aid the state's most environmentally impacted and socioeconomically disadvantaged communities by reducing environmental health risks; expanding access to beneficial goods and services; and increasing both community-level resilience and access to resources from public investments in low-carbon goods and services.

2. Does the policy promote economic equity?
Climate policy should generate high-quality, career-track, and family-sustaining jobs in clean economic growth sectors; include specific efforts to create pipelines to these jobs for workers from disadvantaged communities; and contain supports for workers and communities in carbon- intensive industries at risk of disruption or decline due to climate policy.

3. Does the policy promote public accountability?
Climate policy should embrace inclusive, effective participation in decision-making; identify and incorporate constituencies at every stage in the process; and utilize a robust set of indicators that benchmark and measure progress on sustainability and equity goals—and quickly change policy if it does meet the grade.

[1] pg 9

Principles Applied to Clean Energy Jobs

1. Environmental Justice: Protect most impacted communities locally and globally. Oregon must ensure that a carbon pricing program does not harm low-income people and people of color ("most impacted communities"). Certain carbon pricing approaches produce disparate, negative impacts on most impacted communities, while benefiting other people, places and institutions. A combination of mechanisms will be required to ensure that most impacted communities are not disproportionately impacted by higher costs or additional environmental burdens. Such mechanisms include a way to reach households that do not file taxes, as well as monthly energy or fuel/transportation assistance for the lowest income households. A proportional reduction of personal income taxes is not sufficient, unless accompanied by other measures targeted at most impacted communities. We must reduce risks, enhance benefits and improve resilience in most impacted communities.

a. ***Ensure real GHG and air pollution reductions based on best available science.***

- **Significantly limit free allowances given to EITEs.** Provision of free allowances must be based on consistent, rigorous methodology and the number given freely must be reduced over the life of the program. The burden to prove trade exposure should be on the entity. No qualified entity should be exempt from the program and, under no circumstances, should free allowances be codified in legislation.
- **Prohibit offsets** in meeting a covered entity's reduction obligations.
  - Unclear metrics: Measuring forest carbon capture is an inexact science,
  - Impermanence: Given the ever-present risk of fire and disease, it is difficult to guarantee that forests will always be around forever
  - Leakage: How can we ensure that funding a forest conservation project in one area of the U.S. doesn't merely move the deforestation to another area?
  - Additionality: Some forests were going to be conserved anyways. It is difficult to prove that these forests were going to be logged, and thus, are reducing carbon emissions.
  - There is no guarantee that these projects will be located in the state of Oregon, thus the benefits and jobs will likely not benefit rural communities in Oregon. CA projects happen all over North America (including Canada and Mexico).
  - Offset projects are too large in size (rarely at a scale lower than 20,000 acres) to benefit small farm and forest owners and mostly benefit large industrial timber companies. With numerous opportunities to invest in forests conservation projects that yield significant co-benefits, offsets are instead a blunt and questionable GHG mitigation instrument, that guarantee little benefit to Oregon.
  - Cost savings for businesses buying offsets are minimal. Given that offsets would be limited to at most 4% to match CA's program and offsets are roughly 20% cheaper than allowances, the cost savings system wide would be about 0.8% (4% offsets multiplied by 20% in savings).
  - Every offset is an allowance not purchased. Decreases the revenue we need to reinvest to ensure a just transition to a renewable economy.
- **Limit or prohibit allowance banking**. Establish allowance banking rules that discourage speculation, avoid financial windfalls, reduce banking to at most 3 years, contribute to volatility of the market. (see CA 2017 AB 398)

b. ***Ensure reduction of harmful pollution, both co-pollutants and cumulative emission impacts.***

- Require State to improve air pollution data collection and reporting; require expedited pollution control

retrofit of large stationary sources; increase penalties for air pollution violations; require enhanced air pollution monitoring; require State to adopt a statewide emissions reduction strategy targeting pollution-burdened communities; and requires State and local jurisdictions/air authorities to implement community emissions reduction programs. (CA 2017 AB 617 and CA 2017 AB 378, see end of this document for more details to adopt to Clean Energy Jobs)

- **Prevent hotspots of pollution** and carbon emissions. **Prohibit trading and carbon offsets by emitters** in Environmental Justice ("EJ") communities in Oregon and linked markets. Require minimum reduction standards from polluters, particularly in most impacted communities.
- **Prevent any increase in and/or reduce the emissions** of toxic air contaminants or criteria air pollutants. Consider the potential for direct, indirect, and cumulative emission impacts from market-based compliance mechanisms, including localized impacts in communities that are already adversely impacted by air pollution.
    - The full impact of pollution upon a given area should be taken into account, even if all of the vehicles of pollution are not coalesced within the same regulatory category. Comprehensive air quality regulations like Cleaner Air Oregon are essential complements to Cap and Invest. Taking into account covered and non-covered entities is the most transparent pathway to ensure that the concerns regarding disproportionate impacts and a just transition are taken into account, even if all of those entities will not be covered within this program.
    - For example, the Cully neighborhood in Northeast Portland is one of the most ethnically diverse neighborhoods in the Portland metropolitan area and it is one of the most disproportionately impacted by the consequences of air pollution. Contrary to what one expects from such an impacted neighborhood, there is only Title (V) permitted facility in Cully, the Owens-Brockway Glass Container facility. There are nevertheless a plethora of smaller facilities that cumulatively lead to a significant concern to the health of the Cully public.

c. ***Prevent and mitigate displacement***. Recognize that as communities receive investments, particularly climate or environmental investments, increased desirability of neighborhoods can lead to displacement and gentrification. Consider and mitigate these potential impacts. Responsible State agencies will work with governments and communities statewide to identify vulnerabilities and strategies. Require inclusion of anti-displacement strategies when administering program proceeds, including sustainability plans. (see California SB 375 and Transformative Climate Communities Program furthering purpose of AB 32 and AB 2722)

d. ***Mitigate impacts of transportation sector,*** which is unaddressed in Cap and Invest. We must be intentional about investing in most impacted communities, creating and maintaining complementary policies for pollution reduction (LCFS, diesel reform, Cleaner Air Oregon) and opportunities. We must prohibit offsets in this sector to meet an entity's compliance and prohibit free allowances related to this sector.

- There is clear evidence of health impacts from living near busy roads, both from air pollution and from noise. Oregon has especially large racial disparities related to disparate exposure to mobile source air pollutants. Here's an interactive map of diesel exposure by census tracts in Oregon.
- Policy implications are analyzed in the journal *Environmental Justice.* The authors find scientific support for air filtration in buildings, adjusting air intake locations for buildings, soundproofing, and a few other interventions that could conceivably be **funded by proceeds** from carbon pricing.
- Target transportation proceeds to most impacted communities and communities with high transportation cost burden. People of color, low-income households, and rural Oregonians will be especially vulnerable to increased costs in transportation given these communities disproportionately live far from employment and

basic services.

2. <u>Economic Equity</u>: Reinvest revenues in ways that reduce disparities and create benefits and opportunities for most impacted communities. Oregon must go beyond cost or harm mitigation. "Without specific intervention, the same market forces that produce wage disparities and inequality in the economy as a whole can be expected to impact the emergent low-carbon industry sectors...[2]" We must create a carbon pricing program that also yields economic, health, environmental and social benefits for urban and rural most impacted communities:

a. ***Identify "most impacted communities."*** The State must identify most impacted communities based on racial and socioeconomic demographics, overlaid with environmental and public health data (*"Cumulative Impacts Test"*). This analysis is required to accurately identify communities most vulnerable to climate change as well as which communities are eligible for proceeds. (See forthcoming PSU Carbon Pricing and Most Impacted Communities research). Consider adapting comprehensive mapping methodology (CalEnviroScreen) tool for Oregon context.

b. ***Allocating carbon pricing proceeds.*** The State must ensure that a significant portion (at least 50%) of each transportation, utility, and industrial sector proceeds is set aside for investments in projects and programs that are provide direct benefits to most impacted communities across the state, with a majority of these project funds geographically located within these communities (minority of funds to the direct benefit of low-income households within one mile of an impacted community). (See Appendix for example prioritized investments)
   - Utilities. Do not allocate allowances freely to utility sector; consign allowances and require utilities to auction in market place. Proceeds must be used to mitigate cost impact for low income customers through a combination of direct on-bill rebate (on at least quarterly basis), percentage of income payment plan (PIPP), funding for Oregon Energy Assistance Program (OEAP), and energy efficiency/weatherization programs. Any amount in excess of meeting statewide low-income needs should be directed to on-bill rebates for ratepayers and small businesses.
   - Transportation. Proceeds subject to the Highway Trust Fund should be directed to most impacted communities, communities experiencing disproportionate exposure to air toxics and criteria air pollutants associated with transportation, and communities with high transportation cost burdens. DOT must use consistent grant criteria developed through rule making process and in consultation with most impacted communities and/or relevant committees.
   - Industry. Proceeds should be directed to most impacted communities and to support workers in impacted industries.

c. **Target proceeds and additional resources for most impacted communities and workers.**
   - Use program proceeds to ensure financial and technical resources are available for most impacted communities to engage in development and oversight of program as well as to apply and access program proceeds.
   - "Identify a lead state agency and funding sources for inclusive planning process to mitigate transition losses for workers and communities potentially impacted by industrial decline due to climate policy[3]"

d. ***Priority hire for historically excluded workers.*** Ensure priority hire provisions promote job training and apprenticeships, field entry, and access to jobs and projects for minority contractors and workers (historically excluded workers and communities) through all sectors. Utility-scale solar and other projects funded, in whole or in part, through program proceeds must have explicit minority-women targeted-hire goals and job tracking systems.

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[2] http://laborcenter.berkeley.edu/pdf/2016/Advancing-Equity.pdf

[3] pg 18, http://laborcenter.berkeley.edu/pdf/2016/Advancing-Equity.pdf

3. Public Accountability: Inclusive, transparent and accountable policy development and implementation. Across all provisions of this Act **require robust public engagement with urban and rural most impacted communities** at the state and regional/local level. This core principle of Environmental Justice ensures that those most affected by climate change play a fundamental role in designing and implementing climate solutions. This requires culturally appropriate, convenient and accessible public engagement, per Title VI of the Civil Rights Act.

a. **Elevate role of and fund Environmental Justice Task Force (EJTF) in Clean Energy Jobs**. Recognize Oregon's EJTF as key to the Act's public accountability commitment. The EJTF was created by the Legislature to help protect Oregonians from disproportionate environmental impacts on minority and low-income populations. The EJTF encourages state agencies to give all people knowledge and access to improve decisions that affect environment and the health of all Oregonians. EJTF shall play a leadership role in the Act's implementation and evaluation, including ensuring that impacted communities play a fundamental role in all decision-making bodies tasked with policy design, development, implementation, reporting, stakeholder engagement, and deployment of carbon pricing proceeds. **Provide fee authority/funding, staff and resources to ensure EJTF can effectively engage in the above roles.**

b. **Enhanced public participation in decision making.** Ensure that groups that advocate and organize with most impacted communities **represent no less than half of seats on additional decision making bodies** tasked with policy design, development, implementation, reporting, stakeholder engagement, and deployment of carbon pricing proceeds. Provide adequate funding to the committee to cover agency staff time and, where necessary, participant costs. Increase stakeholder engagement with DOT and other agencies, including following best practices for increasing workforce and contracting diversity. Recommendations of most impacted communities must be incorporated into final plans and recommendation. (See forthcoming recommendations from Governance and Committee Structure Sub-Committee).

c. **Require local (statewide) stakeholder engagement** in development of overall program. Including, a community-led development of planning and implementation projects funded by program proceeds. For example, AB 2722, the Transformative Climate Communities Act, passed in California in 2016. "AB 2722 proposes to use $250 million from the GGRF to fund place-based strategies for environmental cleanup and economic development in the most overburdened communities identified by the CalEnviroScreen... provide[s] money directly to community entities that have developed community-led, neighborhood-level plans for multiple GHG projects.[4]" TCC final guidelines require the following: **collaborative stakeholder structure/community engagement** (including process for including community members in decision making and support and participation of local public agencies); majority of project in "disadvantaged communities" census tract no more than five square miles; **track and monitor GHG emission reductions, community benefits, and other indicators; avoid the displacement of existing households and small businesses** ("Displacement Avoidance Plan"); and **increase climate adaptation and resiliency.**

d. **Transparent monitoring of equity outcomes.** Develop and require a mechanism and/or consistent relevant criteria for measuring and reporting community reinvestment and co-benefits in most impacted communities coupled. Coupled these metrics with accountability provisions ensures effective implementation makes Oregon's carbon pricing program accountable, transparent, and accountable. "The state should develop an annual Climate Equity Report based on tracking equity outcomes to enable state officials to monitor whether equity goals have been reached, to identify areas where climate policy should be improved to advance equity, and to hold public

[4] pg 29, http://laborcenter.berkeley.edu/pdf/2016/Advancing-Equity.pdf

bodies accountable for progress on equity in GHG reduction measures."[5] California has faced multiple issues with accessible and transparent data. We must ensure better data on "cap-and-trade sources and transactions, changes in local co-pollutant emissions, job growth and loss, and job quality and access for members of disadvantaged communities."[6] We must incorporate co-pollutant emissions in a GHG mapping/reporting too and publicly report the cap-and-trade transactions by facility.

e. **Continuous learning and improvement** "Data on equity impacts and any corresponding analytical tools must be accessible to both public officials and affected constituencies in order to foster meaningful participation on equity goal-setting and benchmarking as well as learning to correct for undesirable outcomes."[7]
   - Create an adaptive management plan, including, but not limited to localized air quality impacts from cap-and-trade covered entities under the regulation, actualized benefits from program proceeds (also mapped onine), and workforce/contractor diversity associated with project implementation.
   - Ensure state and agencies have statutory duty to measure and publicly report on the equity of proceed use and to increase efficiency and efficacy of investments.

Appendix : Co-Benefits and Reinvestment Priorities

Allocation of resources should meet multiple co-benefits and should be designed to respond directly to priorities and disparities in most impacted communities (i.e. through a needs assessment). Working group recommendations are not a replacement for statewide stakeholder engagement to develop final investment priorities and grant criteria.

Co-Benefits for underserved communities may fall into the following categories, all supporting climate adaptation, mitigation and resilience:

1. Public health/co-pollution benefits
   - Reduce health harms (e.g., asthma) suffered disproportionately by low-income residents/communities due to co-pollutants
   - Reduce health harms (e.g., obesity) suffered disproportionately by low-income residents/communities due to the built environment (e.g., by providing active transportation opportunities, parks)
   - Increase community safety, including complete streets and access to active transportation
   - Complement efforts to improve air quality including Air toxic and criteria air pollutants from stationary and mobile sources that are not covered entities under program
   - Eliminating short-lived climate pollutants.
2. Economic benefits: Increased family income and assets
   - Direct investments toward the most underserved/impacted communities and households in the state;
   - Increase family income (e.g., targeted hiring for living wage jobs)
   - Increase job readiness and career opportunities (e.g., workforce development programs, on-the-job training, support through apprenticeships for most impacted communities)
   - Revitalize local economies and create opportunities for historically exclude business(e.g., increased utilization of local businesses and minority-women businesses)
3. Economic benefits: Reduced family costs

[5] pg 19, pg 56 http://laborcenter.berkeley.edu/pdf/2016/Advancing-Equity.pdf
[6] pg 3-4, [6] pg 29, http://laborcenter.berkeley.edu/pdf/2016/Advancing-Equity.pdf

[7] pg 56 http://laborcenter.berkeley.edu/pdf/2016/Advancing-Equity.pdf

- Rent savings (e.g., affordable housing)
- Transportation cost savings (e.g., free or reduced cost transit passes, low- and zero-carbon transportation alternatives that are low to no cost for low-income households)
- Energy cost savings (e.g., weatherization, solar, low-income energy assistance programs, on-bill rebates for low-income households, etc.)

4. Mobility and Access to Opportunity
   - Improve transit service levels on systems/routes that have high ridership of low-income riders
   - Bring jobs and housing closer together (e.g., affordable housing in transit oriented development, and in healthy, high-opportunity neighborhoods)
5. Sustainable Community Infrastructure and Community Resilience
   - Improvements that will benefit low-income residents without increasing the risk that they will be displaced.
   - Local community-led climate resilience planning
   - Sustainable agricultural practices that promote the transitions to clean technology, water efficiency, and improved air quality.
   - Healthy forests and urban greening.
   - Other climate adaptation and resiliency strategies which provide direct benefit to most impacted communities
6. Community Identified Priority Needs
   - An investment will meet an unmet need that has been identified as a high priority in an inclusive process led by disadvantaged community residents and groups.
7. Technical Assistance
   - Provide opportunities for businesses, public agencies, nonprofits, and other community institutions to participate in and benefit from statewide efforts to reduce greenhouse gas emissions
   - Use program proceeds to ensure financial and technical resources are available for most impacted communities to engage in development and oversight of program as well as to apply/ access program proceeds
   - "Identify a lead state agency and funding sources for inclusive planning process to mitigate transition losses for workers and communities potentially impacted by industrial decline due to climate policy[8]"

Appendix: Analysis of California Legislation

Assembly Bill 1550, Greenhouse gases: investment plan: disadvantaged communities

Text: https://leginfo.legislature.ca.gov/faces/billTextClient.xhtml?bill_id=201520160AB1550

Analysis: https://leginfo.legislature.ca.gov/faces/billAnalysisClient.xhtml?bill_id=201520160AB1550

Summary: Requires that 25% of the Greenhouse Gas Reduction Fund (GGRF) be spent on projects located within disadvantaged communities (DACs), and requires that an additional 5% be spent on projects that benefit low-income households.

Assembly Bill 2722, Transformative Climate Communities Act

Text: https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=201520160AB2722

Analysis: https://leginfo.legislature.ca.gov/faces/billAnalysisClient.xhtml?bill_id=201520160AB2722

Summary: AB 2722 proposes to use $250 million from the GGRF to fund place-based strategies for environmental cleanup and economic development in the most overburdened communities identified by the

[8] pg 18, http://laborcenter.berkeley.edu/pdf/2016/Advancing-Equity.pdf

CalEnviroScreen. In contrast to the SB 535 approach whereby numerous state agencies administer funds to individual GHG reduction projects, AB 2772 proposes a place-based, comprehensive approach to allocating GGRF money.

Final Program and Guidelines: http://sgc.ca.gov/Grant-Programs/Transformative-Climate-Communities-Program.html

Assembly Bill 617, non-vehicular air pollution: criteria air pollutants and toxic air contaminants

Text: https://leginfo.legislature.ca.gov/faces/billSearchClient.xhtml
Bill Analysis: https://leginfo.legislature.ca.gov/faces/billAnalysisClient.xhtml?bill_id=201720180AB617

SUMMARY: Requires the Air Resources Board (ARB) to improve air pollution data collection and reporting; requires expedited pollution control retrofit of large stationary sources; increases penalties for air pollution violations; requires enhanced air pollution monitoring; requires ARB to adopt a statewide emissions reduction strategy targeting pollution-burdened communities; and requires ARB and air districts to implement community emissions reduction programs.

- The bill expedites the cleanup of old equipment at oil refineries and other large facilities that have been polluting the air for decades.
- Fixes loophole of grandfathered facilities
- Increases air district penalty authority (From $1000 to $5000 per day) and indexes it to inflation
- Air quality clearinghouse, used in approval (some air districts not as aggressive as others) to identify best available control technology for addressing toxic air contaminants and criteria air pollutants
- More community air monitoring; data standards
- Community level reduction plans from stationary and mobile sources. Plans have to be in place. ARB has to approve those plans. Not clear how much more they will require.
- ARB to evaluate and address banking so there aren't too many excess allowances post 2020. (One proposal: Move more unused allowances into the reserve.)
- Enhances the tools that regulators need to hold polluters accountable.

AB-378 Greenhouse gases, criteria air pollutants, and toxic air contaminants *2017-unsuccessful*
Text: https://leginfo.legislature.ca.gov/faces/billTextClient.xhtml?bill_id=201720180AB378
Analysis: https://leginfo.legislature.ca.gov/faces/billAnalysisClient.xhtml?bill_id=201720180AB378

Summary: Extends the Air Resources Board's (ARB) cap-and-trade authority to 2030 and requires ARB to adopt air pollutant emissions standards that industrial facilities must meet to receive free allowances after 2020. Specifically, this bill:

1. Extends ARB's cap-and-trade authority to 2030.
2. Authorizes ARB to adopt "no-trade zones" or facility-specific declining greenhouse gas (GHG) limits where facilities' emissions contribute to a cumulative pollution burden that creates a significant health impact.
3. Requires ARB, in consultation with each affected district, to adopt air pollutant emissions standards for

industrial facilities subject to cap-and-trade.

4. Requires ARB to evaluate the air pollutant emissions of each industrial facility, based on the following factors:
    a. Permitted and actual emissions of criteria air pollutants and toxic air contaminants;
    b. Date of the most recent new source review conducted pursuant to the federal Clean Air Act for each emission unit;
    c. Emissions control measures for each criteria air pollutant and toxic air contaminant, including, but not limited to, emissions control technology for each emission unit;
    d. Whether each emission unit meets "best available control technology" or "best available retrofit control technology," as applicable;
    e. The performance of similar industrial facilities; and,
    f. f. District records of complaints, enforcement actions, and penalties.

5. Prohibits ARB, after 2020, from allocating allowances pursuant to cap-and-trade to an industrial facility that does not meet the air pollutant emissions standards.

Additional Resources:

"Advancing Equity in California Climate Policy: A New Social Contract for Low-Carbon Transition." Authored by: Carol Zabin, Abigail Martin, and Rachel Morello-Frosch, University of California, Berkeley; Manuel Pastor, University of Southern California; Jim Sadd, Occidental College. September 13, 2016. URL: http://laborcenter.berkeley.edu/pdf/2016/Advancing-Equity.pdf

"A Preliminary Environmental Equity Assessment Of California's Cap-and-Trade Program." Authored by Lara J. Cushing, Madeline Wander, Rachel Morello-Frosch, Manuel Pastor, Allen Zhu, and James Sadd. September 14, 2016. URL: https://dornsife.usc.edu/PERE/enviro-equity-CA-cap-trade

Offsets Resources:

- Critical Views of California's Offsets from CA and Mexico," *REDD Monitor*, Chris Long. (May 22, 2012)
- "Global Warming Law Shifts Responsibility from Polluters to Communities." *Alternet*, by Jeff Conant (April 21, 2011).
- What Would Nature Do?: Should Chiapas Farmers Pay the Price of California's Carbon? Yes! Magazine
- "Money thrown out of the window": Article in taz.de about the Kalimantan Forest and Climate Partnership. *REDD-Monitor*. Chris Lang.
- "Reduced Emissions From Deforestation: Can Carbon Trading Save Our Ecosystems" *World Rainforest Movement*, (July 2007), Issue 120. Ernsting, B. A., & Rughani, D. URL:http://www.biofuelwatch.org.uk/docs/Avoided_Deforestation_Full.pdf
- Chiapas Cancels Disastrous Forest Carbon Offset Plan: Blog post: Dorset Chiapas Solidarity website."

Greetings,
These are my comments to the questionnaire on the CEJ Bill. I think it is a good start and even though our contribution to overall GHG pollution is small, Oregon needs to be a leader and set an example. I feel the CEJ Bill will eventually have the lowest potential down-side impact while achieving the greatest results in GHG reduction.

Questions #1 Response: My main concern is that an adequate portion of the accrued funds are applied to resources for individuals and communities that are most affected by the GHG reductions. Also a major portion of the funds should strongly support the development of renewable energy solutions.

Question #2 Response: In theory, offset investment credits are a good concept; they must be closely monitored so as not to be abused. The credits should be progressive in nature to promote the move towards renewable energy and not as a crutch to keep doing “business as usual”.

Question #3 Response: Renewable energy/ energy efficiency/ energy conservation has the potential to be the largest arena of economic stimulation in Oregon. The emphasis should be on "renew" and not “consume” resources. Renewable energy production is seeing a exponential growth in the world and we need to be a part of this growth.

Respectfully,
Dennis Sobolik
Ashland, OR

Dear Co-Chairs Diego Hernandez and Pam Marsh,

We regard the **Environmental Justice and Just Transition Work Group** to be fully engaged in establishing a science-based environmental justice strategy where possible. Other legislative Work Groups can benefit from the strategies developed in your group.

It is our belief that the purpose of SB 1070 is to contain carbon emissions, while a secondary goal is to invest cap revenue and enable a market concept to further cap emissions. The latter has been deployed in CA for 10 years and has accomplished total emissions reductions of 1% per year.
(Ref https://www.arb.ca.gov/cc/inventory/pubs/reports/2000_2014/ghg_inventory_trends_00-14_20160617.pdf, search on "9.4%"). The California legislated cap and trade reductions are not sufficient to support the *Under 2 MOU* signed by Governor Kate Brown. This is clearly illustrated by the enclosed file (submitted in .doc and .pdf format). Reductions on the order of 4% per year are necessary.

This correspondence responds to Work Group Question 1: What aspects of a cap and invest policy as it is being discussed in Oregon are you most concerned about…? In the enclosed file, we identify several proposed budgets for keeping the planet's average temperature increase under 2 degree C. Justice suffers if this limit is exceeded.

Building quantified terms into legislation, with scheduled reviews and resets, can show the way for other states to meet their own share of carbon reductions. Decisions on this matter are the province of legislators, our role is to present public domain information disclosing a quantified basis for assuring a habitable and therefore just environment.

Please feel free to contact me or the other engineers listed below if you have any questions about this note or attachment.

Reference links can be accessed by copy/paste to a browser command line. Hyperlinks are not embedded.

Best Regards,

Mike Unger, President, 503.348.8716
Engineers for a Sustainable Future

Tracy Farwell, Action Committee, 503.477.8811
Ed Averill, Board, 503.807.2460
Robert James. Board, 503.828.4812

Work Group on Environmental Justice and Just Transition

Gov. Kate Brown supports Climate Justice

- **Climate Justice is meaningless with a catastrophic climate failure**
- **She signed the Under 2-degree Memorandum of Understanding**
  - **A pledge to limit the carbon emissions that force increasing global average temperature**
  - **When annual emissions reach zero, average temperatures stabilize 30 years later**

NOTE: In ppt format this file provides references in "Notes Page" view.

Work Group on Environmental Justice and Just Transition

Gov. Kate Brown is asking us to work for success

- **Environmental Justice in Oregon means do our part to reduce climate risk**
- **DoD military threat assessment carries climate change as the highest threat (termed a threat multiplier)**
- **Working for climate justice involves reducing climate risk**

NOTE: In pdf format this file includes references in the Appendix

Work Group on Environmental Justice and Just Transition

Environmental Justice in Oregon means we quantify our efforts to reach zero carbon emissions along with other states and nations

The fairest decision is to start yesterday, well before any future crisis can amplify unfair expediencies

A Model for Best Science Brought to Legislation
(ESF Draft, 7 Oct 2017)

Justice and science are served by full disclosure of facts and numerical relationships that are understood by all, and kept current as knowledge and experience accumulates

Legislators/Rulemakers are Faced with Choices

- **Set our share of the Carbon Cap budget in conformance with the upper limit for 2 deg C, … or 1.5 deg C**
- **Climate tracking science shows a chance for 1.5 deg C**

A Model for Best Science Brought to Legislation
(ESF Draft, 7 Oct 2017)

Is it a single, maximum emission level allowed per state emitter, expressed as "x mmt CO2" ?

- **Oregon annual GHG emitted is about 60 mmt CO2 total**
- **Determined by complex accounting rules**

Is it a pooled maximum emission level where emitters bid for burn permits until the annual cap is exhausted?

ESF Model for Best Science

ESF ENGINEERS for a SUSTAINABLE FUTURE

Various Global Annual CO2 Budgets to choose from

Source	Amount	When cited
Oil Change International	843 Gt (2 deg C) 393 Gt (1.5 deg C)	2016 2016
UN IPCC	1,000 Gt (2 deg C)	2012
350. Org	565 Gt (2 deg C)	2012
World Resources Institute (Non-CO2 gases counted)	275 Gt	2012

Oregon's CO2 Budget is 0.1% of the selected Global Budget

ESF ENGINEERS for a SUSTAINABLE FUTURE

Global Carbon Annual Burn Rate

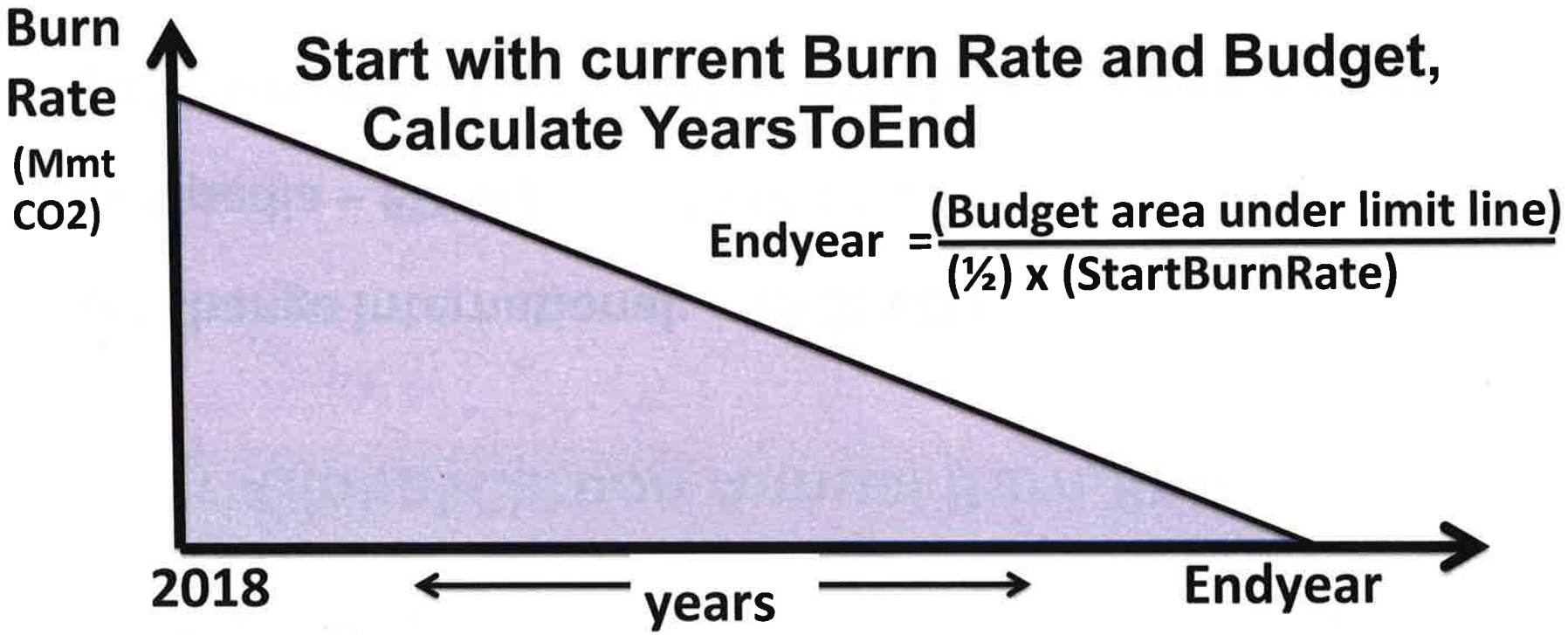
Oil Change International: 39 Gt CO2

Wikipedia – EDGAR: 36 Gt CO2

10 % variance when bringing 2012 budget up to present

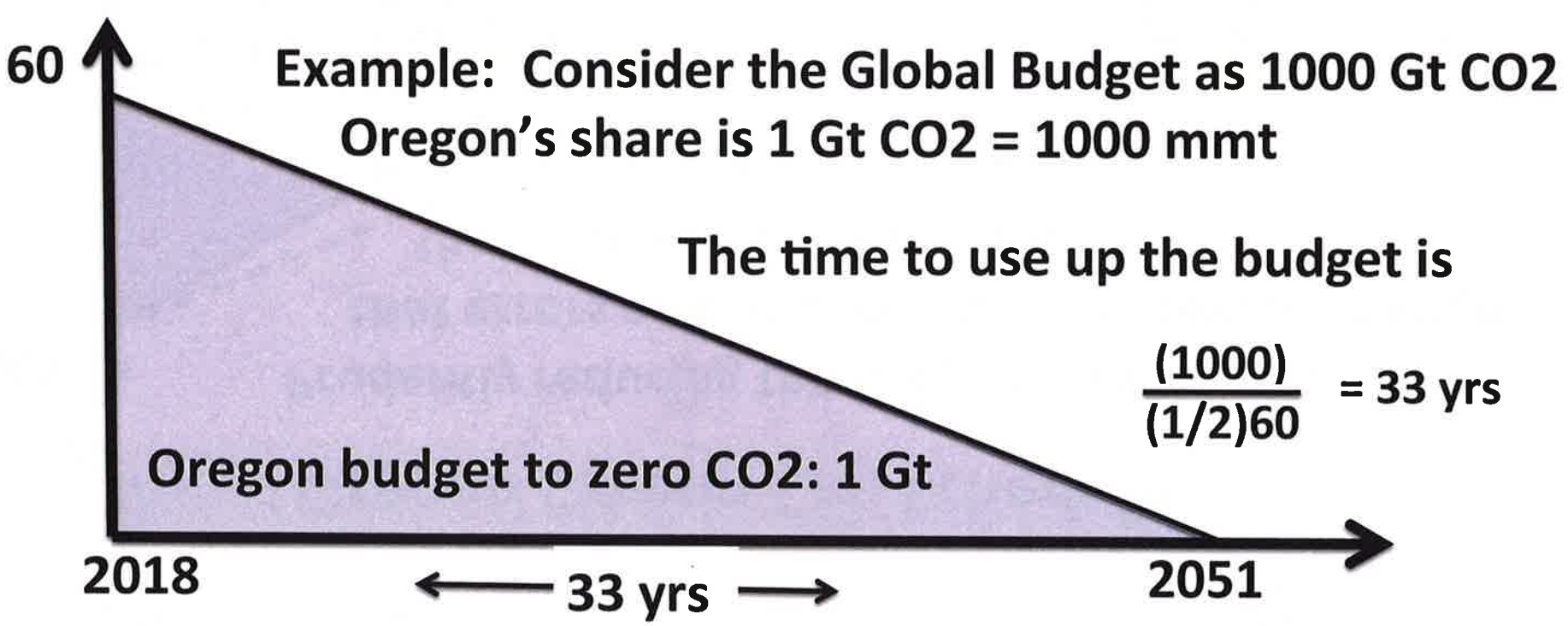
ESF ENGINEERS for a SUSTAINABLE FUTURE

Oregon Carbon Cap Schedule



ESF ENGINEERS for a SUSTAINABLE FUTURE

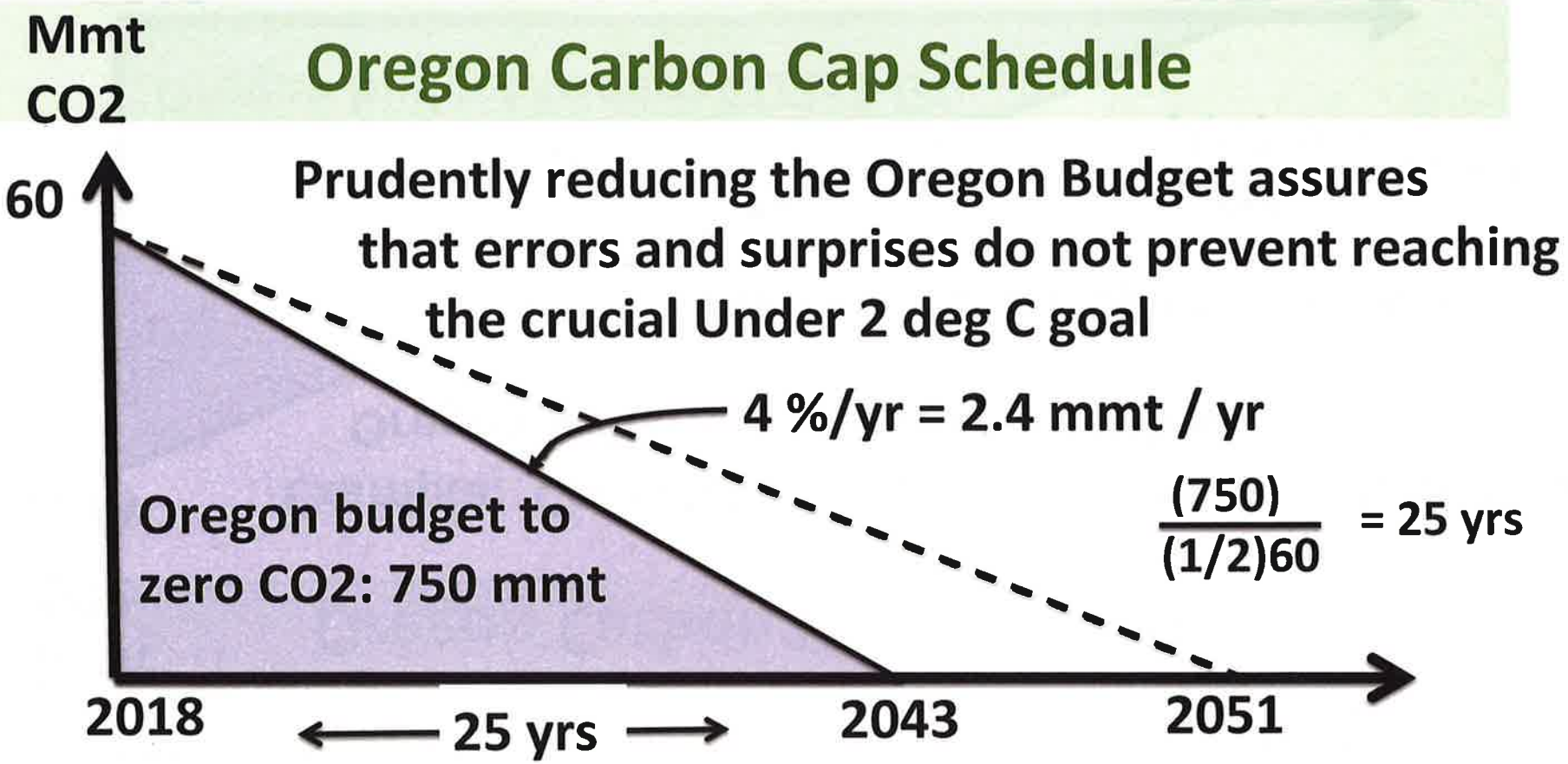
Oregon Carbon Cap Schedule



ESF Model for Best Science

ESF ENGINEERS for a SUSTAINABLE FUTURE

Oregon Carbon Cap Schedule



ESF ENGINEERS for a SUSTAINABLE FUTURE

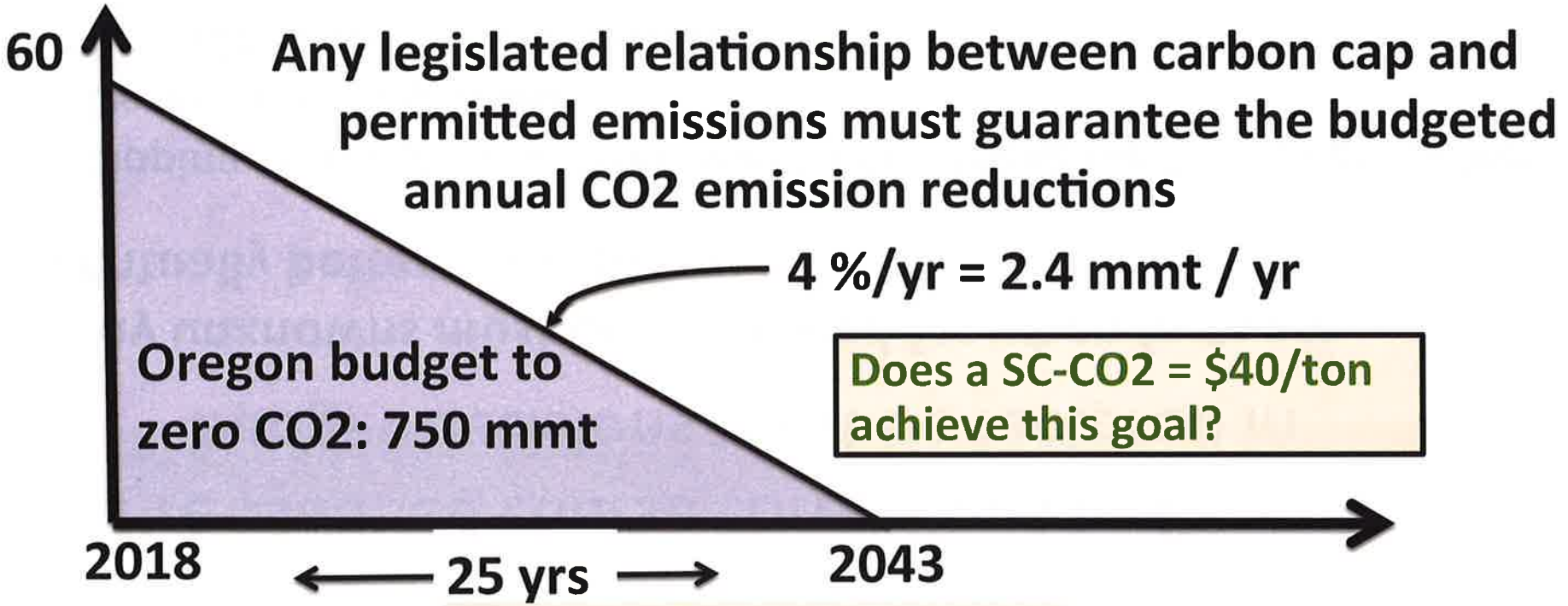
Pre-planned course corrections to Oregon budget decisions must be factored in

Many unknowns must be accounted for when facts are eventually better understood:

- **Tipping points (methane releases from melting tundra and permafrost)**
- **Ocean ecology collapse**
- **Agriculture methane discoveries**
- **Poor fossil industry methane containment programs**
- **Carbon accounting errors/changes**
- **Carbon capture setbacks**

ESF ENGINEERS for a SUSTAINABLE FUTURE

Oregon Carbon Cap Schedule



Social Cost of CO2 = SC-CO2

Appendix - References

Slide 1

Under 2 MOU: http://under2mou.org/

Gov Brown signs MOU (photo caption) :

http://www.oregonlive.com/politics/index.ssf/2017/06/kate_brown_oregon_will_uphold.html

30 years (not an easy read) :

http://www.homepages.ed.ac.uk/shs/Climatechange/Response times.pdf

Slide 2

DOD Threat Assessment:
http://archive.defense.gov/pubs/150724-congressional-report-on-national-implications-of-climate-change.pdf?source=govdelivery

Slide 4

Climate Tracking:
https://www.carbonbrief.org/analysis-how-well-have-climate-models-projected-global-warming

Appendix - References

Slide 6

OCI Table 1: http://priceofoil.org/content/uploads/2016/09/OCI_the_skys_limit_2016_FINAL_2.pdf
1000 Gt: Fig. ES-1,
http://edgar.jrc.ec.europa.eu/docs/The_Emissions_Gap_Report_2014-November_2014EGR2014_LOWRES.pdf
565 Gt: http://www.rollingstone.com/politics/news/global-warmings-terrifying-new-math-20120719
275 PgC: http://www.wri.org/sites/default/files/WRI13-IPCCinfographic-FINAL_web.png
NOTE: 275 PgC= 275 GtC

Slide 9

60 mmt:
http://www.keeporegoncool.org/sites/default/files/ogwc-standard-documents/OGWC 2017 Biennial Report to the Legislature_final.pdf

Enhabit Homework Responses

Environmental Justice and Just Transition Work Group Meeting #1

Question 1: What aspects of a cap-and-invest policy as it is being discussed in Oregon are you most concerned about for your organization/industry/constituents/customers?

A. **Current grant structure does not appear to ensure consideration of certain types of emissions reductions projects.**

It's no secret that Oregon has an affordable housing crisis, and the state's shortage of housing stock is a major reason for that crisis. A significant portion of Oregon's affordable housing is also in need of critical repairs. If these units do not receive the repairs they require, they may fall out of the state's housing stock entirely and further compound the housing crisis. Such homes are also usually energy inefficient and expensive to heat, and studies have shown that living in substandard housing leads to poor health outcomes. As it is currently written, SB 1070 does not adequately address Oregon's housing issues or maximize the opportunity to use revenue from a cap and invest policy to help solve the problem.

SB 1070's Climate Investment grant program seeks to reduce GHG emissions and protect impacted communities and economically distressed areas. Housing prices and energy costs are two of the greatest financial burdens facing low-income Oregonians, and homes with poor energy efficiency are more expensive to heat and increase our state's emissions. By directing revenue from a cap-and-invest program to critical home repairs and energy efficiency upgrades for affordable housing, the state could simultaneously preserve affordable housing stock in economically distressed areas, improve health outcomes for low-income Oregonians, reduce Medicaid costs and utility costs and achieve substantial emissions reductions. For example, the bill could clearly allow investments in non-energy measures that are required for effective energy efficiency measures (such as fixing a leaking roof before installing insulation). This is especially important in low and moderate-income homes.

SB 1070 would benefit from improved clarity about the priorities for Climate Investment program funds and specificity about the percentage of funds that these priorities should receive. The opportunity to explicitly identify affordable housing as a priority while reducing GHG emissions can realize efficiencies in the work and leverage capital for these investments, while also addressing one of the most acute problems facing our state.

B. **The current structure for guiding investments appears to rely too heavily on grants rather than capturing potential efficiencies through formula-based investments.**

For example, the cap-and-invest program could invest in certain incentive programs or investment programs based on formulas for energy efficiency and renewable energy

generated. Grant programs, on the other hand, require the cost of proposals, evaluation committees, lengthy processes and other costs. There is certainly a need for the flexibility afforded by a grant-based approach, but some formulaic approaches could also be integrated—or grants could be used to establish such formulaic approaches.

Residential energy efficiency and solar projects have clear metrics for projecting the amount of energy usage they reduce, and incentives for these projects can be designed to be based on these metrics. Investments can be driven by clear programs that fund on a $/kwh or $/therm basis, using projected energy savings or energy generated. By giving more funding to projects that achieve greater energy consumption reductions and emissions reduction per dollar, the state could ensure that cap-and-invest revenue is deployed in an efficient and effective manner. It is also important that SB 1070 prioritizes funding for projects that provide the greatest return on investment (ROI), and the emissions reductions and cost effectiveness of large, complex programs can often be difficult to evaluate.

C. The bill could more clearly express the preference for work to be performed by minority and women-owned firms (as is mentioned) as well that projects should incorporate worker-level equity, diversity and inclusion programs to ensure historically disadvantaged workers are included in the economic activity spurred by these investments.

Question 2: What changes would you suggest be made to cap-and-invest as it is currently being discussed to address the concerns you have?

SB 1070 would benefit from clearer objectives and greater detail about how cap-and-invest program revenue should be spent. Priority should be given to projects that both reduce emissions and tackle the state's greatest challenges. By giving precedence to projects that improve Oregon's housing stock and reduce displacement, SB 1070 could protect impacted communities and economically distressed areas while also decreasing residential GHG emissions. Directing cap-and-invest revenue specifically to critical home repairs and energy efficiency upgrades would achieve both these objectives by lowering home energy costs and consumption for low and moderate-income Oregonians. Additionally, the influx of funding would stimulate the state's building trades, energy efficiency, solar and construction industries, resulting in the retention and creation of thousands of living-wage jobs.

Question 3: What opportunities do you believe exist for your organization/industry/constituents/ customers from implementation of a cap-and-invest policy as it is currently being discussed in Oregon?

A cap-and-invest program has enormous potential to fundamentally change the way we address housing as a state. When homes receive critical repairs and energy efficiency upgrades, there are myriad benefits beyond reduced emissions and energy costs. Eliminating black mold, lead pipes and radon from housing greatly improves health outcomes for residents, and studies

even show that children are more likely to attend school when they live someplace that is warm and dry. An efficient, well-insulated home is also more resilient to the temperature extremes produced by our changing climate.

The value of all these benefits should factor in to the decision about how to spend cap-and-invest program revenue, and all the state agencies that deal with different aspects of housing should be more coordinated in their work to improve the state's housing stock, especially homes occupied by low and moderate-income families. The state could use cap-and-invest funds to make a modest investment in housing that would help these agencies, residents and businesses to leverage other loan products and sources of state funding, ultimately stimulating a much larger influx of capital into Oregon's housing industries. By explicitly prioritizing investments in housing, SB 1070 would effectively reduce GHG emissions while also creating a tremendous opportunity to address the affordable housing crisis in our state.

Sincerely,

Tim Miller
CEO, Enhabit

October 10, 2017
Via Electronic Mail

Clean Energy Jobs Work Groups Meeting #1 -- Homework Questions

My comments are generally personal and do not represent any particular constituency. EQL is a economic consultancy and service provider to utilities, vendors, and customers in areas, e.g., demand side management and technology research, distributed solar and storage planning, distribution planning, and vehicle electrification planning.

Question 1: What aspects of a cap-and-invest policy as it is being discussed in Oregon are you most concerned about for your organization/industry/constituents/customers?

1. **<u>Bill Reduction.</u> Funding to reduce customer electric bills should not be too prescriptive, and should consider non-utility customer counsel and research, pricing options, direct access, and distributed energy resources (DER), including energy efficiency, demand and capacity management, renewables, storage, etc.**

   In the time frame of this legislation, opportunities for customer bill reduction will go way beyond energy efficiency and weatherization. Many utilities will have rates and pricing flexibility or direct access that will allow customers to reduce bills, and manage their load to reduce bill. Other bill reducing solutions will include solar, grid interactive water heaters, and storage, especially as these technologies continue to see price declines and supporting policies and programs are implemented.

   Bill assistance should not be direct payments to customers. Oregon has an active business environment to assist customers with bill reductions. Growing this industry supports objectives of the Policy.

   Policy could support funding for distributed energy resource (DER) research and business development in the state. Example is California's EPIC program.
   http://www.energy.ca.gov/contracts/epic.html

2. **<u>Rate Reduction.</u> Policy should direct Public Utility Commission to focus on transmission and distribution utilization factors and losses, and promote planning, resource types and locations that improve T&D utilization factors and reduce energy losses.**

   In a high renewable electric business environment there will be less variable energy cost components and more fixed asset components to rates, e.g., transmission and distribution. It will be important to promote demand side management, utility dynamic pricing, distributed renewables, and EV charging that more efficiently use transmission and distribution assets. Integrating more variable resources in Oregon without

addressing the demand side of the equation will reduce T&D utilization factors and hence increase rates to all customers – even those with direct access or solar.

California has realized this policy as rate reducing and has implemented several policies to focus attention on transmission and distribution utilization.

http://www.cpuc.ca.gov/uploadedFiles/CPUCWebsite/Content/About_Us/Organization/Divisions/Policy_and_Planning/DataDashBoard/17/System_Efficiency_Report.pdf

http://drpwg.org/

3. **Policy should provide clear language that allows all energy efficiency and bill reduction operators (e.g., Energy Trust of Oregon) to promote beneficial electrification or fuel switching to lower GHG emitting sources.**

4. **Customer choice of lower GHG energy sources through utility programs or direct access should be attributed to buyer not to electric utility.**

   Oregon has customers willing to purchase power supply with less GHG. For instance, PGE has the highest number of customers purchasing 100% renewable energy in the country. Not just

5. **Section 35 regarding transportation electrification addresses only Investor owned electric utilities. This Policy should address and provide funding for transportation electrification at consumer owned utilities as well.**

6. **Policy needs more attention on language that ensures state is not injured in the event Oregon or other linked market participants exit the carbon market. (aka Prenuptial language)**

7. **Will Oregon have a board member on the WCI? Who appoints this?**
   http://www.wci-inc.org/board-directors.php

8. **Funding should support Oregon resiliency planning and projects. Climate change is creating less reliable power and water systems.** Climate change adaptation projects that improve reliability of power and water systems should be one of the investment and research areas of Policy Grant Program.

Question 2: What changes would you suggest be made to cap-and-invest as it is currently being discussed to address the concerns you have?

Some of these are mentioned in Question 1. We may have specific recommendations in the future.

Question 3: What opportunities do you believe exist for your organization / industry / constituents/ customers from implementation of a cap-and-invest policy as it is currently being discussed in Oregon?

1. Policy will increase and improve customer energy choices
2. Policy will lead to funding to improve reliability of electric and water systems
3. Policy will provide better economic signals between transportation, electricity, and natural gas sectors
4. Policy will improve price signals to electric and natural gas customers will lead to technology and new business development in the state.
5. Policy will support funding for distributed energy resource (DER) research and business development in the state. Example is California's EPIC program. http://www.energy.ca.gov/contracts/epic.html

Thanks for considering my comments. I hope they help.

Ken Nichols
503 438 8223
ken@eqlenergy.com

My answers for the Ag/Forestry work group.
Fergus Mclean

Question 1: *Discuss the opportunities for agriculture, forestry and fishing sectors under a cap-and-invest program and what would be important to understand for the offsets conversation.*

State-regulated forestlands sequester 46 million gross tons of carbon each year, and scientists estimate changing forestry practices could increase this amount by 15%- so improvements in forest management alone could offset 10% of Oregon's total carbon footprint of 60 million tons of CO2e/year, up to 7 million tons/year.
Since Canada has announced a floor price on carbon of $50/ton by 2022, monetising Oregon's carbon resources could mean a huge boost to Oregon's distressed timber communities, but it will take a great deal of organisational, scientific and infrastructure work to capture this potential value.
2. *How can an Oregon offsets program be designed to provide the most benefit to Oregon's rural economies, communities and tribes?*

Since our forest carbon resources are so large, standard limitations on the percentage of compliance allowances which can be met with offsets may not be appropriate. The present ceiling on offsets in SB 1070 is set at 8%. Under the California system, the percentage of compliance allowed to be met through offsets can be raised according to the *stringency* of those offsets. Higher *stringency* indicates an offset with a higher level of scientific verifiability and durability. By producing forest carbon credits of the highest *stringency*, Oregon can design a system in which forest carbon offsets can make up 30% or even more of compliance instruments.
As Coos and Douglas counties are economically distressed and also have huge carbon resources in the Elliott State Forest, the Elliott should be declared a "*General Market Participant*" under SB 1070, eligible to sell carbon offset credits in Oregon's carbon trading market created under SB 1070.
Since forest carbon credits are so significant to Oregon, a member of the Global Warming Commission's Forest Carbon Measurement Task Force should be included on the Environmental Quality Commission's Advisory committee (Section 7(1) of SB 1070). Their September report linked
here: http://www.keeporegoncool.org/sites/default/files/meeting-supporting-files/September%202017%20Oregon%20Forest%20Carbon%20Picture_revised.pdf

3. *What are the concerns related to development of, and use of, offsets, and how can a program be designed to address some of these concerns? What can we learn from existing offset programs?*

Forest carbon science is relatively young, with significant uncertainties. This level of uncertainty generates forest carbon credits of lower *stringency,* resulting in credits of lower value, and lower levels of permitted offset compliance. Oregon has some of the world's most accomplished forest carbon scientists, capable of creating a world-class forest carbon research facility based in- and supported by the sale of carbon credits from- the Elliott Forest. Forest carbon credits of the highest scientific quality made possible through such an institution can become a driver of Oregon's forest economy and make Oregon a global leader in forest carbon science as well as the leading producer of forest carbon credits. Such economic activity will boost local forest-based communities throughout Oregon and create a whole new forest jobs sector in monitoring and establishing forest carbon credits.

4. *What opportunities exist in Oregon for agriculture, forestry, and fishing sectors, and who would benefit? How will revenues be invested in rural communities? What are some examples?*

A forest carbon research facility based in the Elliott Forest will push the scientific boundaries of knowledge about the forest carbon cycle and establish new levels of certainty about carbon storage which will translate directly into higher value of forest carbon credits registered with higher *stringency*.

The research itself, and the monitoring field work accompanying widespread establishment of carbon reserves, will create a substantial, new jobs sector for Oregon, as researchers come from all over the world to learn forest carbon science in the Elliott and thousands of forest technicians find work establishing and monitoring forest carbon reserves.

The Elliott-based institution can provide a kind of extension-type service to small woodlot owners and industry alike, assisting them to register carbon reserves and draw income from preserving and nurturing forests instead of and in addition to harvesting timber, resulting in manifold environmental improvements benefiting fisheries and the recreation sector.

The added value of establishing and marketing carbon credits of the highest quality will work its way through first the rural and then the rest of the state's economy.

5. *How can a cap-and-invest program help advance Oregon's efforts to mitigate and adapt to the effects of climate change?*

State-regulated forest lands store on the order of 10 billion tons of CO2e- more than a hundred times the state's annual carbon footprint of 60 million tons. Even small changes in the amount of carbon stored can have a huge impact on the state's carbon footprint. Oregon can potentially sequester a significant portion of the carbon needed to be drawn from the atmosphere globally.

As Oregon pushes the boundaries of forest carbon science it may become possible to improve the much vaster carbon storage capacity of our federal lands, especially in the Coast Range and Western Cascades- truly among the planet's top few natural carbon sinks. The possible carbon sequestration implications are truly gigantic.

The surprising emissions from Oregon's forests (Guest opinion)

41
Posted on September 17, 2017 at 8:30 AM

The U.S. Forest Service has been battling drought and a bark beetle epidemic that have been killing trees across the West.(*AP Photo/Scott Smith*)
51 shares

By Guest Columnist

BY CATHERINE MATER

Once in a while, you'll hear reference to a black swan event, an episode that comes as a surprise, has a major effect, and is often inappropriately rationalized after the fact.

The fires raging through Oregon underscore such an event. Not the fires themselves, but the death and damage that occurs before lightning ever strikes. Up until this year, it was an accepted fact that the 60 million metric tons of carbon dioxide that Oregon releases into the atmosphere annually comes primarily from transportation emissions (about 20 million metric tons a year) and emissions from power plants (about 9 million metric tons a year).

But this year Oregon Global Warming Commission vigorously revisited this issue. In the past, the commission had determined that Oregon's forests were 'carbon neutral,' meaning each year they acquired and stored as much carbon (via tree growth) as was released (via tree harvesting). Updated information from the U.S. Forest Service and Oregon State University revolutionized our thinking on this matter.

Wildfires have historically produced soot, or black carbon, that are by no means beneficial. But these black carbon emissions last only a few days to two weeks in the atmosphere. Yet harmful "invisible" carbon dioxide emissions when trees die happen well before the fires begin and last 100-plus years in the atmosphere and produce global warming. Tree mortality is often due to insect and diseases resulting from changes in temperature influenced by global warming.

The black swan event happening in our forests is driven by the sheer annual volume - about 22 million metric tons a year -- of these long-term emissions released as Oregon's trees die. That's the equivalent of nearly all annual statewide emissions derived from the transportation and power generation sectors combined.

More alarming, while national forests comprise less than 50 percent of all forestlands statewide, they contribute 70 percent of Oregon's annual long-term emissions due to tree mortality. In contrast, family-owned and industrial forests comprise 33 percent of statewide forestland but contribute only 16 percent of emissions from tree death.

While the number of fires and acres burned have increased over time, we've learned that the release of the most harmful, long-term emissions from wildfires happen only in sporadic, high-severity fires. The last notable high-severity fire was the Biscuit Fire in 2002, when nearly 4 million metric tons of long-term carbon dioxide emissions were released. The bulk of high-severity hotspots in the Biscuit Fire appeared mostly from arid litter on the forest floor: Dead leaves, needles and bark resulting from tree mortality, not the standing dead or downed trees.

ADVERTISING

All told, more than 45 million metric tons of long-term emissions are released every year from Oregon forests. That's an annual emission level equivalent to 75 percent of long-term emissions produced statewide by all other reporting sectors (transportation, utilities, industrial, commercial, residential, etc.) Half of those emissions are due to tree mortality. The other half is from harvest activity predominately on private industrial forestlands.

These same forests each year also absorb a stunning 80 million metric tons of long-term emissions from the atmosphere through new tree growth. This means that Oregon's forests acquire a *net* 35 million metric tons of long-term carbon from the atmosphere every year.

In hindsight, as with all black swan events, acknowledging that our forests are the 'lungs' for our common home makes perfect sense. No longer 'carbon neutral,' Oregon forests must now be considered central to meeting our state's emission reduction goals. And that understanding leads to more questions: How do we best monetize the value of that carbon to help forest owners grow trees for carbon with the same passion they have for growing trees for lumber? How do we decrease devastating tree mortality, even though the bulk of it happens on federal lands outside of state jurisdiction? How do we grow more forests in Oregon, even though a net 320,000 acres of family forests have disappeared from our state base since 1977?

Pope Francis once commented that "a tree that falls makes more noise than a growing forest." Oregon's forests are roaring right now, but a black swan is emerging.

Catherine M. Mater is a member of the Oregon Global Warming Commission and chair of its Task Force on Forest Carbon. She lives in Corvallis

Friends of Family Farmers ◆ 249 Liberty St NE, Ste 212 ◆ Salem, OR 97301

503-581-7124 ◆ www.FriendsofFamilyFarmers.org

October 9, 2017

Comments to the Clean Energy Jobs Work Group on Agriculture, Forests, Fisheries, Rural Communities, and Tribes

Representative Ken Helm, Senator Michael Dembrow, Work Group members:

Friends of Family Farmers promotes socially and environmentally responsible family scale farming and ranching in Oregon. We have held dozens of farmer and rancher listening sessions in rural communities across Oregon every other year since 2009 to develop our policy positions, hearing from hundreds of producers along the way. At these meetings, we have seen increasing concern among family farmers and ranchers about the impacts of runaway climate change, and a desire for policy makers to enact solutions that protect the viability of Oregon's small and mid-sized family farms and ranches now and in the long term.

We appreciate the opportunity to provide early input on the proposed 'Clean Energy Jobs' legislation and we are offering our perspective on how such a proposal can support climate friendly farming practices on diversified small and mid-sized family farms and ranches in Oregon. Below are our answers to several policy and 'homework" questions posed to stakeholders by Representatives Helm and Senator Dembrow regarding the opportunities to agriculture from a cap-and-invest program and greenhouse gas emission offsets. Five overarching policy questions have been posed to the Work Group:

1. How would a cap-and-invest program affect agriculture?
2. How can an Oregon offsets program be designed to provide the most benefit to Oregon's rural economies?
3. What are the concerns related to development of, and use of, offsets, and how can a program be designed to address some of these concerns?
4. What opportunities exist in Oregon for agriculture, forestry, and fishery sectors, and who would benefit? How will revenues be invested in rural communities? What are some examples?
5. How can a cap-and-invest program help advance Oregon's efforts to adapt to the effects of climate change?

In answering these overarching questions, our position is that a well designed 'cap and invest' program can and should create significant new resources for small and mid-sized farms and ranches to adopt practices that promote soil health and soil carbon sequestration, including: managed rotational grazing of livestock, building soil organic matter, increased use of cover crops, diversified crop rotations, reducing or eliminating use of petroleum-based fertilizers, organic transition and research, and leaving land fallow periodically. While larger operations can and should be encouraged to adopt these practices as well, according to USDA, the vast majority of Oregon's

farms are smaller than the statewide average of 460 acres. Of Oregon's nearly 35,500 farms, over 80% are smaller than 180 acres in size, and over 60% are smaller than 50 acres.[1] Ensuring that offset program investments are targeted towards climate friendly practices on smaller and mid-sized farms is key to ensuring that significant benefits are spread across rural Oregon.

It is also our position that the largest individual agricultural sources of greenhouse gas emissions, like very large concentrated animal feeding operations (CAFOs), should not be exempt from the greenhouse gas emissions cap or reporting requirements if their overall emissions rival that of other 'high emitting facilities' that would otherwise be legally required to report annual emissions or be subject to the overall emissions cap. For example, Oregon has a small number of uniquely large dairy facilities with over 10,000 animals on site, including a facility recently approved for 30,000 dairy cows. Facilities of this scale are very large sources of methane, a greenhouse gas over 20 times more potent than carbon dioxide. Based on this, it is likely that Oregon's largest dairy facility, with over 60,000 cows, is among the top 25-50 largest individual sources of greenhouse gas emissions in the state. Facilities of this scale should not be exempt from the cap, as they operate much more like a factory than a typical farming operation in terms of their greenhouse gas emissions and impacts on climate change. Exempting these individual large emissions sources from the cap would seriously undermine Oregon's overall efforts to address climate change.

Our view on offsets is that they should focus primarily on targeting incentives towards smaller and mid-sized operations that may not otherwise have the economic means to adopt climate friendly practices. Historically, projects like methane digesters at large dairy farms have been a significant focus of offset funding. We believe that larger operations that are high emitting facilities should be required to install such pollution controls, not be paid to do so. Currently, because Oregon offers tax credits for manure digesters, steps should also be taken to ensure that facilities are not able to 'double dip' by collecting both tax credit money and offset funding for the same activity.

Focusing investments on projects at smaller and mid-sized farms and ranches and on organic practices will help ensure that there are broad and significant positive impacts across rural Oregon. Already, the growth of farm direct agriculture and organic acreage in Oregon has been substantial over the past decade. But recently, a wealth of data has emerged showing that smaller and mid-sized farms and ranches, and organic operations in particular, bring significant economic benefits to rural communities.

The positive impact of local and regional food system investments has even drawn the attention of the Federal Reserve. The Federal Reserve's 2017 report 'Harvesting Opportunity: The Power of Regional Food System Investments to Transform Communities,'[2] explored "the potential for regional food systems to promote economic growth for both rural and urban communities through the creation of new or the enhancement of existing jobs and businesses," noting that "appropriately targeted policies and support can advance the economic and financial security of low- and moderate-income households and communities." We would strongly argue that Oregon's

[1] https://www.agcensus.usda.gov/Publications/2012/Full_Report/Volume_1,_Chapter_1_State_Level/Oregon/st41_1_001_001.pdf

[2] https://www.stlouisfed.org/community-development/publications/harvesting-opportunity

cap and invest program should be constructed to help support local and regional food systems by investing in projects on small and mid-sized farms and ranches across the state.

Additionally, research from Penn State agricultural economist Dr. Edward Jaenicke published in 2016 titled 'U.S. Organic Hotspots and their Benefit to Local Economies' showed that the presence of organic agriculture and related businesses provide significant economic benefits to rural areas. This research looked into county-level economic indicators across the US related to agriculture and demonstrated that organic food and crop production, and related organic businesses, create real and long-lasting economic opportunities in regions where they are located. The research noted that organic "hot spots" – clusters of counties with statistically high numbers of organic farming and related organic businesses - have lower poverty rates and higher median annual household incomes than more general agricultural hot spots. According to the research, "a county's poverty rate drops by 1.3 percentage points and the median household income increases $2,094 when the county is part of an organic hotspot."[3]

In addition to this, focusing investments on supporting adoption of organic practices (both on organic and conventional farms) makes good sense for the climate. Recently published research by Northeastern University and The Organic Center has shown that organic practices are better at storing carbon in soils that would otherwise be released into the atmosphere.[4] Looking at over 1000 soil samples nationwide from both organic and conventional farms, the study found that employing organic practices on farms that build soil organic matter - like increased use of cover crops, diversified crop rotations, reducing or eliminating use of petroleum-based fertilizers, using compost, and leaving land fallow periodically - has 26 percent more long-term carbon storage potential than on conventional farms that do not employ such practices.

The research cited above should help underscore the potential for significant positive economic and carbon sequestration impacts across rural Oregon if our 'cap and invest' program directly invests in climate friendly farming practices on small and mid-sized farms and ranches engaged in local and regional food production, as well as increased adoption of organic practices.

In conclusion, our responses to the three 'homework questions' posed by Representative Helm to the Work Group following the September 21 meeting are below:

Question 1: What aspects of a cap-and-invest policy as it is being discuss in Oregon are you most concerned about for your organization/industry/constituents/customers?

We are concerned that historically, 'offset' investments have not benefited small and mid-sized farms and ranches. A well designed Oregon 'cap and invest' program should create significant new resources for small and mid-sized farms and ranches to adopt practices that promote soil health and soil carbon sequestration, including: managed rotational grazing of livestock, building soil organic matter, increased use of cover crops, diversified crop rotations, reducing or eliminating use of petroleum-based fertilizers, organic transition and research, and leaving land fallow periodically.

[3] https://ota.com/sites/default/files/indexed_files/OTA-HotSpotsWhitePaper-OnlineVersion.pdf
[4] http://www.sciencedirect.com/science/article/pii/S0065211317300676?via%3Dihub

We also believe that the largest individual agricultural sources of greenhouse gas emissions in Oregon, like the very largest concentrated animal feeding operations (CAFOs) in the state, should not be exempt from the greenhouse gas emissions cap or reporting requirements. Continuing to exempt high emitting facilities within the agricultural sector from the cap will significantly undermine Oregon's overall efforts to address climate change.

Question 2: What changes would you suggest be made to cap-and-invest as it is currently being discussed to address the concerns you have?

The proposal should create a grant program administered through local soil and water conservation districts, or through state agencies like ODA and OWEB, specifically targeted towards helping smaller and mid-sized farms and ranches adopt practices that help store carbon in soils. The proposal should be amended to also acknowledge that very large CAFOs can be high emitting facilities and if so, such facilities should be subject to the cap on greenhouse gas emissions. The proposal should further include safeguards to prevent double or multiple payments for the same practice (ie if a tax credit is available for a practice, the use of the tax credit should make the project ineligible for other types of payments).

Question 3: What opportunities to do you believe exist for your organization/industry/constituents/customers from implementation of a cap-and-invest policy as it is currently being discussed in Oregon?

As noted above in greater detail, investments in small and mid-sized farms and ranches that utilize organic practices and which engage in local and regional food systems have the potential to bring significant new economic benefits across rural Oregon. We would like to see this program lead to broad economic and environmental benefits in communities across Oregon, and significant investments in climate-friendly practices on small and mid-sized farming operations across the state will help ensure that occurs.

Sincerely,

Ivan Maluski

Policy Director

Clean Energy Jobs Work Groups

Meeting #1 -- Homework Questions

DIRECTIONS: No later than one week prior to the second work group meeting, please send your responses to the questions below to committee staff (beth.patrino@oregonlegislature.gov or beth.reiley@oregonlegislature.gov). As you prepare your responses, please consult with others in your organization or industry, particularly any located in jurisdictions currently participating in the Western Climate Initiative.

Question 1: What aspects of a cap-and-invest policy as it is being discussed in Oregon are you most concerned about for your organization/industry/constituents/customers?

I am most concerned about carbon tax, usually an industry just passes on a tax to the consumer, rich are poor. Our work along with Yale and University of Washington has shown that we can solve a lot of climate change through renewable energy and Cross Laminated Timber (CLT) and now we have Mass Plywood Panel (MPP). I have attached a scientific paper on CLT.

Question 2: What changes would you suggest be made to cap-and-invest as it is currently being discussed to address the concerns you have?

An alternative might be a carbon fee-dividend that is charged and returned in an annual dividend to the general taxpayer. See Citizen's Climate Lobby proposal.

Question 3: What opportunities do you believe exist for your organization/industry/constituents/ customers from implementation of a cap-and-invest policy as it is currently being discussed in Oregon?

In 2013 LCRI wrote a paper on how we could offset all Lake County Carbon Emissions using renewable energy, I have attached a paper.

LAKE COUNTY RESOURCE INITIATIVE

Lake County, Oregon: Offsetting Abiotic Carbon Emissions Through Renewable Energy

By Brian P. Hider and David S.C. Wade

January 2013

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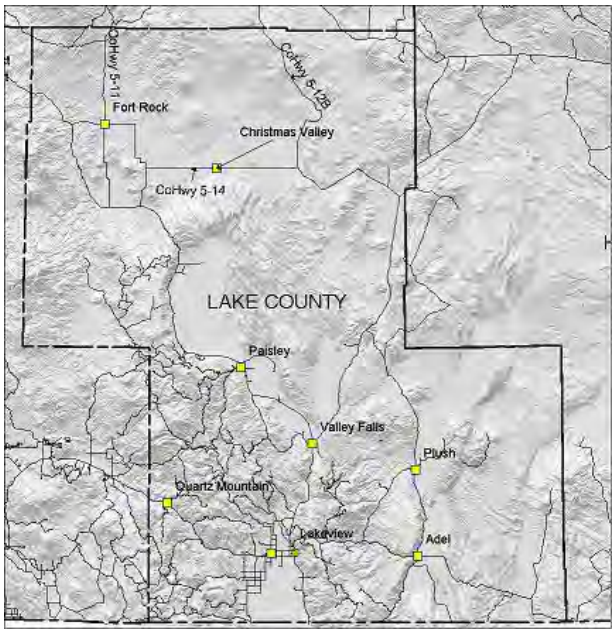
Executive Summary

Lake County, Oregon, is in an excellent position to reinvigorate its economy and become the first county to offset its fossil fuel carbon (abiotic) emissions. This report compares the county's fossil fuel-based carbon emissions to the carbon offset potential of the county's known renewable energy resources. The report finds that the combined emission count of the county's residential, public and private, and agricultural sectors is 288,574 tons of abiotic CO2 a year. By calculating the carbon offset potential of the county's known renewable resources, the report finds that the county can at least offset 93% of its abiotic emissions. As Lake County's substantial solar and geothermal resources have yet to be fully explored, our results make us confident that the county has the potential to offset more than 100% of its abiotic emissions.

Our confidence stems from three favorable attributes. First, Lake County has abundant renewable resources. The Environmental Protection Agency classified the county as providing very good solar resource (National Renewable Energy Laboratory [NREL], 2008). Additionally, the NREL rated the Lake County as an excellent source of geothermal energy (NREL, 2009). Currently, geothermal energy powers one Lake County project and will soon power two more. Second, the low population density of Lake County makes its land prices relatively inexpensive, and thus, the county can offer energy developers affordable land prices. Third, Lake County is fortunate enough to have a large number of transmission lines feeding into large and growing communities in Oregon, Nevada, and California, meaning Lake County is well positioned to meet the growing renewable energy needs of these communities. All of which sets Lake County to become a net exporter of renewable energy.

This report examines the carbon offset potential of 19 renewable energy projects, three of which are already built. Six projects are scheduled to be built by the end of 2013, and 10 are proposed but have yet to secure the resources to move forward. By the end of 2013, the nine built projects will offset 30% of the county's abiotic emissions (86,771 tons CO2). Once on line, the 10 proposed projects will offset an additional 63% of the county's abiotic emissions, bringing the county's offset to 93% of its abiotic emissions. Collectively, the projects would offset 267,731 tons CO2 per year. These 19 projects by no means represent the full extent of Lake County's renewable energy resources. The high likelihood that Lake County's solar and geothermal resources could prove far larger than current estimates, the county's low land prices, and direct transmission lines with growing population centers of Oregon, Nevada, and California make us confident Lake County can become the first county to offset 100% or more of its abiotic emissions.

Introduction



Lake County, Oregon is in an excellent position to improve its economic conditions and contribute to the world's efforts to stabilize the Earth's climate. Since the collapse of Oregon's timber market in the late 1980's, Lake County has been plague by unemployment rates of at least 12%. While its abundant geothermal, biomass, and solar resources have long been recognized, it is only now that rising energy costs and government action against dependence on foreign oil and climate change have made the development of renewable energy a viable option for Lake County.

Lake County is situated in southern Oregon, borders California and Nevada, and is 8,300 square miles. With a population of approximately 8,000 people and relatively cheap land prices, the county offers abundant acreage on which to build renewable energy projects. Additionally, the county has a large number of transmission lines connecting it to the electrical grids of much larger communities. The county's location, electrical transmission lines, and natural resources position it well to meet the growing renewable energy needs of not only Oregon but also California and Nevada. Figure 1 illustrates Lake County's known abilities to generate renewable energy by listing the count of the county's built, scheduled, and proposed biomass, geothermal, solar, and wind projects.

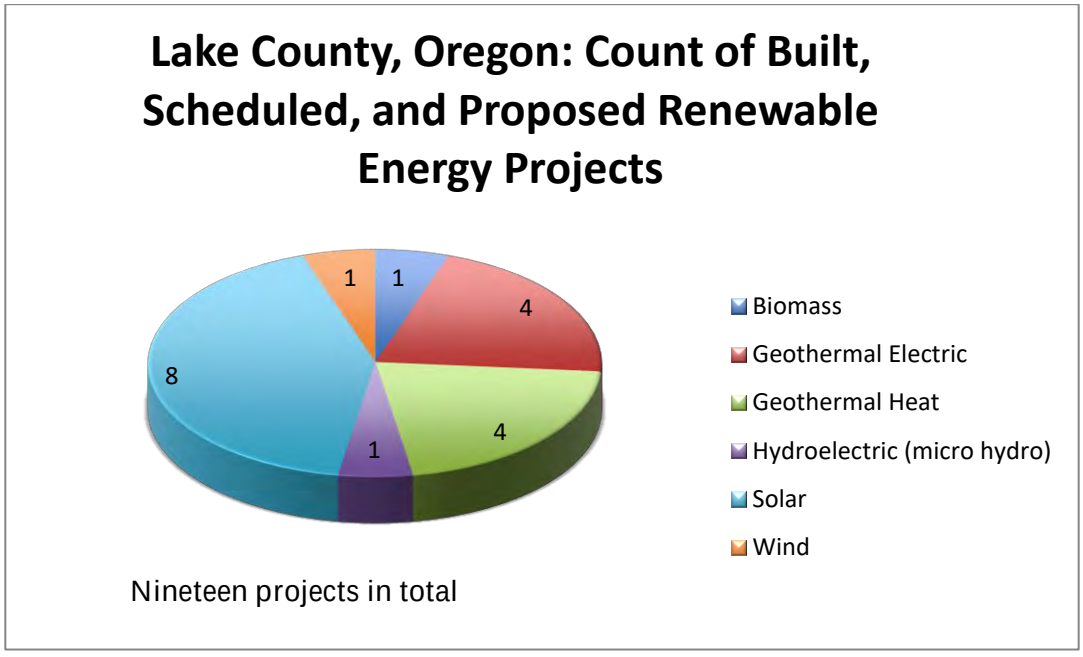


Figure 1: Count of built, scheduled, and proposed renewable energy projects.

The Lake County Resources Initiatives (LCRI) is dedicated to environmental stewardship through sound economic development. We believe renewable energy is an excellent means to bring economic health back to Lake County. In this report, we will show that renewable energy has the potential to more than offset the fossil fuel-based carbon emissions (abiotic emissions) of the county, a potential that could lead Lake County to become the nation's first county to offset its fossil fuel-based emissions. The distinction would not only provide new opportunities for the county but also inspire other communities to find ways of offsetting their own emissions.

The Need for a Carbon Inventory

Lake County has set the goals of exporting more energy than it consumes and offsetting its abiotic carbon emissions. The rough date for reaching energy independence is late 2013, and because of the recent reduction in the demand for renewable energy, we don't anticipate offsetting all abiotic emissions until 2024. However, with three existing renewable energy projects, five that will be operational by the end of 2013, and 10 proposed projects, Lake County is well positioned to achieve both energy independence and the distinction of offsetting its fossil fuel-based carbon emissions.

However, there are barriers that may hamper Lake County in achieving its renewable energy goals. This report aims to mitigate those barriers by providing key information on the carbon offset potential of each of Lake County's projects. One of the largest barriers to these projects is their cost. A carbon inventory of Lake County renewable energy projects can reduce costs by providing the methodological framework for applying to key federal grants that require carbon offset calculations or environmental benefit assessments. This report can serve as a foundation for these efforts and help assist in this process. Additionally, the findings presented here can inform decision makers on what projects can generate high carbon offsets or reductions. Given the existence of voluntary carbon markets and the likelihood that state governments will create regulated carbon markets in the near future, carbon offsets are a potentially lucrative resource (Wade, 2009).

The following is the methodology, findings, and conclusion of this report. The methodology explains our approach to measuring both the county's fossil fuel-based emissions and the offset potential of the county's renewable energy projects. Next, we show the results of our carbon assessment and carbon offset count. Finally, we close by explaining the implications of our findings.

Methodology

To ensure our results are not only trusted but also able to be improved upon, we provide the methodology behind our emission counting procedure and the methodology used to calculate the emissions offsets.

Abiotic vs. Biotic Carbon Emissions

We recognize two forms of carbon emissions: biotic and abiotic. Biotic emissions generally consist of methane generated from the decay of plant material and the digestive processes of animals such as cattle. Abiotic emissions consist primarily of carbon dioxide and are generated from the combustion of fossil fuels such as coal and gasoline. This report focuses on Lake County's ability to offset its abiotic emissions. LCRI does not deny the importance of biotic emissions. However, we believe the current methods used to measure biotic emissions fail to account for the natural processes that for millions of years have removed these emissions from the atmosphere and, thus, softened the impact of biotic emissions. Biotic emissions have always been a part of the atmosphere. It is the generation of abiotic emissions from fossil fuel use that is the primary cause of climate change.

Carbon Trust Standard

The standard used to measure Lake County's abiotic emissions is the Carbon Trusts' international methodology PAS 2050. The Carbon Trust is a UK-based organization that is a leading advocate of carbon emission assessment standards (Carbon Trust, 2012). We selected this standard for two reasons: 1) it is accepted by the World Resources Institute as a guideline for emission standards, and 2) it is a product of collaboration between business, government, and academy and takes into consideration a wide variety of perspectives in a thorough and complete framework.

Adaptation to Lake County

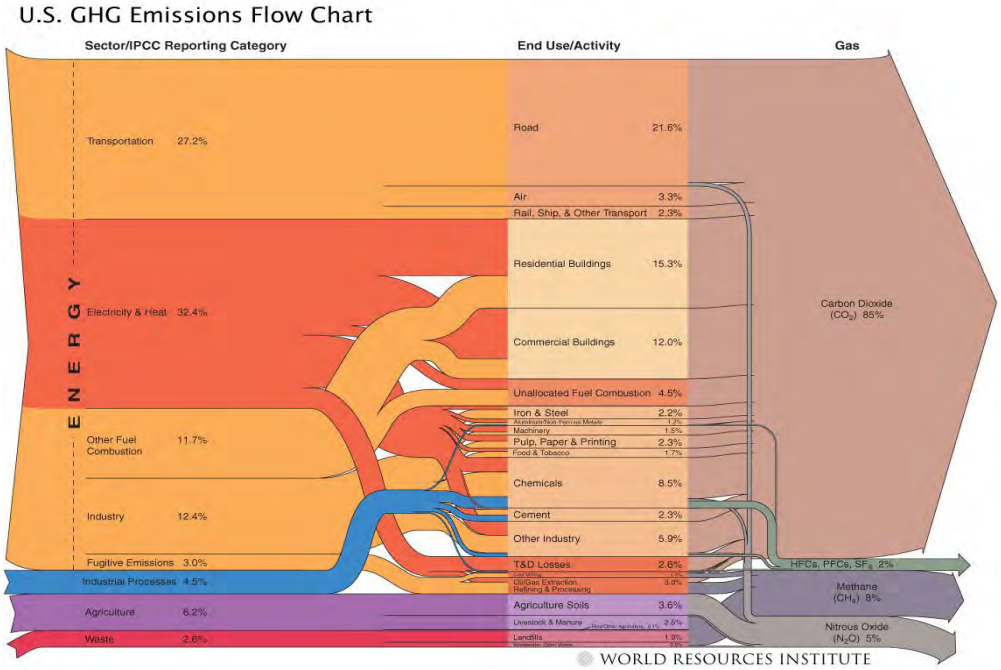
The PAS 2050 methodology was predominantly designed to assess carbon emissions of a company's manufacturing process (BSI, 2012). It uses a system by which processes are categorized from greatest importance to least importance, aggregated together to form emission clusters, and then mapped for the business to understand the carbon footprint of an individual product. This methodology will be adapted in the study of Lake County in one key way: emission functions relating to residential, commercial, or agricultural activities will be categorized as if they were business processes. Additionally, the PAS 2050's methodology of only counting emissions from sources that generate more than 5% of the total emissions will be used to select the emissions sources counted in the Lake County study.

Unfortunately, given the scope of this study, every detail of the PAS 2050 methodology could not be addressed. Directly measuring carbon emissions is an expensive and time-consuming

process. LCRI is a small non-profit and cannot afford the cost of directly collecting data on the county's emissions. Instead, we aim to provide an accurate but not exhaustive assessment of Lake County's abiotic emissions. Consequentially, direct measurements of emissions were not taken; instead, we used an informed estimate based on secondary data sources such as information gained from research, publications, or authorities. For instance, instead of measuring the CO2 emissions firsthand over an extended length of time, the researcher can use CO2 figures from published studies in the scientific literature.

Focus

This study assesses the emissions of Lake County's residential population, private and public sectors, and agricultural industry. We define the residential sector as abiotic emissions produced by activities of the residents, and we define the agricultural sector as abiotic emissions produced by activities of the county's ranchers and farmers. We define the private and public sectors as abiotic emissions produced by activities of the county's non-profits, businesses, industries, and government agencies. Based on our knowledge of Lake County, we judge these sectors to be the county's largest sources of fossil fuel-based emissions. Borrowing from the emissions framework of the World Resources Institute, shown in figure 2, we estimate the sectors' emissions stemming from the transportation, electrical, and heating activities (WRI, 2008). Note that we do not report on the heating activities of the agricultural sector, as heating forms a miniscule part of that sector's emission profile.



- Transport constitutes 27% of overall US emissions
- Electricity combines to create 32.4% of US emissions
- Although agriculture is only 6.2% of national emissions, Lake County will have higher result given its relatively large ranching industry

Figure 2: U.S. emissions breakdown (WRI, 2008).

In this study only emissions which can be directly attributed to Lake County will be considered. The study will not include emission from the following sources:

- residential and commercial entities passing through Lake County but that do not consider the county a permanent place of residence,
- airlines utilizing Lake County air space,
- natural processes of decomposition and ecology that would occur regardless of human activity, and
- cattle emissions from digestive processes (flatulence) or the decay of manure.

Emission Factors: Electricity, Gasoline, Diesel, and Heating Oil

Electricity

Lake County uses a variety of electrical companies for their power needs. The following electrical utilities provide power to Lake County:

Surprise Valley Electric Corp

Hydro-electric utility, therefore no emissions are associated

Mid-State Electric

Hydroelectric utility, therefore no emissions are associated

Pacific Power

A majority of Pacific Power electricity comes from conventional coal plants, but some comes from renewable sources

It is important to note that, while Surprise Valley and Mid-State actually produce a small amount of emissions from the miles driven by their employees, we considered their emission contribution to be zero. Since hydroelectric dams provide these two utilities with electricity and this type of energy produces very little carbon emissions that are hard to measure, we decided to consider all electricity provided to Lake County by Surprise Valley and Mid-State as carbon neutral. However, as is explained below, Pacific Power provides Lake County electricity produced from the fossil fuel coal, so we ascribe an emission factor to the electricity provided by Pacific Power.

Electricity Emission Factor

Pacific Power receives 94% of their power from fossil fuel. Six percent comes from hydroelectric and wind power while 18.9% is generated from unknown sources of fuel (Toby Freeman, personal communication, 2009). We assume one of the unknown sources may be coal as it is a common fuel source in the western United States. As figure 3 demonstrates, to accurately estimate the CO2 emissions associated with a kilowatt hour (kWh) of Pacific Power, we multiply 94% by the pounds of CO2 generated from the amount of kilowatt hours in 1 million British thermal units (Btu). The calculation works because coal produces heat in Btus that is then used to make electricity in kWh. The calculation shows us that Pacific Power produces 0.67 lbs of CO2 per kWh it delivers to Lake County.

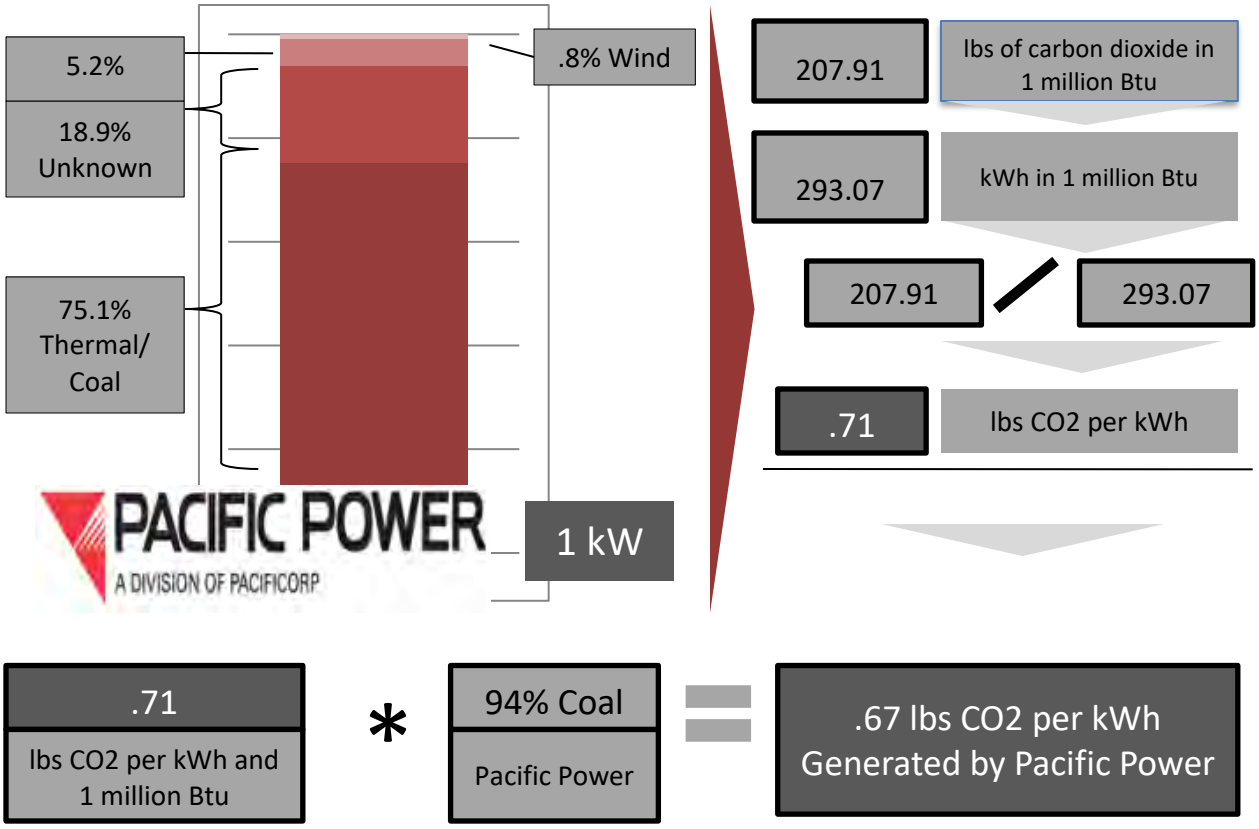


Figure 3: Per kilowatt hour carbon emission count of Pacific Power's electricity provided to Lake County.

The electrical consumption of households, businesses, and industries that use Pacific Power electricity is multiplied by a factor of 0.67 lbs CO_2 per kWh to derive Lake County's total electrical abiotic emissions. According to the Energy Information Administration, Pacific Power's emission factor of 0.68 CO_2/kWh is nearly half the national average of 1.34 lbs/kWh and more than double Oregon's average of 0.28 lbs CO_2/kWh (2002). Pacific Power's emission factor is lower than the national average because they use renewable energy sources including newer and cleaner power plants. Other power plants around the country utilize older power plants with especially high carbon-burning coal as a main source of power. The reason Pacific Power's emission factor is higher than the Oregon average is that a considerable amount of Oregon power comes from hydroelectric sources. These hydroelectric sources are considered to be zero or close to zero lbs CO_2/kWh. Therefore, Oregon's per KWh usage is considerably lower by virtue of its hydroelectric sourcing.

Gasoline, Diesel, and Heating Oil

In addition to burning coal in the production of electricity, the burning of gasoline, diesel, heating oil, and propane generates Lake County's abiotic carbon emissions. Gasoline and diesel propel residential, commercial, and government vehicles, while heating oil and propane heat a large number of the county's homes and office buildings. Each of these fuel sources has an emission factor, which is a number that represents the pounds of CO_2 a standard unit of the fuel source generates when burned. In the case of gasoline, diesel, and heating oil, determining the

emission factor for each fuel source is straightforward: if the amount of fuel combusted is known, then the amount of emissions can be determined by multiplying the amount combusted by the fuel's emission factor. The emission factors of gasoline, diesel, heating oil, and propane are listed in table 1 below (Environmental Protection Agency, 2004).

Carbon Emissions of Fossil Fuels used in Lake County, Oregon			
Gasoline	Diesel	Heating Oil	Propane
19.37 lbs CO2/ gallon	22.23 lbs CO2/gallon	22.23 lbs CO2/gallon	12.70 lbs CO2/gallon
			(EPA, 2004)

Table 1: Carbon emissions of fossil fuels used in Lake County, Oregon

Weaknesses of Analysis

It is widely recognized that emission counts are a key component to preventing global warming. However, as the impact of climate change is felt over decades and not immediately, emission counts can do little to benefit the daily success of utilities, government entities, and especially businesses. As such, it is difficult to obtain fuel use and electrical records from Lake County's utilities, government entities, and businesses. Additionally, the novelty of measuring emissions and the fear that the results would bring negative consequences create resistance. For example, fuel-providing businesses, such as petroleum distributors, understandably fear that sharing their sales figures could lead to new and profit-reducing regulations. To secure the participation of Lake County businesses, utilities, and government entities, our goal was not only to explain the long-term benefits of knowing the county's level of fossil fuel emissions, but also to protect them from liability by providing confidentiality. Our effort to gain trust and information were largely successful but not always, as detailed throughout the report. The lack of full participation means this report is not as accurate as we hoped it would be. However, we are confident that our numbers provide a sufficiently accurate approximation of emission levels to fairly demonstrate the amount of renewable energy needed to offset the county's abiotic emissions.

Results

Considering only major emissions, the data analysis was broken into several sections representing the different sectors of Lake County. The sectors include:

A. Residential
   i. Electrical
   ii. Heating Oil
   iii. Transportation

B. Agricultural
   i. Cattle
   ii. Hay and Alfalfa

C. Commercial and Industrial
   i. Electrical
   ii. Heating Oil
   iii. Transportation

A. Residential Analysis

i. Electrical Analysis

The residential sector represents a relatively significant part of Lake County's carbon footprint. Pacific Power's Regional Community Manager, Toby Freeman, provided the 2009 electrical consumption data for its Lake County service area. In this way, total electricity consumption for both residential and commercial entities was collected for Lake County. This data can be seen in figure 4 and we assume it is a fair estimate of Lake County's annual electrical consumption of Pacific Power electricity (Toby Freeman, personal communication, 2010). Note that Surprise Valley Electric and Mid-State Electric are not considered in the analysis as they source their power from hydroelectric sources. Figure 4 breaks up electrical consumption into the categories of residential, industrial, irrigation, and commercial sales. By summing the Kwhs of residential

sales in table 2, we find that the residents of Lake County consumed a total of 22,223,203 kWh of electricity in 2009.

OR LAKE County	Total Kwhs 2009	Average Kwh per Month	Customer Average
LAKEVIEW			
COMMERCIAL SALES	11,744,759	978,730	223
INDUSTRIAL SALES	124,703	10,392	5
PUBLIC STREET&HIGHWAY LIGHTING	196,386	16,366	3
RESIDENTIAL SALES	13,403,523	1,116,960	1,156
LAKEVIEW UNINCORPORATED			
COMMERCIAL SALES	8,237,895	686,491	205
INDUSTRIAL SALES	9,135,830	761,319	23
IRRIGATION SALES	264,852	22,071	11
RESIDENTIAL SALES	8,122,772	676,898	623
1451 NEW PINE CRK			
COMMERCIAL SALES	82,216	6,851	16
IRRIGATION SALES	2,438	203	3
RESIDENTIAL SALES	696,908	58,076	61
County Total	**52,012,282.00**	**4,334,356.83**	**2,329**

Table 2: Pacific Power energy consumption for Lake County parceled geographically and by sector (Toby Freeman, personal communication, 2010).

As table 3 shows, Lake County's residents produce 7,415.88 tons of abiotic carbon emissions a year from the use of electricity. As the emission factor for the majority of the residents in the state of Oregon is 0.28 lbs/kWh, Lake County residents produce more emissions per kWh than their fellow citizens (EIA, 2002). The reason for this difference is that coal constitutes a far higher percentage of Lake County's energy sources than it does for Oregon.

Pacific Power Residential Electrical Information, Lake County			
Area	**Total kWh 2009**	**Average kWh Per Month**	**Number of Customers**
Lakeview	13,403,523	1,116,960	1,156
Lakeview Unincorporated	8,122,772	676,898	623
1451 New Pine Creek	696,901	58,076	61
Totals	22,223,196	1,851,934	1,840

Total Residential Electrical Emissions of Lake County		
2009 Consumption (kWh)	**Emission Factor (CO2 lbs/kWh)**	**Total Emissions (tons CO2)**
22,223,196	0.67	7,415.88

Monthly emissions per house	**Annual Emissions per House**
684 lbs CO2	4.10 tons CO2

1,840 Residential Customers in Lake County

Table 3: Lake County residential electrical information based on Pacific Power figures.

ii. Heating Oil Analysis

Monitor heaters are used by many of Lake County's residents. Monitor heaters run on heating oil and diesel fuel. To calculate the carbon emissions from the residents' use of heating oil we multiply the carbon coefficient of heating oil (22.384 CO2 lbs per gallon) by the average amount of heating oil purchased by the county's residents in a year. However, because the principle heating fuel provider was unwilling to share its average sales, we were forced to estimate emission levels based on secondary data. The first source of secondary data used is the U.S. Census Bureau, which indicated that 38% of the county's households use monitor heaters (U.S. Census, 2000). The second source we used is the Energy Information Administration, which indicated the average heating oil consumption of households that use a monitor heater is between 650–1000 gallons a year (EIA, 2004). As table 4 shows, assuming Lake County

households use the average of this range (825 gallons a year), we estimate the residential use of heating oil produces 14,833.87 tons CO2 a year.

CO2 Emissions from Residential Heating Oil Use in Lake County				
Number of households	Percentage of homes with monitor heaters	Average use of heating oil per year (gallons)	CO2 lbs per gallon of heating oil	Total CO2 tons
4242	38%	825	22.384	14,833.87

Table 4: Residential CO2 emissions from heating oil.

iii. Transportation Analysis

Our survey of residents' driving habits provided no clear average of the number of miles driven per household, so we instead chose to estimate the amount of residents' transportation emissions using data from a 2001 report of the United States Energy Information Administration. The report stated that rural households, such as those in Lake County, have 2.2 vehicles and use 1,469 gallons of gasoline per year (EIA, 2001). According to the U.S. Census, Lake County had 4,242 households (U.S. Census, 2009). As table 5 shows, the average Lake County household produces 28,454.53 lbs of CO2 per year in transportation emissions, and the combined transportation emissions of Lake County's households is 60,352.06 tons of CO2 per year.

Lake County Residential Transportation Emissions				
Cars/household	**Consumption (Gas/household)**	**Factor CO2 lbs/gal**	**Per House Annual Emissions (lbs CO2)**	**Per House Annual Emissions (tons CO2)**
2.2	1,469	19.37	28,454.53	14.27

Total Annual Residential Transportation Emissions (tons CO2)
4242 households * 14.27 tons CO2 = 60,352.06 tons CO2

Annual Gas Consumption and Cars/household using 2007 "Rural" EIA data

Table 5: Lake County residential transportation emissions.

Residential Summary

The total amount of residential abiotic emissions is 82,652 tons CO2. As figure 4 shows, 9% (7,415.88 tons CO2) of the emissions come from use of electricity and 18 % (14,883.87 tons Co2) come from heating oil. The remaining 73% of emissions (60,352.06 tons CO2) come from transportation.

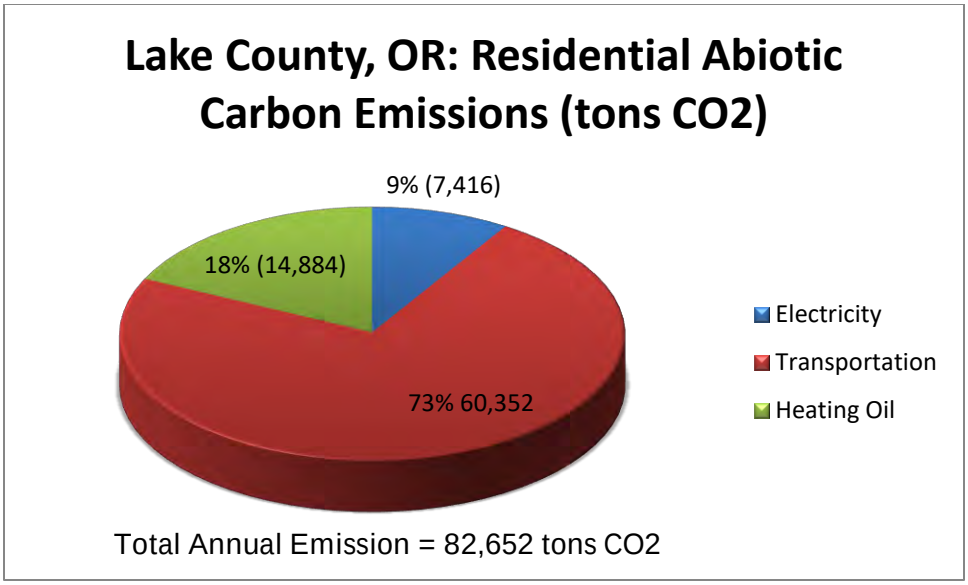


Figure 4: Lake County per year residential abiotic carbon emissions.

B. Agricultural Sector

Historically, Lake County has been an agriculturally-centric community with a sizeable cattle population. The main agricultural areas addressed in this report are cattle ranching and agricultural production from hay and alfalfa. Although Lake County does have other agricultural sectors, we found these two sectors produce less than 5% of the abiotic emissions of Lake County's agricultural activities; therefore, we excluded them from the analysis. Most of the data used to derive Lake County's production totals were from the 2007 U.S. Agricultural Census conducted by the National Agricultural Statistics Service of the United States Department of Agriculture.

The principle means agriculture contributes to CO2 production are fuel combustion and agricultural CO2 fluxes. Additionally, agriculture contributes to greenhouse gas production in the form of methane and nitrous oxide from activities such as raising livestock, cultivating rice, field burning, and fertilizing and tilling soil (EPA, 2012). For this report we choose to focus on the CO2 emissions created from fuel combustion and the use of fertilizer. We choose to exclude agricultural CO2 fluxes and methane and nitrous oxide production from this report for two reasons. First, measuring the natural ebb and flow of CO2 stored in the roots of Lake County's hay and alfalfa plants is beyond our means. Second, in our view the science on calculating the impact of these methane and nitrous oxide emissions on climate change did not provide enough evidence to convince us on the need to reduce these emissions.

i. Cattle Ranching

Ranching is a one of Lake County's largest industries. In 2007, the ranching industry generated $36 million in revenue (USDA, 2007). We learned from Lake County's Oregon State University extension officer, Peter Shreder, that each year the county's ranchers raise and sell approximately 47,794 cattle and 31,105 calves (Peter Schreder, personal communication, 2009). The ranching industry generates fossil fuel emissions both in raising the cattle and in

transporting them to markets and buyers across the Pacific North West and California. As we will explain, our assessment does not fully measure the abiotic emissions generated from the county's production of cattle.

Ideally our assessment of these emissions would be based on the total amount of fossil fuel used to raise the cattle and transport them to buyers. Such an assessment would take into account the fossil fuel used to fertilize the grain and grass feed, power the farm equipment, and transport the cattle to their final destinations. In contrast to our studies done on the other sources of Lake County's abiotic emissions, this assessment would count transportation emissions generated outside the county in the transporting of cattle to markets or buyers. The change in methodology would occur because these emissions would be part of the process of generating revenue from ranching.

Unfortunately, our limited funds and staff made it impossible for us to conduct such a thorough analysis. However, the findings of Professor D.E. Johnson of Colorado State University gave us the secondary data needed to estimate Lake County's abiotic ranching emissions.

Through work with university extension agents and analysis of previous studies on the carbon emissions of ranching, Johnson and his colleagues found that 11% of greenhouse gas emissions associated with cattle production come from fossil fuels. Of the remaining emissions, 48% come from nitrous oxide and 41% come from methane. The researchers examined all the criteria of an ideal study, as outlined above, to determine the amount allotted to fossil fuels. In particular, they examined fossil fuel used for "power equipment, transportation, embodied equipment and facilities energy, fertilizer manufacture, irrigation, feed drying and processing, etc.," then multiplied those estimates to carbon emission factors from the Intergovernmental Panel on Climate Change to determine their CO2 weight equivalents (Johnson et al., 2003). The researchers also accounted for carbon sequestration done by grasslands. According to the studies they reviewed, ranchlands like those used to provide grass to Lake County's cattle released as much greenhouse gases as they sequestered.

Their research indicated that 32.67 lbs of CO2 equivalent was produced per pound of live-weight. In other words, for each pound a given cow weighed, 32.67 lbs of CO2 equivalent were produced. When the emissions created from slaughtering the cattle were taken into consideration, the researchers found that 54.01 lbs of CO2 equivalent were produced per pound of dressed carcass. For example, raising a cow to 740 lbs, the average weight of Lake County's cattle, is calculated to have generated 2.4 tons of CO2 equivalent, whereas a slaughtered and cleaned carcass weighing 740 lbs is calculated to generate 4 tons of CO2 equivalent, meaning nearly 65% more emissions are generated from the slaughtering and butchering process (Johnson et al., 2003).

In speaking with Lake County ranchers, we found the vast majority of the county's cattle are sold at market and not after butchering. For that reason, we use the 32.67 lbs CO2/lbs live-weight factor to estimate the fossil fuel emissions of Lake County's ranching industry. By multiplying the 11% attributable to fossil fuel emissions with the 32.67 lbs CO2/lbs live-weight factor, we find that fossil fuels create 3.59 lbs CO2/lbs per lbs of live-weight of a given Lake County cow.

To determine what the total fossil fuel-based emissions are for Lake County's ranching industry, we needed to multiply the 3.59 lbs CO2/lbs live-weight factor with the total weight of Lake County's cattle. We learned from Lake County's ranchers and extension officer, Peter Scheder, the number of the county's cattle (47,794 adults and 31,105 calves) and the average weight of adult cows and calves at the time of sale. At the time of sale, an average adult cow weighs 740 lbs and an average calf weighs 550 lbs, which means that the approximate weight of Lake County's cattle is 52,475 tons (Peter Shreder, personal communication, 2009). As table 6 shows, multiplying the total weight by the live-weight emission factor shows that the total fossil fuel-based emissions of Lake County's ranching industry are approximately 94,290.26 tons of CO2.

Abiotic Emissions of Lake County's Ranching Industry						
Cattle Count		**Average Live-weight (lbs)**	**Emissions factor (lbs CO2/lbs live-weight)**	**Lbs CO2 per cow**		**Sub-total Tons CO2**
Calves	31,105	550	3.59	1,976.54		30,740.06
Cows	47,794	740	3.59	2,659.34		63,550.20
					Total tons CO2:	**94,290.26**

Table 6: Abiotic ranching emissions of Lake County.

ii. Agriculture - Hay

Hay is an important crop in Lake County. According to the National Agriculture Statistics service, hay sales generated approximately $27,709,000 in revenue for 239 farms in 2007 (USDA, 2007). In Lake County, 119,415 acres of forage (hay, haylage, grass silage, greenchop) were harvested in 2007 (USDA, 2007). Besides cattle, hay constitutes one of the primary forms of economic activity in Lake County. For the purposes and scope of this study, common hay was used as the base crop to determine a reasonable assessment of all hay farming in Lake County.

The results below were broken down into the major emissions categories for hay farming in Lake County. Diesel is the fuel used to plant, irrigate, harvest, and process the hay. An additional source of emissions is fertilizer. Other studies that assess the carbon emissions of hay production also include those associated with embodied machine emissions (Johnson et al., 2003). We chose to exclude embodied machine emissions as only a negligible amount of Lake County's farm equipment was produced in Lake County.

Table 7 shows Lake County's hay emissions. The energy sources and units per acre of the study conducted on the greenhouse gas emissions associated with beef production of D.E. Johnson formed the basis of our emission count (Johnson et al., 2003). Those energy sources are diesel used to power farm equipment, diesel used to irrigate fields, and fertilizer. Except in the case of fertilizer, we arrived at an emission count for each energy source by multiplying the number of

liters of diesel used per hectare by the carbon coefficient of diesel (22.23 lbs. per gallon or 0.0029363 tons CO2 per liter) (EPA, 2004). In the case of fertilizer, we had to use secondary data from the Carnegie Mellon's economic input-output tables, which combine the common practices of industries such as agriculture with revenue earnings to estimate carbon emissions (Carnegie Melon, 2008). Because the economic data on the input-output tables are from 2002, we used $26,946,000, the amount of revenue generated by Lake County's hay sales, to estimate the per hectare emissions from fertilizer.

We found hay production created 3,822.67 tons of CO2 from irrigation, 6,685.84 tons of CO2 from fertilizer use, and 9,081.40 tons of CO2 from the use of diesel in operating farm equipment. In total, hay production produces 19,589.92 tons of CO2 per year.

Hay Energy Sources and Emissions for Lake County					
Energy Source	Units/ha	Emission Factor tons CO2/Liter	Hectares	Unites/ha	Emission Sub-totals (tons CO2)
Diesel Liter/ha	64.00	0.0029363	48325.54	3,092,834.30	9,081.40
Irrigation Liter of Diesel/ha	26.94	0.0029363	48325.54	1,301,879.79	3,822.67
Fertilizer lbs CO2e/ha	276.70	NA	48325.54	13,371,675.80	6,685.84
Total Hay CO2 Emissions (tons)					19,589.92

Table 7: Abiotic hay emissions of Lake County.

Agricultural Summary

In comparison to cattle ranching, growing hay is a relatively minor emitter of fossil fuel-based carbon emissions in Lake County. As figure 5 shows, hay production creates 17% of agricultural emissions (19,589.92 tons CO2), while cattle ranching produces 83% (94,290.26 tons CO2). The total emissions generated from the agricultural sector are 113,880.18 tons CO2 per year.

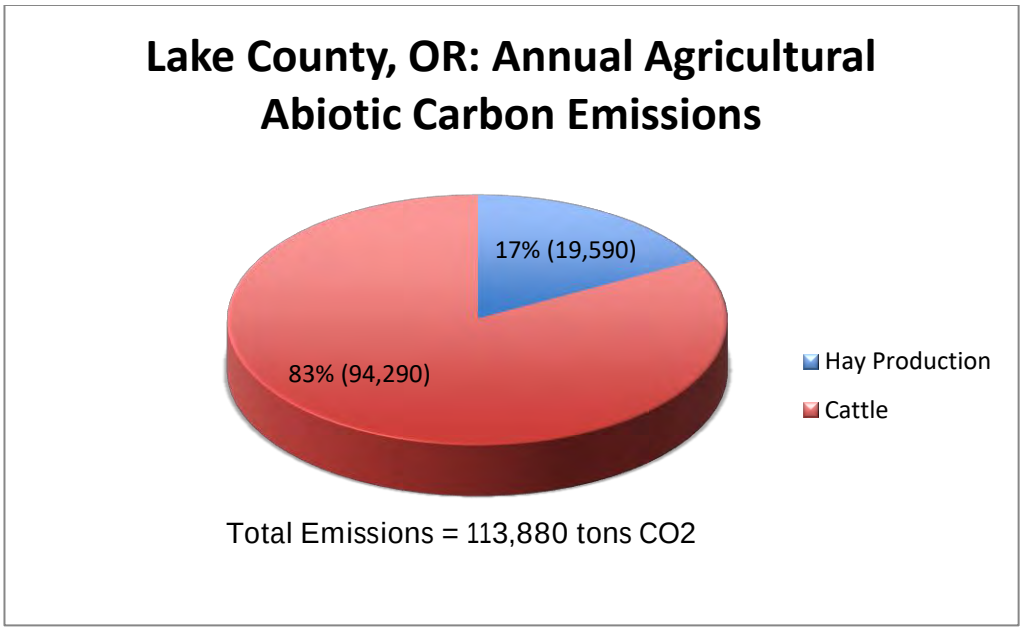


Figure 5: Lake County annual agricultural abiotic carbon emisssions.

C. Private and Public Sector Inventory

We defined Lake County's businesses, non-profits, and government agencies as the county's private and public sectors. Just as in the residential sector, these sectors produce abiotic emissions through powering and heating their buildings, as well as transporting goods and people. Unfortunately, except for electrical produced emissions, providing more than rough estimates of private and public sector emission sources proved to be beyond the capabilities of LCRI. We were able to provide an accurate estimate of electrical emissions because Pacific Power shared its 2009 data on the electrical consumption of Lake County's private and public sectors. The difficulty of obtaining primary or secondary data on the emissions generated from heating and transportation forced us to make educated guesses on the emissions created from these activities.

There are four reasons why we could only provide educated guesses. First, businesses, non-profits, and the government agencies had goals that made reporting on their energy use a low priority. Second, many entities feared that sharing this data would hurt them in the future if a carbon tax was enacted in the future; after some effort, we decided that convincing these entities to share their energy use data was too difficult for us to achieve. Third, we had no good sources of secondary data to use. No county-specific statistics on heating oil use by businesses existed during the time we conducted our research, nor were there county-specific information about the transportation practices of the private and public sector. Fourth, the primary distributor of heating oil, diesel, and gasoline refused to share its sales records. Knowing how much fuel was purchased per year would have significantly improved the accuracy of our estimates. However, we found ways to roughly estimate the emissions created from the heating and transportation activities of Lake County's public and private sectors.

In the future, new legislation concerning reporting energy use may enable LCRI to provide more accurate counts of the emissions generated by the heating and transportation activities of Lake County's private and public sectors.

i. Electrical Analysis

Calculating the carbon emissions generated by the electrical consumption of Lake County's private and public sectors is straightforward. Every business in Lake County gets their power from one of three utilities: Pacific Power, Mid-State Electric, or Surprise Valley Electric. Mid-State Electric and Surprise Valley Electric are considered to have neutral emission contributions since their energy sources are predominantly hydroelectric. Therefore, the only organizations that produce emissions from electrical use are those that receive their power from Pacific Power. Pacific Power provided us with a detailed description of the electricity it sold in Lake County in 2009. As table 8 shows, the total CO2 emissions from the electrical consumption of the private and public sectors is 9,970.64 tons per year.

Lake County, Oregon: 2009 Commercial and Industrial Combined Electrical Consumption and Emissions					
Area	Total kWh 2009	Average kWh per Months	Emission Factor (lbs CO2)	Lbs CO2	Tons CO2
Lakeview	11,869,462.00	989,122.00	0.67	7,952,539.54	3,976.27
Lakeview Unincorporated	17,373,725.00	1,447,810.00	0.67	11,640,395.75	5,820.20
New Pine Creek	82,216.00	6,851.00	0.67	55,084.72	27.54
Totals	29,325,403.00	2,443,783.00	0.67	19,648,020.01	9,824.01

Table 8: 2009 commercial and industrial combined electrical consumption and emissions in Lake County.

ii. Heating Oil

As is the case with many of Lake County's households, heating oil is a fuel source for many of the buildings owned by the county's businesses, factories, and government agencies. According to the U.S. census, there are 693 businesses in Lake County (2009). Additionally, the U.S. Forest Service, Bureau of Land Management, and the U.S. Department of Fish and Wildlife all own or rent office space. The ideal way to calculate the heating oil-based carbon emissions from these entities would be to multiply the heating oil's carbon coefficient (22.384 lbs CO2 per gallon) by the average amount of gallons purchased each year by organizations. However, due to the expense and long time period it would take to collect the heating fuel use statistics from these entities, we could not measure the annual fuel consumption. Another good approach would be to collect fuel purchase statistics from the county's principle fuel distributor. However, due to concerns about attracting competition or a carbon tax, the distributor would not share its fuel sale statistics with us. And while the U.S. Economic Census did report heating fuel statics for Lake County's residents, the U.S. Economic Census did not provide data on the heating fuel data for Lake County's businesses, non-profits, and government agencies.

Instead, we have to make an informed, though admittedly rough, estimate of the heating oil emissions generated annually by Lake County's businesses and government agencies. To make this estimate we assume that the same portion of businesses and government agencies use heating oil as Lake County residents use. As 38% of residential households use 825 gallons of heating fuel a year, we assume that 38% of businesses and government agencies use heating oil and each entity uses 825 gallons a year. As table 9 shows, these assumptions suggests the abiotic emissions created by the county's private and public sectors' use heating oil amounts to 2,431.52 tons of CO2 a year.

CO2 Emissions from Heating Oil Use of Lake County Businesses and Government Agencies				
Number of businesses	Percentage using heat with oil	Average fuel use per year (gallons)	CO2 lbs per gallon of heating oil	Total CO2 tons
693	38%	825	22.384	2,431.52

Table 9: CO2 emissions from heating oil use by Lake County's private and public sectors.

iii. Transportation Analysis

Transportation is much more difficult to quantify. There are no county level statistics provided by the U.S. Census or any other publications that specify travel unique to Lake County. The Oregon Department of Transportation does provide statistics on all traffic that passes through Lake County, but quantifying emissions for all of this traffic would not be representative of traffic from Lake County entities. Using the total transportation that passes through Lake County would include emissions from processes, individuals, and businesses that do not reside or originate in Lake County and, therefore, grossly overestimate the amount of emissions that should be attributable to Lake County alone.

The most effective way of gathering emissions associated with the logistics of commercial transportation is to gather data directly from individual organizations. However, this relies on the voluntary cooperation of these organizations, and obtaining this cooperation can be very time-consuming. Lacking an affordable and simple way to directly measure the transmission emissions of the private and public sectors, we estimate the private and public sectors' transportation emissions by assuming that the degree to which their transportation emissions differ from those of the residential sector is the same as the degree to which their electrical emissions differ from that of the residential sector. By assuming the difference in electrical emissions between the residential sector and the private and public sectors is mirrored by their transportation emissions, we can estimate the approximate emission size of the combined transportation activities of the private and public sectors.

As table 10 shows, by dividing the 9,970.64 tons CO2 of emissions associated with the electrical consumption of the private and public sectors by the 7,415.88 tons CO2 of residential electrical consumption, we find that for every 1 ton CO2 produced by the electrical consumption of the residential sector, 1.32 tons CO2 are produced by the private and public sectors. By assuming this ratio holds for transportation emissions, we multiply that 1.32 tons with the residential sector's 60,352.06 tons CO2 of the transportation emissions to estimate that roughly 79,949.94 tons CO2 are produced by the combined transportation activities of the private and public sectors.

Lake County, Oregon: Annual Abiotic Transportation Emissions of the Private and Public Sectors				
Transportation Emissions of Residents (tons CO2)	Ratio of Electrical Emissions of Residential Sector and Private and Public Sectors (tons CO2)			Estimated Transportation Emissions of Public and Private Sectors (tons CO2)
	Private and Public Electrical Emissions	Residential Electrical Emissions	Ratio between the Two Sectors	
60,352.06	9,824.01	7,415.88	1.32	79,639.69

Table 10: Annual abiotic transportation emissions of the private and public sectors.

We recognize this estimate is just an approximation. The estimate may be low, as it fails to include the long distances manufactures must ship their goods. Or, it may be high, since on a per capita basis residents may create more vehicle miles than the employees of the private and public sectors. We have observed that, typically, there are more customers who drive to a business than the number of people the business employees. If and when funding for gathering data or more information about fuel sales becomes available, we will improve the accuracy of our estimate with primary data.

Private and Public Sector Summary

At this time, it is impossible to give more than a rough estimate of the fossil fuel emissions of Lake County's private and public sectors. While cooperation by Pacific Power allowed us to accurately measure the electrical emissions of these sectors, we were not able to directly

measure their fuel consumption. The principle reason for this failure was the difficulty of collecting the fuel-use data of the hundreds of businesses, non-profits, and government agencies operating in Lake County. However, by assuming the emissions of the private and public sectors closely mirrored those of the residential sector, we are able to provide rough estimates of the heating oil and transportation emissions of the private and public sectors. As figure 6 shows, the data provided by Lake County's only coal-burning electric utility, Pacific Power, shows us that the electrical carbon emissions of the public and private sector averages 9,824.01 tons CO2 per year. And from our educated guesses, we estimate that the public and private sectors produce on average 2,431.52 CO2 per year from heating oil use and 79,639.69 CO2 per year from transportation activities. We estimate the total emission count of the private and public sectors is 92,042 tons CO2.

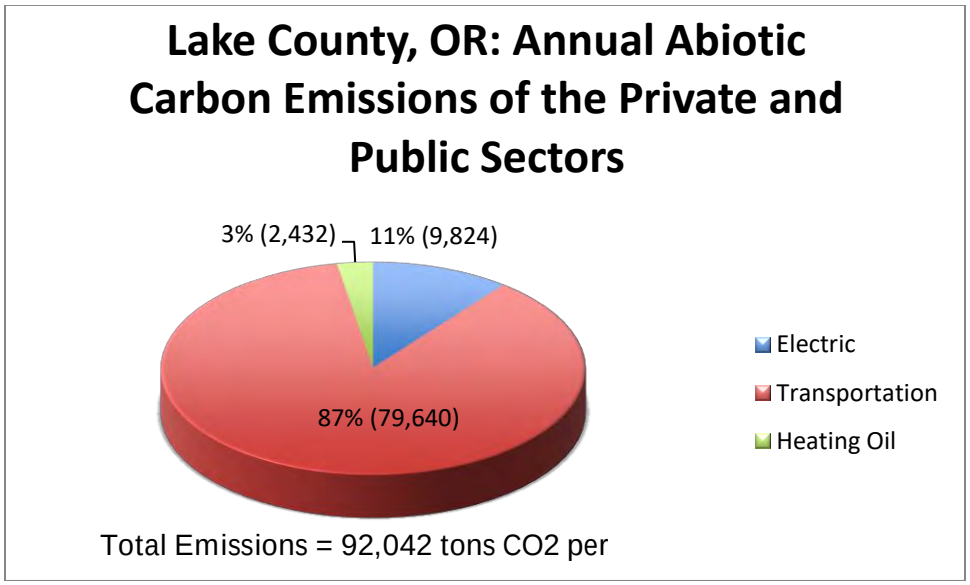


Figure 6: Annual abiotic carbon emissions of private and public sectors.

Lake County's Renewable Energy Resources

Lake County sees renewable energy as an excellent means of ensuring economic prosperity. Renewable energy cannot only provide high-paying green jobs but it can also protect businesses and residents from the fluctuating price of oil and gas. Due in part to the rising unemployment resulting from the logging industry's exodus in the 1990s, Lake County began exploring alternative sources of economic activity for the community. Relatively speaking, the land in Lake County is cheap, available, and contains plentiful underground geothermal reserves. Additionally, Lake County is situated in an excellent area to produce solar energy. On average, a single tilt solar panel can generate at least 5.5 kWh per meter squared per day, well above the national average (NREL, 2008). Additionally, Lake County has over 1 million acres of overstocked forests that could serve as excellent sources of biofuel. The combination of low land prices, high intensity sunlight, plentiful biomass resources, and high geothermal activity make Lake County an ideal place to generate renewable energy.

To date, the county has well over 100 residential and business renewable energy projects built, three medium-scale projects built, five industrial-scale projects under construction or scheduled to be built, and 10 proposed projects of varying sizes. We anticipate the proposed projects to be built in three to five years as market demand for renewable energy increases. What follows is an in-depth examination of the tons of abiotic emissions the county's built and proposed renewable energy projects can offset.

Built and Scheduled Renewable Energy Projects

While there are more than a hundred residential and business renewable energy systems in the county, tallying their energy production and carbon offset is beyond LCRI's means. However, we are able to examine the medium and large-scale projects that have been built, are scheduled to be built, and have been proposed. In total there are nine industrial-sized renewable energy projects in Lake County that have been built or will be built by the end of 2013. Figure 7 shows the combined carbon offset of the projects that have been built is 756 tons CO2. Figure 8 shows the combined carbon offset of the projects that are under construction or are scheduled to be built is 86,015 tons CO2, and figure 9 shows the combined carbon offset of all the built and scheduled projects is 86,771 tons CO2. For a description of the projects and the methodology used to calculate each project's carbon offset see Appendix A.

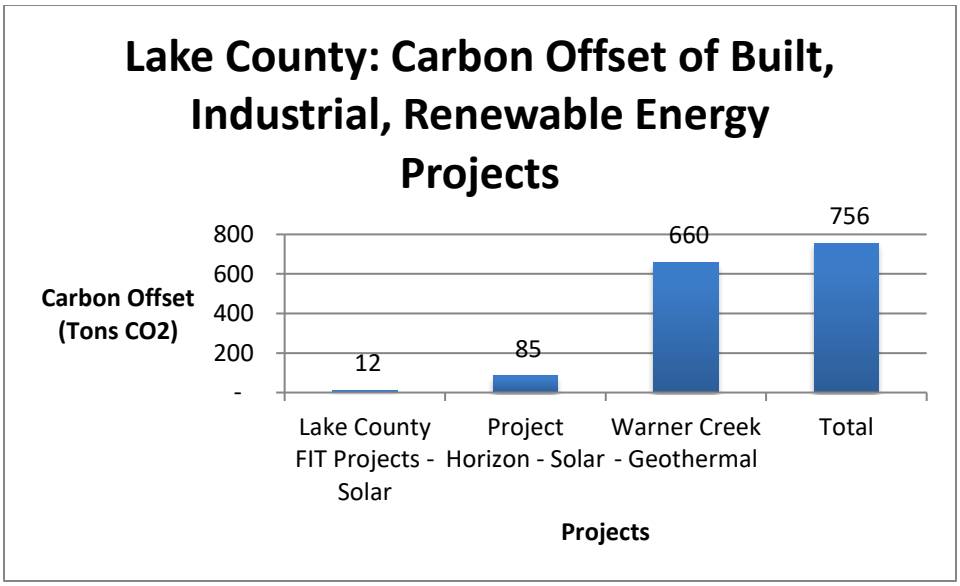


Figure 7: Carbon offset of built industrial renewable energy projects of Lake County.

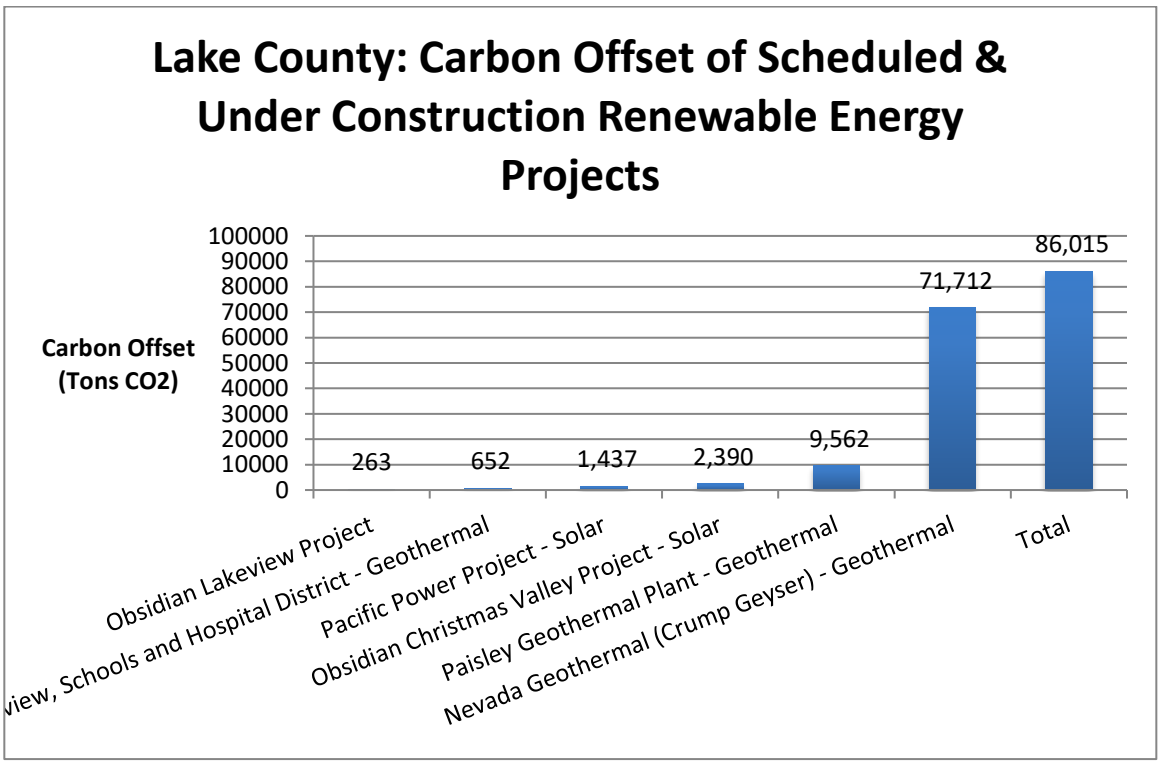


Figure 8: Carbon offset of scheduled or under construction renewable energy projects in Lake County.

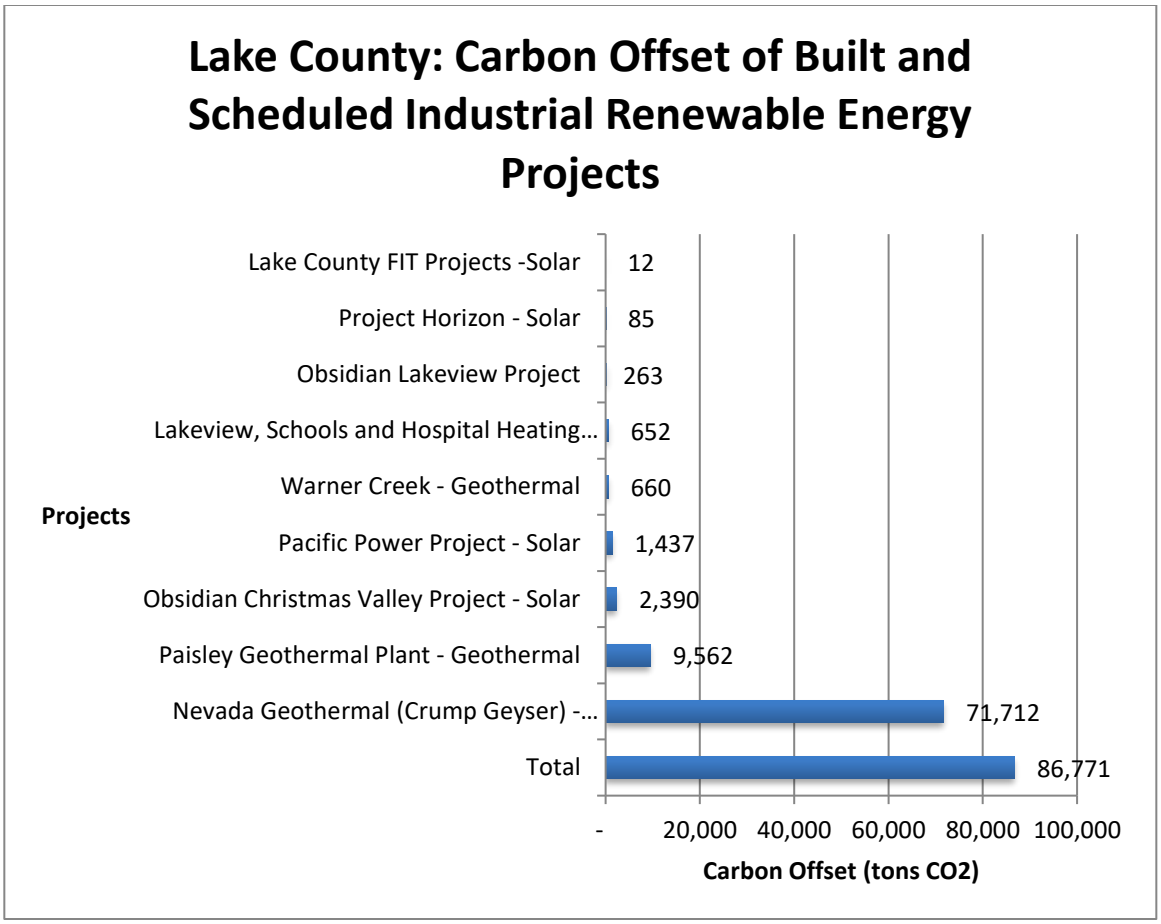


Figure 9: Carbon offset of built and scheduled industrial renewable energy projects in Lake County.

Proposed Projects

As of the publication of this document, developers are proposing to build 1o industrial-sized renewable energy projects in Lake County. Figure 10 shows the combined carbon offset of these projects is 180,960 tons of CO2. For a description of the projects and the methodology used to calculate each project's carbon offset see Appendix A.

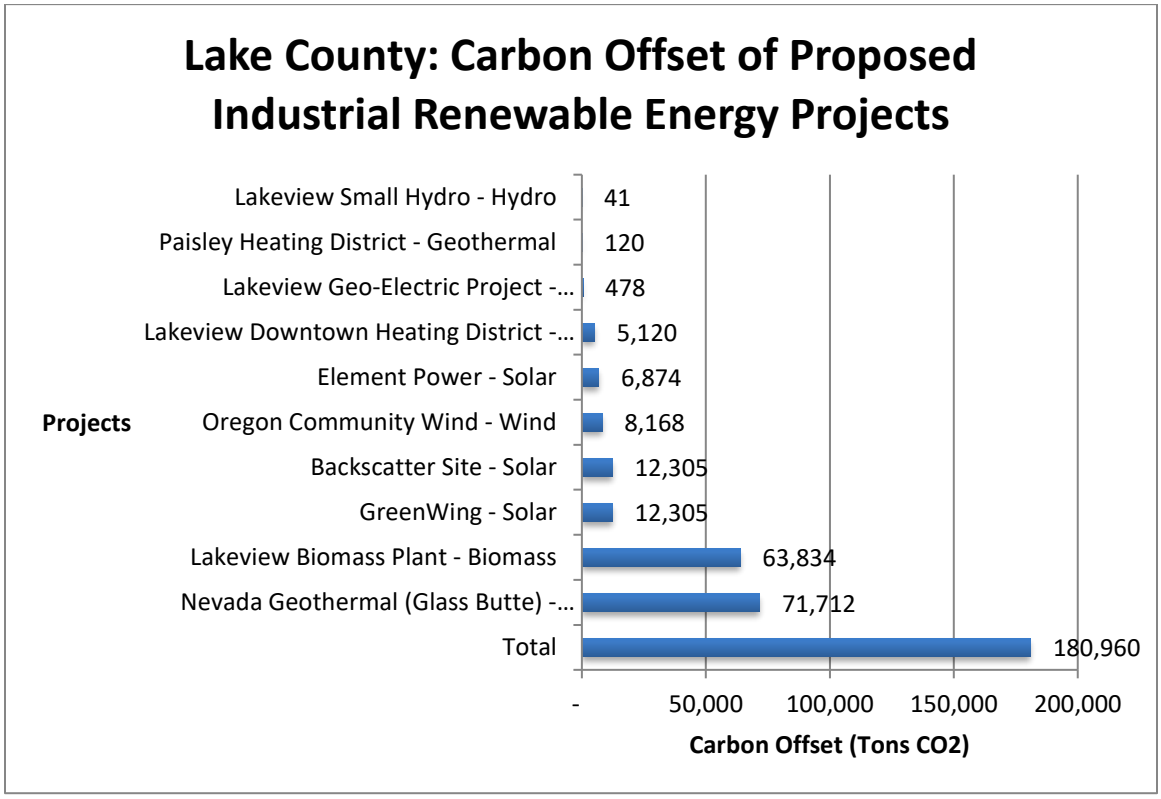


Figure 10: Carbon offset or proposed industrial renewable energy projects in Lake County.

Carbon Offset of Built, Scheduled and Proposed Projects

In total, Lake County has 19 built, scheduled, and proposed projects. Figure 11 shows the combined carbon offset of these projects is 267,731 tons of CO2.

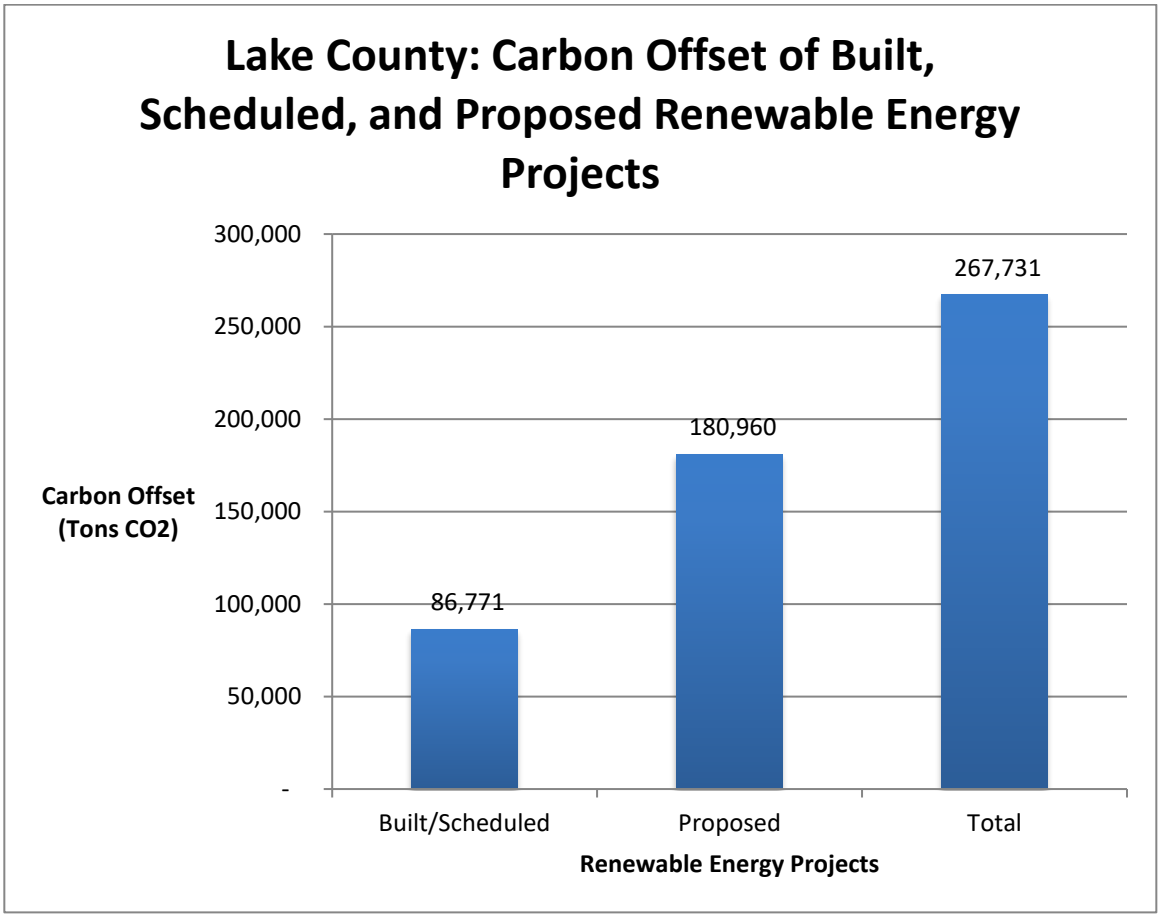


Figure 11: Carbon offset of built, scheduled, and proposed renewable energy projects in Lake County.

Summary of Lake County's Renewable Energy Projects

Collectively, Lake County's renewable energy projects are expected to generate several benefits including job retention, temporary construction jobs, and insulation against expected price increases from fossil fuels. The Biomass plant alone is expected to generate approximately 20 high-paying management positions and 50 to 70 wood harvesting positions collecting the necessary fuel for the plant's operation. All of these projects will assist in stabilizing Lake County's local economy and aligning the region on a path of energy independence. Figure 12 shows the combined carbon offset of the built, scheduled, and proposed renewable energy projects of Lake County is 267,731 tons of CO2. This carbon offset would compensate for 93% of Lake County's carbon emissions.

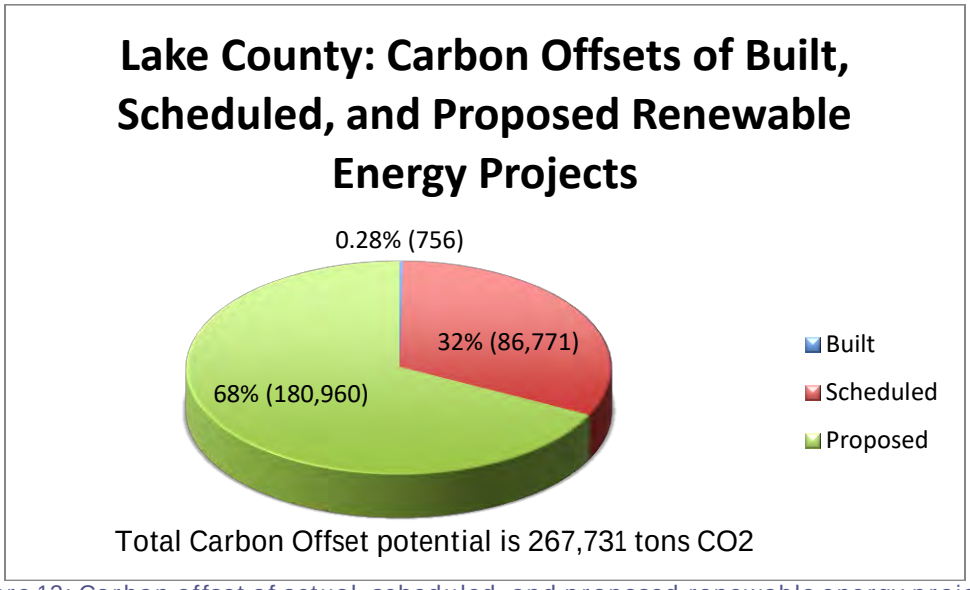


Figure 12: Carbon offset of actual, scheduled, and proposed renewable energy projects.

Offsetting Lake County's Fossil Fuel-based Carbon Emissions through Renewable Energy

Lake County is in an interesting position from an emissions perspective. As a low population center with relatively limited commercial and industrial activity and plentiful renewable energy resources, there is the real potential for completely offsetting the county's abiotic emissions. The breakdown of the total abiotic emissions calculated for Lake County is shown in figure 13.

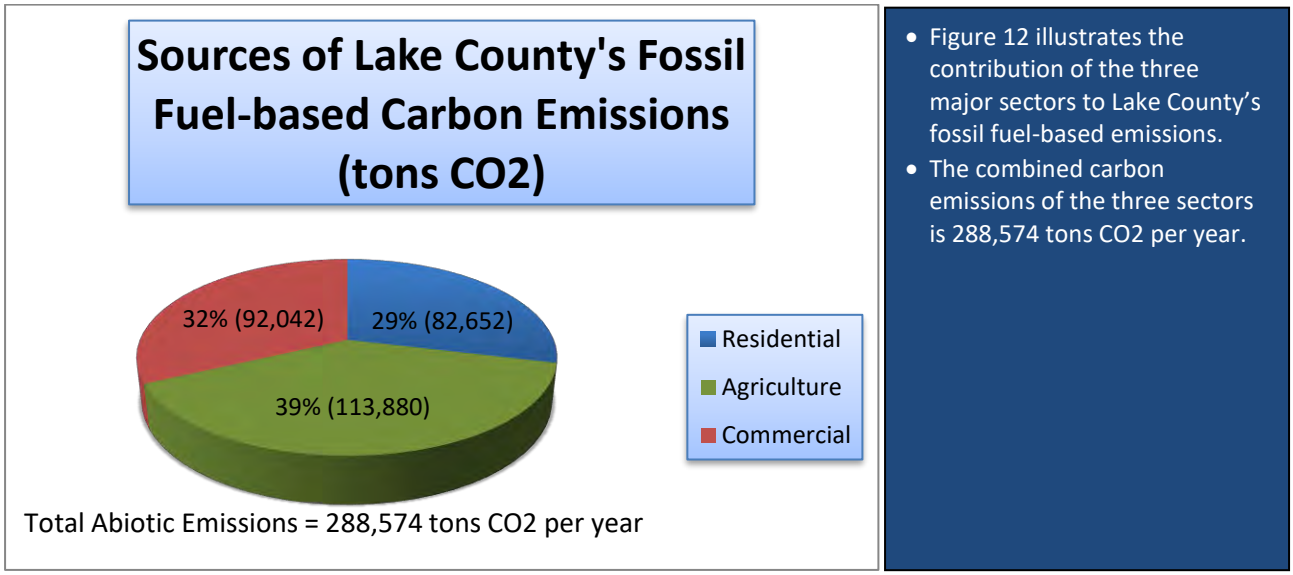


Figure 13: Sources of fossil fuel-based carbon emissions (tons CO2) in Lake County.

The total recorded abiotic emissions generated for Lake County amount to 288,574 tons CO2 per year. At 113,880 tons per year, the majority of emissions are generated by the energy needs of the agricultural industry. Residents' electrical use, heating oil use, and transportation activities brought the county's emission level to 82,652 tons CO2 per year. Unfortunately, our estimation of the fossil fuel-based emissions of the private business and public agencies is not as precise as our estimates of the agricultural and residential sectors. While we did obtain an accurate measurement of the electricity provided the private and public sectors by Pacific Power, we were not able to obtain any primary or secondary data on the heating oil use and transportation activities of the private and public sectors.

However, by assuming the energy use ratios of the residential sector held true for the private and public sectors, we are able to provide a rough estimate of the abiotic emissions generated by the heating oil use and transportation activities of the private and public sectors, allowing us to estimate that the private and public sectors jointly produce 92,042 tons CO2 a year. We concluded that the total aggregate emission level of the residential, agricultural, and private and public sectors is 288,574 tons CO2 per year.

LCRI divides renewable energy projects into three categories: built, scheduled and proposed. Built projects are operational and provide heat or electricity; scheduled projects are under construction or soon will be; and proposed projects have been proven viable through feasibility studies but lack sufficient funding. As of the writing of this paper, three projects have been built, six projects are scheduled to be built, and ten projects have been proposed. What follows is an

explanation of how the built, scheduled, and proposed projects currently contribute and what their future contribution will be to offsetting Lake County's carbon emissions.

Built Offset

At the publication of this paper, Lake County had three built and completed renewable energy projects. Those projects are called the Warner Creek Geothermal Project, the Lake County FIT Solar Project, and the Project Horizon Solar Project. Collectively, these three projects create a carbon offset of 756 tons CO2 per year. Figure 14 shows that these projects offset 0.3 % of the county's fossil fuel-based carbon emissions.

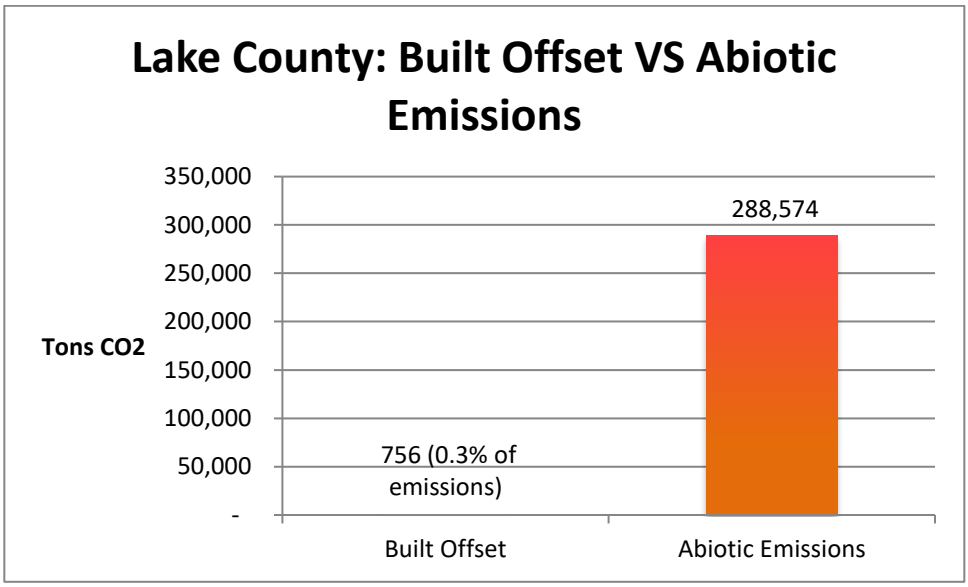


Figure 14: Built offset versus Lake County's abiotic emissions.

Under Construction and Scheduled Offset

In addition to Lake County's three completed projects, the county has five projects currently under construction or scheduled to be completed by the end of 2013. These projects are called the Lakeview Schools and Hospital Geothermal Heating District, the Pacific Power Solar Project, the Obsidian Christmas Valley Solar Project, the Paisley Geothermal Plant, and the Nevada Geothermal Project. Figure 15 shows that together these projects will offset 30% of the county's fossil fuel-based carbon emissions.

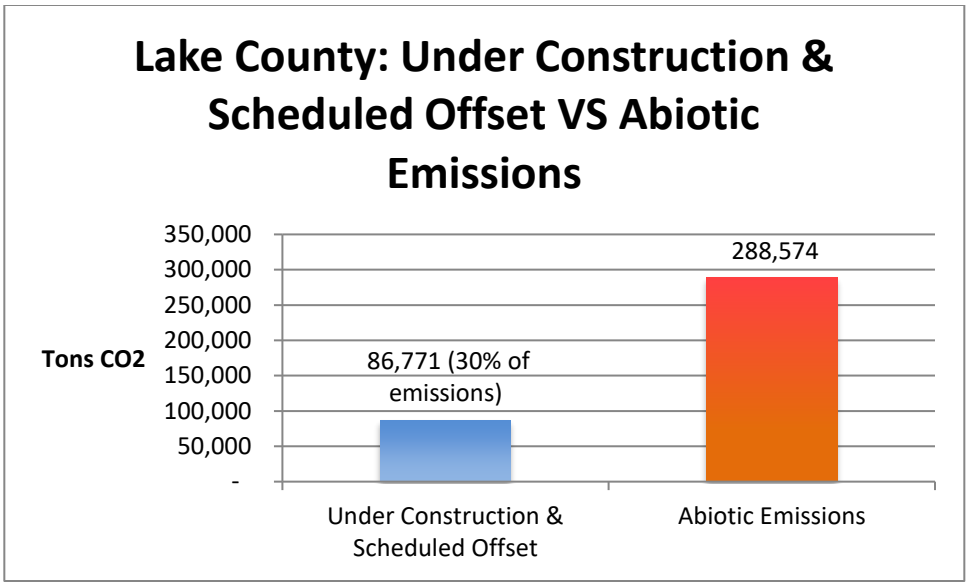


Figure 15: Under construction and scheduled offset versus abiotic emissions in Lake County.

Built, Under Construction & Scheduled, and Proposed Offset

In addition the renewable energy projects that are built and under construction, Lake County has 10 proposed renewable energy projects to date, and figure 16 presents a complete list of these projects. If built, the proposed projects would make a significant contribution to offsetting Lake County's abiotic emissions. Collectively, Lake County's built, under construction and scheduled, and proposed projects would contribute an annual offset of 180,960 tons of CO2. As figure 15 shows, the contribution of all the projects would bring Lake County's carbon offset to 93% of the county's emission level.

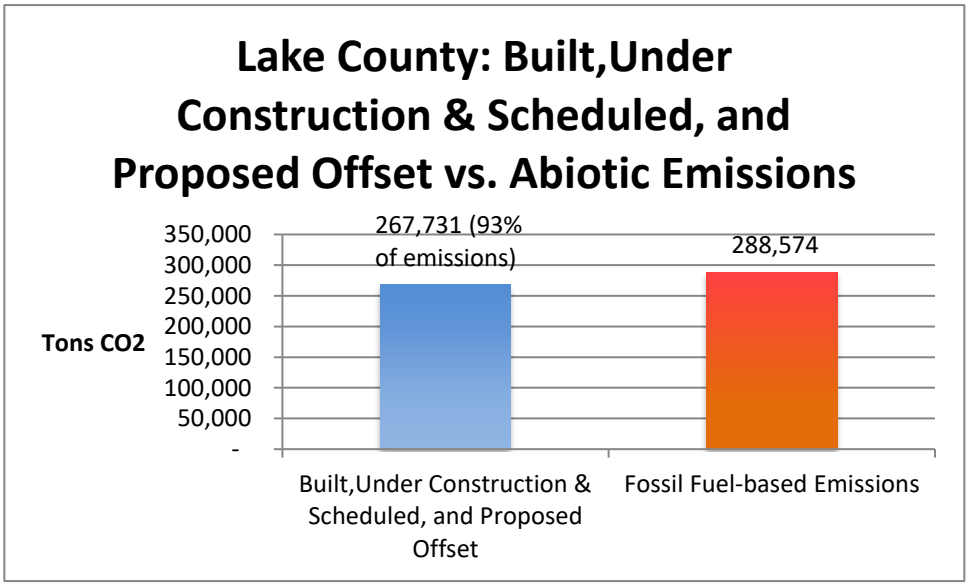


Figure 16: Renewable energy offset of Lake County's built, under construction & scheduled, and proposed renewable energy projects.

Summary of Offsets vs. Abiotic Carbon Production

Currently, Lake County has three renewable energy projects built and in operation, and five more project scheduled to go live by the end of 2013. Collectively these projects will offset 30% of the county's 288,574 tons CO2 of fossil fuel-based carbon emissions. Eleven more projects have been proposed and proven feasible. These projects include the use of solar, wind, and geothermal energy; if all are brought online, Lake County will offset 93% of its abiotic emissions. Fortunately, these projects will not come close to exhausting the county's ability to produce renewable energy and Lake County will easily be able to reach and even exceed a 100% offset of its fossil fuel-based carbon emissions.

Conclusion: Lake County Will Offset its Abiotic Carbon Emissions

Lake County, Oregon is in an excellent position to offset its abiotic carbon emissions. Our analysis of the county's fossil fuel-based emissions and its renewable energy resources shows that the built, scheduled, and proposed renewable energy projects of the county can offset 93% of the county's abiotic emissions.

Our research, while not perfectly accurate, shows that Lake County's residents, businesses, government agencies, and agricultural activities generate roughly 288,574 tons of abiotic CO2 a year. This number is equivalent to the CO2 content of 29.8 million gallons of gasoline[1], no small amount of greenhouse gases. Fortunately, the county's abundant forest, sunshine, and geothermal resources give the county the ability to completely offset 100% of its abiotic emissions.

While we cannot provide a firm date for when all the emissions will be offset, we can say that the nine renewable energy projects will offset 30% of the county's fossil fuel-based emissions by the end of 2013. These projects will offset 86,771 tons of carbon dioxide and provide county residents, businesses, and government agencies with stable energy prices as the price of fossil fuels continues to rise.

We hope that the county's 11 proposed projects will be built in the next 3 to 5 years as the market for renewable energy expands. Along with the county's abundant renewable fuel sources, the county's cheap land and high number of electrical power lines position the county to meet the growing energy needs of Oregon, Nevada, and California with the county's renewable energy.

We make no claim that the renewable energy produced in Lake County will significantly reduce global carbon emissions. However, we do believe in the significance of Lake County's example. Lake County is an isolated, rural community with minimal financial resources. By actively seeking out partnerships with universities to quantify the county's resources and fostering relationships with energy developers, Lake County is now poised to offset nearly all its fossil fuel-based carbon emissions. This is no small feat, no matter what the size and wealth of a community may be. By offsetting its abiotic emissions, Lake County will not only do its part to curb the destructive trajectory of global warming, but also will inspire numerous small and large communities to do the same.

[1] (288,574 tons CO2 * 2000 lbs)/19.37 lbs CO2 per gallon of gasoline = 29,795,973 gallons of gasoline

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Appendix A: Renewable Energy Projects of Lake County

Biomass

Iberdrola Biomass Facility								
Location	Renewable Energy Type	Product	Status	Nameplate Capacity (MW)	Average Annual MWh Production	Average Annual Carbon Offset (tons CO2)		
Lakeview	Biomass	Electricity	Feasibility study complete and some construction complete. Construction paused until a power purchase agreement is reached.	26.8	191,450	63,834		
How we arrived at the average annual MWh and carbon offset numbers:								
All the information about the biomass plant came from an Iberdrola representative (Anders Bisgard, personal communication, 2012).								
Average Plant Output (MW)	Station Service (MW)	Hours in a Year	Hours in Maintenance	Annual Megawatt Hours Produced (AC)	Annual Kilowatt Hours Produced (AC)	Carbon Coefficient of Pacific Power (lbs CO2 per kWh)	Annual Carbon Offset (lbs CO2)	Annual Carbon Offset (tons CO2)
26.8	3.3	8760	613.2	191,450	191,449,800	0.67	127,668,918	63,834

Geothermal

Lakeview Geo-Electric Project								
Location	Renewable Energy Type	Product	Status	Nameplate Capacity (MW)	Average Annual MWh Production	Average Annual Carbon Offset (tons CO2)		
Lakeview	Geothermal	Electricity	Feasibility study complete	0.2	1,434	478		
How we arrived at the average annual MWh and carbon offset numbers: Average plant output came from a feasibility study conducted by Anderson Engineering & Surveying, Inc. (Anderson, 2008). To arrive at the carbon offset amount, it was assumed the project would require as much time in maintenance as the Iberdrola biomass plant.								
Average Plant Output (MW)	Station Service (MW)	Hours in a Year	Hours in Maintenance	Annual Megawatt Hours Produced (AC)	Annual Kilowatt Hours Produced (AC)	Carbon Coefficient of Pacific Power (lbs CO2 per kWh)	Annual Carbon Offset (lbs CO2)	Annual Carbon Offset (tons CO2)
0.2	0.024	8760	613.2	1,434	1,433,837	0.67	956,159	478

Lakeview - Downtown Heating District						
Location	Renewable Energy Type	Product	Status	Nameplate Capacity (BTU/hr)	Average Annual mmBtu Production	Average Annual Carbon Offset (tons CO2)
Lakeview	Geothermal	Heat	Source well drilled. Now drilling for reinjection well.	42,689,636	64,034	5,120
How we arrived at the average annual MWh and carbon offset numbers:						
The BTU/hr use of the Lakeview - Downtown Heating District came from report given by Anderson Engineering & Surveying, Inc. (Anderson, 2009).						

BTU/hr	Annual Btu consumption	Annual mmBTUs	Heat Content of Diesel (mmBtu/gal)	Equivalent in Diesel (gal)	Carbon Content of a Gallon of Diesel (lbs CO2)	Annual Carbon Offset (tons CO2)
42,689,636	64,034,454,000	64,034	0.139	460,680	22.23	5,120

Lakeview - Schools and Hospital Heating District						
Location	Renewable Energy Type	Product	Status	Heating Oil Offset (gallons)	Propane Offset (gallons)	Average Annual Carbon Offset (tons CO2)
Lakeview	Geothermal	Heat	Buildings are fitted to accept geothermal heat. Construction to lay pipes and build the heating district is scheduled for June 2013.	55,518	5,456	652

How we arrived at the average annual MWh and carbon offset numbers:

Facility characteristics obtained from the Anderson Engineering & Surveying, Inc. (Anderson, 2009).

Heating Oil Offset (gallons)	Propane Offset (gallons)	Emission Factor of Heating Oil (tons CO2)	Emission Factor of Propane (tons CO2)	Heating Oil Emissions Offset	Propane Emissions Offset	Total Emissions Offset
55,518	5,456	0.011	0.006	617	35	652

Paisley Geothermal Plant						
Location	Renewable Energy Type	Product	Status	Nameplate Capacity (MW)	Average Annual MWh Production	Average Annual Carbon Offset (tons CO2)
Paisley	Geothermal	Electricity	Source well drilled. Now drilling for reinjection well.	4	28,677	9,562

How we arrived at the average annual MWh and carbon offset numbers:

Paisley Mayor, Mark Douglas, stated that the average plant output of the Paisley Geothermal Plant would be 4 MW (Mark Douglas, personal communication, 2012). To arrive at the carbon offset amount, it was assumed the project would require as much time in maintenance as the Iberdrola biomass plant.

Average Plant Output (MW)	Station Service (MW)	Hours in a Year	Hours in Maintenance	Annual Megawatt Hours Produced (AC)	Annual Kilowatt Hours Produced (AC)	Carbon Coefficient of Pacific Power (lbs CO2 per kWh)	Annual Carbon Offset (lbs CO2)	Annual Carbon Offset (tons CO2)
4	0.48	8760	613.2	28,677	28,676,736	0.67	19,123,174	9,562

Paisley Heating District						
Location	Renewable Energy Type	Product	Status	Nameplate Capacity (BTU/hr)	Average Annual mmBtu Production	Average Annual Carbon Offset (tons CO2)
Paisley	Geothermal	Heat	Source well drilled. Now drilling for reinjection well.	1,000,000	1,500,000,000	120
How we arrived at the average annual MWh and carbon offset numbers: Facility characteristics shared by Surprise Valley Electric (Dennis Flynn, personal correspondence, 2012).						
BTU/hr	Annual Btu Consumption	Annual mmBTUs	Heat Content of Diesel (mmBtu/gal)	Equivalent in Diesel Gallons	Carbon Content of a Gallon of Diesel (lbs CO2)	Annual Carbon Offset (tons CO2)
1,000,000	1,500,000,000	1500	0.139	10,791	22.23	120

Nevada Geothermal (Glass Butte)						
Location	Renewable Energy Type	Product	Status	Nameplate Capacity (MW)	Average Annual MWh Production	Average Annual Carbon Offset (tons CO2)
Christmas Valley	Geothermal	Electricity	Feasibility study complete	30	215,076	71,712
How we arrived at the average annual MWh and carbon offset numbers: A Nevada Geothermal representative told us the plant's anticipated nameplate capacity is 30 MW (Stevie Bommar, personal correspondence, 2012). To arrive at the carbon offset amount, it was assumed the project would have the same operating and maintenance demands as the Iberdrola biomass plant.						
Average Plant Output (MW)	Station Service (MW)	Hours in a Year	Hours in Maintenance	Annual Megawatt Hours Produced (AC)	Annual Kilowatt Hours Produced (AC)	Carbon Coefficient of Pacific Power (lbs CO2 per kWh)	Annual Carbon Offset (lbs CO2)	Annual Carbon Offset (tons CO2)
30	3.6	8760	613.2	215,076	215,075,520	0.67	143,423,806	71,712

Nevada Geothermal Electric (Crump Geyser)								
Location	Renewable Energy Type	Product	Status	Nameplate Capacity (MW)	Average Annual MWh Production		Average Annual Carbon Offset (tons CO2)	
Adel	Geothermal	Electricity	Feasibility study complete	30	215,076		71,712	
How we arrived at the average annual MWh and carbon offset numbers: Nevada Geothermal states the plant's nameplate capacity to be 30 MW (Nevada Geothermal, 2012). To arrive at the carbon offset amount, it was assumed the project would have the same operating and maintenance demands as the Iberdrola biomass plant.								
Average Plant Output (MW)	Station Service (MW)	Hours in a Year	Hours in Maintenance	Annual Megawatt Hours Produced (AC)	Annual Kilowatt Hours Produced (AC)	Carbon Coefficient of Pacific Power (lbs CO2 per kWh)	Annual Carbon Offset (lbs CO2)	Annual Carbon Offset (tons CO2)
30	3.6	8760	613.2	215,076	215,075,520	0.67	143,423,806	71,712

Warner Creek Heating District						
Location	Renewable Energy Type	Product	Status	Nameplate Capacity (BTU/hr)	Average Annual mmBtu Production	Average Annual Carbon Offset (tons CO2)
Lakeview	Geothermal	Heat	Constructed in 2005	5,500,000	8,250	660
How we arrived at the average annual MWh and carbon offset numbers: Facility characteristics provided by the Town of Lakeview (Ray Simms, personal correspondence, 2009).						
BTU/hr	Annual Btu Consumption	Annual mmBTUs	Heat Content of Diesel (mmBtu/gal)	Equivalent in Diesel Gallons	Carbon Content of a Gallon of Diesel (lbs CO2)	Annual Carbon Offset (tons CO2)
5,500,000	8,250,000,000	8250	0.139	59,353	22.23	660

Hydroelectric

Lakeview Small Hydroelectric Facility						
Location	Renewable Energy Type	Product	Status	Nameplate Capacity (BTU/hr)	Average Annual MWh production	Average Annual Carbon Offset (tons CO2)
Lakeview	Small hydroelectric	Electricity	Feasibility study complete.	0.01414	124	41
How we arrived at the average annual MWh and carbon offset numbers: Facility characteristics provided by the Anderson Engineering report titled *Feasibility study for the town of Lakeview to develop a micro-hydroelectric system using the Bullard Canyon Spring Line* (Anderson, 2007).						

Average Plant Output (MW)	Station Service (MW)	Hours in a Year	Hours in Maintenance	Annual Megawatt Hours Produced (AC)	Annual Kilowatt Hours Produced (AC)	Carbon Coefficient of Pacific Power (lbs CO2 per kWh)	Annual Carbon Offset (lbs CO2)	Annual Carbon Offset (tons CO2)
0.01414	NA	NA	NA	124	123,844	0.67	82,586	41

Solar

Element Power						
Location	Renewable Energy Type	Product	Status	Nameplate Capacity (MW)	Average Annual MWh Production	Average Annual Carbon Offset (tons CO2)
Christmas Valley	Solar	Electricity	Feasibility study complete	12	20,617	6,874
How we arrived at the average annual MWh and carbon offset numbers:						
Element Power shared that the annual MWh production in the facility's first year would be 28,767 MWh and stated the annual degradation rate would be 0.005 (Nicole Hughes, personal correspondence, 2012).						

First Year MWh Production	30 Average Annual MWh Production (DC) at a 0.005 Annual Degradation Rate	Conversion Rate from DC to AC	30 Average Annual MWh Production (AC) at a 0.005 annual degradation rate	Annual Kilowatt Hours Produced (AC)	Carbon Coefficient of Pacific Power (lbs CO2 per kWh)	Annual Carbon Offset (lbs CO2)	Annual Carbon Offset (tons CO2)
28,767	26,776	0.77	20,617.15	20,617,150	0.67	13,748,613	6,874

GreenWing Solar Project						
Location	Renewable Energy Type	Product	Status	Nameplate Capacity (MW)	Average Annual MWh production	Average Annual Carbon Offset (tons CO2)
Christmas Valley	Solar	Electricity	Feasibility study complete.	20	20,617	12,305

How we arrived at the average annual MWh and carbon offset numbers:

GreenWing provided the location and nameplate capacity of their proposed facility (Source name was lost, personal correspondence, 2012). These two data points were enough to determine the average annual kWh production of the facility. Using software called PV Watts, a product of the National Renewable Energy Laboratory, we found the first year of the MWh production to be 39,651 MWh. Data about the first-year production of kWh allowed us to estimate the carbon offset of the proposed facility.

First Year MWh Production	30 Average Annual MWh Production (DC) at a 0.005 Annual Degradation Rate	Conversion Rate from DC to AC	30 Average Annual MWh Production (AC) at a 0.005 Annual Degradation Rate	Annual Kilowatt Hours Produced (AC)	Carbon Coefficient of Pacific Power (lbs CO2 per kWh)	Annual Carbon Offset (lbs CO2)	Annual Carbon Offset (tons CO2)
39,651	PV Watts did the DC to AC conversion	0.77	36,906.14	36,906,139	0.67	24,610,978	12,305

Lake County Solar FIT Projects							
Location	Renewable Energy Type	Product	Status	Nameplate Capacity (MW)	Average Annual MWh Production	Average Annual Carbon Offset (tons CO2)	
Lakeview	Solar	Electricity	Built	0.0198	35	12	
How we arrived at the average annual MWh and carbon offset numbers: The Lake County municipal government shared that the nameplate capacity of the facility was 18.18 KW or 0.018 MW and was located in Lakeview, Oregon (Jim Walls, personal correspondence, 2012). These two data points were enough to determine the average annual kWh production of the facility. Using software called PV Watts, a product of the National Renewable Energy Laboratory, we found the first year of the MWh production to be 38 MWh. Data about the first year production of kWh allowed us to estimate the carbon offset of the proposed facility.							
First Year MWh Production	30 Average Annual MWh Production (AC) at a 0.005 Annual Degradation Rate	Conversion rate from DC to AC	30 Average Annual MWh Production (AC) at a 0.005 Annual Degradation Rate	Annual Kilowatt Hours Produced (AC)	Carbon Coefficient of Pacific Power (lbs CO2 per kWh)	Annual Carbon Offset (lbs CO2)	Annual Carbon Offset (tons CO2)
37.61	NA	NA	35.01	35,010	0.67	23,347	12

Obsidian Lakeview Project							
Location	Renewable Energy Type	Product	Status	Nameplate Capacity (MW)	Average Annual MWh Production	Average Annual Carbon Offset (tons CO2)	
Lakeview	Solar	Electricity	In construction	0.366	488	263	
How we arrived at the average annual MWh and carbon offset numbers: Obsidian Financial Group, the developer and owner, shared that the nameplate capacity of the facility would be 366 kW AC (Todd Gregory, personal correspondence). We used that figure with the PV Watts software, a product of the National Renewable Energy Laboratory, to determine that the facility would produce 847 MWh in the first year of production. Assuming an annual degradation rate of .0005, we estimated that the facility will average an annual production of 788 MWh over a 30-year span.							
First Year MWh Production	30 Average Annual MWh Production (AC) at a 0.005 Annual Degradation Rate	Conversion rate from DC to AC	30 Average Annual MWh Production (AC) at a 0.005 Annual Degradation Rate	Annual Kilowatt Hours Produced (AC)	Carbon Coefficient of Pacific Power (lbs CO2 per kWh)	Annual Carbon Offset (lbs CO2)	Annual Carbon Offset (tons CO2)
847	NA	NA	788	788,663	0.67	525,922	263

Pacific Power Black Cap Project							
Location	Renewable Energy Type	Product	Status	Nameplate Capacity (MW)	Average Annual MWh Production		Average Annual Carbon Offset (tons CO2)
Lakeview	Solar	Electricity	Construction began in May 2012. Completion date is Sept 2012.	2	4,310		1,437
How we arrived at the average annual MWh and carbon offset numbers: Obsidian Financial Group, the developer and owner, shared that the nameplate capacity of the facility would be 2 MW AC (Todd Gregory, personal correspondence). We used that figure with the PV Watts software, a product of the National Renewable Energy Laboratory, to determine that the facility would produce 4,630 MWh in the first year of production. Assuming an annual degradation rate of .0005, we estimated that the facility will average an annual production of 4,310 MWh over a 30-year span.							
First Year MWh Production	30 Average Annual MWh Production (AC) at a 0.005 Annual Degradation Rate	Conversion rate from DC to AC	30 Average Annual MWh Production (AC) at a 0.005 Annual Degradation Rate	Annual Kilowatt Hours Produced (AC)	Carbon Coefficient of Pacific Power (lbs CO2 per kWh)	Annual Carbon Offset (lbs CO2)	Annual Carbon Offset (tons CO2)
4,630	4,310	NA	NA	4,309,634	0.67	2,873,893	1,437

Oregon Military Backscatter Site							
Location	Renewable Energy Type	Product	Status	Nameplate Capacity (MW)		Average Annual MWh Production	Average Annual Carbon Offset (tons CO2)
Christmas Valley	Solar	Electricity	Feasibility study complete	20		36,906	12,305
How we arrived at the average annual MWh and carbon offset numbers: The Oregon Military shared that the nameplate capacity of the facility would be 20 MW and it will be located near Christmas Valley, Oregon (Stevie Bommar, personal correspondence, 2012). By using the software PV Watts, a product of the National Renewable Energy Laboratory, we used the nameplate capacity and location and determined the annual MWh production of the proposed facility to be 39,651 MWh. As is shown below, the first year production of kWh allowed us to estimate the carbon offset of the proposed facility.							
First Year MWh Production	30 Average Annual MWh Production (DC) at a 0.005 Annual Degradation Rate	Conversion rate from DC to AC	30 Average Annual MWh Production (AC) at a 0.005 Annual Degradation Rate	Annual Kilowatt Hours Produced (AC)	Carbon Coefficient of Pacific Power (lbs CO2 per kWh)	Annual Carbon Offset (lbs CO2)	Annual Carbon Offset (tons CO2)
39,651	PV Watts did the DC to AC conversion.	0.77	36,906.14	36,906,139	0.67	24,610,978	12,305

Project Horizon						
Location	Renewable Energy Type	Product	Status	Nameplate Capacity (MW)	Average Annual MWh Production	Average Annual Carbon Offset (tons CO2)
Christmas Valley	Solar	Electricity	Built	0.1505	254	85

How we arrived at the average annual MWh and carbon offset numbers:

The Oregon Military shared that the nameplate capacity of the facility is 150.5 KW or 0.1505 MW and its location is near Christmas Valley, Oregon (Stevie Bommar, personal correspondence, 2012). By using the software PV Watts, a product of the National Renewable Energy Laboratory, we used the nameplate capacity and location to determine the annual MWh production of the facility to be 273.09 MWh. As is shown below, this first year production of MWh allowed us to estimate the carbon offset of the proposed facility.

First Year MWh Production	30 Average Annual MWh Production (DC) at a 0.005 Annual Degradation Rate	Conversion rate from DC to AC	30 Average Annual MWh Production (AC) at a 0.005 Annual Degradation Rate	Annual Kilowatt Hours Produced (AC)	Carbon Coefficient of Pacific Power (lbs CO2 per kWh)	Annual Carbon Offset (lbs CO2)	Annual Carbon Offset (tons CO2)
273	PV Watts did the DC to AC conversion.	0.77	254.19	254,188	0.67	169,506	85

Wind

Oregon Community Wind						
Location	Renewable Energy Type	Product	Status	Nameplate Capacity (MW)	Average Annual MWh Production	Average Annual Carbon Offset (tons CO2)
Christmas Valley	Wind	Electricity	Feasibility under study	9	24,498	8,168
How we arrived at the average annual MWh and carbon offset numbers: Oregon Community Wind shared that the proposed facility would produce 24,498 MWh per year (source name was lost, personal communication, 2012). We used that figure to determine the carbon offset of the facility.						
Annual Megawatt Hours Produced (AC)	Annual Kilowatt Hours Produced (AC)	Carbon Coefficient of Pacific Power (lbs CO2 per kWh)	Annual Carbon Offset (lbs CO2)	Annual Carbon Offset (tons CO2)		
24,498	24,498,000	0.67	16,336,571	8,168		

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Carbon, Fossil Fuel, and Biodiversity Mitigation With Wood and Forests

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Carbon, Fossil Fuel, and Biodiversity Mitigation With Wood and Forests

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Life-cycle analyses, energy analyses, and a range of utilization efficiencies were developed to determine the carbon dioxide (CO_2) and fossil fuel (FF) saved by various solid wood products, wood energy, and unharvested forests. Some products proved very efficient in CO_2 and FF savings, while others did not. Not considering forest regrowth after harvest or burning if not harvested, efficient products save much more CO_2 than the standing forest; but wood used only for energy generally saves slightly less. Avoided emissions (using wood in place of steel and concrete) contributes the most to CO_2 and FF savings compared to the product and wood energy contributions. Burning parts of the harvested logs that are not used for products creates an additional CO_2 and FF savings. Using wood substitutes could save 14 to 31% of global CO_2 emissions and 12 to 19% of global FF consumption by using 34 to 100% of the world's sustainable wood growth. Maximizing forest CO_2 sequestration may not be compatible with biodiversity. More CO_2 can be sequestered synergistically in the products or wood energy and landscape together than in the unharvested landscape. Harvesting sustainably at an optimum stand age will sequester more carbon in the combined products, wood energy, and forest than harvesting sustainably at other ages.

KEYWORDS carbon sequestration, wood products, biodiversity, fossil fuel, global forest growth, sustainable forest management

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INTRODUCTION

Two different forest conservation approaches are being proposed that are each intended to sequester greenhouse gases and to protect forest biodiversity. Greenhouse gases in this article are measured in carbon dioxide (CO_2) equivalents; "CO_2" refers to CO_2, methane, and nitrous oxide as well as carbon in fossil fuel (FF), solid wood products, and forests that could become CO_2. One approach is to minimize harvest and thus store CO_2 in the forest and protect biodiversity through forest preservation. The other approach is to use solid wood products and wood energy that avoid CO_2 emissions from substitute materials and to maintain biodiversity through active management.

The infrastructure of buildings, bridges, and other constructions is expected to triple worldwide with demographic and economic changes by 2050 (Seto, Güneralp, & Hutyra, 2012). Much past construction has been from steel, concrete, and brick; however, wood construction innovations (mgb Architecture + Design, 2012) may avoid much of the CO_2 release and FF consumption associated with these other products (Figure 1). As FF prices rise, wood will increasingly be in demand as a low-energy building material and as energy through direct wood combustion. There is disagreement over whether this increased wood use is complementary or counterproductive to reducing CO_2 emissions and protecting biodiversity.

This article examines CO_2 and FF savings and biodiversity protection through both harvesting and/or not harvesting the forest with four studies:

1. comparing CO_2 and FF savings from harvested products and/or wood energy and the standing forest;
2. determining whether either enough harvestable wood or enough needed construction exists for wood use to have a globally meaningful impact on CO_2 and/or FF savings;
3. determining the relation of forest harvest or preservation to biodiversity and forest CO_2 savings;
4. examining the long-term CO_2 savings from wood harvest and use versus not harvesting the forest.

Both forest sequestration of CO_2 and active use of wood have had considerable analyses (Perez-Garcia, Lippke, Comnick, & Manriquez, 2005b; Fargione, Hill, Tilman, Polasky, & Hawthorne, 2008; Hennigar, MacLean, & Amos-Binks, 2008; Searchinger et al., 2009; Ryan et al., 2010; Lippke et al., 2011; Malmsheimer et al., 2011; Ashton, Tyrrell, Spalding, & Gentry, 2012).

Wood can potentially avoid emitting CO_2 from FF to the atmosphere by several pathways:

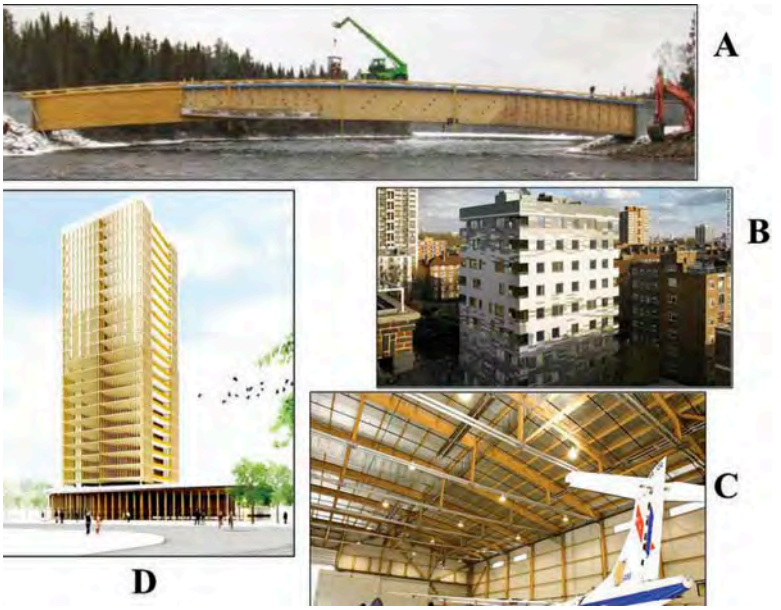

FIGURE 1 Innovative wood construction designs can replace much steel and concrete: (a) high-load wood bridge, Quebec, Canada; (b) Stadthaus—Murray Grove Tower, London, United Kingdom; (c) aircraft hanger in Montreal, Canada; (d) design of 20-story wood building, Vancouver, British Columbia, Canada. ((a) and (c) construction by Nordic Engineered Wood, Chantiers Chibougamau, LLC, Quebec; photo courtesy of Jean-Marc Dubois. (b) designed by Waugh Thistleton Architects, London; photo courtesy of Will Pryce, London. (d) of designed building, MGA, Michael Green Architecture, Brooklyn, New York, and Vancouver, British Columbia.)

- forest pathway (FP): sequestering CO_2 in the standing forest;
- storage pathway (SP): storing wood in the products so it does not rot or burn and produce CO_2;
- energy pathway (EP): displacing CO_2 produced by burning FF with CO_2 produced by burning energy;
- avoidance pathway (AP): substituting wood for steel, concrete, and other products that use more energy in their manufacture, thus consuming less FF and emitting less CO_2;
- landfill pathway (LP): storing waste wood in landfills where it either does not decompose or decomposes and emits methane and other greenhouse gases.

Wood can also save FF by the avoidance and energy pathways.

Each pathway has uncertainties that could sway analyses for or against any forest preservation or wood use scenario. For example, recovered wood from demolished buildings could be put into landfills where methane could be emitted or it could be reused as solid products or wood fuel that save

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CO_2. This study assumes "reasonable conditions" occur; that is, the forests, wood use, and waste disposal are treated in conscientious ways that avoid extremely negative consequences. In addition, this study examines a range of wood use efficiencies to determine the potential range of CO_2 and FF savings.

Harmon, Ferrell, and Franklin (1990), Krankina and Harmon (1994), Harmon and Marks (2002), Kristin and Raymer (2006), Seidl, Rammer, Jäger, Currie, and Lexer (2007), Seidl, Rammer, Lasch, Badeck, and Lexer (2008), and Nunery and Keeton (2010) found more CO_2 was saved by limiting wood harvest and storing carbon in the forest; however, many of these studies did not include the avoidance pathway. Other analyses have found more CO_2 was saved by utilizing solid wood products (Oliver, Kershaw, & Hinckley, 1991; Kershaw, Oliver, & Hinckley, 1993; Kauppi et al., 2001; Perez-Garcia et al., 2005b; Petersen & Solberg, 2002; Hennigar et al., 2008).

Wood has been reported to save CO_2 when used as a fuel (Manley & Richardson, 1995; Hoogwijk et al., 2003; Seidl et al., 2007; Seidl et al., 2008). However, others claim that harvesting wood for fuel is not an immediate CO_2 savings, and whether it contributes to fossil fuel savings depends on the waiting period before carbon is re-sequestered by the growing forest (O'Laughlin, 2010).

Equally important, will either forest preservation or wood use have meaningful enough global CO_2 and FF savings to justify promoting any policies? There are 3.9 billion ha of forest (3.9×10^9) in the world (United Nations-Food and Agriculture Organization [UN-FAO], 2007). Luyssaert et al. (2007) estimated that 8.4 billion (milliard) tonnes of aboveground woody biomass are produced each year as net primary production, or 21 billion m^3/yr. Haberl et al. (2007) estimated that approximately 1 billion tonnes of forest carbon are harvested annually, equivalent to 5.2 billion m^3/yr. Schulze, Korner, Law, Haberl, and Luyssaert (2012) estimated that more than doubling the estimated forest harvest would be needed to reduce FF energy consumption by 20%, presuming the wood is used for energy production (energy pathway). By contrast, FAOSTAT (2012) reported that the world is harvesting 3.4 billion m^3/yr (3.4×10^9) of wood, of which 32% was used for construction, 15% for pulp/paper, and 53% for fuelwood. Most of this fuelwood is burned very inefficiently at present.

Using the FAOSTAT (2012) estimate, the world is harvesting an average of 0.9 m^3/ha. Much of the world's forests grow faster than this average harvest. Carle and Holmgren (2008) have found that planted forests occupy only 7% of the world's forest area, but grow 41% of the amount of wood globally harvested by the estimate of FAOSTAT (2012). It is highly likely that the world could harvest much more wood and still harvest sustainably (Oliver, 2001)—that is, harvest no more than is growing.

Schulze et al. (2012) are concerned that harvesting more of the world's forest growth could adversely affect ecosystems. A common assumption is

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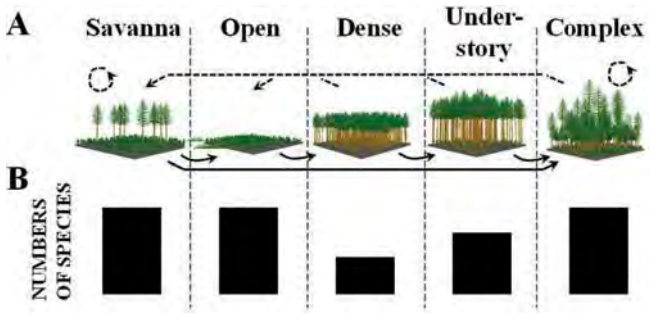

FIGURE 2 Forest landscapes naturally contain a dynamic diversity of stand structures: (a) as individual stands grow (solid lines) and are disturbed (dashed lines); (b) different species depend on each structure, with more species generally depending on the savanna, open, and complex structures than the dense and understory.

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that greater CO_2 savings and greater biodiversity will result from avoiding forest harvest (Grainger et al., 2009; Paoli et al., 2010). Biodiversity is being promoted by establishing reserved forests, where forest harvest is prohibited. On the other hand, not all species live in old, closed forests that develop if a forest grows a long time without natural or human disturbances. Rather, forests have contained stands in a variety of structures for millennia (Figure 2), and different species have evolved that depend on each structure (Oliver, 1992; Oliver & Larson, 1996). The savanna, open, and complex structures support the most species; however, each structure supports different species, so all structures are necessary to avoid species extinctions.

At present, the world's current 3.9 billion ha of forests have been fragmented and reduced by much of the 1.6 billion ha of cropland (UN-FAO, 2010) and by other human activities. Remaining forests in many parts of the world do not contain a balance of structures (Oliver & Deal, 2007; Han, Oliver, Ge, Guo, & Kou, 2012). Consequently, species are endangered that require various structures that are regionally lacking (Oliver, 1992; Oliver & O'Hara, 2004). The present fragmentation, reduction in forest area, and imbalance of structures may mean that it is prudent for active management to provide the diversity of structures (Oliver, 1992) rather than anticipate that natural processes will return the diversity. In the process of this active management, some trees can be harvested and utilized. Seymour and Hunter (1999) have proposed management in which part of each forest is set aside as reserves and others are actively managed to provide a diversity of structures and other values. Currently, 12.5% of the world's forest area is in such reserved areas (UN-FAO, 2000).

Some structures probably sequester less CO_2 than others. Maintaining all structures within a forest to ensure biodiversity may necessitate providing structures that sequester relatively little carbon, and hence may not be completely compatible with sequestering the most CO_2 in a forest.

Forests exist under a variety of climatic, edaphic, physiographic, and biotic factors (Toumey, 1928). Some forests accumulate biomass and thus sequester CO_2 (Nunery & Keeton, 2010); others are relatively stable (Harmon et al., 1990); and others release CO_2 through disturbances (Oneil & Lippke, 2010). Furthermore, a diversity of stand structures (Figure 2) can reduce a forest's susceptibility to catastrophic fires that drastically reduce the amount of closed structures (dense, understory, and complex) and release much CO_2. Both regions and forests of high fire susceptibility can be identified, and prudent silvicultural interventions can be taken to minimize the catastrophic fires.

Even in forests with a low danger of catastrophic fires, differences in the calculated forest carbon savings or loss from harvest is because different analyses address the impacts immediately after harvest (Marland & Schlamadinger, 1997; O'Laughlin, 2010) or after forest regrowth (Perez-Garcia et al., 2005b; Fargione et al., 2008; Hennigar et al., 2008; Searchinger et al., 2009). Some studies examine future opportunities to sequester more CO_2 in forests (forest pathway) and analyze the "opportunities lost" if the forest is harvested (Harmon et al., 1990; Nunery & Keeton, 2010).

A "debt-then-dividend" consideration has been suggested (Searchinger et al., 2009) where a harvested stand may first create a net decline in CO_2 savings, but create an even greater savings as it regrows. Others point out that forest carbon, as well as biodiversity and other values, needs to be examined across a landscape of many stands (Oliver, 1992; Perez-Garcia et al., 2005b; Ryan et al., 2010; Malmsheimer et al., 2011). Individual stands fluctuate widely in CO_2 sequestered with harvest and regrowth, but these fluctuations are offset across the landscape (O'Laughlin, 2010; Ryan et al., 2010) with other stands being harvested and regrowing at different times.

Analyses seeking to store CO_2 in products and/or wood energy sometimes assume that there will be no net loss of CO_2 from the forest if it is harvested sustainably (Malmsheimer et al., 2011). On the other hand, the amount of CO_2 saved sustainably in the combined products, wood energy, and forest may vary with harvest age as the mean annual increment changes.

Policymakers are receiving mixed signals of whether to promote CO_2 savings in the forest, wood products, or wood energy. Forest certification (Cashore, Auld, & Newsom, 2004) and various carbon credits (Cairns & Lasserre, 2006) and REDD+ (Corbera, Schroeder, & Springate-Baginski, 2011) encourage forest management to provide carbon sequestration and other values such as biodiversity in the forest. Other policies are being considered to harvest forests for CO_2 reductions and FF savings (Cubbage, Harou, & Sills, 2007; Richter et al., 2009). The above issues need to be clarified before policies can be crafted that promote desired goals such as biodiversity protection, CO_2 sequestration, and FF savings (Ruddell et al., 2007).

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METHODS

CO_2 and FF Savings With Wood Products, Wood Energy, and Unharvested Forests

The National Research Council (1976) compared FF savings by using wood alternatives to steel, concrete, brick, and aluminum building materials in the 1970s. Results found wood to be very favorable to all other materials in saving both CO_2 and FF (Oliver et al., 1991; Kershaw et al., 1993; Perez-Garcia, Oliver, & Lippke, 1997).

The analyses were redone comparing wood with steel and concrete by the Consortium for Research on Renewable Industrial Materials (CORRIM; Lippke, Wilson, Perez-Garcia, Bowyer, & Meil, 2004), a consortium of 17 research institutions. We further analyzed a range of paired wood/substitute (steel or concrete) wall and floor assemblies (Table 1) that had been analyzed for their CO_2 and FF impacts throughout the life cycle in different parts of the United States (Lippke et al., 2004; CORRIM, 2005a) using the Athena Environmental Impact Estimator (ATHENA Institute, 2004) and life-cycle data from the National Renewable Energy Laboratory (NREL, 2009).

For each wood and substitute product, we calculated total wood and fuelwood used by weight, CO_2 emitted, and FF consumed using a wood heating value of 13.9 MJ/kg (CORRIM, 2005b; Lippke, Wilson, Johnson, &

TABLE 1 Wood and Nonwood Building Components Analyzed for This Study (Lippke & Edmonds, 2006, 2009)

Abbreviation	Symbol in figures	Explanation
BioDried Stud	WS	Wood wall column (stud), dried using wood energy
BioDryStud/BioDryPly/ BioDryPly	WS & PC	WS and plywood on interior & exterior (sheathing) dried using wood energy
Steel Stud	SS	Steel wall column (stud) to functionally replace WS
Concrete Block/Stucco	CB & SC	Concrete block wall with stucco exterior to functionally replace WS & PLY & PLY
Dimension Joist	WB	Wood beams (joists) to support floor
EWP I-Joist	WI	Engineered wood product (EWP) to functionally replace WB
EWP/Ply	WI & PLY	WI covered with plywood dried using wood energy
Steel Joist	SB	Steel joist to functionally replace WB or WI
Concrete Slab	CS	CS laid on ground to functionally replace WI & PLY on ground floor
Steel Joist/Concrete Slab	SB & CS	We "created" a raised concrete floor by underpinning the ground concrete slab with steel joists. (Probably more energy/ material is needed than calculated here.)

Puettmann, 2010a). Values are reported on the basis of CO_2-equivalents using Global Warming Potential (GWP) for a 100-yr time horizon (Forster et al., 2007). Wood products were assumed to be 50% carbon, and CO_2 was calculated at 3.667 kg CO_2/kg carbon. This article assumed all nonwood energy in the life-cycle analyses would come from FF with a value of 0.08 kg CO_2/MJ of energy based on CORRIM data; this value is consistent with the CO_2 emissions from burning FF analyzed for wood energy (Table 2). The concrete slab analyzed by CORRIM was placed directly on the ground; however, this study virtually suspended the concrete slab onto steel joists in one analysis and compared wood to this suspended concrete and steel floor.

Net CO_2 changes were separated into storage, energy, and avoidance pathways. The FF CO_2 emissions generated during wood use were subtracted from the avoided emission generated by nonwood substitutes. FF changes were segregated into similar energy and avoidance pathways.

Building life spans and CO_2 and FF outputs for living (e.g., heating and cooling), repair, and demolition were very similar for buildings made from all products (Perez-Garcia et al., 2005a; Winistorfer, Chen, Lippke, & Stevens, 2005; Werner, Taverna, Hofer, & Richter, 2006; Lippke, Wilson, Meil, & Taylor, 2010b), so "cradle to gate" life cycles of functionally equivalent

TABLE 2 CO_2 and FF Data and Analysis for Wood Burned for Energy

	Energy content (MJ/kg wood)		
Wood fuel	Technical low[d]		Technical high[e]
Wood energy content[a]	13.9		20.9
Harvesting/processing[b]	−3.78		−6.24
Net energy yield of wood[c]	10.12		14.66
	CO_2 emissions intensity (kg CO_2-eq./MJ)		
Fossil fuel type[f]	Lower[i]	Average[j]	Upper[k]
Natural gas	0.05	0.06	0.06
Residual fuel oil[g]	0.08	0.08	0.08
Lignite[h]	0.09	0.10	0.12
	Net CO_2 emission savings from substitution (kg CO_2-eq./kg wood)		
Wood fuel substituting for:	Technical low/lower[l]	Technical average[m]	Technical high/upper[n]
Natural gas	0.55	0.70	0.86
Residual fuel oil	0.76	0.97	1.17
Lignite	0.92	1.31	1.71

Note. Superscripts a & b, see text; c = a − b; i & k from Burnham et al. (2011), see text; j = (i + k)/2; l = c:d × i; n = c:e × k; m = (l + n)/2.

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wood, steel, and concrete products are compared here. Comprehensive life-cycle analyses have not been done for hardwoods and for cross-laminated timber (CLT) used in modern high-rises (mgb Architecture + Design, 2012). CLT was assumed to have CO_2 and FF efficiencies similar to solid wood beams. Analyses of some products suggest hardwood results are similar to conifers (Bergman & Bowe, 2012). This study assumed hardwoods could be used with the same range of efficiencies as the conifers studied.

We also analyzed CO_2 and FF savings for wood burned directly for energy instead of used in construction (Table 2). Wood can be burned at a theoretical energy efficiency maximum of 28.2 MJ/kg of wood, and recent industrial and pellet stoves generate values up to 20.9 MJ/kg of wood (Lehtikangas, 2001). The CO_2 saved by wood energy was compared with natural gas, residual fuel oil, and lignite (Intergovernmental Panel on Climate Change [IPCC], 2006; Burnham et al., 2011). These CO_2 emission intensities were the CO_2-equivalent units using global warming potential values (Burnham et al., 2011) for a 100-yr time horizon. Lignite was used to assess a wide range of CO_2 values, even though bituminous and anthracite coals are more commonly used.

Forest harvesting generally generates some logs that are "unmerchantable"—the wrong size, shape, or species to make into solid products (Figure 3). The "merchantable" proportion of harvested logs varies with harvesting and processing technologies. In addition, only about 50% of the merchantable log is made into solid products when milled (Perez-Garcia et al., 2005b), with the remainder becoming "scrap-wood"—sawdust, slabs, and bark. Some of this scrap-wood can be burned for energy to make the product (energy pathway). This article assumes that all unmerchantable logs are removed from the woods. The solid wood product portion of merchantable logs was calculated for CO_2 and FF savings for the products in Table 1. The scrap-wood used as product fuel was subtracted from the nonproduct half of the merchantable log weight, and the remaining scrap-wood and unmerchantable logs were assumed to be burned directly for energy as a FF substitute that also avoids CO_2 emissions (Table 2). Both the high and low CO_2 emission intensity and FF energy values were calculated for the scrap-wood and unmerchantable logs burned directly for energy.

The instantaneous effect of harvest is to remove stem wood from the forest. Over time, dead foliage and branches rot, new foliage and trees grow, and the soil and other forest carbon pools adjust to changes (e.g., Laiho, Sanchez, Tiarks, Dougherty, & Trettin, 2003). Other carbon pools are generally calculated as proportional to stem wood (Perez-Garcia et al., 2005b); however, the adjustments of these pools is not rapid. For purposes of this study, total stem carbon is used as a better indicator of total forest carbon than total carbon calculated through proportions to stem wood. (For example, immediately after harvest, the dead or regrowing limb, root, and soil

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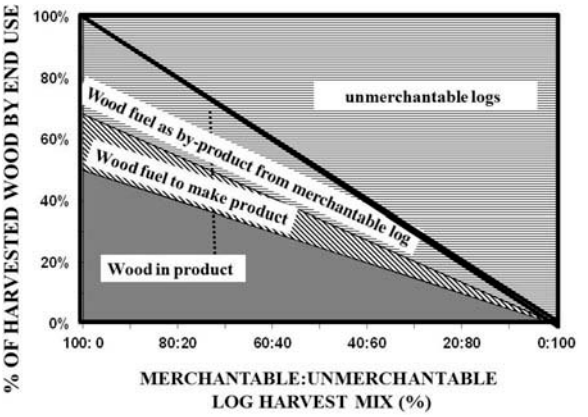

FIGURE 3 Distribution of harvested wood from logging and milling operations with stems used in different proportions of merchantable-to-unmerchantable logs by weight. Some wood from merchantable logs is made into products, and the rest becomes "scrap-wood" that is used for fuel. Some scrap-wood fuel is used to manufacture the product and other is simply a by-product. All unmerchantable logs become by-product fuels. Dashed lines show 70%:30% values used in subsequent analyses.

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carbon do not immediately adjust to the very low amount of stem carbon remaining.)

Global Availability of Wood and Potential Global Consumption

To determine if an increase in wood use could markedly change the world's CO_2 emissions and/or FF consumption, it was necessary to determine both the impact of nonwood construction on global CO_2 and FF changes and how much wood could potentially be grown worldwide.

The world consumes approximately 0. 41 quadrillion MJ/yr (4.1×10^{14}) of fossil fuel (2010 basis; Energy Information Administration [EIA], 2011). The energy consumed globally from producing steel, concrete, brick, and aluminum was calculated by multiplying the global annual production by the embedded energy of each product (Table 3). These materials consumed 17% of the world's total FF energy, not including transportation and assembly in buildings. Only a portion of these materials are used in construction; so we conservatively identified 10% as the proportion of FF energy used for nonwood building materials that could be saved by using wood materials instead (avoidance pathway).

The potential global forest growth rate under nonintensive management was calculated from the literature to determine how much wood could be harvested sustainably in the world. The world's forest had been stratified into ecoregions and areas by the UN-FAO (2007). We assessed forest growth rate for each ecoregion from the literature on forest growth of states, provinces,

TABLE 3 Estimates of Global FF Energy Consumed by Various Nonwood Construction Products; Embedded Energy Shows Ranges

Construction material	2010 global production (kg)	Embedded energy estimate (MJ/kg)[c]	Total FF energy consumed (MJ)[d]	Percent of global FF consumed[e]
Steel	1.4E + 12[a]	25 (8.8[e] to 48.4[f])	3.6E + 13	9%
Concrete	2.2E + 13[a]	1 (0.5 to 2.1)	2.2E + 13	5%
Brick	2.0E + 12[b]	5 (3 to 8)	1.0E + 13	2%
Aluminum	4.1E + 10[a]	100 (24[e] to 218[f])	4.1E + 12	1%
		Total	7.2E + 13	17%

Note. Superscript a from (U.S. Geological Survey, 2011); b from (EIA, 2011); c from (Hammond & Jones, 2008); d from (Hammond & Jones, 2008; EIA, 2011); e = recycled; f = virgin.

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or countries where they could be identified by ecoregion (Table 4; UN-ECE/FAO, 2000; Clark et al., 2001; Evans & Turnbull, 2004; Smith, Miles, Perry, & Pugh, 2009; Fredericksen, 2011; Fuwape, 2011). Intensive plantation growth data were not used. Clark et al. (2001) listed aboveground Net Primary Production (NPP) for some forests; stem growth was estimated as 70% of this NPP, based on (Gholz, 1982). Conservative estimates were made where no data was available for an ecoregion, primarily in regions of very low productivity. The resulting estimate of 6.5 billion (milliard) tonnes of stemwood/year (Table 4) is similar to the aboveground NPP estimate of 8.4 billion tonnes of aboveground woody biomass by Luyssaert et al. (2007).

The range of CO_2 and FF that could be saved was determined by substituting various wood building materials for other materials (Table 1) until either no more structures needed building or global wood growth was completely used. Merchantable logs were assumed to be 70% of the total harvested stem volume.

The analyses were streamlined by assuming "instantaneous" use of additional wood solely for wood construction or wood energy under current circumstances; thus, the added uncertainties of future changes in pulpwood use, total construction, accelerated forest growth, or lag times in increasing wood use were avoided.

Stand Structures, Biodiversity, and CO_2 Sequestration

To determine the impact of different stand structures on forest CO_2 sequestration, two forest landscapes were examined:

- 32 stands constituting a part of Pack Forest (University of Washington), a productive, conifer forest (average site index of 31 m at 50 yr) of 284 ha in western Washington, USA; and

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TABLE 4 Potential Forest Wood Growth, Based on Literature Stratified by UN Ecoregions; Potential Growth Refers to Growth From Normally Managed Forests (Excluding Intensive Plantations)

United Nations Food and Agriculture global ecoregions[a]	Estimated average potential timber growth[b] (m^3/ha/yr)	Forest area[c] (10^6 ha)	Potential global forest growth: Volume[d] (10^6 m^3)	Potential global forest growth: Mass[e] (10^9 kg)	Sources
Tropical rainforest	8	1,004	7,929	3,048	Clark et al., 2001
Tropical moist deciduous forest	7	355	2,485	955	Clark et al., 2001; Evans & Turnbull, 2004
Temperate oceanic	6	46	282	109	Smith et al., 2009; UN-ECE/FAO, 2000
Tropical dry	6	430	2,367	910	Clark et al., 2001; Evans & Turnbull, 2004; Fredericksen, 2011
Subtropical mountain	5	112	562	216	Smith et al., 2009
Subtropical humid	4	156	610	234	Smith et al., 2009
Tropical shrub	3	71	219	84	Clark et al., 2001; Fuwape, 2011
Temperate continental	3	248	719	276	Smith et al., 2009; UN-ECE/FAO, 2000
Subtropical dry	3	55	148	57	UN-ECE/FAO, 2000
Temperate mountain	3	195	487	187	Smith et al., 2009; UN-ECE/FAO, 2000
Boreal coniferous	2	580	870	334	UN-ECE/FAO, 2000
Boreal mountain	1	329	165	63	No data (estimated)
Tropical mountain	1	111	56	21	No data (estimated)
Boreal tundra	1	96	48	18	No data (estimated)
Subtropical steppe	1	48	24	9	No data (estimated)
Temperate steppe	1	31	15	6	No data (estimated)
Subtropical desert	1	12	6	2	No data (estimated)
Temperate desert	1	8	4	2	No data (estimated)
Tropical desert	1	2	1	0	No data (estimated)
Polar	0	16	0	0	No data (estimated)
Total		3,906	16,996	6,534	

Note. Superscript a = UNFAO ecoregions (UN-FAO, 2007); b = average forest growth from multiple sources; c = average area of each ecoregion (UN-FAO, 2007); d = b × c; e = d × 0.3844 kg/m^3.

- 64 stands constituting Bent Creek Experimental Forest (U.S. Forest Service), a moderately productive, predominantly mixed species hardwood forest (average site index of 24 m at 50 yr) of 2,474 ha in western North Carolina, USA.

Inventories of both forests were downloaded through the Landscape Management System platform (McCarter, 2013), and the total tree stem standing volume and stand structure of each stand at time of inventory was determined using the Landscape Management System (Oliver, McCarter, Ceder, Nelson, & Comnick, 2009). Standing volume was converted to kg CO_2 sequestered/ha using wood densities of 418 kg/m^3 for conifers and 500 kg/m^3 for mixed hardwoods.

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Forest CO_2 Sequestration, Forest Growth, and Wood Use Interactions

Catastrophic forest fires immediately release CO_2 to the atmosphere and release more if the charred, dead stems burn again in subsequent fires. The energy released does not offset FF CO_2, so there is no CO_2 or FF savings. Consequently, there would be emissions of CO_2 and added consumption of FF by not avoiding the catastrophic fires or by not harvesting these forests before they burned.

Many forests do not burn; however, even unburned forests may sequester less CO_2 if not harvested than if harvested for products and/or wood energy and allowed to regrow. To examine the CO_2 relations of harvesting and not harvesting forests that do not burn, we developed a "best case" scenario using forests that are not burned in catastrophic disturbances of the relation between CO_2 sequestered in the combined products/wood energy/and forests, time since harvest, and sustainable rotation age. Data from a 150-yr chronosequence (McArdle, Meyer, & Bruce, 1961) of Douglas-fir (*Pseudotsuga menziesii* [Mirb.] Franco) forests were used to compare CO_2 savings by harvesting with allowing the forest to grow. This data collected before 1930 was used to ensure that younger forests in the sample would not have been subjected to intensive management, and so had grown similarly to older sampled forests. The data contained forest volume averages for 10-yr intervals, stratified by productivity. A high productivity stratum was used (Site Index 49 m at 100 yr). The data were cubic volumes/acre of stems greater than 15.2 cm diameter at 1.4 m height; these were converted to CO_2/ha of stemwood using wood densities of 418 kg/m^3. Only stemwood carbon was considered, for reasons described earlier.

For conceptual simplicity, this study assumed harvest and regrowth across the landscape in a fully regulated forest that is sustainably managed by even-age harvesting an equal area each year. More complex, sustainable

harvesting analyses that maintain all structures are possible (Oliver et al., 2009), but do not change to conceptual results of the present inquiry.

RESULTS

CO_2 and FF Savings With Wood Products, Wood Energy, and Unharvested Forests

Comparisons of wood with substitute products and FF energy (Figure 4a–b) show a very wide range of CO_2 and FF savings can be gained, depending on the product. These results are consistent with an average total savings of 3.9 kg CO_2/kg of wood estimated from a meta-analysis by Sathre and O'Connor (2010). The National Research Council (1976) data had shown that kiln-fired bricks and aluminium are even more CO_2 and FF intensive than concrete and steel (Oliver et al., 1991; Kershaw et al., 1993).

The greatest gains of both CO_2 and FF savings in forest products are through avoiding FF needed to manufacture, transport, and construct with steel or concrete (avoidance pathway; Figure 4a–b). For CO_2 savings, slightly less carbon is generally stored in the wood product (storage pathway) than was used because some wood is removed and burned for energy to manufacture the product. Compared to avoidance and storage pathways, relatively little CO_2 and FF are saved by the wood energy used to manufacture wood products. Unless extremely efficient, wood burned solely for energy (energy pathway) without being the residual of wood product manufacture saves less CO_2 than was in the unburned wood. Wood energy can save FF, although less than using wood for most solid products (Figure 4b).

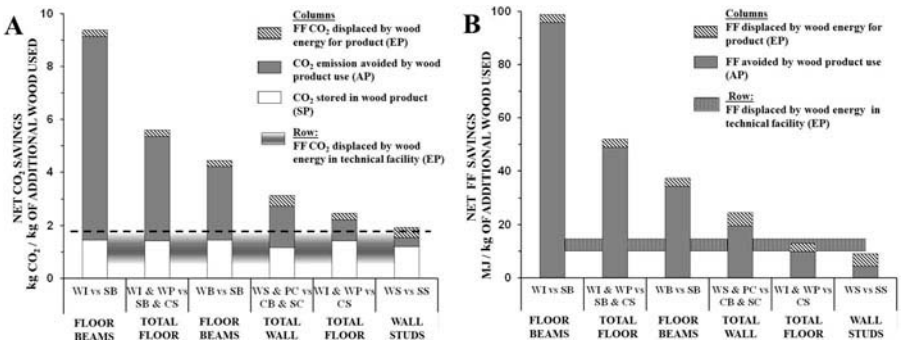

FIGURE 4 CO_2 and FF savings efficiencies of wood products compared to alternative steel and concrete building components: (a) CO_2 emissions savings and (b) FF savings when substituted for various steel and concrete building components or burned for energy. For (a), darker shading of bar = more conservative values; dashed line = immediate CO_2-equivalent stored in unprocessed wood. (See Table 1 for horizontal axis terminology; AP, SP, & EP = FF and CO_2 storage pathways.)

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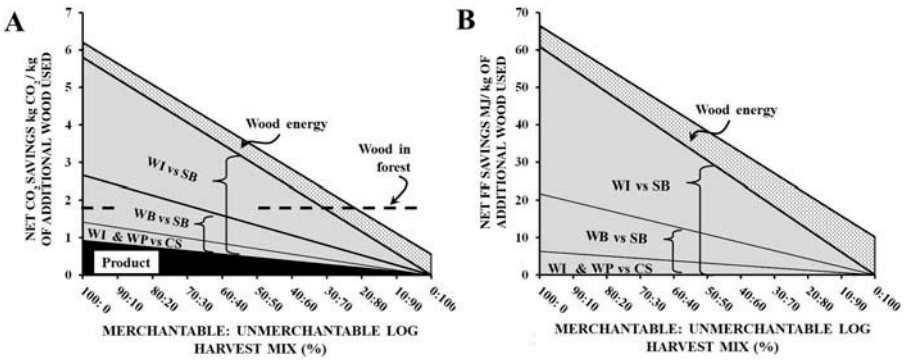

FIGURE 5 CO_2 (a) and FF (b) saved with different product and processing efficiencies (Figure 3) and different merchantability standards (Figure 2). Gray shows avoidance pathways for three comparisons (Table 1). Hatching shows average energy pathway with inefficient burning of wood. Black in (a) shows product pathway. Horizontal dashed line in (a) shows forest CO_2 lost instantly by harvesting stems.

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When harvesting and milling are considered (Figure 5a–b), the overall efficiency of wood use is less than Figure 4a–b because not all wood can be used for solid products. A wide range of savings can be obtained depending on the specific wood building material, the nonwood product being replaced, the amount of harvest that can be used for products (merchantable logs), and the efficiency of burning the scrap-wood and unmerchantable logs for energy.

With efficient product use and harvesting, more CO_2 is saved in the avoided emissions, products, and wood energy than is lost instantaneously from the harvested forest. Energy from burning the nonproduct scrap-wood and unmerchantable wood contributes an additional CO_2 and FF savings during the manufacture of wood products (Figure 5a–b), but not as effectively as if this wood had been used to make most products.

Global Availability of Wood and Potential Global Consumption

The global harvest of 3.4 billion m^3/yr (3.4×10^9; UN-FAO, 2012) and estimated growth of 17 million m^3/yr (Table 4) indicate that the world is currently harvesting about 20% of the forest'spotential growth if managed with moderate intensity. The additional wood that needs to be harvested to replace steel and concrete so that the world's FF energy consumption is reduced 10% annually through construction savings (avoidance pathway) varies dramatically with efficiency of wood product (Figure 6a). In the most efficient case (wood I-joists substituting for steel joists), an additional 14% of the world's wood growth would be needed beyond the 20% already harvested. Building with less efficient wood products requires more wood to

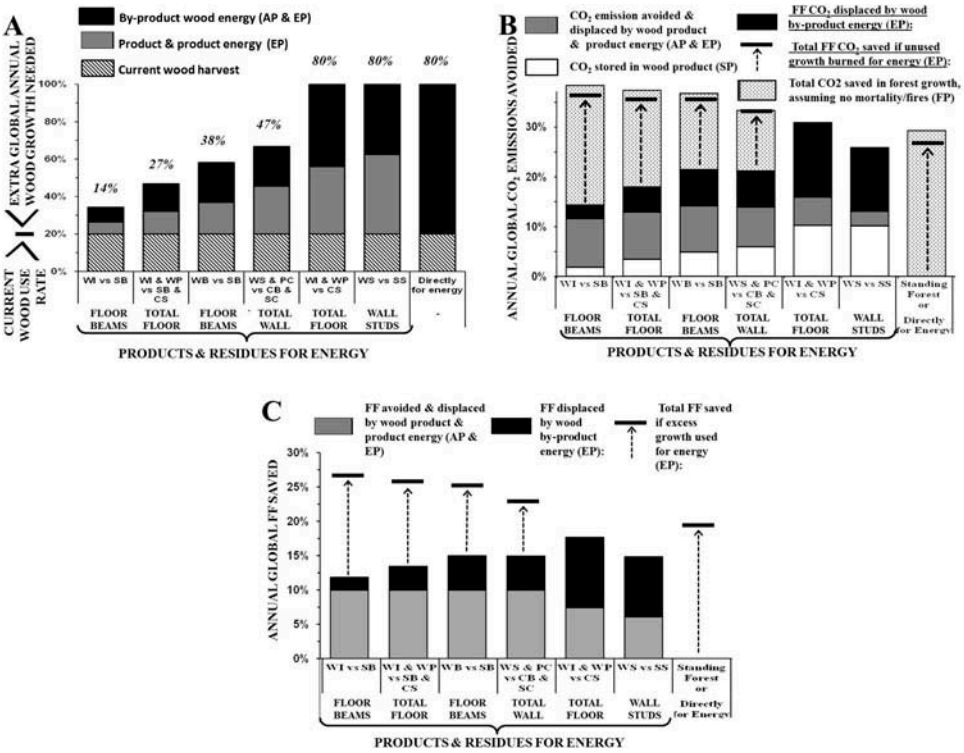

FIGURE 6 Global impacts of wood use for different products to avoid FF lost in construction (estimated at 10% of global annual FF consumption): (a) proportion of global annual wood growth used, numbers above columns show extra wood harvested; (b) proportion of annual global CO_2 emissions avoided; (c) proportion of annual global FF consumption saved. Arrows to bars show CO_2 and FF saved if extra wood growth is utilized for wood energy. (A 70:30 merchantable/unmerchantable harvest ratio is assumed.)

replace the target 10% energy saving. An additional 38% of the growth would need to be harvested if wood beams (comparable to CLT used in high rises; mgb Architecture + Design, 2012) were used. And, inefficient wood products run out of wood growth before they reach that target.

The global FF savings by wood construction would actually be between 12 and 15% instead of just the 10% conserved by the construction itself (avoidance pathway; Figure 6c) because additional wood energy from the accompanying scrap-wood and unmerchantable logs would replace FF energy (energy pathway). The less efficient products save more total FF because they use more wood and so generate more wood energy from scrap-wood and unmerchantable logs. (Notice that the "WI & WP vs CS" saves the most total FF energy through both the avoidance and energy pathways even though it cannot replace all of the targeted 10% construction FF of the avoidance pathway.)

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Between 14 and 31% of the world's CO_2 emissions from FF (Figure 6b) could be avoided in the combination of CO_2 stored in the wood products (storage pathway), CO_2 avoided (avoidance pathway), and FF displaced (energy pathway). Building with less efficient wood products also sequesters even more FF CO_2, largely because less efficient products both use more product wood (storage pathway) and burn more scrap-wood and unmerchantable logs that displace more FF energy (energy pathway).

In efficient cases, less wood would be harvested than is growing, so the forests and harvest rates would be more than sustainable; in fact, the unharvested wood could accumulate in some forests and save even more CO_2 (forest pathway). If none of the unharvested wood growth burned or rotted, CO_2 savings would be greatest by using wood for efficient building products, but not harvesting the excess that would only be used directly for energy. This strategy is probably unrealistic because it is impossible to keep all forest wood from rotting, burning, or being harvested. Alternatively, if all wood growth were harvested and used directly for energy, approximately 19% of the world's FF and 27% of the world's CO_2 could be saved. And, FF savings as high as 27% and CO_2 savings of up to 37% could be realized if the 15 to 38% of wood growth were used for efficient products and remaining growth were harvested and used directly for wood energy. The current results are similar to Schulze et al. (2012), who analyzed wood used directly for energy and suggested that 20% of the FF consumption could be reduced by using 60% of the wood growth.

Stand Structures and CO_2 Sequestration

Table 5 shows the amount and variation in stem CO_2 sequestered in different stand structures in the conifer and mixed hardwood forests. Maximum forest CO_2 savings would be accomplished by keeping all forests in the understory and complex structures; however, this would preclude species that depend on other structures—especially savannas and openings.

In fragmented forests with an imbalance of structures, experience suggests that we have not been able to rely on natural processes of disturbances and growth to restore all structures in a timely manner in order to maintain biodiversity (e.g., Oliver & O'Hara, 2004; Oliver & Deal, 2007; Han et al., 2012). Rather, even if stands in the complex structure are preserved to accumulate biomass, some other stands may need to be harvested to create or maintain sufficient open and savanna structures—and to allow these stands to regrow to the dense and understory structures. In the process, the wood removed could be used for construction and energy to save FF CO_2 and FF energy.

Other concerns of nutrient depletion by forest harvest can be partly mitigated by avoiding removal of tree foliage, buds, small twigs, roots, and the

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TABLE 5 CO_2 Sequestered in Different Stand Structures in a Productive Conifer Forest and a Moderately Productive Hardwood Forest; the Number of Stands in the Stages Reflects the Common Pattern of Small Amounts of Savanna, Open, and Complex Structures Because of Past Human Activities (Oliver & Deal, 2007)

	Savanna	Open	Dense	Undestory	Complex
Productive conifer forest					
CO_2 (kg/ha)	5.10E + 05	2.80E + 03	2.60E + 05	9.10E + 05	1.20E + 06
Standard deviation	3.90E + 05	1.40E + 04	7.30E + 04	2.30E + 05	1.50E + 05
# stands in sample	4	7	12	9	3
Moderately productive, mixed hardwood forest					
CO_2 (kg/ha)	4.00E + 05	0	3.00E + 05	5.00E + 05	4.40E + 05
Standard deviation	1.50E + 05	0	6.10E + 04	2.30E + 05	4.50E + 04
# stands in sample	2	7	21	31	3

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soil where most nutrients are found; and by harvesting on longer rotations so nutrients rebuild between harvests.

Forest CO_2 Sequestration, Forest Growth, and Wood Use Interactions

For those forests that do not burn in catastrophic fires, the carbon change in the forest can be included in the CO_2 analyses (Figure 7a–b). The immediate effects of harvest/product/wood energy use can be positive or negative, depending on whether more CO_2 is stored by product and wood energy use than was in the forest.

A stand that does not burn accumulates carbon rapidly when young, but less as it ages (Figure 8a). Harvesting for wood products/wood energy that immediately save CO_2 (Figure 5a) sequesters even more CO_2 as the forest regrows (Figure 8b). Even harvesting for inefficient products or wood energy that create an initial net CO_2 loss (Figure 7b) can sequester more CO_2 in the combination of products, wood energy, and forest than in the unharvested forest provided the stand regrows long enough (Figure 8c) through the "debt-then-dividend" pattern (Fargione et al., 2008; Searchinger et al., 2009). If the forest would burn unless harvested or partially harvested, even greater CO_2 savings would be achieved by harvesting. And, across a landscape, harvesting so that a diversity of stand structures is created and maintained would both reduce fire danger (Camp, Oliver, Hessburg, & Everett, 1997) and increase biodiversity (Oliver & O'Hara, 2004).

Figure 9a shows the mean annual increment (MAI) and Figure 9b shows the cumulative increment of CO_2 stored by harvesting for different products (with residual wood used for wood energy) in a regulated Douglas-fir forest. It also shows the MAI and cumulative carbon sequestered in stems on the average hectare of the forest (assuming total forest carbon is proportional to stem carbon, described earlier). Harvesting sustainably across a landscape creates no net loss in forest carbon because the same amount of wood is

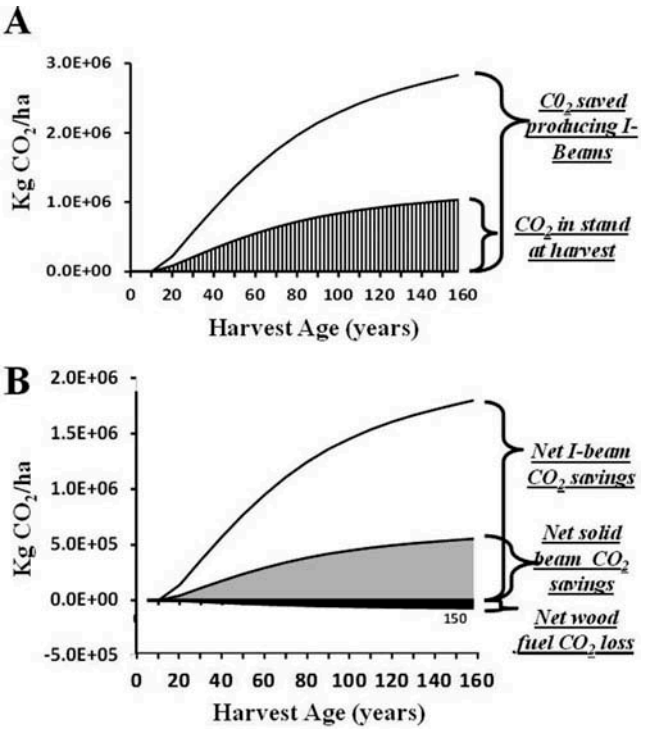

FIGURE 7 Comparison and net effects of CO_2 stored in product and forest when forest growth is not considered in the analysis (immediate effects): (a) immediate effects of CO_2 savings by efficient wood use (I-beam; Figure 5a) and by not harvesting forest; (b) net, immediate storage/loss of total CO_2 by products of different efficiencies (Figure 5b, and 4a for wood fuel) when subtracting carbon in harvested forest.

harvested each year as growth. However, the amount of wood that can be harvested sustainably—and the amount of wood products to save CO_2 (and FF)—varies considerably depending on the target harvest age in a regulated forest (Figure 9), even though all harvest ages could be sustainable.

Forest carbon stored within the sustained forest landscape (forest pathway) is the average of all stands and would also vary with harvest age (Figure 9). Such harvesting would provide net carbon sequestration as long as harvested wood sequestration were above this average carbon sequestration of the forest. Consequently, harvesting even for inefficient CO_2 storage (e.g., wood fuel) could be a net CO_2 savings in a sustainable forest landscape (Figure 8c & Figure 9) although it is an immediate CO_2 loss for the stand harvested (Figure 7b).

The greatest sustainable harvest of wood—and so greatest CO_2 savings in products and wood energy—would occur when the target harvest age is at the culmination of the mean annual increment (Figure 9a). Forest carbon also reaches an inflection of greatest storage rate, although a few decades

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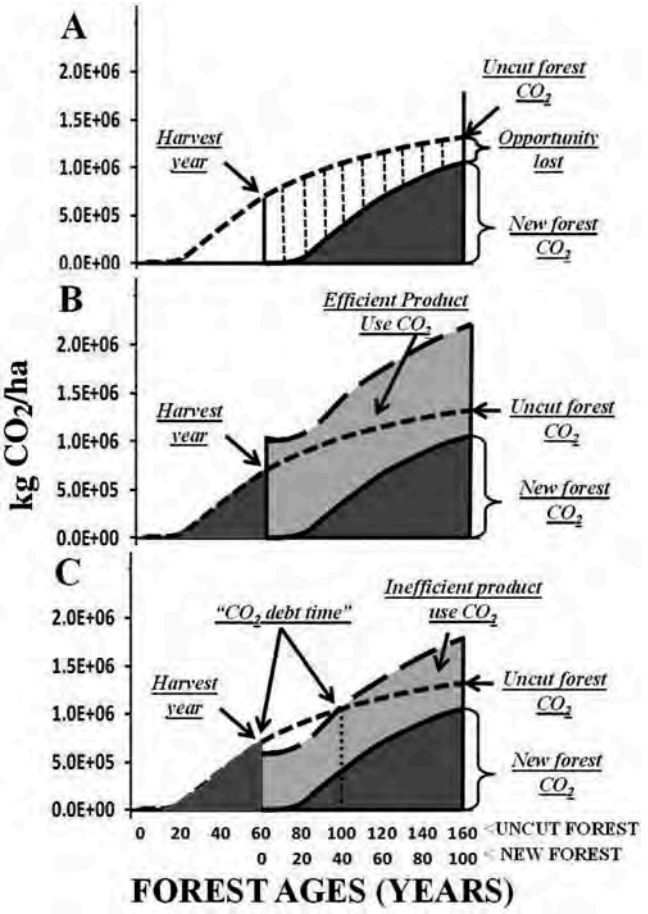

FIGURE 8 Tradeoffs and synergies of sequestering carbon in forests and products when forest growth is included in the analysis: (a) unharvested forest sequesters less carbon with older age, so regrowth can sequester increasingly larger parts of the CO_2 loss over time; (b) efficient wood use (gray) will immediately sequester more carbon than standing forest (black), and more will be sequestered as forest regrows (black); (c) inefficient wood use (e.g., wood energy) that saves only part of the CO_2 in the harvested stand will eventually sequester more CO_2 in the combination of regrowing forest (black) and products (gray) as a "dividend" following a "debt" period.

after wood growth. Sustainable, total carbon storage would be greatest when the sum of harvest and forest carbon were highest.

The shape of the MAI curve (Figure 9a) and consequently the time of greatest CO_2 savings in the combination of products, wood energy, and forest would vary with site, species, and silvicultural practices. The greatest CO_2 stored in the combination of products, and wood energy, and forest can be determined for each forest management regime; and development of optimum harvest for CO_2 savings could be further refined to ensure all structures are maintained (Hennigar et al., 2008; Oliver et al., 2009). In addition, the

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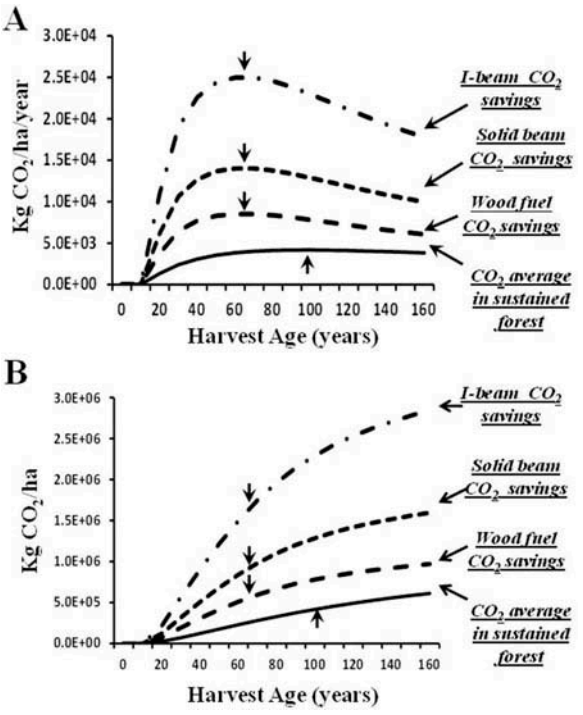

FIGURE 9 Effects of sustainability—growth equals harvest—on total forest and product CO_2 savings. Forest carbon is average of all stands in landscape. (a) Sustainability—growth equals harvest—can be achieved at different rates of CO_2 storage in products and forest (and different FF savings) by harvesting at different ages because average volume growth and carbon storage change with target harvest age. Arrows show maximum rates of forest growth ("culmination of mean annual increment") and forest carbon storage. (b) Total annual CO_2 storage in sustainable forests is the sum of the forest landscape carbon and CO_2 saved by products. Since forest and product carbon are not maximized at same harvest age, optimum storage would be at an intermediate harvest age. (CO_2 values and ages would vary with species, productivity, and management.)

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likelihood of the forest burning in a catastrophic fire can be determined and specific silvicultural operations can be taken to reduce the fire danger.

DISCUSSION AND CONCLUSIONS

Globally, both enough extra wood can be harvested sustainably and enough infrastructure of buildings and bridges needs to be built to reduce annual CO_2 emissions by 14 to 31% and FF consumption by 12 to 19% if part of this infrastructure were made of wood. The range is based on the efficiency of wood use (Figure 6b–c). This reduction would require 34 to 100% of the world's wood growth (Figure 6a), again depending on the efficiency

of wood use. Consequently, efficient wood use could make an important but not overwhelming contribution to saving CO_2 and FF globally, even if only part of its potential savings were realized. The greatest CO_2 and FF savings from wood use are by avoiding the excess FF energy used to make steel and concrete structures (avoidance pathway). Wood products are more efficient than wood energy for CO_2 and FF savings; however, up to 37 % of the world's annual CO_2 emissions and 27% of the FF use could be saved if all wood growth not used in construction were used for energy (energy pathway; Figure 6b–c).

If catastrophic fires do not occur and forest regrowth after harvest is not considered, saving CO_2 by not harvesting the forest growth is slightly more efficient than harvesting just for wood energy—but generally less efficient than harvesting for construction products. This efficiency of CO_2 storage in unharvested forests also assumes none of the wood blows over or otherwise rots in the forest—an unrealistic assumption in most of the world.

Not harvesting any of an area's forests will also not gain maximum biodiversity if all stands grow out of the savanna and open structures (Figure 2 & Table 5). Maximum forest carbon will not create maximum biodiversity since savanna, open, and dense structures sequester less CO_2 than understory and complex ones. A forest needs either fortuitous disturbances occurring at the right time and place or it needs appropriate harvesting to maintain all structures. Wood harvested to create the open and savanna structures can be used for construction products and wood energy and to reduce the likelihood of catastrophic fires—all of which save CO_2 and FF.

When regrowth after harvest is considered, even wood harvested just for energy (energy pathway) can be more efficient for CO_2 sequestration than not harvesting the forest and using FF for energy. By elaborating the sustained yield calculations, it is possible to design dynamic, sustainable landscapes that maintain all structures for habitat, provide wood sustainably at an age that optimizes CO_2 savings (mean annual increment, Figure 9A), and makes the forest less susceptible to catastrophic fires. Included in these landscapes could be some forests that are reserved from harvest to provide complex structures (Seymour & Hunter, 1999)—although they could reduce the potential CO_2 and FF saved had they been appropriately harvested and utilized.

Immediately changing to older harvest ages to save more CO_2 (Figure 9) could delay all wood harvest where older forests are not present. Such delays could lead to temporary, local timber shortages that might promote more CO_2-intensive steel and concrete products. A "transition" period could be instituted to avoid these temporary shortages. On the other hand, the world's excess wood growth relative to harvest means the extra wood needed while waiting for young forests to grow could probably be obtained quite readily from elsewhere.

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It may be appropriate to adjust carbon sequestration incentives and building codes to reflect the value of wood use in saving CO_2 and FF (Ruddell et al., 2007). For example, REDD and other incentives that seek to store CO_2 in forests appear to be counterproductive if curtailing harvest meant steel and concrete were used in construction instead, with concomitant high rates of CO_2 emissions and FF consumption. A dilemma becomes how to avoid deforestation and degradation while promoting CO_2 savings if wood products/wood energy save much CO_2. One solution would be to credit landowners for additional CO_2 stored in the forest at a landscape level, but give CO_2 credits to builders for substituting wood for steel or concrete construction components (Figure 1; mgb Architecture + Design, 2012). It is anticipated that the builder would pass some of the money saved by using wood to the landowner in increased timber prices. The result would be incentives for landowners to grow useful forest products/wood energy, but also to store more carbon within the forest landscape. Such a solution could be further enhanced by only allowing REDD, other forest carbon credits, and/or wood construction carbon incentives where wood is harvested from certified forests, presuming certification ensures that forests are sustained and biodiversity is protected.

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Senator Dembrow and Representative Helm,

Forest resources can become a major driver of Oregon's economy provided the Clean Energy Jobs Bill is properly crafted.

1.) Discuss opportunities for agriculture, forestry, and fishing sectors under a cap and invest program and what would be important to understand for the offset conversation.
- State regulated forest lands sequester 46 million gigatons of carbon/ year, and scientists estimate changing forestry practices could increase that amount 15%.
- Improvements in forestry management alone could offset 10% of Oregon's total carbon footprint of 60 mgtc/ yr., up to 7 mgtc/ yr.
- Canada has a floor price of $50/ ton by 2022. Monetizing Oregon's carbon resources could mean a boost to Oregon's distressed timber communities.
- This process would take organizing, scientific study, and infrastructure work to capture the state's potential value.

2.) How can an Oregon offsets program be designed to provide the most benefit to Oregon's rural economics, communities, and Native American Tribes?
- SB 1070 ceiling offsets are set at 8%. By producing forest carbon credits of the highest stringency, Oregon can design a system in which forest carbon offsets can make up 30% or more of compliance instruments. The California percentage of compliance is allowed to be met through offsets and can be raised with a higher level of scientific study and durability.
- Coos and Douglas Counties are economically distressed, yet have huge carbon resources in the surrounding forests especially the Elliott State Forest. This could be considered a " General Market Participant" under SB 1070, being eligible to sell carbon offset credits in Oregon's carbon trading market created under SB 1070.
- The Native American Tribes are landowners in these counties that could benefit from these offset credits.
- Because forest carbon credits are so significant to Oregon, a member of the global warming quality commission's forest carbon measurement task force should be on environmental quality commission's advisory committee.

3.) What are concerns related to development of, and use of, offsets, and how can a problem be designed to address some of these concerns? What can we learn from existing offset programs?
- Oregon has some of the world's most accomplished forest carbon scientists, capable of creating a world class forest carbon research facility based in and supported by the sale of carbon credits from the Elliott Forest.
- Oregon can become a global leader in forest carbon science as a leading producer of forest carbon credits.
- This economic activity will boost local forest based communities throughout Oregon and create a new forest jobs sector in monitoring and establishing forest credits.

4.) What opportunities exist in Oregon for agriculture, forestry, and fishing sectors, and who would benefit? How will revenues be invested in rural communities? Examples?
- An Atmospheric Recovery Institute should be established at the University of Oregon or at Oregon State to design a plan to assist in restoring Earth's atmosphere to a stable equilibrium of 350 ppm of carbon dioxide. An independent institute would serve as the best hope for designing a template of

actions to restore a stable climate system. An Atmospheric Recovery Institute would be a global leader in the endeavor to restore a global climate system.
- Many of the best scientists in the world are researching approaches to de carbonization or Drawdown, but these research initiatives are mainly singular. They lack the coordination of a global climate change collaborative and do not have an eye towards achieving de carbonization and drawdown in a systemic way responsive to the actual magnitude of the task and urgency of looming tipping points. Much of the research stops at conceptual stage and does not proceed into the next phase of designing broad scale implementation on the ground. This institute would serve as the collective for innovation, the catalyzing, organizing entity that steers a cross disciplinary endeavor from concept to practical design.
- A forest carbon research facility in the Elliott Forest would push scientific boundaries of knowledge about forest carbon cycles and establish new levels of certainty about carbon storage that would translate into higher value of forest carbon credits.
- A new Oregon job sector will be established by monitoring field work by researchers from all over the world to learn forest carbon science and forest technicians would establish and monitor forest carbon reserves.
- The value of establishing and marketing carbon credits of a high quality will work its way from the rural sector into the rest of the state.
- The Elliott Facility could provide an extension service to small timber owners and to industry alike, assisting them to register carbon reserves and draw income from preserving forests instead of harvesting resulting in many environmental improvements benefiting fisheries and the recreational sector.

5.) How can a cap and invest program help advance Oregon's efforts to mitigate and adapt to the effects of climate change?
- State regulated forest lands store 10 billion tons of CO_2 , more than 100 times the state's annual carbon footprint of 60 million tons. Oregon can sequester a significant portion of the carbon needed to be drawn from the atmosphere globally and small changes in the amount of carbon stored can have a significant impact on the state's carbon footprint.
- Oregon can set the standard for forest carbon science which may include storage capacity of federal lands in the coast range and western Cascades.

James Neu
Eugene, Or.
350.Eug Volunteer

I am going to avoid the topics that I anticipate that others will comment on and focus on a small number of topics that may be missed by the work group participants.

Integration with California, Quebec and Ontario Markets

There are a large number of reasons to integrate our GHG markets with California, and other already associated with California. Many around the table focused on the thinness of an Oregon-only market and the difficulty that it could have finding a price in whatever auction design is chosen.

There is a second, more compelling reason, to integrate with California -- market power. "Considerations for Designing a Cap-and-Trade Program in Oregon" (Considerations) (http://www.oregon.gov/deq/FilterDocs/ghgmarketstudy.pdf) gives a list of actors that will have to purchases allowance in Appendix 1. The list potential bidders is long and the Herfindahl index, a commonly used index of market concentration, is only 0.0614. That would generally not get the attention of the DOJ in a merger context where monopoly power is the concern, but this is about monopsony power and there are few, well established, standard.

According to the appendix of the Considerations report, six firms will be required to purchase 49.8% of the allowances and the top 10 firms will be purchasing 72% of the allowances. That is concentrated enough to provide caution. California does not have the same concentration levels because they have more independent power producers that are required to purchase allowances.

Integrating with WCI and California markets reduces this monopsony power and can help avoid some of the market monitoring expenses that will go along with the allowance market.

Need for Legislative Guidance on Floor and Ceiling Price Mechanisms.

Price ceilings and floors in allowance markets are a key compromise that makes cap and trade palatable to the business community, which prefers the certain prices of a carbon tax. As with all market interventions, ceilings and floors require many additional rules and introduce a lot of complexity to a market.

California's Allowance Price Containment Reserve has many laudable features, e.g., holding limitations and speed bumps. It allows for allowances that remain unsold at the price floor to enter the reserve and later be sold when prices are at the ceiling level. This prevents some of the abuses, mentioned in the work group, of states issuing new allowances at the price ceiling, effectively removing the GHG emission cap if prices are to high.

In Oregon this would have to be implemented by having the Global Warming Commission, or other government entity, operating as the seller of last resort. They would have to withdraw allowances when the allowance prices are at the floor so that the consigned and free allowances could be sold at market rates to achieve the investment objectives of Cap and Invest.

Sales of allowances at the price ceiling and floor should not be thought of as rare. Borenstein, Bushnell, and Wolak analyzed California's Allowance Price Containment Reserve,

in "California's Cap-and-Trade Market Through 2030: A Preliminary Supply/Demand Analysis" (https://ei.haas.berkeley.edu/research/papers/WP281.pdf). They find, "... [that] there is a 34% probability of the price hitting this ceiling, a 47% probability of the price settling at the floor, and a 19% probability of a price between the floor and the ceiling."

In other words, they expect a powerful role for a market maker, either holding allowances when the price is at the floor or selling when at the price ceiling. The functioning of the market is very sensitive to the rules we use for price containment and speed bumps. This should probably be specified in the legislation rather than later rule making because of its pivotal role in price formation, volatility and revenue.

Bankability of Allowances

There is significant debate within the policy community on the value of bankability, allowing allocations purchased in one year to be used in later years. The general consensus is that bankability allows: reduced volatility allocation prices as they near expiration, increases in both allowance prices, and increases in investments in technology that reduce GHG emissions.

Bankability comes with some risks. The primary problem is that it provides a certain return equal to the annual increase in the price floor, assuming that our market will function similarly to California and be at the price floor 47% of the time. Depending on the rate at which the floor increases, this could be a very popular investment.

Depending on how the Oregon PUC chooses to treat banked allowances, the limitations on quantities and how they are marked to markets, there could be even greater certain returns for the regulated utilities. They could earn both the floor increase and their regulated rate of return. Again, this depends on specific PUC decisions.

Bankability is relatively difficult to change after the fact and can be disastrous. The European markets famously crashed in December 2007 after an attempt to limit bankability.

There is another mechanism that can provide some of the benefits of bankability, even increasing the benefits of bankability while reducing the costs, a carbon futures market similar what already exists for California and European carbon allowances on the Intercontinental Exchange.

The futures markets are where price discovery is truly made. For example, in 2011 about 88% of the total carbon transactions in Europe were in futures, 2% in spot emission allowances and 10% in options (George Daskalakis, On the efficiency of the European carbon market: New evidence from Phase II, Energy Policy, Volume 54, March 2013, Pages 369-375.). There is also significant evidence that futures markets help the efficiency of spot markets. This generally holds true in foreign exchange, energy and commodities markets and could be considered an additional benefit of integrating with California and the WCI.

In summary, integrating with California as much as possible has large potential benefits for Oregon. Taking our own path, which we tend to do, citing Oregon's uniqueness, may force us to take more risks.

An overarching concern is that this legislation is predicated on it not being a revenue bill. I believe we need a fallback position in case of resistance in the legislature calling for a super-majority vote or later lawsuit that questions the constitutionality of the bill. I have suggested per capita free allocations in the past, but those would be ineffective in generating the revenue that would be used for the ‘invest’ portion of cap and invest.

Sincerely,
Jamie Woods

Clean Energy Jobs Work Groups

Meeting #1 -- Homework Questions

DIRECTIONS: No later than one week prior to the second work group meeting, please send your responses to the questions below to committee staff (beth.patrino@oregonlegislature.gov or beth.reiley@oregonlegislature.gov). As you prepare your responses, please consult with others in your organization or industry, particularly any located in jurisdictions currently participating in the Western Climate Initiative.

Question 1: What aspects of a cap-and-invest policy as it is being discussed in Oregon are you most concerned about for your organization/industry/constituents/customers?

The cap and invest policy has the potential to generate significant revenue that will be invested in accelerating the deployment of clean energy technologies, such as in-conduit hydropower facilities. In order for this revenue to have a significant impact in our rural communities it will be necessary for the regulatory agency to provide a clear, transparent process for organizations with an interest in developing projects – either offset projects or projects that will increase the amount of renewable energy we generate here in Oregon. Complexity and high costs associated with accessing available revenue are often market barriers for irrigation districts accessing capital to buy down the cost of our projects.

Question 2: What changes would you suggest be made to cap-and-invest as it is currently being discussed to address the concerns you have?

I would provide more clarity about how much money will be available to invest in projects like in-conduit hydropower generation. Right now the language in the bill is really vague and leaves a lot up to the rule-making process.

Question 3: What opportunities do you believe exist for your organization/industry/constituents/ customers from implementation of a cap-and-invest policy as it is currently being discussed in Oregon?

Our ability to develop in-conduit hydropower generation facilities is an integral part of irrigation modernization. Our primary purpose is to deliver reliable water resources to our patrons. Converting open ditches and canals to pressurized piping systems allows us to meet this obligation using the water necessary to meet demand. This conversion has the potential to conserve a significant amount of water in Oregon that can be used to enhance healthy rivers and streams. Converting to pressurized pipe also allows for irrigation districts to install in-conduit hydropower projects. Not only do theses projects provide 100% renewable baseload energy to our utilities, they

1. Create local economic development,
2. Provide local energy resources in cases of emergency for emergency responder teams and bases, such as the Cascadia earthquake, and
3. Establish a critical additional revenue stream for districts that can be used to invest in future water conservation projects.

My homework is as follows:

1. My primary concern is that we are not able to tell industry how much the cost of this initiative will cost them. I understand that it is market based, but we need to be able to give a fiscal impact estimate to them in order to truly forecast the impact of this bill. I am also concerned about the disparate impact to low income households who spend a proportionately higher amount of their monthly income on utilities.

2. I think we need to set a price for the credits for the first couple of years so we can offer determinate pricing and keep businesses from leaving the state because of the perceived risk.

3. I believe that this is an opportunity to make an investment in the future of rural Oregon. We need to structure this to encourage businesses to locate in our rural regions, including eastern Oregon and the coast. I think we need to offer credits to the consumer owned utilities so the savings can be passed to their owners, especially since they are primarily located in the rural areas.

Melissa

Melissa Cribbins
Coos County Commissioner

Clean Energy Jobs
Work Group on Utilities and Transportation
Homework of Randy Tucker, Legislative Affairs Manager
October 10, 2017

Metro

Thank you very much for the opportunity to participate in this critical conversation.

Introductory comments

While the Metro Council is keenly interested in the overall success of efforts to reduce greenhouse gas emissions, these comments will be confined to the aspects of the proposed legislation that directly implicate issues within the realm of our specific responsibilities as a government.

Metro has two broad categories of interest in this legislation.

First: on the policy level, Metro and its local partners in the Portland region have agreed upon a set of desired outcomes for successful communities, one of which is that the region demonstrate leadership in addressing climate change. The Metro Council is committed to actions and policies that advance this objective through our four primary business lines:

- land use and transportation planning
- solid waste management, waste reduction and recycling
- protection, management and restoration of parks and natural areas
- operation of visitor venues like the Oregon Zoo and the Oregon Convention Center

Second: depending on its eventual specifics, the proposed legislation could affect the institutional interests of our agency in terms of both funding and operations related to the four business lines mentioned above. We are encouraged about the opportunities the legislation may provide for Metro to further advance its specific efforts to reduce greenhouse gas emissions. However, there may also be risks to Metro's institutional interests and operations depending on how the legislation is drafted or implemented.

Another of the desired outcomes for successful communities is that the burdens and benefits of growth and change are equitably shared among the residents of our region. With this in mind, Metro is committed to diversity, equity and inclusion in both of the realms mentioned above. On the policy level, we increasingly recognize and elevate the importance of equity throughout our programmatic work, on issues ranging from equitable housing to transportation planning and investment to access to nature. On the institutional level, we have dedicated increasing resources to ensuring that our operations reflect the importance of addressing systemic inequalities both in our workplace and in the larger community.

We thus appreciate the emphasis of the proposed legislation on mitigating any challenges a cap-and-invest system might impose on impacted communities. For example, our work in land use and transportation planning has demonstrated the importance of taking into consideration not just housing costs but also transportation costs when defining affordability. This is because lower-income residents, many of whom are people of color, are often forced to live far from important destinations and spend more of their income on getting to work, school, and shopping, often in older, less fuel-efficient vehicles. These individuals thus both contribute to climate change and suffer greater impacts from actions taken to address it that might raise transportation costs.

Final introductory comment: These responses remain preliminary. We anticipate that we will have opportunities for further input as the legislation, and our understanding of it, advances.

1. What aspects of a cap-and-invest policy as it is being discussed in Oregon are you most concerned about for your organization/industry/constituents/customers?

- How to ensure the most effective expenditure of auction proceeds that are constitutionally restricted to being spent in the road right-of-way
- How to support investments in reducing GHG emissions from transportation that are not eligible for Highway Fund dollars
- Apparent failure of the draft legislation to explicitly exempt waste and agriculture, even though this seems to be intended (per work group presentations and previous information)
- Definitions related to impacted communities, etc., and how they affect the geographic distribution and use of auction proceeds

2. What changes would you suggest be made to cap-and-invest as it is currently being discussed to address the concerns you have?

We are still developing an understanding of how the proposal would work and its implications for Metro, so we will reserve judgment on specific potential changes at this time beyond those suggested in questions 1 and 3.

3. What opportunities do you believe exist for your organization/industry/constituents/ customers from implementation of a cap-and-invest policy as it is currently being discussed in Oregon?

The proposed legislation may provide many opportunities to enable or otherwise support activities of Metro or our regional partners that directly reduce our region's contributions to climate disruption.

Transportation

- **Support the Portland region's Climate Smart Strategy and other MPO climate efforts.**

Metro and our jurisdictional partners in the Portland region have a long history of making cost-effective transportation investments that protect air quality by reducing single-occupancy vehicle use and vehicle emissions. In partnership with the Joint Policy Advisory Committee on Transportation (JPACT), Metro serves under federal law as the region's Metropolitan Planning Organization (MPO) and thus has the responsibility of allocating federal transportation dollars, including those that are specifically required to be used for transportation investments that improve air quality. As of October 2, we reached the milestone of having successfully complied with federal air quality standards for 20 years without exceeding pollution limits.

Statewide, two out of every three Oregonians live within an MPO boundary. Like Metro, Oregon's seven other MPOs (Albany, Bend, Corvallis, Eugene/Springfield, Middle Rogue, Rogue Valley, Salem/Keizer) are responsible for making sure that the urban regions of the state meet federal air quality goals, and for allocating the federal funding that comes to Oregon to improve air quality through transportation. Most Oregon MPOs have significant experience distributing funds to meet specific air quality and environmental goals, setting them up for success in reducing greenhouse gas (GHG) emissions. ODOT already turns over most of its environmental and air quality management and reporting to the MPOs.

Moreover, the Legislature has already recognized the role that MPOs in particular play in meeting our goals for reducing GHG emissions through transportation planning and investment. The 2009 Jobs and Transportation Act (JTA, HB 2001) directed every Oregon MPO to develop a scenario for reducing GHG emissions from the transportation system, and required Metro/JPACT, the largest MPO, to develop *and implement* a strategy to reduce the Portland metropolitan region's emissions enough to achieve state climate targets by 2035. In response, Metro and JPACT in 2014 adopted the Climate Smart Strategy, which has been approved by LCDC (with ODOT support) as a framework for reducing transportation-related GHG emissions. *However, significant funding is still needed to successfully implement this strategy.*

The charge to address GHG emissions from transportation was given to the MPOs, not the state, because the Legislature recognized that each MPO manages its regional transportation system and has the ability to effect long-term change on that system. All existing US cap and trade precedents have made the same decision: California allocates the majority of their transportation-related cap and trade funds to MPOs, and the American Clean Energy and Security Act, federal cap and trade legislation passed by the House of Representatives in 2010, dedicated 2% of total revenue to MPOs for transportation planning focused on reducing GHG emissions.

Climate Smart Strategies that can be implemented with State Highway Fund dollars

The region's Climate Smart Strategy includes nine categories of activity. The ones *<u>underlined</u>* below are eligible to be funded out of the State Highway Fund:

1. *Implement adopted local and regional land use plans*
   Building compact urban communities that provide convenient access to jobs, services and other key destinations and offer multiple transportation options can significantly reduce per capita GHG emissions. Avoiding unnecessary urban expansion onto farm and forest land offers further climate benefits. The Climate Smart analysis found that full implementation of existing local and regional land use and transportation plans would enable the Portland region to achieve the emissions target established in the JTA. The main barrier to full implementation is funding.

2. *Make transit convenient, frequent, accessible and affordable*
   Many types of capital projects within the road right-of-way can improve transit operations and help public transportation move more efficiently. These could include signal priority for transit lanes, improving transit stops to establish so-called "enhanced transit," improving intersections to provide better performance for all users, etc. Of course, other improvements to transit are not Highway Fund eligible (see below).

3. *Make biking and walking safe and convenient*
   Any projects to facilitate biking and walking that are built in the road right-of-way are Highway Fund eligible.

4. *Make streets and highways safe, reliable and connected*
   Self explanatory.

5. *Use technology to actively manage the transportation system*
   Investments in intelligent transportation systems (ITS) within the road right-of-way can help reduce idling, improve safety, and support carbon-friendly modes such as transit.

6. *Provide information and incentives to expand the use of travel options*
   Information and incentives have proven to be highly cost-effective ways to induce voluntary reductions and greater efficiencies in single-occupancy vehicle use as well as increased biking, walking and transit use, and thus reduce vehicle emissions.

7. *Make efficient use of vehicle parking and land dedicated to parking*

8. *Support Oregon's transition to cleaner, low carbon fuels and more fuel-efficient vehicles*

9. *Secure adequate funding for transportation investments*
   Self explanatory.

- **Increase funding for transit capital and operations.**

Significantly increasing transit service and use is the single most effective strategy for reducing regional GHG emissions from transportation. HB 2017, the transportation package passed by the 2017 Legislature, will make possible a historic expansion of public transit operations throughout the state, supported by a new payroll tax. The Portland region is extremely grateful

for this new funding stream, which will support significant progress in meeting the climate goals described above. Even with this first-ever statewide funding for transit operations, however, additional funds will be needed to provide the level of service required to meet the 2035 and 2050 limits. Moreover, key transit capital investments like the Southwest Corridor light rail line remain unfunded. To support significant investments like those described here, it will be necessary to identify auction proceeds that are not constitutionally restricted to being spent in the road right-of-way.

- **Invest in affordable housing along major transit corridors.**

As noted above, one of the easiest ways to reduce the amount people drive is by ensuring that they have convenient access to key destinations via low-carbon transportation modes like biking, walking and public transit. This is especially important for lower-income residents, who often drive older cars and who, for affordability reasons, are often forced to live far from jobs, services and other important destinations. Metro has long supported the development of affordable housing along key transit corridors by leveraging modest resources through our Transit-Oriented Development (TOD) Program. California's climate program funds affordable TOD as one of its GHG reduction strategies through a program called Affordable Housing and Sustainable Communities. Spending cap-and-invest proceeds on affordable transit-oriented housing would both reduce GHG emissions and support impacted communities, a key priority of the proposed legislation.

Solid Waste

A cap-and-invest program could provide opportunities to reduce greenhouse gas emissions while improving the solid waste and recycling services provided to residents and businesses in the Portland metropolitan region and potentially offsetting some of the costs of providing those services. The program could support investments like the following:

- **Organics processing facilities:** Development of new or expanded organics processing facilities, including both food scraps processors such as anaerobic digesters and compost facilities that process yard debris and residential food wastes. These facilities reduce the emission of GHGs that would result if these wastes were landfilled. Moreover, anaerobic digesters create renewable bio-fuels that can be used in place of fossil fuels.

- **Recycling processors and manufacturing facilities:** Grants and loans to upgrade or expand facilities that can produce better quality materials and products with recycled content, including paper fiber, glass, wood and plastics.

- **Market development:** Incentives to increase the use of waste materials by organic and recycling processors, thereby increasing demand for recovered materials – an important complement to investments in organic and recycling facilities.

- **Cleaner fuels:** Support for development of cleaner and alternative fuels to reduce diesel emissions. Metro is committed to reducing the climate impacts of the solid waste and recycling system diesel emissions, including from our long haul disposal system, regional refuse and recycling trucks and regional recycling and disposal processing facilities.

- **Waste prevention:** Support for programs that promote waste prevention, particularly the reduction of food waste and the promotion of food rescue. Working upstream on preventing food waste has especially strong GHG reduction benefits.

- **Use of recovered of recycled materials in highway projects:** Incentives to increase the use of asphalt roofing and tire wastes in road construction; development and use of new concrete mixes that emit less GHGs; expanded use of compost on roadside green spaces.

- **Compost:** Expanded use of compost on agricultural and range lands to provide both crop and grassland improvement and potential sequestering of carbon in soils.

- **Landfill gas:** Systems for improved collection.

Natural Areas

Since 1995, investments approved by the voters of the region have enabled Metro's Natural Areas Program to protect over 17,000 acres of land. Last winter alone, we planted more than 1 million native trees and shrubs as part of our restoration efforts. Increasing our capacity to protect and restore natural areas as part of a climate resiliency program would build on existing efforts to protect water quality and fish and wildlife habitat in the region. Residents of the state would benefit from those investments both from a climate change perspective, but also in terms of protecting natural resources that are critical to endangered species and sensitive habitats.

Investing proceeds of a cap-and-invest program in natural area restoration, reforestation, forest improvement programs and other carbon sequestration efforts can help to reduce the impact of emissions that cannot be eliminated for reasons of technological feasibility or cost-effectiveness. Metro's land acquisition and management programs are science-based and consistent with the substantial independent research that documents the ability to increase carbon storage in temperate forests in the Pacific Northwest.

Visitor Venues

Having installed one of Oregon's largest rooftop solar arrays on the roof of the Oregon Convention Center, Metro continues to seek ways to reduce the climate impact of energy use at our major visitor venues. Support from a cap-and-invest program could increase the feasibility of future energy efficiency and renewable energy investments in these facilities.

Multnomah County, Oregon
501 SE Hawthorne Blvd., Suite 600
Portland, Oregon 97214

To: Senator Michael Dembrow
Representative Ken Helm
Senator Lee Beyer
Representative Diego Hernandez
Representative Pam Marsh

From: Jessica Vega Pederson, Multnomah County Commissioner
Sam Baraso, Multnomah County Office of Sustainability
Brendon Haggerty, Multnomah County Health Department

Dear Senators and Representatives,

Multnomah County is grateful for the opportunity to participate in the Clean Energy Jobs work groups on Utilities & Transportation and Environmental Justice & Just Transition. The County has decided to submit answers to the questions requested at the first work group meeting as one organization. The cap-and-invest policy currently being discussed has the potential to set Oregon apart as a leader in the global fight against climate change. Our community strongly believes that climate change presents a crisis which will require massive transitions in our economy and society. This is why earlier this year the County and City of Portland jointly committed to transitioning our community to being powered completely with renewable energy by the year 2050. We believe that transitioning to a clean energy economy will make our community a more resilient and prosperous place and that the economic opportunities of this transformation will benefit people of color, low income people, and people who have been left behind by previous waves of economic development.

Multnomah County believes that it is essential that the policy we are discussing reflect the values of environmental justice, which include: reducing health and environmental harm to impacted communities; economic opportunity being extended to impacted communities through investment; protections for low and moderate income ratepayers; and ensuring impacted communities have meaningful access to the decision-making process of the program and its crafting at every level. We specifically define “impacted communities” as communities of color, low-income communities, tribal communities, and other communities traditionally underrepresented in public processes. These values have informed the answers we have provided, and will guide our advocacy and support for this policy. We look forward to continuing to engage in this process in order to craft the best policy for Oregonians and our environment.

Question 1: What aspects of a cap-and-invest policy as it is being discussed in Oregon are you most concerned about for your organization/industry/constituents/customers?

There are several aspects of the proposed policy that would need to be reworked in order to meet the goals of reducing greenhouse gas (GHG) emissions while also ensuring that impacted communities receive the support and investments needed to ensure the policy is equitable.

Multnomah County has identified several of these aspects where the policy fails to adhere to our principles outlined above, including:

- A lack of a clear decision-making structure that includes meaningful participation and representation of impacted communities;
- A lack of transparent discussion regarding the impact of offsets, free allowances, and consigned allowances on local pollution reduction, reinvestment revenue, and GHG emissions reductions; and
- A lack of meaningful discussion on mechanisms to protect impacted communities from adverse economic consequences as a result of the policy.

We provide specific recommendations on how these weaknesses can be addressed in our response to question 2.

Question 2: What changes would you suggest be made to cap-and-invest as it is currently being discussed to address the concerns you have?

Multnomah County believes that there are several changes that could be made to the cap-and-invest policy that will help ensure that the policy adheres to the goals and values of Multnomah County residents. Below we provide brief context for these suggestions and outline the suggestions in bold.

- Multnomah County bears the highest burden of transportation-related air pollutants in Oregon, the health and social costs of which fall disproportionately on impacted communities. In addition, cap-and-invest compliance costs for transportation related emissions are challenging to mitigate for impacted communities. Previous experience suggests that local control of transportation investments, guided by representation from impacted communities, will both reduce GHG emissions and provide direct health and social benefits for impacted communities. Since 1990, Multnomah County has welcomed a 33% population increase, and a 24% job increase, while reducing its overall carbon emissions by 21%; In that same timeframe, the overall emissions from the State of Oregon have increased 12%. Clearly, local jurisdictions have had greater success at reducing GHG emissions than the State. **We recommend that reinvestment revenues subject to the Highway Trust Fund be prioritized for areas that bear the greatest burden of transportation-related air toxics emissions and have shown success at reducing GHG emissions, while ensuring representation of impacted communities and local control of dollars.**
- An equitable cap-and-invest policy must include protections for low and moderate income rate payers as well as investment in impacted communities to ensure a just transition to a clean energy economy. **Free allowances must not be given to utilities. Instead, utilities should be consigned allowances for their sale back to the market, such that the proceeds are sufficient**

to provide ratepayer support to low and moderate income ratepayers and progressive energy investments in impacted communities.

- Multnomah County recognizes that free allowances may be used to support energy intensive, trade exposed entities prone to leakage, which occurs if production shifts outside of Oregon to a region not subject to GHG emissions reduction requirements, potentially resulting in unchanged emissions. While this may be necessary to minimize economic impact while meeting GHG goals, it is important that such entities reduce their GHG emissions over time in order to meet our GHG goals. It is also critical that all GHG emitters are included by the cap-and-invest program, irrespective of how allowances are allocated. A successful cap-and-invest policy must also regularly re-evaluate whether and to what degree free allowances are necessary. **Under no circumstances should any GHG emitters covered in SB 1070 (2017) be determined to be exempted from the cap-and-invest program. Additionally, the allocation of free allowances should not be codified into legislation, and instead should be determined in rule and reconsidered on a regular basis based on a consistent methodology.**
- A flexible compliance mechanism is key to maximizing GHG reductions while minimizing negative economic impacts. We believe the underlying allowance mechanism within the cap-and-invest policy provides such a framework. We also believe the use of offsets is contrary to the cap-and-invest policy goals, displaces the urgency to shift to a clean energy economy, and reduces reinvestment revenues that may otherwise drive meaningful environmental and economics benefit to Oregonians. In lieu of offsets, there are strategic reinvestment opportunities within the cap-and-invest policy that improve the economic health of our rural communities through investments in forest health, wildfire prevention, carbon sequestration, and other climate resilient forestry/agriculture projects that better support GHG emissions reduction goals. Similarly, there are better programmatic cost containment measures, such as allowance reserve pools, that both maintain cost stability and integrity in our GHG emissions reductions. **Allowing offsets is not necessary to meet the GHG goals in a cost-effective manner, and they should not be included in the program.**
- Finally, additional changes must be made to clarify the decision-making structure of the program, taking care to ensure that impacted communities have a meaningful place at the table and that the perspectives of those communities are able to access the decision-makers. **The decision making structure must be both simplified and clarified to ensure a clear oversight structure that includes meaningful representation of impacted communities. We define such representation as at least 40% of relevant parties representing impacted communities.**

Multnomah County believes that this policy must result in a program which will meet the State of Oregon's adopted GHG reduction goals, as well as the goals established in the Multnomah County/City of Portland Climate Action Plan of reducing GHG emissions 80% below 1990 levels by the year 2050.

Question 3: What opportunities do you believe exist for your organization/industry/constituents/customers from implementation of a cap-and-invest policy as it is currently being discussed in Oregon?

Multnomah County sees a number of existing and potential local implementation pathways that will help ensure the policy adheres to the goals and values of Multnomah County residents. These pathways are not unique to Multnomah County and will serve the majority of communities across the state. These pathways are also clear strategies for mitigating the potential harm to impacted communities from the cap-and-invest program by providing direct economic, health and safety benefits to these communities.

I. Increase the percentage of transportation funding generated for the Highway Trust Fund for local jurisdictions to invest in GHG emission reducing transportation projects that maximize health, safety, and community co-benefits for impacted communities. Examples include:

- Bring orphan highways up to urban street standards (Powell Blvd, 82nd Ave, Lombard St.).
- Fund Highway Trust Fund eligible projects that have been identified by MPOs with a particular emphasis on pedestrian and bicycle safety projects in areas where impacted communities live.
- Fund priority projects identified in the State of Oregon mandated and complimentary Metro Climate Smart Communities process which is projected to reduce tailpipe emissions by 29% over 2005 levels.

II. Invest in energy related programs using the proceeds of utility consigned allowance sales to both mitigate utility related cost impacts for impacted communities and support a just energy transition. Examples include:

- Addressing the unmet needs of low-income weatherization assistance programs to lower the energy costs for low income rate payers, which will also improving their health and well being.
- Expand the eligibility of low income weatherization programs to moderate income rate payers.
- Increase funding for oversubscribed low income rate energy assistance programs or transition to other innovative approaches that support low and moderate income rate payers such as a percentage of income payment plan (PIPP).
- Increase investment in energy incentives that prioritize access to and jobs from renewable energy, energy efficiency, and electric vehicles for impacted communities.

III. Invest in projects that reduce greenhouse gas emissions, build resilience to climate impacts, and directly improve local air quality. Examples include:

- Implementation of a wood stove education and changeout program that addresses the 15,000 uncertified wood stoves in households in Portland, and the many more across the state in areas with unhealthy air quality.
- Complete targeted upgrades to households of vulnerable or sensitive populations, such as HEPA capable indoor heating, cooling and ventilation systems, that can reduce concentrations of indoor pollutants that can trigger asthma and other health problems.
- Provide funding for clean diesel replacement and retrofits programs to reduce particulate matter emissions that accelerate climate change and harm respiratory health.

Oregon has an unparalleled opportunity to address climate change in ways that improve public health, create jobs, and benefit all residents. Reducing greenhouse gases is not only critical for the residents of Multnomah County, but also our state, the nation, and the global community. Multnomah County greatly appreciates the legislature having committed energy and resources to this important work.

Neighbors for Clean Air
PO Box 10544
Portland, OR 97296

To: Senator Michael Dembrow
Representative Ken Helm
Senator Lee Beyer
Representative Diego Hernandez
Representative Pam Marsh

From: Akashdeep Singh, Neighbors for Clean Air

Neighbors for Clean Air is grateful for the opportunity to participate in the Clean Energy Jobs work group on Environmental Justice and Just Transition. We stand with the cap-and-invest policy being a potential tool to use in our efforts to mitigate the catastrophic effects of climate change while nevertheless strongly cautioning against only espousing market-based mechanisms as the primary methodologies as we turn towards a future build on renewable energy sources.

Neighbors for Clean Air strongly believes in the principles of environmental justice and its implementation within all environmental policies designed for a more sustainable future. We see a plethora of opportunities available within Clean Energy Jobs for environmental justice to be implemented. There is an opportunity to reduce health and environmental harm to impacted communities, to ensure that the most impacted communities being at the forefront of receiving sustainability and equity-minded investments, protections of low income ratepayers, and ensuring that environmental justice communities will have a consistent and meaningful engagement within this process.

Neighbors for Clean Air defines the most impacted communities within the lens of environmental justice as communities of color, low-income communities, tribal communities, and other communities traditionally underrepresented in public processes.

Question 1: What aspects of a cap-and-invest policy as it is being discussed in Oregon are you the most concerned about for your organization/industry/constituents/customers?

1. There is a lack of a transparent decision-making structure that specifies the environmental justice mechanisms that include meaningful participation, representation, and access for impacted communities. These mechanisms must also address a just transition of jobs for impacted workers.
2. Clear definitions on offsets, free allowances, and consigned allowances on local pollution reduction, reinvestment of garnered revenue, and the reduction of greenhouse gas emissions.

As an organization, we harbor a significant concern in regards to offsets and/or allowances being used as a loophole mechanism by industry.

Question 2: What changes would you suggest be made to cap-and-invest as it is currently being discussed to address the concerns you have?

- No free alliances to utilities.
- We are supportive of reinvestment revenues that are currently beholden to the Highway Trust Fund be prioritized for the most impacted neighborhoods through a transparent and accountable process.
- No greenhouse gas emitters within the bounds of SB 1070 can be allowed to be exempt from this program.
- Offsets negate the urgency of acting on climate change and critically reduces the reinvestments our most impacted communities so urgently need to transition towards a clean energy job market. Other options are more viable, exist, and should be explored.
- The current committee process is byzantine and is difficult to clarify in simple terms. Its structure can also unfortunately inhibit the practice of environmental justice as there is not a sufficient requirement to ensure that marginalized communities have a meaningful engagement and impact on the process.
- Community engagement processes need to increase in their equity and efficacy. The current process as it holds is in its nascent stages, but the public needs the information in an accessible information in order to understand what Clean Energy means for their communities.
- Carbon charge pricing needs to be set at a high enough level as to where the eschewing of carbon intensive fossil fuels is cost effective and the revenues garnered for investment will be high enough to garner more substantial clean energy jobs and initiatives.

Question 3: What opportunities do you believe exist for your organization/industry/constituents/customers from the implementation of a cap-and-trade policy as it is currently being discussed in Oregon?

- Most critically, prioritize the most impacted communities for revenue investment.
- Public transit infrastructure in the most impacted Portland neighborhoods, including sidewalks.
- Fund air quality improvement projects in disproportionately impacted neighborhoods.
- Invest in energy related programs that designed to mitigate energy costs for low- and moderate-income families.
- Expand eligibility of low-income weatherization programs and prioritize impacted communities living in vulnerable areas, such as coastal zones, floodplains, and disproportionately impacted urban areas.

- Increase investments that provide a priority to just transition jobs, energy projects, and vehicular transport.
- Retraining for affected workers and retooling for affected industries.
- Increase funding for clean energy research and investment
- Incentivize the affordability of clean and renewable technologies.

Neighbors for Clean Air is honored to be a part of this opportunity to ensure that Oregon keeps a leadership position on the fight against the catastrophic impacts of climate change. Reducing greenhouse gases and air pollution are priorities for the organization and we are committed to working on this proposition on behalf of all Oregonians but most importantly the most impacted communities. Neighbors for Clean Air is grateful for the legislature's time, efforts, and resources committed to this work.

Sincerely,

Akashdeep Singh

Akashdeep Singh, BAH
Neighbors for Clean Air
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(209) 263-1774

NORTHWEST FOOD PROCESSORS ASSOCIATION

October 9, 2017

Senator Michael Dembrow
Clean Energy Jobs Work Group
Beth.patrino@oregonlegislature.gov

RE: Meeting #1 – Homework Questions

The members of the Northwest Food Processors Association (NWFPA) submit the following responses to the Regulated Entities Meeting #1 Homework Questions.

Question 1: What aspects of a cap-and-invest policy as it is being discussed in Oregon are you most concerned about for your organization/industry/constituents/customers?

Impact on Climate Change and Impact on Oregonians. Oregon contributes about 1% of total U.S. greenhouse gas emissions and represents about 3/10th of 1% of total global emissions. Actions taken by Oregon will have little or no effect on climate change. Do the citizens understand that actions will not affect climate change and that cap-and-invest will result in increased energy costs and costs of goods for all citizens?

Emissions (Energy) Intensive Trade Exposed Industries. The cap-and-invest program will impair the ability of Oregon companies to compete in the domestic and world economy. Oregon companies will experience increased costs of production when energy prices increase as a result of cap-and-invest.

What is the definition of Emissions (Energy) Intensive Trade Exposed entities? How will EITEs be determined? Will there be an outright exemption for certain industries or will standards be set? Will there be an exemption process or a determination process? What are approaches that have been used in other markets? What are approaches that could be used in Oregon?

Leakage. Leakage does not involve only EITE companies**.** Increased energy costs that result from implementation of cap-and invest can adversely impact non-EITE companies and affect their competitiveness relative to foreign and domestic competitors, especially companies with extremely thin margins. Leakage impacts are not restricted to solely to emissions/environmental impacts but include loss of jobs, loss of tax revenue, loss of economic multiplier benefits, e.g., other businesses and jobs, community infrastructure and support.

What are the cost control and containment measures that can be applied? What provisions can be included to guard against bidder collusion and market manipulation, that minimize the burden of complying with program requirements, that minimize fees and program administrative costs? What are the state's administrative costs and what is the cost to link to WCI or other markets?

Covered Emissions. What emissions are considered subject to the program? Does this apply only to fuel combustion for direct use and for electricity production? Does it include biogenic (woody and non-woody)? Does it include process emissions? Process emissions reductions may require huge capital investments to alter their production processes. For some companies, the only way to reduce process emissions is to cut production.

Offsets. What types of projects can be used for offsets and how will this be determined? How many offset credits will be available and will offsets be restricted? How will the linked market dictate Oregon offset provisions? Can covered entities generate offsets?

Revenues.

How would industrial customer rates be affected by allowance allocations to utilities? What customers will benefit and how will this be determined. How will utilities be regulated?

What kinds of projects and programs are envisioned for the several funds and accounts into which cap-and-invest revenues will be deposited? Who may apply for grants and funds? How will the state assure that it is using revenue to address greenhouse gas reductions? A majority of the funds are to be distributed to projects or programs in impacted communities and economically distressed areas. What kinds of projects and programs are envisioned in these areas? How can we assure that revenues collected to drive reductions in greenhouse gas emissions are not used for existing projects and programs that should be funded from other state sources? How can we assure that there is transparency and accountability for the expenditure of revenues?

Question 2: What changes would you suggest be made to cap-and-invest as it is currently being discussed to address the concerns you have?

Impact on Climate Change. There needs to be recognition by the state and clear communication to the citizens of the state that any cap-and-invest program will not affect greenhouse gas emissions or climate change such that harm to the state from climate change can be reduced. Likewise, the citizens must be informed that a cap-and-invest program in Oregon will impose increased costs on <u>every</u> business and household in Oregon. It is not just the "big polluters" that will pay, but everyone will pay.

Emissions (Energy) Intensive Trade Exposed Industries. The food industry must be exempt or receive free allowances and these allowances or exemptions must be permanent and not expire or be reduced over time. Oregon food companies face significant competition from imported food products as well as domestic food products from areas of the U.S. that lack strict

environmental regulations like those in Oregon. Cap-and-trade will further increase the cost of making food in Oregon by an industry that is already operating on extremely low margins. Energy is necessary not only to make raw materials into food, but it is also critical to assure that the food we provide to consumers is safe. Food is a necessity and to keep food affordable, food companies are not able to pass on these additional costs to consumers. Likewise, agricultural producers, including their mobile sources, should be exempt.

If EITE standards are set, they should not be "one-size-fits-all" as there are significant differences among industry sectors and within industry sectors and subsectors. Sectors are not homogeneous. Standards should be guidelines and determinations should be facility specific.

Leakage. Carbon pricing and costs of compliance must be set at a level that does not result in competitively disadvantaging companies and that minimizes leakage. This applies to covered and non-covered entities, which are both at risk when energy prices increase, margins are slim, and costs are not readily passed on to consumers. Rural communities will be particularly impacted by loss of food companies or loss of production at food companies as these companies are major employers and support related businesses and community infrastructure in these locales.

Covered Emissions. Should be limited to energy combustion emissions and process emissions that are reasonably able to be reduced. Food company biogenic emissions should be excluded from coverage. Food byproducts must be recognized as biomass sources for biofuel and electricity production and should be exempt. Exclusion devalues and disadvantages food byproducts as a potential renewable energy source.

Offsets. Carbon sequestration (forest, agricultural, and others) must be recognized as activities that are eligible for offsets. Covered entities should be able to generate offsets.

Revenues. Revenues should be used to provide incentives, tax credits and grants for companies to implement voluntary measures that reduce greenhouse gas emissions at their facilities. In addition to reducing emissions, projects and programs at industrial facilities will produce efficiencies and facility upgrades that will improve competitiveness, support job retention and creation, and will reduce/prevent leakage.

In 2009, members of Northwest Food Processors Association adopted a voluntary goal to reduce industry-wide energy intensity (amount of energy used to produce our products) by 25% in 10 years and 50% in 20 years. We are well on our way to achieving this goal (and also achieving associated reductions in greenhouse gas emissions). The members recognized that technology advances would be needed to achieve the 50% goal and greater energy reductions. Technological advances are now available, but they are extremely costly. This is where revenues could provide grants and incentives to make these technologies and their associated emissions reductions a reality for food companies. High efficiency boilers and non-thermal processing technologies (these are cutting edge and game-changing) are examples. Conversion of refrigeration trailers to electricity and installation of shore power at loading docks at companies and distribution centers could eliminate hours and hours of diesel truck idling and significantly reduce greenhouse gas emissions and particulates.

Question 3: What opportunities do you believe exist for your organization/industry/constituents/customers from implementation of a cap-and-invest policy as it is currently being discussed in Oregon?

We are not convinced that there are opportunities afforded for food companies (both those who would be covered entities and those who would be non-covered entities under the policy currently being discussed. But, with changes like the ones we have outlined above and with other changes that may be needed as we continue to investigate and understand cap-and-invest, food processors can have an opportunity to continue to provide family-wage jobs to the citizens of Oregon, to provide healthy and nutritious food to Oregonians and the world, and to operate efficiently and competitively in Oregon.

Thank you for your consideration of our responses to the work group questions. We look forward to continued participation in the work group process.

Sincerely,

Pamela Barrow
Vice President
Energy, Environmental and Sustainability

Regarding question 1.

How are energy intensive Oregon businesses expected to make strategic investment decisions when there is no certainty regarding the allowance price for any given year and there are many factors that could drive up that price in the long term, injecting a new source of price volatility into business planning in the state?

How are the Oregon agencies that receive funds from energy consumers in the form of allowances going to budget year to year when there is so much uncertainty surrounding to level of revenue from year to year?

If allowance revenues plummet due to technological breakthroughs that drastically lower carbon emissions, will the recipients of funds be able to adjust to the lack of revenue?

If Oregon is linked to California and allowance prices spike in California in the next ten years, will Oregon businesses experience another version of the Western Energy Crisis that occurred in 2001-2002? If such a crisis started to occur, how would the implementing agency intervene to avoid the business shutdowns that could occur?

If the United States adopts a carbon tax, will Oregon energy consumers face a double tax or will the state "cap and invest" program be terminated? Where would the agencies that have begun to depend on the revenue turn if Oregon terminates its program in favor of a federal solution that has been enacted?

Question 2

To address the volatility concern, one would scrap "cap and trade" in favor of a set carbon tax with no escalators or with statutorily enacted escalators.

To address the double tax concern the legislation would have to automatically sunset if the United States enacts any policy that imposes a carbon price.

Question 3

As industrial energy consumers of natural gas, our members would pay either directly or through their natural gas utility for the cost of allowances. Even if some revenue was returned to the consumers if they invested in carbon dioxide emission reduction programs, it would be highly unlikely that any energy consumer would receive more revenue in the long run from the "invest" side than they would pay for through the price of allowances. This is particularly true for natural gas consumers as in most end uses of natural gas there is not a less expensive, lower carbon alternative to natural gas as the fuel.

Clean Energy Jobs Work Group on
Utilities and Transportation

Chair: Senator Lee Beyer, Senate District 6
Work Group Homework questions

Responses by: Roger Gray, Northwest Requirements Utilities (NRU) , Danelle Romain, Oregon People's Utility District Association (OPUDA), and Jennifer Joly, Oregon Municipal Electric Utilities Association (OMEU)

Northwest Requirements Utilities (NRU)

NRU is a non-profit trade association representing the common business interests of 53 consumer owned utilities, which are located in the seven states served by the Bonneville Power Administration (BPA): Washington, Oregon, Idaho, Montana, Nevada, Wyoming, and California. NRU members include electric municipalities, public and people's utility districts (PUDs), and electric cooperatives, all of which are primarily non-generating electric distribution utilities serving end-use electric consumers that rely on BPA as their primary supplier of wholesale power and transmission services. Eighteen of NRU's 53 members are located in Oregon. NRU appreciates this opportunity to provide comments on legislation that, if adopted, could significantly impact the electrical sector and the local communities our utilities serve.

Oregon People's Utility District Association (OPUDA)

OPUDA's members include all of Oregon's People's Utility Districts (known as PUDs), which provide electric service to nearly two-thirds of the Oregon coastline, parts of Columbia and Multnomah counties, Lane County, and as far east as Wasco County. PUDs are governed by five-member Boards of Directors that are elected by voters in each PUD's service area.

Oregon Municipal Electric Utilities Association (OMEU)

The Oregon Municipal Electric Utilities Association (OMEU) includes eleven municipally owned and operated electric utilities in Oregon. Member utilities include the City of Ashland, City of Bandon, Canby Utility Board, City of Cascade Locks, City of Drain, Forest Grove Light & Power, Hermiston Energy Services, McMinnville Water &

Light, Milton-Freewater Light & Power, City of Monmouth, and the Springfield Utility Board.

Question 1: What aspects of a cap-and-invest policy as it is being discussed in Oregon are you most concerned about for your organization/industry/constituents/customers?

Oregon is part of a Western Grid: It is critically important to understand that the wholesale electricity market in the Western US and Canada is physically and economically interconnected. However, with respect to greenhouse gas (GHG) policies, it is not "policy interconnected," which creates challenges.

Ideally, policies would be consistent across jurisdictions. In that way, GHG policies would recognize the policies already put in place by other jurisdictions. State-by-state policies (particularly Renewable Portfolio Standards (RPS)) have created somewhat chaotic results across Western power markets that are increasing costs, not creating particularly cost-effective GHG reductions, and creating worrisome trends in grid reliability due to electricity oversupply in a growing number of hours and loss of flexible resources.

A cap-and-trade/invest approach, if used across multiple jurisdictions and many economic sectors of the economy, has the theoretical potential to result in the most cost effective GHG reductions and to allow the other economic and important physical reliability aspects of the grid to function properly.

Because wholesale electricity markets are physically and economically interconnected across the West, it is important that any Oregon-based policies applicable to the electric sector not conflict with other states. We applaud the Oregon Legislature for recognizing and exploring this issue. We understand that the broad intent of the Oregon policy in its present form is to create a cap-and-trade/invest program that provides cross-jurisdictional trading. This would require Oregon policy to be consistent or perhaps at least compatible with other jurisdictions. Likewise, other jurisdictions have developed methods to establish points of regulation and accounting. Because Oregon imports and exports electricity, Oregon methods should be designed to work with other jurisdictions. It appears that SB1070's structure is different than California's approach regarding the point of regulation of electric utilities, which is not to say one is better or worse. We understand the proposed point of regulation under SB1070 may be trying to take a practical approach, which generally makes good sense. However, this is an area that needs more exploration because of the fact that electricity is bought and

sold across state lines. Different approaches to points of regulation may be able to be reconciled, but this remains an open question for us now.

Relationship to RPS: State RPS policies that apply only to the electric sector have made electricity more expensive, which may actually run counter to GHG reduction goals. This is because some of the greatest potential GHG reduction in Oregon and in some other states is in the conversion of fossil fuel transportation to electric vehicles (EVs) powered by carbon-free or lower carbon electricity. RPS policies may also have the unintended consequence of making conversion to natural gas heating more economic. Whether this conversion reduces GHG emissions depends on the make-up of the electricity presently used to serve that heating need. If the electricity is hydro-based or generated by other renewable resources then GHGs actually increase with the conversion from carbon-free electric heating to gas-based heating. Cap-and-trade/invest policies have the potential to levelize the playing field with put a price on GHG emissions through a market-based mechanism rather than RPS policies that pick winners and losers or ignore whole sectors of the economy that produce GHG.

Existing RPS policies (in all states, not just Oregon) have resulted in relatively high-cost reductions in GHG compared to alternatives. Cap and trade would result in much more cost-effective reductions in GHG emissions. While the goal of reducing GHG emissions is reasonable, the means of achieving that goal should be as reasonable and cost-effective as possible.

Relative to other state RPS policies, Oregon's original 2007 RPS was fairly well crafted. It recognized the important contribution of legacy hydropower although it did not necessarily recognize it as "renewable," and it was tempered by actual need as opposed to other states' policies that have created massive oversupply. A contributing factor to the relative success of Oregon's 2007 RPS was the manner in which it was created, which was in distinct contrast to Oregon's 2016 RPS changes.

The Northwest Power and Conservation Council's Seventh Power Plan provides clear and objective insight into what policies create the most cost-effective GHG reductions in the electric sector. RPS policies have created significant distortions in the Western electricity market place. Carbon-free Northwest hydropower, which is the backbone of the Northwest's power system and has been a major factor in the Northwest economy for decades, is not recognized as renewable under RPS. We believe that a cap-and-trade/invest approach levelizes the playing field and properly places the emphasis on GHG reductions rather than picking winners and losers or favorite technologies. With RPS policies there is an assumption that if new renewable generation is built that it will result in a one-for-one reduction in fossil fueled generation; with hindsight we can see

this is not true. Increasingly, new renewable generation is displacing other renewable generation, especially in the Northwest. In other words, these types of policies only add costs to our electrical system while failing to achieve the goal of reducing GHG emissions. Also, as mentioned above, RPS policies have the unintended consequence of making electricity more expensive, thus actually discouraging conversion from fossil fuels to carbon-free electricity in other sectors like transportation.

Another potential advantage of cap-and-trade/invest is that it puts a variable dispatch cost on resources that emit GHGs. Generally in the west today, we do not have such a variable cost. For example, in a cap-and-trade/invest world, natural gas might dispatch ahead of coal based on a combination of fuel price plus GHG emission costs. Today it is only fuel price.

There is relatively recent evaluation work from universities such as Stanford University that have assessed the effectiveness of cap-and-trade systems. While the economic theory of cap-and-trade is fairly clear, the theoretical advantage can easily be undone by conflicting policies or political intervention. The Stanford paper asserts that part of the reason California's cap-and-trade has struggled is because of a market-based solution (cap-and-trade) was operating in parallel to traditional command-and-control approaches thus causing market confusion and uncertainty.

In contrast to California's GHG cap-and-trade system, the California South Coast Air Quality Management District's (LA Basin) cap-and-trade system that has applied to NOX emissions, among other things, is one of the oldest cap-and-trade systems in the world. Many point to it being successful as a market-based solution that has helped clean up the LA Basin air quality in a relatively economic fashion. However, it should be recognized that it did result in displacements and elimination of businesses, and any cap and trade/invest programs that would be adopted in Oregon should recognize and address these kinds of impacts.

For these reasons, we encourage the Oregon Legislature to look towards an effective cap-and-trade/invest policy that applies economy wide as the primary policy to tackle GHG emissions rather than increasing RPS policies. Of course, any policy will have the potential to create "winners" and "losers" including serious consequences to some people, businesses, and communities just like the successful LA Basin NOX program did. The current draft of SB1070 and earlier evaluations by DEQ seem to acknowledge this potential and there are mechanisms to help mitigate adverse impacts, but it is critical to get these mechanisms right and to provide flexibility to adjust quickly and effectively as time goes along.

Potential Adverse Local Impacts on Rural, Small and Disadvantaged Communities: While we believe the a cap-and-trade/invest approach has the potential to achieve the most cost effective reductions in GHGs emissions, it is critical to fully understand not just the macro-level and theoretical impacts, but the micro-level and actual impacts. For example, Oregon sponsored a Portland State University study a few years ago on the economic effects of carbon taxes. (note: Carbon taxes are somewhat similar to cap-and-trade/invest approaches in that they create an effective cost on GHG emissions) The PSU studies did not find significant economic change on a macro-level (e.g. state level). But, small changes at a macro-level can still mean major changes at a micro-level (e.g. county or community level). A large negative local impact in rural Oregon can easily be lost in the noise when looking at the entire state economy.

Earlier evaluations by DEQ on cap-and-invest policies acknowledge this potential adverse impact on rural or smaller communities. We are particularly concerned about the potential impacts of policies on energy intensive/trade sensitive businesses in Oregon. We have watched the disappearance of the once large aluminum industry in the Northwest because of energy prices. A more recent example is a paper mill in Cowlitz County, Washington, that has announced plans to reduce output because of energy prices causing the loss of many jobs and erosion of economic output.

While cap-and-trade/invest policies may not have an immediate or direct effect on Consumer Owned Utilities (COUs) that rely on BPA power that is almost entirely carbon free, if policies result in closure of large businesses that are energy intensive/trade sensitive, that could have extremely adverse impacts on local communities. The job losses that occur due to the closure of these types businesses have devastating impacts to local communities and their local COUs because electricity rates increase with the loss of customer base. Some large mills or other large industrial customers can represent as much as 25%, 50%, and even 75% of a COU's retail sales base.

We understand and appreciate that SB1070 contains mechanisms intended to address these concerns. This is theoretically good. However, the actual mechanism and details are not fully developed, and our concern is that these energy intensive/trade sensitive businesses could close faster than detailed mechanisms and mitigation tools are put in place. This would create both job and GHG "leakage", which is contrary to the intent of proposed legislation.

Market Structure: Markets in general and electricity markets in particular, need stability, certainty, and fairness. We believe an Oregon cap-and-trade/invest policy needs to be consistent and compatible with other jurisdictions (note: "consistent" does

not mean identical). As mentioned earlier, we believe cap-and-trade/invest needs to become the new policy vehicle for GHG emission reduction, rather than ever increasing RPS obligations. Legislation to adopt cap-and-trade/invest, while also modifying Oregon's RPS policies, will create higher cost and chaos.

Cap-and-trade/invest is a market-based approach. In theory, a GHG reduction market that transcends political jurisdictions has the potential to create better and more stable outcomes, but it also has the potential to create volatile or unexpected outcomes. California has already experienced "learning issues" with its GHG cap-and-trade system. The role of government in a market-based system should be clear and defined in order for a market to perform rationally and fairly in response to the policy goal of government. Oregon's regulators should not regularly intervene in the market to create ordained outcomes.

The primary role of the state as the regulator in a market-based approach is to establish the amount of pollution (i.e. the GHG limits) and to ensure a fair and reasonable market (i.e. the scale is accurate, everyone plays by the rules, and goals are being met). There may be reasonable government policies of price floors and caps to help create certainty and to mitigate market volatility. This may be particular necessary early on when market players are adapting to the paradigm. However, these floors and caps will inter-play with other jurisdictions and should be carefully thought out and considered. The West Coast Energy crisis of 2000-01 contains many examples of the pros and cons of intervention by regulators with price caps. Obviously, the intent of price caps was to control a run-away market. However, in some cases it created even worse problems. The intent was one thing, but the actual result was completely different.

Local Decision Making and Authority: One key part of flexibility is to leave detailed implementation of decision-making to local governing boards where appropriate. This flexibility will allow regulated COUs to implement the broad intent of the "invest" part of SB1070 to meet local needs rather than requiring "one-size-fits-all" approaches. Additionally, we should avoid introducing additional and extraneous issues for more command-and-control and ideological-driven policy that is not supported by evidence or data.

Question 2: What changes would you suggest be made to cap-and-invest as it is currently being discussed to address the concerns you have?

General Process and Approach: One general comment we offer is less about specific changes and perhaps more about the process and approach. As we currently understand the SB1070 approach, it contemplates legislation followed by a 3-year rule-making process. As offered in NRU's initial statement at the first workshop, we are just starting to digest the SB1070 language to better understand the intent and effect of the actual language. This is complex legislation that will affect small and large communities and nearly every economic sector in Oregon. It makes sense to invest more time upfront to ensure clarity on intent and effect of the statutory language with the possibility and goal of actually shortening the rule-making timeframe. If the legislation does not provide adequate and clear guidance and safeguards, the rulemaking will be fraught with issues.

Practicality Factors: We understand that the general intent of this policy is to capture as much of the GHG emissions as practically possible, while recognizing that attempting to chase the last diffuse ton of GHG emissions might not be practical or particularly economic. BPA's power portfolio may be something to consider for practical treatment. BPA's primary power portfolio (carbon-free hydro, nuclear, and other renewable resources) is balanced with a very small amount of market purchases that sometimes contain carbon. Developing a practical way to account for this without creating administrative and costly accounting mechanisms makes sense.

Avoid One-size-fits all: Any new policies should recognize that not all utilities are in the same starting place. For example, some COUs are served entirely or mostly with BPA power today, which is almost entirely carbon-free. However, because BPA power is a limited supply, some COUs must buy power from the marketplace, which may include power with carbon content. To the extent any policy allocates allowances to utilities with GHGs in their resource mix, it should reflect individual utilities needs and situations rather than be based on broad averages or generalizations.

Rationalize Oregon Position and Policy: The State of Oregon continues to pursue litigation related to the Federal Columbia River Hydro Power System (FCRPS), which produces carbon-free power. The State's litigation position could result in shut-down or serious reductions of approximately 1/7th of BPA's portfolio of carbon-free power from the FCRPS, which would result in massive amounts of additional GHG emissions. This seems inconsistent with the very purpose of SB1070.

Allowances: This is an area of the legislation where we are still evaluating both intent and effect of the current language. The concept of allowances for the electric utility sector seems generally intended to mitigate the potential cost of a cap-and-trade/invest program. We believe it is appropriate to recognize both different historical starting

points of utilities (i.e. different GHG emissions) as well as potential changes caused by policies and litigation positions of the state.

Local Decision Making and Authority: We understand the general intent of SB1070 in its present form is to define and designate the uses of revenue associated with allowances (i.e. the "invest" portion of the legislation). The general purposes identified seem reasonable on the surface. It is crucial to leave the final decision making on how revenue generated from the sale of allowances is spent to the locally-elected governing bodies of COUs, rather than having prescriptive or pre-determined formulas or allocation methods. This is because COUs are vastly different from one another in their make-up and situations. For example, some COUs are 100% residential and some have single large industrial loads that comprise 25%, 50%, and even 75% of the total retail customer sales. One-size-fits all policies make no sense for COUs, and wise state policy would provide general guidance and intent, with final authority and decision making vested in local governing boards that are closest to the customers, residents and businesses. Because of the scale of the IOUs in Oregon, general guidance applied by the OPUC can be applied across those service territories because of the broader customer diversity and scale of those service territories.

Question 3: What opportunities do you believe exist for your organization/industry/constituents/ customers from implementation of a cap-and-invest policy as it is currently being discussed in Oregon?

Well-crafted cap-and-trade/invest legislation with well-crafted mitigation mechanisms has the theoretical potential to create the most economic and cost effective GHG reductions without either GHG or job "leakage." Likewise, poorly crafted policy has the potential to create poor outcomes. As we are just beginning to understand and engage in SB1070, we see a reasonable high-level framework that contemplates addressing potential adverse impacts and even creates potential offset opportunities in areas such as forestry and agriculture. We believe working through these important details is critical to ensure that the broad intent of GHG reduction is achieved at reasonable cost, that mitigation mechanisms will be effective, and that opportunities envisioned are realized.

Thank you for this opportunity to comment.

Affiliated Tribes of Northwest Indians
AirWorks, Inc.
Alaska Housing Finance Corporation
Alliance to Save Energy
Allumia
Alternative Energy Resources Organization
American Rivers
Backbone Campaign
Beneficial State Bank
BlueGreen Alliance
Bonneville Environmental Foundation
Centerstone
Citizens' Utility Board of Oregon
City of Ashland
City of Seattle Office of Sustainability & Environment
Climate Solutions
Community Action Center of Whitman County
Community Action Partnership Assoc. of Idaho
Community Action Partnership of Oregon
Earth and Spirit Council
Earth Ministry
Ecova
eFormative Options
Emerald People's Utility District
Energy Savvy
Energy Trust of Oregon
Environment Oregon
Environment Washington
EQL Energy
Forth
Home Performance Guild of Oregon
Home Performance Washington
Housing and Comm. Services Agency of Lane Co.
Human Resources Council, District XI
Idaho Clean Energy Association
Idaho Conservation League
Idaho Rivers United
Interfaith Network for Earth Concerns
League of Women Voters Idaho
League of Women Voters Oregon
League of Women Voters Washington
Montana Audubon
Montana Environmental Information Center
Montana Renewable Energy Association
Montana River Action
National Center for Appropriate Technology
National Grid
Natural Resources Defense Council
New Buildings Institute
Northern Plains Resource Council
Northwest Energy Efficiency Council
NW Natural
OneEnergy Renewables
Opower
Opportunities Industrialization Center of WA
Opportunity Council
Oregon Energy Fund
Oregon Environmental Council
OSEIA
Pacific Energy Innovation Association
Pacific NW Regional Council of Carpenters
Portland Energy Conservation Inc.
Portland General Electric
Puget Sound Advocates for Retired Action
Puget Sound Cooperative Credit Union
Puget Sound Energy
Renewable Northwest
Save Our wild Salmon
Seattle City Light
Seinergy
Sierra Club
Sierra Club, Idaho Chapter
Sierra Club, Montana Chapter
Sierra Club, Washington Chapter
Small Business Utility Advocates
Smart Grid Northwest
Snake River Alliance
Solar Installers of Washington
Solar Oregon
Solar Washington
South Central Community Action Partnership
Southeast Idaho Community Action Partners
Spark Northwest
Spokane Neighborhood Action Partners
Sustainable Connections
The Climate Trust
The Energy Project
UCONS, LLC
Union Of Concerned Scientists
United Steelworkers of America, District 12
US Green Building Council, Idaho Chapter
Washington Environmental Council
Washington Local Energy Alliance
Washington State Department of Commerce
Washington State University Energy Program
YMCA Earth Service Corps

NW Energy Coalition
for a clean and affordable energy future

October 9, 2017

To: Senator Michael Dembrow
Representative Ken Helm
Senator Lee Beyer
Representative Diego Hernandez
Representative Pam Marsh

From: Wendy Gerlitz, Oriana Magnera, NW Energy Coalition

The NW Energy Coalition is grateful for the opportunity to provide comment on principals for Clean Energy Jobs legislation and to engage in both the Utilities and Transportation and Environmental Justice and Just Transition workgroups.

The Coalition is an alliance of about 100 organizations who unite around the pillars of energy efficiency, renewable energy, fish and wildlife, and low-income and consumer protections. Because of the diversity of interests in the Coalition, these comments do not speak for all members; the comments herein reflect the position of staff working to balance these diverse interests in a manner that best reflects the mission of our organization to promote clean and affordable energy.

The Coalition supports an aggressive timeline for adopting greenhouse gas (GHG) reduction policy in Oregon. Conversations about carbon pricing have been occurring for a decade, while the effects of climate change, including wildfires, increasingly harm our state. Oregon has always been a leader in clean energy solutions, and yet we are currently not on track to meet our statewide carbon reduction goals. Achieving immediate and increasingly effective GHG emissions reductions is critically important, as is the regulatory certainty establishing this policy will provide to utilities and other emitting entities.

At a high level, a statewide GHG emission reduction policy should:

1) Result in meaningful and measurable GHG reductions in a least-cost manner.
2) Minimize cost impacts to customers, especially low- and moderate-income residents.
3) Utilize a decision-making process that is transparent and includes the values and opinions of impacted communities and businesses in a meaningful way.
4) Ensure that all sectors (residential, commercial, industrial, transportation, agriculture, etc.) share proportionately in greenhouse gas emissions reductions.

Question 1: ***What aspects of a cap-and-invest policy as it is being discussed in Oregon are you most concerned about for your organization/industry/constituents/customers?***

The following is a summary of some high-level concerns with cap and invest policy as it is being discussed in Oregon.

- The policy should be complementary to and be able to work effectively with existing policies that reduce GHG emissions. Some of the policies in place for the utility sector include the state renewable portfolio standard, the public purpose charge, low-income weatherization funds, and utility voluntary green power programs. State GHG emission reduction policy should make gains in all of these areas (renewables, energy efficiency, low income energy efficiency) that are incremental to these existing policies.
- The policy process should be equitable, meaningfully and transparently engage impacted communities, and challenge traditional structures that may leave those communities out of decision-making processes.
- The policy should maintain a focus on GHG emission reductions, while at the same time ensuring consideration of other environmental values such as other air and water pollutants and fish and wildlife impacts. Policies should, to the maximum extent possible, also help meet public demands and legal requirements for abundant salmon, healthy rivers, clean and affordable energy, and help preserve the Northwest's treasured quality of life.
- The policy should provide regulatory certainty to covered entities and ensure a direct relationship between covered entities and those entities with the ability to take action to reduce emissions.
- Distributed energy resources (such as solar and storage) are tools that will be necessary to reach our GHG emission reduction goals in the utility sector, but it is unclear how this policy will assist in achieving increased implementation of these resources.
- Any policy should recognize that the atmosphere belongs to the public, and therefore no "rights to pollute" will be allocated automatically to any emitter or polluter.
- The policy should carefully consider the role of existing hydropower in our region. Key considerations include:
    a) The extent to which high and low water years impact the regulated system.
    b) The fact that hydropower output is limited in our region and actions of non-regulated utilities will impact the overall availability of hydropower to replace GHG emitting resources as energy and capacity sources.
- There should be a clear understanding of the investments associated with the policy and how costs and benefits will accrue to residents, businesses, and impacted communities in the state.

- There should be clear intent and resources committed to ensure that Oregon's policy effectively connects to other state and/or regional cap and trade systems, as appropriate.

Question Two: What changes would you suggest be made to cap and invest as it is currently being discussed to address the concerns you have?

- A cap and invest system should incorporate the following principles regarding the distribution of allowances:
    - Ensure that the costs of addressing emissions rest with the emitter.
    - Decrease the allocation level over time in a manner that mitigates economic impacts.
    - Ensure that any economic benefits accrue to the utilities' customers.
    - Do not penalize investments in conservation and renewable resources.
    - Allocation formulas must take into account verified savings from energy efficiency investments by load serving entities or by non-profit entities acquiring energy efficiency on behalf of customers of load serving entities.
- The revenue received from a GHG reduction mechanism should support: investments in clean renewable energy technologies, clean energy research and development, energy efficiency programs and measures, clean advanced non-fossil fuel technologies, environmental remediation activities, low-income energy programs, support and appropriate adaptation measures for impacted communities and displaced workers, and should not be expended or rebated in any way that would result in increased consumption of fossil fuels.
- Voluntary purchases of renewable energy by utility customers in green power programs or by other means, or voluntary purchases of Renewable Energy Certificates, must reduce CO2 emissions below the amount required under the cap. The possibility of double counting of renewable energy generation or its environmental benefits must be eliminated.
- Re-examine the point of regulation for utilities related to market customers, ensure that the regulatory burden falls on the entity that has decision-making authority to implement actions that will result in GHG emission reductions.
- The policy should consider whether there are structures that can be fairly put into place to incentivize actions by non-regulated entities that will promote overall GHG emission reductions in the state, such as through energy efficiency actions in non-regulated utility service territories. At the same time, we must be cautious of any transfer of economic benefits from customers of covered entities to customers of non-covered entities.

- The policy puts in place a diversity of representation on the advisory committee and the Climate Investments in Impacted Communities Advisory Committee, but this is not equivalent to engaging impacted communities meaningfully in the decision-making process. Mechanisms must be put in place to adequately seek out community input and not merely the input of community leaders who already have access to decision makers.
- The policy should consider whether the Public Utility Commission of Oregon needs any additional authorities to consider GHG emission reductions or the achievement of state GHG goals in order to ensure effective, least-cost implementation of the policy in the covered utility sector.

Question 3. What opportunities do you believe exist for your organization/industry/constituents/customers from implementation of cap and invest policy as it is currently being discussed in Oregon?

- Increase the ability of utilities and service providers to implement strategies that allow hard-to-reach or impacted communities to participate in activities such as energy efficiency, weatherization and critical home repairs, or ownership of distributed energy resources that reduce GHG emissions.
- Build the clean energy economy in Oregon through business creation, innovation and workforce development in a manner that provides for opportunities for a diverse group of Oregonians. This will include increasing investments in programs and projects that create pathways and sustainable job markets in renewable energy, energy efficiency, and weatherization for impacted communities.
- Support activities that not only reduce GHG emissions, but also increase the health and welfare of Oregonians, and provide resiliency benefits in our infrastructure such as homes and workplaces that are better able to withstand and recover from natural disasters.

Meeting #1 -- Homework Questions

Comments to the Legislative Committee from NW Natural

DIRECTIONS: No later than one week prior to the second work group meeting, please send your responses to the questions below to committee staff (beth.patrino@oregonlegislature.gov or beth.reiley@oregonlegislature.gov). As you prepare your responses, please consult with others in your organization or industry, particularly any located in jurisdictions currently participating in the Western Climate Initiative.

Question 1: What aspects of a cap-and-invest policy as it is being discussed in Oregon are you most concerned about for your organization/industry/constituents/customers?

- Ideally, the carbon policy solution would cover the broadest possible geographic area, with a national carbon pricing solution being optimal. If this isn't possible the broadest possible regional program is favorable.
- NWN supports a process that works through the details and that generates a clear program – rather than leaving many complex issues all for rulemaking. It makes more sense to take the time necessary on the front end regarding program development.

Question 2: What changes would you suggest be made to cap-and-invest as it is currently being discussed to address the concerns you have?

- The utilities should not be responsible for the GHG emissions of products that they do not sell, but only transport. NW Natural's low carbon pathway shows opportunities to reduce GHG emissions in the areas of reducing the carbon intensity of our product, driving efficiency and displacing higher carbon fuels. These do not apply to our "transport" customers who we do not buy gas for nor do we partner with on energy efficiency. (A small portion of these customers fall over the 25,000 metric ton threshold, while many of them are under this threshold.)

- How the consignment to the utility sector is allocated from the overall cap is not detailed in the bill and how the consignment to the utility sector is allocated amongst utilities is not laid out within the bill. These allocations determine much of what a cap and trade mean for utilities and therefore should be considered in the bill itself. For example,

setting a historical baseline has the potential to provide a windfall for companies with higher emissions today and harm those who had fewer emissions to begin with. Policies should be explored, including an updating baseline, which guard against an outcome the rewards those with who currently have the highest emissions. Leaving these determinations to a future rulemaking leave too much risk on the table for utility customers and the utilities themselves.

- We believe funds from consigned allowances should be returned to customers – in the form of rate relief and/or other customer benefits. The current bill appears to steer funds in this way, but the language should be clarified.

Question 3: What opportunities do you believe exist for your organization/industry/constituents/ customers from implementation of a cap-and-invest policy as it is currently being discussed in Oregon?

Oregon AFL-CIO
Oregon's Union Movement

Tom Chamberlain, *President*
Barbara Byrd, *Secretary-Treasurer*

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Portland, OR 97202
oraflcio.org

Responses submitted in connection with the Clean Energy Jobs Work Groups process, by Barbara Byrd, Secretary-Treasurer, Oregon AFL-CIO:

Question 1: What aspects of a cap-and-invest policy as it is being discussed in Oregon are you most concerned about for your organization/industry/constituents/customers?

In 2008, the Oregon AFL-CIO adopted a labor position on climate policy. It opened with a statement committing the organization and its affiliated unions to the goal of dealing with climate change in a way that guarantees economic growth and equity.

At that time, we stated our belief that climate policy should be tied strategically to economic development goals and offer opportunities to create good jobs with a future – jobs that are paid a decent wage and that offer pathways into higher paid positions. We also called for

- Investing revenues from carbon pricing policies into clean energy solutions and infrastructure;
- Flexibility to protect Oregon's manufacturing sector against leakage;
- Incentives for the use of domestically manufactured materials and equipment on projects funded by policy-generated revenue;
- The creation of a fund to provide transition assistance – as a last resort – to any workers whose jobs are impacted;
- The use of high standards for construction work associated with climate mitigation and adaptation, and the use of registered apprenticeship programs to train workers for the renewable and energy efficiency industries;
- Equitable treatment for our communities that have been adversely impacted by climate change or might be affected by higher electricity prices;
- Adequate monitoring to inform policy updates;
- And finally, for a labor voice to be incorporated into advisory and oversight bodies associated with climate programs.

Our position on these issues has remained consistent, informed both by subsequent research findings and by on-going conversations with partners in the environmental, business and environmental justice realms.

Question 2: What changes would you suggest be made to cap-and-invest as it is currently being discussed to address the concerns you have?

The provisions designed to assure that revenue be spent in ways that simultaneously further reduce carbon emissions, mitigate past environmental degradation, and create sustainable economic development are all extremely important. We believe that all these provisions can be strengthened.

On the economic development front, we are especially concerned that responsible contractor, apprenticeship, PLA and high road standards be made required, not just recommended. And we would like to see further thought given to how we might incentivize the use of domestically manufactured materials and equipment on Climate Investment funded projects.

We would also like to see the definition of "impacted communities" strengthened, so that it clearly includes workers and communities that are affected by plant closures and layoffs attributable to cap and invest policy implementation, where relevant. Provisions that address the need for flexibility (e.g. free allowances) are necessary to prevent leakage and job loss in our manufacturing sector, and the provisions currently in SB 1070 should be retained.

Related to that, we would like to see the just transition options for laid-off workers expanded. Retraining is an inadequate solution and must be joined with other efforts to make these workers whole – extended unemployment benefits, mental health and other services, and bridges to retirement for older workers.

Question 3: What opportunities do you believe exist for your organization/ industry/ constituents/ customers from implementation of a cap-and-invest policy as it is currently being discussed in Oregon?

If done right, with strong labor standards, the job creation potential of Climate Investment grants could be significant. We are committed to working with our allies in the environmental justice community to assure access to these jobs for underrepresented workers, strong apprenticeship training programs for all workers, and jobs that pay a community standard wage and benefits. High road agreements as well as Project Labor Agreements will make it possible to create *good* green jobs with pathways for low-income, women and other underrepresented workers.

As many of our members live and work in rural parts of the state, we are also gratified that rural Oregon is called out as a target for investment.

We value the opportunity to play a role in addressing climate change in our state, regionally and nationally.

Oregon Association of Nurseries Homework Responses

Agriculture, Forest, Fisheries, Rural Communities and Tribes Work Group Meeting #1

Question 1: What aspects of a cap-and-invest policy as it is being discussed in Oregon are you most concerned about for your organization/industry/constituents/customers?

The majority of Oregon's nursery products are exported, meaning that Oregon's nursery industry competes with nursery industries across the nation. Oregon nurseries succeed because the quality of the products grown here is superior to nursery products grown in other states, and that superior quality allows Oregon nurseries to command higher prices for their goods. However, Oregon's high wages and strong labor regulations mean that the cost of production for Oregon nurseries is also significantly higher than it is for nurseries in most other states. A cap-and-invest program will further increase the cost of production by increasing transportation fuel prices and therefore transportation costs. The cost of production is cumulative, and the Oregon Association of Nurseries is profoundly concerned that yet another significant cost increase will make it very difficult for Oregon nurseries to compete in the national market.

The nursery industry is also concerned that a cap-and-invest policy will not account for the voluntary measures that nurseries have already taken to conserve resources. Many nurseries have significantly reduced the amount of water they consume and the amount of energy they use for irrigation, and such efforts towards conservation should be recognized and rewarded by a cap-and-invest policy.

Question 2: What changes would you suggest be made to cap-and-invest as it is currently being discussed to address the concerns you have?

The Oregon Association of Nurseries appreciates the intention of the legislature to exempt agricultural industries from the proposed cap-and-invest program. However, the transportation fuels that Oregon's agricultural industries depend on to move products to market will not be exempted. Rising fuel prices will also increase the cost of fertilizer, and higher utility rates will raise the cost of energy used for irrigation. In order to avoid a significant cost burden that could jeopardize the competitiveness of Oregon's nursery industry, any cap-and-invest policy must account for the impact of higher fuel and utility prices on the agricultural sector and take steps to insulate agricultural businesses from this increasing cost.

One potential way to compensate Oregon nurseries for higher fuels costs would be to reward the nursery industry for the carbon offsets that its products provide. The trees and other plants that Oregon nurseries grow reduce GHG emissions by absorbing CO2. Although the majority of Oregon nursery plants are sold in other states and therefore reduce CO2 outside of Oregon, they are still delivering substantial carbon reductions and Oregon's cap-and-invest policy should recognize this positive impact. Providing free allowances or offsets to Oregon's nursery industry as compensation for the emissions reductions its products achieve would go a long way

towards negating the impact of the higher fuel prices and utility costs that a cap-and-invest program will produce.

Question 3: What opportunities do you believe exist for your organization/industry/constituents/ customers from implementation of a cap-and-invest policy as it is currently being discussed in Oregon?

A cap-and-invest program would create challenges for the nursery industry, but it also creates potential opportunities to upgrade our state's transportation infrastructure in innovative ways. Oregon nurseries depend on Oregon's roadways to get their products to market, and they are struggling with increasing delays and unreliability caused by the worsening congestion in the Portland metro region. Shipping more products by rail could help to alleviate these issues if some cap-and-invest revenue was invested in multimodal infrastructure. Additionally, since about 40% of cap-and-invest revenue is expected to be diverted to the state highway fund due to constitutional restrictions, Oregon needs to think creatively about ways to use that revenue to reduce GHG emissions. For example, the state of Florida has instituted a policy that requires a certain number of trees and shrubs to be planted per lane mile of roadway as a method of offsetting carbon. The Oregon Association of Nurseries would support Oregon instituting a similar policy for the cap-and-invest revenue that is used to build new roads in our state.

The Oregon Association of Nurseries recognizes that innovation has the potential to reduce both operating costs and resource consumption, and Oregon nurseries have already succeeded at lowering costs through advances in pesticide application and irrigation. It is important that any cap-and-invest policy is designed in a way that recognizes the conservation measures that agricultural businesses have already undertaken, and that the policy encourages further innovation without being overly punitive.

Clean Energy Jobs Work Groups

Meeting #1 -- Homework Questions

The Oregon Business Alliance for Climate (The Alliance) appreciates the opportunity to contribute to the assigned working groups and provide input and comments to the proposed Cap and Invest Bill (SB 1070). We also applaud all the hard work and leadership that has gone into the process and believe the current draft bill presents a viable and workable solution for addressing the impacts of climate change through a market based approach while also providing substantial reinvestment into Oregon's economy. That said, the Alliance consisting of its newly formed Board of Directors and existing members, is not in the position to formally suggest changes or endorse SB 1070 in its current draft form but we look forward to providing further feedback and input during the working groups and will welcome the opportunity to review further iterations and the final language.

The following are some high level responses to the questions asked for the Regulated Working Group meeting and we intend to provide more detailed comments and review in the coming weeks.

Question 1: What aspects of a cap-and-invest policy as it is being discussed in Oregon are you most concerned about for your organization/industry/constituents/customers?

Response: The following are not considered formal statements addressing concerns to cap and invest but rather suggestions on reinforcing language and concepts most of which are already highlighted in the draft bill.

In terms of EITEs and treatment of regulated entities it is important to ensure that allowance allocations and the methodology applied to determining appropriate allocations and models are based on Oregon outputs while evaluating and learning from other program designs and methods specifically WCI programs. Furthermore it is important to factor in competiveness and addressing leakage concerns when determining allocations specifically for industries that are in highly competitive trade exposed sectors with high emissions costs. Considering this it is also important to prevent over allocations or priming the market with too many free allowances which in turn can cause market dilution and also weaken the environmental integrity of the program. In short the devil is in the details on allowance allocations and it would be good to understand when and how these details will be defined.

Cost containment mechanisms are also essential in maintaining market flexibility and lowest cost impact and focus should be on defining these earlier rather then later. Some appropriate examples of cost containment mechanisms that are highlighted in the bill include: offsets, clear price signals with ceiling and floor, consignment programs for utilities and WCI linkages.

Question 2: What changes would you suggest be made to cap-and-invest as it is currently being discussed to address the concerns you have?

Response: At this stage we are not in the position to provide any proposed changes to the bill since our newly formed Board of Directors is still reviewing the draft language. We will plan to provide further feedback at the next working group and during the final draft stages.

Question 3: What opportunities do you believe exist for your organization/industry/constituents/ customers from implementation of a cap-and-invest policy as it is currently being discussed in Oregon?

Response:

The opportunity to link with California, Ontario and Quebec and to further strengthen the WCI market presents a significant opportunity for Oregon. Market linkage offers not only further flexibility towards lowest cost solutions but also market certainty, liquidity, economy of scale benefits and increased revenue from the program.

In addition the use of offsets as an identified cost containment mechanism of 8 % is an important component of the Cap and Invest program and offers alternative revenue sources and co-benefits to Oregon industries outside of the cap including the Timber and AG sectors.

The reinvestment model offers significant opportunity to strengthening Oregon's economy. In considering the revenue disbursements that have been earmarked in the draft bill, it is important to focus on transformative impacts and using these new sources of revenue to advance technology transfer, infrastructure development and job creation in places of need such as rural and community energy programs. The Alliance welcomes the opportunity to engage in further discussions around the reinvestment programs and considers this a vital component of the bill.

October 9, 2017

Dear Senator Dembrow:

Thank you for the opportunity to participate in the Clean Energy Jobs Work Group on Regulated Entities. Oregon Business & Industry (OBI) represents diverse business interests from across the state, including many of the proposed regulated entities. Cap-and-trade or cap-and-invest is a complex set of environmental and economic policies. OBI members have spent countless hours and resources to understand similar proposals and evaluate the impacts. We have provided that information to the Legislature in the past and will make it available again at the workgroups request. Nevertheless, answers to the three questions presented require answers to a number of other specific questions. Receiving the answers the questions below will benefit policy discussions important to all Oregonians.

1. ***How would a cap-and-invest program interact with regulated industries*?**

Cap-and-trade and cap-and-invest programs can interact with regulated entities in different ways – both directly and indirectly. Generally speaking, however, SB 1070 would "interact" with regulated entities in two direct ways: (1) require covered entities to purchase allowances to account for process (on-site) emissions, and (2) increased cost of energy (as a result of regulating electric, natural gas, and other fuels). Direct Interaction and indirect impacts, while not the same, may influence regulated entities. For instance, economic impacts of this program to local communities, suppliers, and vendors would also influence how this program would interact with regulated industries. Nevertheless, the specific interaction depends on the design of the program. To better understand the design of the program and to help respond to this question, regulated entities, at a minimum would need to know the following:

- Will certain entities be out-right exempt or conditionally exempt from regulation under this program (EITE, under 25,000 MtCO2, biogenic emissions)? If so, please explain, including the process for seeking an exemption.

- Will certain entities compete for a limited number of free or discounted allowances? If so, please describe these entities and the process for seeking access to free/discounted allowances?

- Will regulated entities have access to or compete for revenues derived from program implementation. If so, please explain.

- SB 1070 proposes several compliance pathways for manufacturers from purchasing allowances to obtaining offset credits. Depending on the number and access to offset credits, the costs to regulated entities differs. How many offset credits will be available under this program – meaning, will there be enough offsets for all regulated entities to cover up to 8% of their compliance obligation? Will regulated entities have the ability to generate offset credits?

- What recent or anticipated Oregon rules and regulations for manufacturers could influence available capital to do energy efficiency projects and otherwise compete with other states? For instance, the Cleaner Air Oregon rulemaking could consume immense capital from a number of regulated sources. It is important to understand what impact that rulemaking could have on

regulated sources to better understand how that program could influence and/or interact with other state regulations and the ability for regulated entities to comply with this proposed program.

- Would industrial customer rates be influenced by allowance allocation to utilities? Would each utility have access to free allowances? If so, to what extent? How would utilities be regulated as it relates to the use of those allowance proceeds?

- Regulated entities often pay fees to cover the cost of regulatory programs. What are the anticipated fees to cover the cost of this program? What regulatory obligations will DEQ (or other state agency(ies)) apply to regulated entities above and beyond submitting the requisite number of allowances?

- Are all anthropogenic and biogenic greenhouse gas emissions considered under the definition of "carbon dioxide equivalent" and covered by the cap?

- How do California regulated entities interact with the California cap-and-trade program? If joining the California market is a goal, how will those California interactions above impact Oregon's program design, now and into the future?

2. ***How would energy-intensive and trade-exposed (EITE) entities likely be determined, and how would EITE determinations likely play out for key Oregon industries?***

This is a great question; however, it is too broad. To some degree, the answers to this question would be influenced by the answers to the questions above. We need more information to adequately answer this question.

Nevertheless, presumably, the goal of the legislation is to reduce global greenhouse gases. That can only happen if the Oregon policy does not incentivize production of products out-of-state and thereby increasing global greenhouse gas emission compared to products produced in-state. If avoiding leakage is the goal, then the following questions need to be answered to better respond to the presented question above:

- Please provide a definition for energy-intensive and trade-exposed entities. Does the definition include emissions-intensive trade exposed entities as well?

- How does California determine energy-intensive and trade-exposed businesses? In order to join the California market/program, would Oregon have the discretion to define EITE's differently?

- What GHG emissions are the result of industrial electricity use in Oregon? How do those emissions compare nationally and internationally with like processes and production? If nuclear power is taken out of the energy mix from other states, how does Oregon industrial energy use compare in terms of greenhouse gas emissions per unit of energy? Please forecast this comparison to the conclusion of the RPS requirements.

- For process emissions, how do Oregon manufacturers GHG emissions compare to out-of-state manufacturers (sector specific) – both nationally and internationally?

- What other states are experiencing capital investment for manufacturing, in particular similar manufacturing process as Oregon? Similarly, what other countries are experiencing capital investment for manufacturing products also produced in Oregon? What are the emissions profiles of the states receiving increasing capital investment, including the emissions profile of the electric sectors serving those industrial loads?

3. ***How could cost containment mechanisms be designed fairly? For example, if we decide to offer free allowances to some industries in order to control leakage, what are the implications for auction revenue generation and for reducing emissions? Should free allowances be time-limited? How will we be assured that EITEs will in fact produce fewer emissions over time?***

These questions are too broad and require too many assumptions to properly answer. Again, presuming the goal is to reduce global greenhouse gas emissions, the program should be designed to avoid leakage. And for Oregon, that should also mean leakage to countries and states that heavily rely on nuclear power to offset greenhouse gas emissions. Please note that answers to the question's proposed above would also influence the answers to these questions as well. For instance, how many allowances in the market will be auctioned or distributed for free, and how many offset credits will be available. Or put another way, what will the demand be for these allowances. In addition, before we are able to answer this question it would be helpful to know the following:

- What are cost containment mechanisms? Please provide examples.

- What does a fair outcome look like? Is this defined in economic terms, environmental terms, social terms or some other metric?

- Is the goal of a legislative outcome to reduce global emissions or Oregon emissions? Are there other goals of this program?

- Would free allowances for a covered entity include both process emissions and emissions that result from electricity/energy use?

- Can regulated entities offset their emissions using any other compliance mechanisms other than purchasing allowances?

- What cost controls are being proposed for the price of allowances (both floor and ceiling) over the life of the program? How will these prices be set and influenced over time? For instance, statutorily or by regulation? Would these prices be influenced by the goals identified in the answers to the questions above?

Thank you for your consideration. We look forward to participating in the next workgroup meeting.

Sincerely,

Oregon Business & Industry

Oregon Citizens' Utility Board
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(503) 227-1984
www.oregoncub.org

October 9, 2017

Re: Clean Energy Jobs Work Groups
Meeting #1 Homework Questions

Created by a 1984 ballot measure, Citizens' Utility Board (CUB) is Oregon's residential utility customer advocate. CUB represents the interests of Oregon's residential energy (electric, gas) and telecommunications customers before a range of administrative, judicial, and legislative bodies – including but not limited to the State of Oregon Public Utility Commission (PUC), Oregon Legislature, City of Portland, as well as other political jurisdictions.

Public policy can and should address climate change through mandated greenhouse gas (GHG) reductions. Areas of the economy most exposed to such a policy shift (energy, transportation, and large industry) must accept this reality and prepare for the future by making prudent investments today.

CUB generally supports carbon regulation programs such as cap-and-invest because it should provide the right incentive structure to drive smart investments. It is also the next logical step in a lineage of policies – the most recent being the Clean Electricity and Coal Transition Act of 2016 (SB 1547). SB 1547 requires Pacific Power (PAC) and Portland General Electric (PGE) to phase-out the vast majority of their coal by 2030 and doubles the Renewable Portfolio Standard from 25 percent to 50 percent by 2040.

While SB 1547 targets coal emissions exclusive to PAC and PGE, it excludes their and other energy utility's gas and purchased power emissions. Yet CUB believes Oregon can and should do more to address climate change through deep, multi-sector GHG reductions using a cap-and-invest approach.

CUB, as a consumer advocate, supports a cap-and-invest approach in Oregon because giving energy utilities, the transportation sector, and other large emitters clearer economic signals should drive prudent investment choices today and heavily diminish future risk for Oregonians.

For instance, current integrated resource plans of energy utilities contain billions of dollars of investments in new power supply and associated transmission. These investments have useful lives of 30 to 50 years. There is little doubt that carbon regulation is coming and will apply to these investments. It makes sense to establish the regulatory structure before making such investments to ensure cost effectiveness with carbon regulation, as opposed to making investments without knowing how they will be regulated.

The best way to protect customers is to make the right investments consistent with the carbon regulation that will apply to those investments.

Although aside from our general endorsement of cap-and-invest, CUB has concerns about rate increases. Any cap-and-invest program in Oregon must recognize that PGE and PAC, which together account for almost 70 percent of Oregon's electric load, are legally bound to eliminate coal from their respective portfolios. A side note is that PGE's Boardman coal plant is on schedule to close by 2020, the same year Oregon cap-and-invest would launch. And while some out-of-state coal will remain in PGE's system, Boardman represents the company's largest segment.

Simply, CUB proposes that utility sector auction revenues (assuming consignment) offset any significant rate increases identified with emissions from those coal plants already scheduled to close.

Beyond coal, utilities will have greater incentive to reduce emissions related to gas and purchased power. CUB generally supports using these revenues to drive further decarbonization and protect low-income households.

PAC serves many of Oregon's economically challenged communities (Roseburg, Coos Bay, Klamath Falls, etc.) and is currently 50 percent coal. CUB is concerned that Section 13 of SB 1070 allows auction proceeds to support residential customers, particularly assistance for low-income customers, small businesses (below 50 employees), and large industries facing competition. This could mean significant rate hikes for mid-size businesses with 50 or more employees, including schools, community colleges, and hospitals. CUB advocates for greater flexibility in Section 13 – particularly as it relates to carbon emissions from coal resources that are being eliminated due to SB 1547.

Two final points:

CUB supports addressing environmental justice and energy equity concerns in SB 1070.

During the Utilities and Transportation Workgroup, Representative Phil Barnhart asked a worthwhile question concerning allowable investments via the Highway Trust Fund:

Can transportation auction revenues pay for new investments in electrified automated vehicle infrastructure? Electrified automated vehicles will almost certainly rely on new broadband-reliant communications systems as an integral part of transportation infrastructure.

Respectfully,

Bob Jenks, Executive Director

To: Chair Sen. Lee Beyer

Re: Workgroup #2 Comments to the Clean Energy Jobs Workgroup on Utilities & Transportation

October 9, 2017

Dear Senator Beyer,

The Oregon Fuels Association (OFA) represents the majority of Oregon's fuel distributors, retailers, and commercial fueling entities. Cap-and-trade is of great significance to our members, who include many Oregon small businesses.

OFA is beginning our analysis of the impact of cap-and-trade on member companies and the price of fuel to consumers. The details identified below represented two initial topics that we would like to explore in more detail with the workgroup:

Point of Regulation Under Cap-and-Trade

Mitigating the impact of cap-and-trade on Oregon's small businesses is critical to the success of the program. Based on our reading of the policy proposal, an entity that imports fuel from out-of-state and the amount of fuel as a GHG equivalent of over 25,000 MtCO2, those importing entities will be covered entities and therefore regulated under the cap-and-trade program. This requirement will not apply to all importers and all retailers. Meaning, some fuel retailers and consumers will pay for these allowances through their fuel prices while others will not. This approach would be a marked departure from the California cap-and-trade system, which sets the point of regulation at the refiner/producer-level. Oregon does not have in-state refiners. Therefore, OFA members question whether this is an equitable approach to taxing and regulating greenhouse gas emissions.

Distribution of Allowances

OFA is interested in exploring ways to decrease the cost of administering the program on the Oregon businesses currently impacted, such as through the distribution of free allowances. We would like to know how the Chair envisions the distribution of allowances to the regulated entities in the fuels sector.

In addition, because OFA members participate in the clean fuels program, how will the clean fuels program and the cap-and-trade program interact together? What fees will OFA members be responsible for under both programs? Lastly, what will the impact be to fuel prices if both programs are implemented simultaneously? Do those fuel prices change for some retailers and not others? If so, please explain.

Sincerely,

Danelle Romain & Mike Freese, Representing the Oregon Fuels Association

Oregon Fuels Association

www.oregonfuels.org

OREGON HEALTH AUTHORITY
Center for Health Protection
Environmental Public Health Section
Kate Brown, Governor

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Clean Energy Jobs Legislative Work Group: OHA Responses to Homework Questions

Thank you for the opportunity to share our thoughts from the public health perspective regarding the proposed Clean Energy Jobs legislation. Additional references are available upon request.

1: What aspects of a cap-and-invest policy as it is being discussed in Oregon are you most concerned about for your organization/industry/constituents/customers?

A. **The Oregon Climate and Health Resilience Plan** outlines a set of recommendations for Oregon's Public Health System to build resilience to the health risks of climate change, especially among populations most vulnerable to climate disruptions, including tribal communities, migrant farmworker communities, low-income communities and communities of color.

B. **Health effects of climate change are already being felt in Oregon[1].** Climate change has the potential to reverse the health gains our public health system has made in modern history through preventing pollution, control of infectious diseases, ensuring safe food, water, air and other public health measures. A full analysis of health risks related to Oregon's projected climate impacts can be found in the Oregon Climate and Health Profile Report.

C. **There is a need to build local public health agency capacity to support climate action.** In July of 2015 the Oregon Legislature passed House Bill 3100 implementing a new model for public health in Oregon based on recommendations made by the Task Force on the Future of Public Health Services. The bill set forth a path to assess current capacity and modernize Oregon's public health system. The Public Health Modernization Assessment found that over 90% of Oregon's Local Health Departments have only partial-to-minimal capacity to identify and prevent environmental health hazards (Oregon Health Authority – Public Health Division. 2016.).

[1] As an example, changing climate conditions are increasing the likelihood of wild fires in Oregon (Dhalton et al., 2017) and Oregon is seeing increases in emergency department visits associated with wildfire. This year, asthma and other respiratory-related emergency department visits peaked on September 5, 2017 at 583 visits statewide, a 20% increase over the number of visits expected for that day. ED and urgent care patients who mentioned "smoke" or "wildfire" were at an 86% increase over the number of visits expected based upon historic trends. (OHA, 2017).

D. **There is a significant opportunity to achieve public health benefits through climate mitigation strategies[2].** Certain climate mitigation investments can yield considerable health 'co-benefits'. For example:

i. **A reduction in co-pollutants** (i.e. particulate matter, ozone) decreases risks of asthma and other respiratory diseases, heart disease, and stroke[3]. Low income communities and communities of color are often disproportionately impacted by these health burdens of air pollution (OHA, 2013).

ii. **An increase in active transportation options** (walking, biking, and transit), as documented in OHA's Climate Smart Strategy Health Impact Assessment[4], can result in a reduction of greenhouse gas emissions while also improving population health (Cheng JJ, 2012).

iii. **Investments in green infrastructure** can result in improved air quality, provide cooling during extreme heat and serve as flood protection.[5]

iv. **Investments that build social capital** (i.e., increased community capacity to adapt and respond to climate stressors, increased levels of civic engagement and connectivity within and among diverse groups) lead to health co-benefits (improved mental and physical health) and greater climate resilience (Aldrich, 2014).

2: What changes would you suggest be made to cap-and-invest as it is currently being discussed to address the concerns you have?

A. Consider incorporating health co-benefits as a criterion for prioritizing investments. There are methodologies to analyze the health benefits and burdens of proposed investments that can inform program decisions (Mendez MA. 2015).

B. **Include a mechanism to review and update methodologies based on new data.** Building in the flexibility to consider new data and research will help to ensure that Oregon is making science-based decisions.

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[2] For example, the Lancet Commission on Health and Climate Change (a multi-disciplinary and international collaboration among academic centers), published a report in 2015 with the central finding that tackling climate change could be the greatest health opportunity of the 21st century (Watts N, 2015).

[3] Experts estimate that pollution accounts for up to 30% of asthma attacks in the US (Zheng X, 2015). Poor air quality is a contributor to heart disease (Cai et. al., 2016), which is the second leading cause of death in Oregon, costing Oregonians over $1.1 billion in 2011 alone (OHA, 2013). Emerging research also indicates that exposure to air pollution during fetal development may increase risk of still birth (Siddika N, 2016) and premature birth (Sun X, 2015). There is also evidence that children exposed to air pollution in early life are more likely to have decreased lung function and asthma later in life (Clifford A, 2016).

[4] In 2014, our Climate Smart Strategy Health Impact Assessment assessed the extent to which the Metro Regional Government's proposed Climate Smart Strategies (aimed at reducing per capita vehicle miles traveled in the region) would increase physical activity, reduce exposures to air pollutants, and prevent traffic collisions. The results showed that by 2035 Metro's approach would avoid 126 premature deaths and reduce illness of Oregonians living in the Metro region by 1.5% annually (Iroz-Elardo N, 2014).

[5] As an example, a recent study by Portland State University researchers found that nitrogen dioxide pollution reduction associated with increased tree planting in Portland could result in significantly fewer incidences of respiratory problems, providing a $7 million USD benefit annually (Rao M, 2014).

C. **Account for impacts to migrant farmworker communities within the investment program.** The draft proposed methodology to distribute revenue is based on stationary sources of air pollution and social vulnerability by census tract, which will not capture migrant farmworkers, who are among the most vulnerable populations and who may not reside in a specific census tract.

D. **Ensure local communities can engage effectively in priority-setting and decision-making, by providing support for local partnerships and community capacity-building.** Best practices show that locally-appropriate strategies that reflect the priorities of place and community-identified needs and solutions will result in improved outcomes (USDN, 2017).

E. **Consider making place-based community assessments and action plans an eligible use of funds.** This could include the assessment of local environmental health risks and community-identified solutions that could achieve climate, health, and economic benefits for a community designated as more vulnerable to climate risks. As an example, Oregon has found some early success in this kind of approach through the new Place-Based Integrated Water Resources Planning Program administered by the Oregon Water Resources Department.

3: What opportunities do you believe exist for your organization/industry/constituents/ customers from implementation of a cap-and-invest policy as it is currently being discussed in Oregon?

A. **Climate adaptation and mitigation strategies have the potential also to achieve public health benefits in Oregon.** This bill contemplates investments to both mitigate greenhouse gas emissions and build resilience to climate risk among the most impacted communities. There are opportunities to identify public health benefits associated with different actions and accord higher priority to actions with greater health co-benefits.

B. **Build capacity to systematically promote health and equity through climate policy.** State and local public health agencies are well positioned to assist other agencies in integrating health and equity data and considerations into climate-related planning and programming.

C. **Inter-agency coordination will achieve greater benefits for Oregonians**. Statewide climate policy presents an opportunity to link and align across agencies, programs and scales of government, resulting in more efficient, and effective use of cap-and-invest revenues to achieve the proposed legislation's equity, environmental, economic, and health goals.

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OREGON RURAL ELECTRIC COOPERATIVE ASSOCIATION

"The Power of Community"

Clean Energy Jobs Work Group
Meeting #1 Homework Questions

Response from Ted Case, Executive Director, Oregon Rural Electric Cooperative Association.

Question 1: What aspects of a cap and invest policy as it is being discussed in Oregon are you most concerned about for your organization?

Answer: It is important to note that the carbon emissions associated with utilities who receive their electricity from the Federal Columbia River Power System are de minimis. (See attached chart.) The Oregon Department of Environmental Quality (DEQ) has calculated that the approximate share of Oregon's statewide emissions attributed to Oregon's electric cooperatives is *0.16%.* However, ORECA appreciates the opportunity to participate in the Utilities and Transportation Work Group, and makes the following points about our concerns with the proposed cap and invest program and related legislation (SB 1070).

- **Alignment of Oregon's carbon policies.** The policies espoused by the State of Oregon are not fully consistent when it comes to reducing carbon emissions. For instance, the Oregon Department of Fish and Wildlife (ODF&W) is pursuing an aggressive plan to increase spill at the federal dams on the lower Columbia and Snake rivers, which significantly reduces clean, carbon-free hydropower generation. Increased spill will force the Bonneville Power Administration (BPA) to rely more heavily on non-specified market purchases, which is estimated to increase carbon emissions by 840,000 metric tons a year.[1] ORECA believes that any serious, comprehensive State effort to reduce carbon emissions should review the full range of State policies that contribute to carbon emissions -- especially those proposed by the State.

- **Impact on rural areas, manufacturing and jobs:** Oregon's electric cooperatives serve some of the most rural and remote parts of the state. As DEQ notes in their February 14, 2017, report on cap and trade, "rural areas of Oregon tend to be less economically diverse than urban areas, meaning impacts on industries in rural communities could be felt more acutely." Furthermore,

[1] 2017 Declaration of Kiernan Connolly, Bonneville Power Administration, In Support of Federal Defendants' Combined Opposition to Motions For Injunctive Relief [ECF 2112, 2114]

economic studies presented to the Oregon Legislature in 2017 indicate a more demonstrable economic impact in rural Oregon than even DEQ suggests.[2] An analysis of the potential regulated entities in DEQ's cap and trade study (Appendix 1) indicates that several of these industries are located in electric cooperative service territory. Many of these industries are economic drivers of the communities we serve. Our review of cap and trade legislation will consider the impact on our members and the overall economic health of electric cooperative territory.

- **Loss of Local Control**: Already some advocates of cap and trade have suggested that SB 1070 could serve as a vehicle for extraneous proposals that could wrest local control away from consumer-owned utilities in areas such as energy efficiency. ORECA will not support any legislation that undermines local control of our electric cooperatives.

- **Threshold**: Section 10 of SB 1070 limits compliance obligations to covered entities that emit more than 25,000 mtCO2e. Currently, only one electric cooperative -- Umatilla Electric Cooperative – has emissions that exceed the proposed threshold because it purchases non-specified resources to meet demands beyond what the federal hydropower system can provide. Any effort to remove or lower the threshold below the 25,000 mtCO2e- would create an unnecessary administrative burden on small, rural electric cooperatives and, by DEQ's own admission, provide little benefit to the ultimate objectives of the bill.

Question 2: What changes would you suggest be made to cap-and-invest as it is currently being discussed to address the concerns you have?

Answer: While our analysis continues, we remain concerned about elements in SB 1070 that appear to put electric cooperatives at a distinct disadvantage regarding the allocation of allowances and leave sweeping authority to the rulemaking process. We will give two brief examples. For instance, Section 10 of the bill states that the EQC's rule *shall* distribute allowances to electric companies and natural gas utilities but that the EQC *may* distribute allowances to consumer-owned utilities. This is no small distinction and puts electric cooperative such as Umatilla Electric at a significant disadvantage when it comes to compliance. This section must be amended to give consumer-owned utilities certainty. In addition, Section 11 of SB 1070 (pg. 10, line 30) states that the "department shall adopt rules governing the use of proceeds from the sale of allowances consigned to the state for auction under this paragraph by consumer-owned utilities." This language unnecessarily wrests local control away from consumer-owned utilities and hands it to the State. Existing governance structures for consumer-owned utilities should be

[2] Associated Oregon Industries Report: Oregon Cap and Trade - Analysis of Economic Impacts of SB 1574 (presented to Oregon Legislature on 3/21/2017)

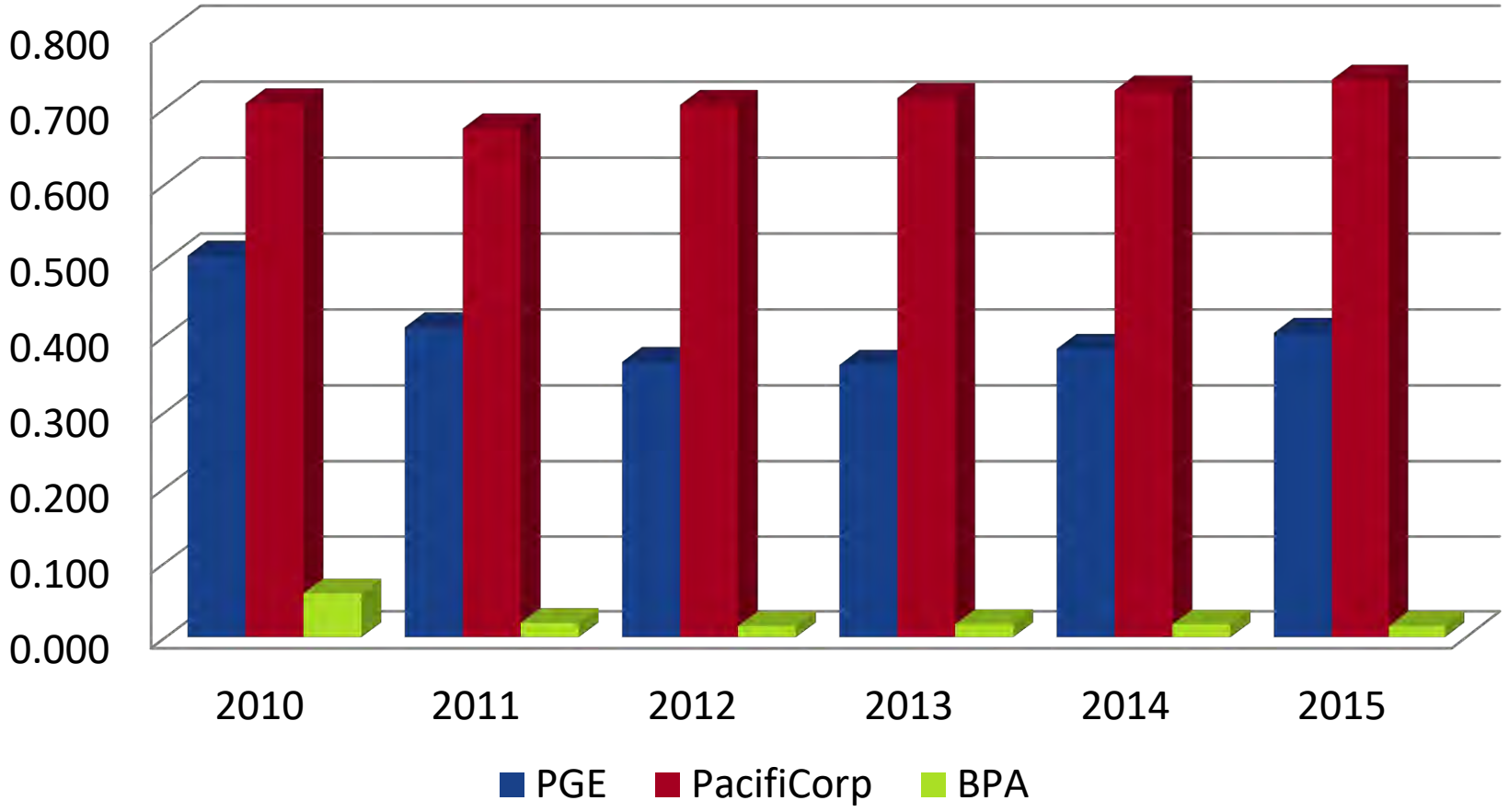
considered when determining how utilities can use the proceeds from the sale of allowances. We urge the Oregon Legislature to look at the experience of Surprise Valley Electrification Corp. in Alturas, California as a model on how proceeds from the sale of allowances can benefit the environment and members of consumer-owned utilities.

Question 3: What opportunities do you believe exist for your organization from the implementation of a cap-and-invest policy as it currently being discussed?

Answer: Some studies have indicated that a carbon pricing regime, rather than increasing renewable portfolio standard (RPS) targets, is a more appropriate mechanism for reducing carbon emissions while preserving the value one of the Pacific Northwest's greatest assets – its abundant, clean, carbon-free hydropower. Accordingly, a properly constructed, multi-state carbon price has the potential to improve secondary revenues of the Bonneville Power Administration, thus enhancing our ability to offer our members an affordable carbon-free source of electricity.

Thank you for the opportunity to comment.

Oregon Greenhouse Gas Emission Factors in MTCO2e/MWh from 2010-2015



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October 9, 2017

Clean Energy Jobs Work Group on
Agriculture, Forests, Fisheries, Rural Communities, and Tribes
Meeting #1 - Homework Questions

Dear Representative Helm and Members of the Workgroup,

Thank you for the opportunity to provide input on legislative efforts to create a cap-and-invest policy and program for Oregon. Please find responses to the 'homework questions' provided after the first work group meeting held on September 21st.

Question 1: What aspects of a cap-and-invest policy as it is being discussed in Oregon are you most concerned about for your organization/industry/constituents/customers?
Oregon Tilth certifies over 350 organic farm operations in Oregon, producing a wide variety of crops and livestock products. As we heard at the first work group meeting, Oregon agriculture is vulnerable to the impacts of climate change in a variety of ways. Farmers are predicted to face more flooding accompanying increased precipitation during winter and spring seasons, as well as higher temperatures and decreased snowpack water supplies during summer months, causing more drought conditions. We support the effort to establish a 'cap' on total greenhouse gas (GHG) emissions as a regulatory framework designed to encourage best practices and innovation that reduce GHG emissions and mitigate the effects of climate change.

As noted in my public comments during the first meeting, organic practices could play an important role in addressing climate change. We want to ensure the opportunity for organic practices to be part of a toolkit of solutions is both recognized and encouraged as a cap-and-invest policy is further discussed and developed.

Question 2: What changes would you suggest be made to cap-and-invest as it is currently being discussed to address the concerns you have?
While agricultural operations represent an 'uncapped sector' under the proposed cap-and-invest policy, a variety of organic management practices can reduce GHG emissions, enhance on-farm capacity for carbon sequestration, and provide numerous environmental and health co-benefits.

We would like to see a cap-and-invest policy approach that recognizes farmers and ranchers can be an important part of a climate solution for Oregon, the nation and the world. This could be achieved by designating offset project funds to support increased research on and adoption of organic practices. It would be great to see a program recognize the value of maintaining and enhancing soil health, while reducing use of high-emission agricultural inputs—like synthetic fertilizers and pesticides—and reward farmers who do so.

It's important to note some of the practices used by organic farmers can and have been incorporated on non-organic farms. While they may not implement all the practices necessary to achieve organic certification, non-organic farms can also contribute to climate solutions by selective adoption of some organic practices.

Question 3: What opportunities do you believe exist for your organization/industry/constituents/ customers from implementation of a cap-and-invest policy as it is currently being discussed in Oregon?
Oregon agriculture could be a leader in mitigating and adapting to climate change.

As farmers and ranchers adopt more climate-friendly management practices, this also becomes an opportunity to enhance their own adaptability to the adverse effects of climate change. Healthy soil, high in organic matter, is more resilient against surface water runoff and soil erosion caused by heavy precipitation. Healthy soil also has a higher capacity for water absorption and retention, making crops more resilient during drought conditions.

To support the climate benefits of organic and sustainable agriculture, research, technical assistance and financial incentives are needed:

- More Oregon-specific research is needed on agriculture and climate change issues, specifically focused on the relationship of organic and biologically integrated agricultural practices to carbon sequestration, GHG emissions reductions, and risk reduction.
- Farmers need adequate outreach and technical expertise to translate the research findings into practice and to actualize real opportunities for GHG emission reductions on Oregon's farms and ranches.
- When there are costs or perceived risks of making the transition to climate-friendly practices, financial incentives for farmers and ranchers are essential. It requires time, skill building and money to transition to new production practices, and financial assistance must be available to growers who implement specific climate-friendly practices. Incentive programs must be accessible and user-friendly by minimizing complexity in the process and avoiding unnecessarily burdensome paperwork.

With investments in additional research, technical assistance and financial incentives, we can ensure that Oregon agriculture remains a viable, innovative and ecologically and economically sustainable industry for years to come.

Thanks in advance for your consideration.

Chris Schreiner,
Executive Director
Oregon Tilth

OREGON WHEAT

"Making Every Resource Count"

Oregon Wheat Growers League 115 SE 8th Street, Pendleton, OR 97801 (541) 276-7330 www.owgl.org

TO: **Chair Ken Helm**
Clean Energy Jobs Work Group: Agriculture, Forests, Fisheries, Rural Communities and Tribes

FR: **Blake Rowe**
CEO, Oregon Wheat Growers League

RE: **Policy Questions & Responses – October 9, 2017**

Question 1. What aspect of cap-and-invest policy, as it is being discussed in Oregon, are you most concerned about for your organization/industry/constituents/customers?

Our primary concerns revolve around the impact to our competitiveness as a supplier to the global wheat market. Thanks in part to Oregon's excessively high regulatory, labor and benefit costs, and declining level of state services, our growers already are dealing with extremely low, if not negative returns. The cap-and-invest policy as currently discussed will raise our costs without providing any significant benefit to growers (beyond the symbolic "we are doing something").

Growers already face all the current and future costs of adjusting to a changing climate. Oregon's cap-and-invest strategy, may make a marginal reduction in Oregon's carbon emissions, but it will not make any significant change in the future trajectory of global climate change because Oregon's share of global emissions is so small. Put another way, we will face even higher costs for transportation, power, and other materials and services, under Oregon's cap-and-invest strategy, with essentially no reduction in the future costs of climate change. This will be the case until a huge portion of the globe matches the steps being taken by early adopters and all producers face a level playing field of production costs.

We should also be clear that the "invest" side of the policy can't fix the competitiveness problem faced by producers. There simply are not enough dollars to make all the impacted groups whole, especially when you consider that the dollars will flow through a state bureaucracy and most of the funds will be used to finance new activities that have no significant return or benefit to the entities that "pay" into the cap part of the program.

Question 2. What changes would you suggest be made to cap-and-invest, as it is currently being discussed, to address the concerns you have?

Our first suggestion is to defer any required implementation of an Oregon program until 75% or more of the countries in the world are committed to implement similar measures. That is the only way to make sure there is level economic playing field for Oregon producers and exporters.

Our second suggestion is to drop the insistence that Oregon's system match the California model and the existing carbon market. Oregon should focus on reducing carbon emissions…period. The existing carbon markets are too cumbersome, require far too much complex documentation and measurement,

penalize states with higher regulatory requirements, penalize early adopters and require long term agreements that encumber the land and are unacceptable to most landowners. Oregon needs a system that works for Oregon economy and landowners. We don't need to adopt problems designed elsewhere. If, at the end of the process to develop an Oregon system, the State finds that it can market our carbon reductions to an outside carbon market, that is fine. However, forcing Oregon to fit into someone else's program is not a good approach.

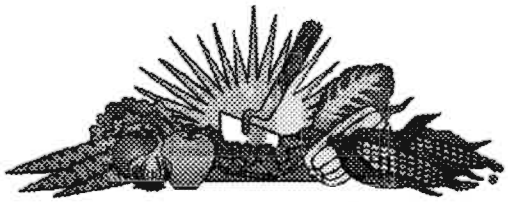
Oregon needs to ensure that early adopters are treated fairly. For instance, a grower who has already adopted no-till practices should be entitled to the same carbon credits as a grower who agrees to adopt the practice in the future. Early adopters and innovators also dominate leadership in many agricultural groups, so fair treatment for them in any program is critical to gaining our support.

Finally, we suggest that the costs and benefits of cap-and-invest to Oregon's economy, businesses, and citizens needs to be studied before any plan is finalized and implemented. The study needs to be done by an independent expert, not by advocates for or against the approach. It should look at the costs and benefits to Oregon's economy, including export dependent industries, and consider how individual sectors are impacted or benefited.

Question 3. What opportunities do you believe exist for your organization/industry/constituents/ customers from implementation of a cap-and-invest policy, as it is currently being discussed in Oregon?

As currently envisioned and described by the advocates and developers of the cap-and-invest strategy, we don't see any substantive opportunities or benefits for growers from this policy.

There will be a few growers who will pursue carbon agreements, but the vast majority will not. From a producer's standpoint this is just about trying to survive the impact on our competitiveness until the rest of the world matches the approach and levels the playing field.



Organically Grown Company

Employee and Grower Owned • Promoting Health through Organic Agriculture as a Leading Sustainable Organization

Oct 9, 2017

Public Comment to the Clean Energy Jobs Work Group
on Agriculture, Forests, Fisheries, Rural Communities, and Tribes

Dear Representative Helm and Members of the Workgroup,

We are submitting comments on potential cap-and invest policies on behalf of Organically Grown Company. Organically Grown Company (OGC) is the largest organic produce distributor in the Pacific Northwest. Founded in Eugene, Oregon in 1978, we are an employee and grower owned business with offices and warehouses in Eugene and Portland, and cross dock facilities in Medford, Spokane, and Des Moines (WA). Employing over 280 people, we work with more than 300 farmers including over 50 regionally. We market and distribute fresh organic produce to over 500 retail, wholesale, and restaurant customers throughout the greater Pacific Northwest and beyond. We are dedicated to supporting and advocating for regional organic and transitioning farmers, particularly small-to-mid-sized growers, whose innovation and success drives a robust and growing local food economy, and enriches our state by protecting our valuable natural resources and growing healthy food.

We are encouraged to see Oregon legislators take up the urgent issue of Greenhouse Gas (GHG) reduction strategies. Oregon agriculture is vulnerable to the impacts of climate change, with reports that state water supplies will become increasingly limited, threatening a fundamental resource for the agriculture industry. Also predicted as a result of climate change are greater pressure from weeds and pests, increased animal diseases, reduced winter chill hours, and an increased number of extreme weather events.

As this Work Group reviews and makes recommendations on specific components of a cap-and-invest program for Oregon, we encourage you to consider the perspectives that reflect the diversity and innovation of Oregon's agricultural community. Organic agriculture in Oregon is strong and growing. Oregon is 6th in the nation in total organic acres. Oregon is also 4th in the nation with organic farmgate sales valued at $269 million, a 14% increase over 2014[i]. Recent Oregon Tilth data indicates that much of this increase is happening as a result of currently certified farms adding new acreage into organic production – a sign of crop management success and increasing market demand. We are also witnessing a recent trend of transition to organic production practices by non-organic growers seeking new opportunities. Oregon's organic sector is hiring employees, adding acreage, and increasing revenue.

Several recent studies indicate the important roles that organic farming and ranching practices play in addressing climate change. One study, directed by The National Soil Project at

Northeastern University, shows soils from organic farms had 26% more potential for long-term carbon storage and 13% more soil organic matter than soils from non- organic farms. The results were based on 659 organic soil samples from 39 states. These were contrasted with samples from more than 700 non-organic farms in 48 states. This important study provides significant evidence that organic agricultural practices build healthy soils and can be part of the solution in the fight against global warming. Organic agriculture is part of a toolkit of climate solutions. It can help reduce GHG emissions, enhance a powerful resource for sequestering carbon, and provide many additional environmental and human health benefits.

We ask that this Work Group develop policies that reflect the tremendous impact that Oregon's organic agricultural sector has on building healthy, economically viable communities in the state, and the important role of organic agriculture as a whole in impacting climate change mitigation through carbon sequestration.

Specifically, we are asking for:

1. Designated economic credit for organic farming;
2. Credit for specific farm management practices proven to mitigate climate change and enhance carbon sequestration;
3. Expansion of funding for programs to support organic research and education, considering the proven carbon benefits of organic farming.

Thank you for your consideration of our request to specifically evaluate and include the benefits and practices of organic farmers in any cap-and-invest policies. Our responses to the Work Group questions are included below.

Sincerely,

Natalie Reitman-White,
VP of Organizational Vitality and Trade Advocacy

Kimberlee J. Chambers, PhD
Supply Chain and Sustainability Program Manager

[i] USDA National Agricultural Statistics Service, 2015 Certified Organic Survey

Policy Questions to Answer:

Question 1: What aspects of a cap-and-invest policy as it is being discussed in Oregon are you most concerned about for your organization/industry/constituents/customers?

Most significant for our industry is the potential for small and mid-scale and organic farmers to be disadvantaged if incentives for cap-and-invest are designed to benefit large scale primarily conventional farms. A common concern among the agricultural community is that early adopters, already implementing one or more beneficial practices, such as organic farmers, are not rewarded while laggards who have resisted implementing progressive farming practices receive financial rewards and technical assistance. Indirect costs may come if other sectors pass through their increased costs for goods and services that are carbon intensive.

Question 2: What changes would you suggest be made to cap-and-invest as it is currently being discussed to address the concerns you have?

Oregon offsets program should be designed to provide:

1. Designated economic credit for organic farming;
2. Credit for specific farm management practices proven to mitigate climate change and enhance carbon sequestration;
3. Expansion of funding for programs to support organic research and education, considering the proven carbon benefits of organic farming.

The bill language should also ensure that funding is available and accessible to farms of all sizes.

Examples of additional Oregon-specific offsets, or new offsets for agriculture, could include:

1. Certified organic farming operations
2. Cover crops and crop rotations
3. Conservation tillage
4. Rotational grazing

The following policy options provide examples for consideration:

I. Provide funding from reinvestment revenue for GHG mitigation by the agriculture sector. Consider establishing an additional Fund, similar to California's Healthy Soils Program, which would provide grant or other funding to the agriculture sector for projects which mitigate greenhouse gas emissions. Ensure that this funding is available and accessible to farms of all sizes.

II. Section 14(4)(c) add a requirement for consideration of projects with multiple environmental and health co-benefits. This appears in Section 16 but probably belongs in both places. Co-benefits can include resistance to both drought and flooding and increased productivity.

III. In Section 16(3)(d) it would be ideal to have representation of someone with experience in natural and working lands. If positions are established there must be representation of farms at all scales.

IV. Section 16(6)(c) allows for provision of technical assistance for women and minority businesses, which we fully support. It is important that small and mid-scale independently owned farms are able to access these investment dollars. We request that terminology related to scale and independently owned businesses be added and defined in regards to technical assistance as well, so that farms of all sizes can benefit. Without these explicit statements we are concerned that this funding will go mainly to large industrial-scale agricultural operations with the resources to write the grants and do the reporting.

Examples of agriculture-related incentives, which subsidize practices or equipment replacement that will reduce GHG emissions from the agricultural sector include:

- Alternative manure management (methane): Provide incentives and technical assistance for the development and implementation of non---digester manure management programs that reduce methane emissions, similar to those in California's Alternative Manure Management Program.
- Commercial composting of food processing waste (methane): Provide incentives and technical assistance for food processors and other agriculture operations producing significant organic waste to send that waste to commercial composting facilities that capture methane.
- Reduce or eliminate diesel engine use for irrigation pumps (CO2): Transition diesel---powered irrigation pumps (there are fewer than 250 in Oregon) to high---efficiency electric pumps where possible or to high efficiency diesel pumps where electrical power is unavailable.
- Increase efficiencies of existing irrigation systems (CO2): Provide financial and technical assistance for improving irrigation systems to reduce electrical inefficiencies and improve water efficiencies; e.g., the use of sensors to improve irrigation scheduling, the use of micro---irrigation pumps, pump improvements or retrofits, use of low pressure irrigation systems, installation of variable frequency drives and reduction of pumping. See California's SWEEP program.
- Reduce or eliminate diesel engine use for greenhouses and other agricultural buildings and infrastructure excepting residences (CO2): Transition any diesel generators to high---efficiency electric heating systems where possible, propane powered engines or high efficiency diesel engines where electrical power is unavailable.
- Phase---in: subsidy for participation in "green electricity" program where clean electricity is not available (CO2): In some parts of the state, electrical power is provided by utilities using coal or other fossil fuels. Where agricultural operations cannot get access to clean electricity, subsidize first five years of participation in "green energy" programs.
- Soil health improvements (CO2): Provide financial and technical assistance for producers implementing practices that reduce GHG emissions and build soil organic matter
- Avoided conversion of existing CREP and CSP lands (CO2): Where CREP and CSP contracts are ending and not likely to be eligible for renewal, provide financial incentives for continuing to keep the land out of production and in natural vegetation without requiring permanent easements.
- Avoided conversion of existing farm land for development (agricultural easements) (CO2): Put agricultural land into agricultural easements to avoid development maintains existing carbon storage. Where agricultural land is in an annual or biannual conventional tillage system, although existing practices might not be the best for carbon sequestration, if the land is not developed, the possibility is always there for the producer to begin implementing practices or raising crops that do allow for carbon storage increase through improvements to soil chemistry. See, e.g., California's Sustainable Agricultural Lands Program (SALC) program.

Many, but not all, of the practices mentioned above can be implemented by both conventional and organic farms and farms of a variety of sizes/scales.

Question 3: What opportunities do you believe exist for your organization/industry/ constituents/customers from implementation of a cap-and-invest policy as it is currently being discussed in Oregon?

The availability of funding from offsets is a great opportunity for Oregon's organic and sustainable agriculture communities. An offset program would allow "uncapped" sectors—like agriculture and forestry—to generate additional emissions reductions, or offsets, that can be sold to regulated parties.

Examples of agriculture-related offsets currently accepted in the carbon market include:

I. Reduced use of nitrogen fertilizers on agricultural crops (N2O): The use of precision agriculture techniques minimizes over--application of nitrogen fertilizers to agricultural lands. Over--application of nitrogen fertilizers releases N2O, as plants and soil are unable to fully incorporate all applied nitrogen into the nitrogen cycling, instead releasing excess nitrogen in the form of N2O to the atmosphere.

II. Avoided conversion of grasslands and shrublands (CO2): Existing grasslands and shrublands are not converted to agriculture or development, maintaining existing carbon storage and allowing carbon storage increase through soil chemistry.

III. Application of compost or composted biosolids to grazing lands (CO2): Compost or composted biosolids applied to existing grazing lands increases the soil's ability to harvest and store atmospheric carbon, increases plant productivity and soil health.

IV. Anaerobic digester installation for dairy operations (methane): Anaerobic digesters capture methane gases released during decomposition of animal waste. The captured methane can be used for energy production.

Oregon will need to create a process for drafting new offset protocols for agriculture that are specific to Oregon and the diversity of small and mid-scale organic farmers present in this state.

To support the climate benefits of organic and sustainable agriculture, research, technical assistance and financial incentives are needed:

- More Oregon-specific research is needed on agriculture and climate change issues, specifically focused on the relationship of organic and biologically integrated agricultural practices to carbon sequestration, GHG emissions reductions, and risk reduction.
- Farmers need adequate outreach and technical expertise to translate the research findings into practice and to actualize real opportunities for GHG emission reductions on Oregon's farms and ranches.
- When there are costs or perceived risks of making the transition to climate-friendly practices, financial incentives for farmers and ranchers are essential. It requires time, skill building and money to transition to new production practices, and financial assistance must be available to growers who implement specific climate-friendly practices. Incentive programs must be accessible and user-friendly by minimizing complexity in the process and avoiding unnecessarily burdensome paperwork.

With investments in additional research, technical assistance and financial incentives, we can ensure that Oregon agriculture remains a viable, innovative and ecologically and economically sustainable industry for years to come.

Question 1: What aspect of a cap & invest policy as it is being discussed in Oregon are you most concerned about.
We would like to see workers transition into employment that offers fair trade for their labor. It is very important that displaced workers new employment is either equal to their current compensation or greater than their current compensation.
The construction industry can provide these job opportunities. We are currently experiencing an unprecedented shortage of skilled workers. However, given the lack of representation of women and minorities in the construction industry it will be very important that there be contractual requirements for women and minorities in numbers proportionate to the demographics of displaced workers not just aspirational goals.

Question 2 I currently have no opinion on this.

Question 3: What opportunities do you see for your organization.
The Pacific NW Carpenters Institute and our fellow trade specific apprenticeship programs offer the skilled training the construction industry desperately needs. We have a wonderful opportunities to help these workers transition into solid middle class jobs that offer fair trade for their labor and in many cases the majority of an Associates degree in Construction Technologies with little to no extra out of pocket expenses.
I also see opportunities for the State of Oregon to help employ other disadvantaged workers by including contractual language that requires giving opportunities to veterans, low income workers, and felons along with women and minority.

Amber McCoy

Recruitment/Retention Coordinator

Pacific Northwest Carpenters Institute

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Annette Price
Vice President, Government Affairs
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PACIFIC POWER
A DIVISION OF PACIFICORP

October 9, 2017

Beth Patrino
Oregon House Committee on Energy and Environment
900 Court St. Room 453
Salem, OR 97301

Dear Beth:

Please find Pacific Power's responses to the Utilities and Transportation Workgroup homework questions below.

Question 1: What aspects of a cap-and-invest policy as it is being discussed in Oregon are you most concerned about for your organization/industry/constituents/customers?

Response: PacifiCorp has the following concerns with the proposed cap-and-trade program:

- The policy discussion to date has not addressed a foundational issue—whether adopting a cap-and-trade program in the near-term is the most effective way for Oregon to meet its emission reduction goals.
- The relationship between the proposed cap and trade program and existing greenhouse gas emissions reduction laws and rules is unclear. Without greater clarity and consideration, cap and trade could amount to double regulation of the electric sector's emissions due to existing renewable portfolio standard (RPS) and Senate Bill 1547 requirements.
- As it relates to its application to Oregon's retail electricity sector, the policy may be vulnerable to constitutional challenges if it regulates out-of-state emissions through the regulation of imported power. The policy may also be vulnerable to challenge if it attempts to assess compliance costs to electricity customers outside of Oregon that are served by power plants located inside of Oregon. It is unclear if the program seeks to impose costs beyond Oregon electricity customers, in both the wholesale electricity market and to retail electricity customers in other states.
- The policy may not adequately capture normal fluctuations in emissions levels that are not in the control of the utility e.g., varying hydro conditions.

- The policy does not clearly state that only actual or direct emissions will be subject to the cap, or that only emissions from generation resources in Oregon rates may be subject to the cap.
- The policy does not adequately address parity between private electric utilities and public electric utilities that receive the majority of their electricity generation from the federal government. This dynamic could lead to unfair and disparate compliance costs among Oregon electricity customers.

Question 2: What changes would you suggest be made to cap-and-invest as it is currently being discussed to address the concerns you have?

Response: PacifiCorp has the following suggestions for a proposed cap-and-trade program:

- Policy proponents and stakeholders should engage in a broader discussion of carbon policy measures for the state of Oregon rather than narrowly focusing on cap and trade.
- The concerns described above also have regional and federal considerations that should be factored into the development and crafting of state carbon reduction. These considerations would be best addressed by broader stakeholder dialogue.

Question 3: What opportunities do you believe exist for your organization/industry/constituents/ customers from implementation of a cap-and-invest policy as it is currently being discussed in Oregon?

Response: PacifiCorp wants to ensure that meaningful greenhouse gas reduction measures can be achieved, that the introduction of a cap and trade program does not impair emissions reduction expected to occur under existing public policies. Furthermore, both the benefits and risks of any new programs being considered, including cap and trade, should be thoroughly considered and fairly shared.

Thank for you for the opportunity to provide feedback, and feel free to call me directly at 503-813-6019 or our Salem representatives, Shawn Miller and Elizabeth Howe, if you have any questions.

Sincerely,

Annette Price

Clean Energy Jobs Work Group Home Work
Submitted by Pinchot Institute for Conservation
10.9.17

1. **What aspects of a cap and invest policy as it is being discussed in Oregon are you most concerned about for your organization/industry/constituents/customers?**

- An auction or other mechanism should be used to generate program revenue when pollution allowances are distributed.

- Rural communities and working lands should play an important role in carbon pricing policy. A significant amount of resources will need to be dedicated to emission reduction projects in agriculture, ranching, and forestry. This can and should be done in disadvantaged communities and can and should be guided by the best available science on best practices for climate smart natural resource management, with an eye to practices that both help mitigate greenhouse gas emissions and help working lands adapt to the effects of climate change.

- As should be the case with the treatment of other sectors, the legislative process and subsequent rule-making processes should clearly outline the role of working lands and rural communities in the Climate Investment Fund and Just Transition Fund created by S.B. 1070.

- Existing policies and programs within the state's Natural Resource budget can be considered as avenues for directing resources. Existing state level structures, such as the Forest Resource Trust, may be able to be used without a need to create new institutions. S.B. 1070 should where possible avoid creating conditions where accessing carbon payments/offsets and incentive programs is overly cumbersome for smaller forests and agricultural options. Oregon's legislatively created Forest Resource Trust has been used to plant trees on marginal agricultural land—albeit now lacking a funding source, or as a newly established program. The Trust could be modified to incentivize landowners to undertake climate adaptation/mitigation actions beyond tree planting that are proven to increase carbon storage and improve resilience.

- The existing market for "compliance offsets" is largely inaccessible for most family forest owners, municipal watersheds, and other non-industrial forest owners, as well as for small scale farm operations. An Oregon offset market should be designed to: (1) ensure that emission reductions are real, additional, and as permanent as possible, and (2) accessible for smaller scale non-industrial forest and farm properties.

2. **What changes would you suggest be made to cap and invest as it is currently being discussed to address concerns you have?**

- Allocate resources to a strong working lands incentive program to reward agricultural and forest landowners for engaging in practices that improve adaptive capacity, ecological health, and carbon sequestration levels on their land. Incentives should be included under the Climate Investments Fund **Section 16(5)*(h).*** Weave into

implementation of an incentive program, science-based tools for measuring the carbon/climate benefits of improved land management tactics. The USDA has developed well researched tools for understanding the climate benefits of a range of agricultural and forestry practices, some of which are being used in California's Healthy Soils Initiative. These tools could be used to calculate the carbon benefits of improved practices for state emissions calculating. Consider ways to monitor incentive performance at a project and programmatic level. In addition to possibly funding existing programs, climate investment funds allocated to incentives should leverage existing agency programs and staff capacity designed to achieve direct and ancillary carbon and climate related benefits. As needed, existing program statutes should be reviewed for amendment to improve their integration with Oregon carbon and climate policy, and access to program revenues. Doing so could reduce program implementation costs, achieve efficiencies in administration, capture and promote existing technical assistance capacity in project development and implementation, and establish greater alignment in agency direction to achieve comprehensive state climate goals.

- Agriculture and forestry incentives can be targeted to operations with: (1) greatest potential for net emission reductions, (e.g. via positive carbon sequestration and storage based over the long-term, or other methods) (2) additional criteria including--income, commitment to project term lengths (permanent vs. shorter-terms), ancillary benefits--e.g. Increasing adaptive capacity of the property and surrounding lands etc. Term lengths could include options of permanent easements or term easements akin to the Federal Healthy Forest Reserve program authorized in the Farm Bill.

- Representation from natural resource science and management should be required for both The Climate Investments Fund Grant Committee **Section 16(3)(d)*(l)(J)*** and Just Transition Fund Grant Committee. **Section 20(2)*(g)(h)***.

3. What opportunities do you believe exist for your organization / industry/ constituents/ customers from implementation of a cap and invest policy as it is currently being discussed in Oregon?

- The Pinchot Institute is interested in convening a process for development of a framework for supporting the engagement of family forest and farm owner in the market for carbon offsets that would result from passage of S.B. 1070. This may entail development of aggregation methodologies or other mechanisms.

- The Pinchot Institute is also interested in supporting development of the incentive mechanisms discussed earlier in this document. We believe that the tools available (e.g. USDA National Resource Conservation Service methodology for "Quantifying Greenhouse Gas Fluxes in Agriculture and Forestry" via USDA's COMET-Planner tool) for quantifying the emission reductions of agricultural and forestry practices should be evaluated to inform the design of incentive programs. We believe that the ranking procedures now in use in California's Healthy Soils Initiative might be useful for informing the application here in Oregon.

Clean Energy Jobs Work Groups

Meeting #1 -- Homework Questions

DIRECTIONS: No later than one week prior to the second work group meeting, please send your responses to the questions below to committee staff (beth.patrino@oregonlegislature.gov or beth.reiley@oregonlegislature.gov). As you prepare your responses, please consult with others in your organization or industry, particularly any located in jurisdictions currently participating in the Western Climate Initiative.

The Port of Portland (Port) appreciates the opportunity to provide these brief responses to the homework questions and looks forward continued involvement in the discussion of climate policy in Oregon.

The Port is concerned with the conclusions reached last year by the Oregon Global Warming Commission that Oregon is not on track to meet its 2020 greenhouse gas emissions reduction target. Consequently, we support consideration of additional policy to continue on a path of greenhouse gas reductions.

Question 1: What aspects of a cap-and-invest policy as it is being discussed in Oregon are you most concerned about for your organization/industry/constituents/customers?

The Port's position on carbon policy is guided by the following primary principles and criteria:

- **Emissions reductions certainty**: Policy is linked to a greenhouse gas emission reduction goal, results in absolute greenhouse gas reduction, and emissions are real, permanent, quantifiable, verifiable, enforceable, and are reported.
- **Social Equity**: the policy addresses impacts to disadvantaged populations.
- **Regulatory certainty**: Oregon businesses and the Port have a predictable regulatory environment in which to plan current and future opportunities
- **Economic and operational impacts**: Carbon regulations do not negatively impact the state economy or create a competitive disadvantage for Oregon businesses.

As written, SB 1070 meets many of these principles and criteria, including allowing linkage to California's program, providing some price protections (in the form of a reserve of surplus allowances to address price spikes), and a plan for grant funding for projects which reduce greenhouse gasses, including in projects in impacted neighborhoods. The Port believes any policy should be mindful of impacts on rural Oregon and structured in a way to create opportunities for increased investment in the rural parts of our state.

Question 2: What changes would you suggest be made to cap-and-invest as it is currently being discussed to address the concerns you have?

The Port would like policy makers and stakeholders to have a deeper discussion about how offsets will be structured in an Oregon cap and invest program and how linkage with California will affect the use of offsets under Oregon's program.

The Port recommends that the cap-and-invest program design should include an economic analysis to demonstrate there will not be adverse economic impacts over other alternatives and to identify potential impacts to at-risk and trade-dependent industries and the mechanisms for monitoring and addressing those impacts. This should include a rigorous evaluation to tailor program design alternatives to ensure Oregon's emission reduction goals are met, while ensuring the maximum achievable economic protections. Such an evaluation should identify optimum offset levels, amount of free allowances, price limits, surplus allowances, and identify the mechanism to monitor the program and make necessary adjustments once the program is implemented.

Question 3: What opportunities do you believe exist for your organization/industry/constituents/ customers from implementation of a cap-and-invest policy as it is currently being discussed in Oregon?

The benefit of a cap-and invest policy is that it creates a market-based pricing system that does not prohibit any type of operation or activity and can adapt to changing economic conditions, thereby minimizing adverse impacts to businesses. The Port believes a cap and invest policy will still allow the Port's marine, aviation, navigation and industrial development activities and our tenants to serve existing operations and to grow operations in the future.

We also believe a cap and invest policy provides a predictable regulatory environment in which to plan current and future opportunities. Cap-and invest provides companies with regulatory certainty and gives companies flexibility to meet the targets at the lowest cost.

There should be a robust conversation about the revenue created by a cap-and-invest program. One area we are interested in is the possibility of addressing other environmental impacts through grant funding to projects with complimentary air quality benefits. For example, revenues from California's cap-and-trade have helped California's ports transition to cleaner transportation, thereby reducing greenhouse gases, criteria pollutants, and air toxics simultaneously.

Further, California's cap-and-trade has earmarked money to boost alternative fuels development. There is a strong interest in the Pacific Northwest in sustainable aviation fuel but there remains a significant price gap with conventional fuels to be viable. We are intrigued by the possible opportunities created for clean fuels development by a cap and invest policy.

Portland General Electric Company
121 SW Salmon Street • Portland, Oregon 97204

October 10, 2017

The Honorable Ken Helm
Chair, House Energy and Environment Committee
The Honorable Michael Dembrow
Chair, Senate Natural Resources Committee
The Honorable Lee Beyer
Chair, Senate Business and Transportation Committee
Oregon State Capitol
900 Court St. NE
Salem, OR 97301

Dear Senators Dembrow and Beyer and Representative Helm,

Thank you for the opportunity to provide comment on the Clean Energy Jobs legislation and to participate in the Utilities and Transportation workgroup. We take Oregon's climate goals seriously and are pleased to be at the table for this discussion.

PGE has a long history of helping to shape and support state and national policies that promote energy efficiency, renewable energy, smart grid and storage deployment, transportation electrification, and greenhouse gas emission reductions. We are also engaged at the local level, working closely with cities and counties in our service territory on bringing to life the ambitious goals they are setting for their clean energy future.

Most recently, we were part of a broad coalition that worked to craft and enact Oregon's Clean Electricity and Coal Transition Plan, SB 1547 (2016). It sets a deadline for getting coal out of our resource mix and requires us to serve our customers with energy that is 50% renewable by 2040. At present, our generation mix is about 40% carbon-free. By 2040, assuming physical compliance with SB 1547, 70% of PGE's energy will be from carbon-free resources. We fully supported this legislation because direct regulation creates a clear path to physically transition the PGE system to one that is low-carbon. This enables PGE to provide our customers with the clean energy they want from us and to do our part to cut carbon emissions in Oregon. We see such direct regulation as delivering the results that policy makers and our customers have come to expect from PGE – an increasingly clean resource mix, the greener the better, the sooner the better and of course delivered while keeping our service affordable, equitable, safe, secure, and reliable.

When we look south to California, which created the cap and trade program to which SB 1070 would link our state, direct regulation – not cap and trade - has been the primary driver of carbon reductions from the electric sector. Their cap and trade program is viewed as a "backstop" and in the years since the cap and trade program was adopted, the state has expanded the so-called "command and control" measures to accomplish more reductions – notably greatly expanding its renewable portfolio standard.

It is within that context that PGE offers these comments on the cap and trade proposal. Just as we worked collaboratively with the state Department of Environmental Quality to improve their study of the efficacy of a state cap and trade program, we do so here to inform the conversation. Our long commitment to carbon reduction policies that drive real CO2 reductions on our system at a reasonable pace, at acceptable price impacts to our customers, and that do not disproportionately fall upon the electricity sector remains strong and it is through that lens that we consider this policy.

Question #1: What aspects of a cap-and-invest policy as it is being discussed in Oregon are you most concerned about for your organization/industry/constituents/customers?

- The policy discussion to date has not addressed a foundational issue—whether adopting a cap-and-trade program in the near-term is the most effective way for Oregon to meet its emission reduction goals. We have genuine concerns about whether a state or regional cap and trade policy is the right one for Oregon's electricity sector. We are currently implementing SB 1547 which will reshape our resource mix over the next 23 years and will place us on the path to meet our proportionate share of Oregon's greenhouse gas reduction goals. Raising rates to reflect the cost of allowances for legacy resources as customers bear the costs of incorporating new non-emitting resources to replace them, unnecessarily and unfairly penalizes customers by making them pay twice for the transition of the electric system. We believe the focus should be on limiting cost impacts to actions that advance the physical transition of the system.

- The bill provides no reason for confidence that all of our customers will be protected from cost impacts through allowance allocation. The policy as written creates the possibility that utility customers could see some rate mitigation through allowance mitigation but leaves it to one state agency and a fundamentally political process to determine how much relief may be provided. It then leaves it to the utility commission to spread whatever benefit is received among the classes of utility customers. It is inevitable that there would be winners and losers in what is at heart a fight over the redistribution of money. We are confident of only one thing – that all of our customers would feel the pain of the price on carbon.

- In the current context, where our customers (businesses, cities, and individuals) are increasingly focused on being served by 100% clean energy, we are concerned that a market based system will take us in the wrong direction by encouraging paper-based compliance for some period of years. The whole point of a market based system is to achieve reductions anywhere under the cap at the lowest price possible, and concurrently to allow emitters to "pay to pollute" until it no longer makes economic sense to do so. This is an entirely rational approach if one does not care where the reductions are physically occurring. If we end up in a system linked with other states and provinces, those reductions could legitimately occur in any sector in any part of the linked geography (e.g. not necessarily on PGE's system or even in Oregon) as long as allowances were available at prices lower than the cost of physical investments in clean energy. Rates would reflect the cost of purchasing the allowances, the money would go somewhere and not necessarily to Oregon or Oregon entities, and those dollars would not have been invested in advancing the clean energy transition that PGE customers want to see.

- We recognize that policy makers believe it is important to provide a price signal to customers, but we respectfully note that we are already providing that signal: we charge residential and commercial customers over 6% of their total bill in order to fund cost-effective

energy efficiency measures and distributed renewable generation. That number is likely to increase over time as we and the ETO work to capture all cost effective energy efficiency.

- PGE cannot determine the total amount of revenue that will be raised from our customers over time, but it is clear that it is quite a lot of money in year one of the program. We would like to see a public discussion of the costs to the utility sector and the costs to individual utilities within that sector. Transparency will be critical, especially with costs of this magnitude.

- How can this bill ensure that moneys raised under the program will be spent on activities that reduce greenhouse gas emissions? There is no assurance provided in the bill that the moneys will be spent to further reduce greenhouse gas emissions as designed. The legislature has attempted several times in the last decade to take money from the ETO to pay for projects unrelated to the ETO's mission. These "redeployments" have been met with broad political opposition – requiring a Governor's veto in 2007 – but are instructive.

- The bill contemplates providing allowances to consumer owned utilities with marginal or no carbon emissions connected with serving their load. Not only that, but there are historical price differentials between rates of the consumer-owned utilities and the other electric utilities in the state based on choices made in federal law. We should avoid adopting state policies that would serve to increase the price disparities, penalize people for the location of their home or business, and invite the dislocation of businesses within the state based on those long-ago adopted federal policies.

- PGE does not see anything in the legislation that would specifically address the issue of annual hydroelectric variability.

- Finally, because the cap and trade discussion is one fundamentally about raising money, the conversation needs to consider and incorporate the other revenue raising discussions that the state is having. Our customers are tax paying citizens, and whether this is called a fee, a tax, or a "price signal" in an electric bill, the burden that they will pay overall will go up.

Question #2: What changes would you suggest be made to cap-and-invest as it is currently being discussed to address the concerns you have?

- We strongly encourage a broader discussion of carbon policy measures that is not solely focused on California-style cap and trade. It is clear from the experience in California that the vast majority of reductions come from direct regulation, not from cap and trade. We should expect the same result in Oregon if we keep doing this one policy at a time. Instead of ending up with the complicated, expensive web of policies to our south, we would rather see a truly Oregonian approach to the task of meeting our climate goals, one that expressly aims to decarbonize our economy and keep our energy costs low. That is a genuine competitive advantage for Oregon that we should be loath to lose.

Question #3: What opportunities do you believe exist for your organization/industry/constituents/ customers from implementation of a cap-and-invest policy as it is currently being discussed in Oregon?

- We appreciate that climate advocates are focused on an economy wide approach to GHG emissions. We think it makes sense to work on reducing emissions from all sectors of the energy economy.

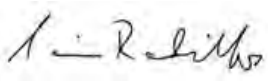
- PGE wants to see Oregon achieve its GHG reduction goals and to do our part in meeting those goals. We see an opportunity to leverage utility decarbonization to reduce emissions in other sectors as described in the emerging work on deep decarbonization. It is unclear whether a linked cap and trade program will advance or slow such an approach. Driving electricity rates up to fund anything other than decarbonization of the electric system seems like a move in the wrong direction.

- It is our understanding that our customers want to be served with clean energy and want us to make the physical changes in PGE's resource mix to provide that clean energy. We are committed to making that physical transition happen, and happen as affordably as possible. As a consequence, we have grave concerns about the cap and trade bill currently under consideration. As currently designed, the cap and trade program can be expected to increase customer rates but would not drive or pay for the investments needed to transition to low carbon resource mix.

- Affordability, equity, safety, security and reliability are "givens" - baseline expectations we must continue to meet while we transition to a low carbon electricity sector. These are not excuses for "business as usual"; they are essential attributes of a system that serves everyone in our community and they must inform policy design and implementation.

We look forward to continued dialogue on this important issue.

Sincerely,



Sunny Radcliffe
Director, Government Affairs & Environmental Policy

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Washington Environmental Council
WashPIRG

421 SW 6TH Ave, Suite 975
Portland, OR 97204
www.RenewableNW.org

Renewable Northwest

To: Senator Beyer, Chair, Clean Energy Jobs Work Group on Utilities and Transportation
Senator Dembrow, Chair, Senate Committee on Environment and Natural Resource
Representative Helm, Chair, House Committee on Energy and Environment
Members, Clean Energy Jobs Work Group on Utilities and Transportation

Renewable Northwest is a regional non-profit organization committed to the environmentally responsible development of renewable energy resources across Oregon and the Pacific Northwest. Our members consist of renewable energy developers and related businesses, consumer protection organizations, and environmental non-profits. We are pleased to submit responses to the homework questions below.

Thank you,

Rikki Seguin

Rikki Seguin
Policy Director

Question 1: What aspects of a cap-and-invest policy as it is being discussed in Oregon are you most concerned about for your organization/industry/constituents/customers?

Renewable Northwest is carefully considering the interaction of a cap-and-invest policy with existing policies and programs. Our priority is to ensure that cap-and-invest does not undermine existing policies and programs that are working in Oregon. The two policies at the top of the list are the Renewable Portfolio Standard (RPS) and the voluntary renewable energy market.

Related to the RPS, how do we ensure that compliance with cap-and-invest does not undermine RPS compliance; is cap-and-invest meant to lead to additional emissions reductions in the electric sector beyond what the RPS drives; and how will emissions reductions in the electric sector be attributed? Further, could cap and invest be designed to support utilities' acquisition of economically desirable renewables, not just renewables to comply with the RPS?

Related to the voluntary market, how do we ensure that customers participating in these programs are indeed achieving regulatory surplus (defined further below); how do we ensure the integrity of Renewable Energy Certificates (RECs) sold in the voluntary market or to other states when emissions reductions claims have been made under cap-and-invest?

As described in "Voluntary Renewable Energy Programs" in the DEQ Study of a Market

Approach to Reducing Greenhouse Gas Emissions[1]:

> All Oregon utilities are required to provide customers with a voluntary, green power rate.[2] One of the key features of these programs is that voluntary renewable energy purchases can be claimed by the households and companies that make them. That is, those purchases are associated with renewable energy generation that is additional to generation that is required of the utility by state and federal regulations. Customers are thus able to claim that their electricity purchases reduce emissions, and their electricity supply is renewable and carbon-free. The incremental difference that these purchases make is often referred to as "regulatory surplus." The demand for purchases in these programs has been a major driver of new clean energy development nationwide.[3] In Oregon, the programs have been popular with customers: Portland General Electric is currently ranked #1 in the country for voluntary renewable program participants, and PGE and PacifiCorp rank #1 and #4, respectively, for the percent of customers participating in these programs.[4]
>
> Adding a cap-and-trade program to the policy landscape can eliminate the surplus nature of these programs unless measures are taken to preserve it. Once a cap-and-trade program is in place, emission reductions from covered units that are due to voluntary renewable energy purchases may no longer be surplus to regulation. Rather, those purchases would support the electricity sector's overall compliance with the carbon cap, rather than going beyond that regulatory requirement. An allowance set-aside is a mechanism that can be used in the cap-and-trade program to preserve the surplus nature of voluntary renewable programs. With this approach, allowances under the cap would be set-aside and retired in an amount equivalent to the CO2 emissions avoided due to the voluntary renewable purchases. This is the approach currently being utilized in California and RGGI.[5]

Question 2: What changes would you suggest be made to cap-and-invest as it is currently being discussed to address the concerns you have?

In order to preserve the surplus nature of voluntary renewable programs, Renewable Northwest strongly supports the additional of an allowance set-aside (detailed above). We encourage policymakers to add this mechanism to any cap-and-invest legislation and not wait to address it in rulemaking.

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[1] http://www.oregon.gov/deq/FilterDocs/ghgmarketstudy.pdf

[2] ORS 469A.205

[3] http://resource-solutions.org/site/wp-content/uploads/2016/09/CRSPolicyBrief_VRESet-asidesformassbasedCPP_8-26-2016.pdf

[4] http://apps3.eere.energy.gov/greenpower/resources/tables/topten.shtml

[5] RGGI State Set-Aside Provisions for Voluntary Renewable Energy (VRE), Draft August 21, 2009, http://www3.epa.gov/greenpower/documents/events/rggi_status_table.pdf.

Question 3: What opportunities do you believe exist for your organization/industry/constituents/customers from implementation of a cap-and-invest policy as it is currently being discussed in Oregon?

A cap-and-invest program could provide a long-term market signal that drives demand away from fossil fuels and toward renewables. Additionally, comments made by Oregon Public Utility Commission Staff at the first work group meeting addressed the intersection of cap-and-invest compliance and the utilities' integrated resource planning process. Renewable Northwest was pleased to hear Staff indicate interest in a utility planning to stay ahead of the declining emissions curve. We believe that cap-and-invest could provide additional impetus to early action on renewables procurement by utilities in order to meet the least cost, least risk resource planning framework. We believe cap-and-invest could be complementary to policies that address these and other near-term renewable energy opportunities.

Question 1: What aspects of a cap-and-invest policy as it is being discussed in Oregon are you most concerned about for your organization/industry/constituents/customers?

- That the policy be designed to coordinate with existing systems in neighboring states/provinces
- that we provide relief to working families for any costs that might get passed onto them
- Give businesses time to adapt but avoid undue delay
- Special consideration for cases where an industry can easily avoid regulation by moving out of state

Question 2: What changes would you suggest be made to cap-and-invest as it is currently being discussed to address the concerns you have?

- We might be able to reduce opposition to the bill if some of the proceeds were directed toward helping certain hard-hit industries adapt to the new rules.

Question 3: What opportunities do you believe exist for your organization/industry/constituents/ customers from implementation of a cap-and-invest policy as it is currently being discussed in Oregon?

- We have the opportunity to attract high paying jobs to Oregon and supercharge our economy by being a center of the next technology revolution.
- The opportunity to breathe cleaner air and live healthier lives.
- The opportunity to live up to our values.
- The opportunity to invest in our grandchildren's health, safety, and happiness.
- The opportunity to inspire others to follow our lead
- The opportunity to learn about the great opportunities to be found in the transition, and the tremendously positive outcomes possible if we move fast enough.

Clean Energy Jobs Work Groups Meeting #1 -- Homework Questions
Comments submitted by Rogue Climate on Tuesday, October 10th to the Rural Working Group

ABOUT ROGUE CLIMATE:
Rogue Climate is a community group based in southern Oregon. Our mission is to bring communities together for practical solutions to climate change that result in cleaner energy, sustainable jobs, and a healthy environment.

Question 1: What aspects of a cap-and-invest policy as it is being discussed in Oregon are you most concerned about for your organization/industry/constituents/customers?

For years, our local and state government has know about the impacts of climate change on our rural communities. For example, a 2008 report, "Preparing for Climate Change in the Rogue River Basin of Southwest Oregon," found that, without a rapid transition to cleaner fuels and greater efficiency, we face a reduction in snowpack in our region by at least 60 percent by the time today's newborns enter adulthood. Days of extreme heat or extreme flooding will increase, as will wildfires and smoke. Streams and fish will be threatened. Forests will be damaged by greater insect infestation.

Changes like these will not only have major effects on our quality of life but also on jobs in industries that depend on the traditional climate, including forestry, agriculture, tourism, retirement services, fishing and many other local businesses. We saw a glimpse of what climate change looks like in our community this summer when our region faced extreme heat, forest fires and smoke, shutting down our tourism industry, and impacting the health especially of our youth and elderly communities and those who work outside in the agriculture and forestry industries.

We need to pass a cap and invest policy that benefits impacted communities this year. Continuing to push the can down the road at this point should not be an option. It is critical that that the benefits of this bill will go to communities that are most vulnerable to the impacts of climate change. In southern Oregon where our organization is based, those communities include low income communities, rural communities, communities of color, Tribal communities, outdoor workers, people with disability, youth and the elderly.

Our concerns about a cap and invest policy include:

- The reductions that the bill calls for are not strong enough or quick enough. We need to reduce climate pollution based on the best available science to avoid the worst impacts of climate change.
- The investments into our rural communities will not start to be seen quickly enough. As the policy is currently written, impacted communities won't see any of the benefits from the bill until 2019. If a cap and invest policy is not passed in the 2017 legislature, we

could be looking at 2020 or even later before GHG reductions start to be seen in our state as a result of this policy.

- The accountability reporting proposed from the Public Utility Commission and the Global Warming Commission are not frequent enough. Oregon legislators and the public should get reports from the PUC and the GWC at a minimum annually to ensure that our state is on track to reduce emissions and that allowance resources are being invested in effective programs that reduce climate pollution, provide benefits for impacted communities and create jobs in rural communities. Annual reports should be available by the 15th of September so that the legislature can be fully informed prior to the start of each legislative session.
- Allowing offsets in this program should be closely scrutinized. We are concerned that the benefits that offsets could provide in terms of investment in carbon capture or storage in rural family farms or forestry operations won't stay in Oregon and may just benefit large industry projects or would subsidise projects that private industry should be taking responsibility for on their own. We are also concerned that offsets could create pollution hot spots, or continue to build an international carbon market.
- We want to make sure that this policy helps to prevent new emissions in rural communities that already experience health disparities.

Question 2: What changes would you suggest be made to cap-and-invest as it is currently being discussed to address the concerns you have?

- Increase the required reductions and the rate they are required by.
- Regarding offsets, we suggest limiting any offsets to Oregon, and otherwise utilizing other mechanisms to contain costs. Instead of relying on offsets, we believe using allowance funds will better reduce the barriers for small businesses, family farms, or foresters to access valuable resources to capture or store carbon in soils and forests.
- All new infrastructure projects proposed for Oregon that would require a significant amount of allowances should should go through a statewide cost and benefits analysis to evaluate how that project will fit with our state's climate goals.
- We are strongly opposed to this legislation preempting local efforts and therefore it needs to state that it does not limit local communities' ability to set their own GHG emissions reductions goals that go beyond the minimum required at the state level.
- The fee should apply to the life-cycle emissions related to the development of or importation of fracked natural gas for consumption in Oregon or elsewhere. This bill should help to further avoid rural oregon being targeted for GHG emissions and fossil fuel export projects.

Question 3: What opportunities do you believe exist for your organization/ industry/ constituents/ customers from implementation of a cap-and-invest policy as it is currently being discussed in Oregon?

We see a cap and invest policy for Oregon as key strategy for job creation and small business development in rural Oregon. The clean energy economy is already starting to grow in rural

Oregon, and will be bolstered by additional investment as well as the innovation that a cap will spur. We also see this policy as a tool to reduce costly fossil fuel export proposals in Oregon by setting a limit on climate pollution in our state.

We would like to see the following types of programs funded in our region:

- Small business development grants to support emerging energy efficiency and clean energy businesses. This year, Rogue Climate worked with Spark NW on a USDA rural business development grant to organize a group purchase program of ductless heat pumps for rural homeowners. In only a few months, we were able to support a local contractor in installing over 70 ductless heatpumps (highly efficient heating and cooling systems) and growing their business by three employees. We especially want to see small business development grants targeting businesses in economically distressed areas, or owned by women or people of color.
- Programs that recruit women, young people, and people of color into apprenticeship or pre-apprenticeship programs in the trades. We hear again and again from contractors in our region that that there are not enough skilled tradespeople to fill existing jobs in the growing solar and energy efficiency economies. Recruitment programs could include funding “maker spaces” in rural communities where many schools have lost all shop classes.
- Grants to help small communities develop clean energy plans and climate adaptation plans and implementation strategies.
- Infrastructure projects that protect our communities from the impacts of climate change. For example, a project that has been proposed in southern Oregon is the Water for Irrigations, Streams, and the Environment (WISE) which would put irrigation water into pipelines, saving water, improving stream health, and creating jobs.
- Increasing the liveability of rural and low income communities generally. We want to see more efficient transportation options, sidewalks, and bike lanes.

Clean Energy Jobs

Work Group Meeting

#1 – Homework

Questions

Directions: No later than one week prior to the second work group meeting, please send your responses to the questions below to committee staff: beth.patrino@oregonlegislature.gov or beth.reiley@oregonlegislature.gov). As you prepare your responses, please consult with others in your organization or industry, particularly any located in jurisdictions currently participating in the Western Climate initiative.

Question 1: What aspects of a cap-and-invest policy as it is being discussed in Oregon are you most concerned about for your organization/industry/constituents/customers?

My concerns focus on the way emissions will be distributed. It is partially answered by protections against pollution loading in vulnerable neighborhoods in the CAO draft rule. The permit system as it stands now is porous with many industry compliance challenges. CAO should tighten that up and that's good.

Question 2: What changes would you suggest be made to cap-and-invest as it is currently being discussed to address the concerns you have?

A more basic concern: Is there really a demand for emission reduction? I think there is regionally. Depends on how the caps are set statewide for demand in and out of Oregon. And how much demand we need. These could be tweaked as the policy is implemented.

Question 3: What opportunities do you believe exist for your organization/industry/constituents/customers from implementation of a cap-and-invest policy as it is currently being discussed in Oregon?

There two sets of opportunities:
One is revenue. There should be a fund to prevent potentially pollution saturated communities, and environmentalists would add saturated places. Those are details to work out.

The other is unique, cheaper, cleaner and smarter. It's big picture and maybe the governor would go for it.

Southern Oregon Climate Action Now

SOCAN

Confronting Climate Change

http://socan.info

Alan Journet, Co-facilitator
Southern Oregon Climate Action Now

Response to Clean Energy Jobs Work Group Meeting # 1 Homework Questions

October 5th 2017

alan@socan.info
541-301-4107

I respond on behalf of over 1,100 Southern Oregonians who are Southern Oregon Climate Action now, an organization of residents concerned about global warming and the climate chaos consequences it is stimulating.

Question 1: What aspects of a cap-and-invest policy as it is being discussed in Oregon are you most concerned about for your organization/industry/constituents/customers?

In Southern Oregon, following a season of excessive smoke, induced by a myriad of wildfires, we are acutely aware of the devastation that global warming can wreak on our beautiful region. The health, economic, and wildlife impacts are many. We wish to protect our corner of Paradise for eternity, but understand fully that this will not be possible unless humanity collectively eliminates the emissions of greenhouse gases that result from our activities. Not only do we support the Paris Agreement, we wish it were stronger and enforceable. We understand that broad international effort is necessary to address the problem of greenhouse gas emissions, and deeply regret that the ignorance and anti-science commitment of the current Administration stands as an obstacle to progress. The issue is urgent, and only become more urgent as each day passes without meaningful action to reduce emissions. In the absence of meaningful federal action, the responsibility falls to the states to take the lead. We want Oregon to become a leader in this arena.

We understand that Oregon's contribution to the global budget of greenhouse gas emissions is small, but also acknowledge that if our state does nothing to reduce its emissions, we are in no position to urge action by others. In addition to talking the talk, we must walk the walk; we must reduce our emissions.

As most know, in 2007 the Oregon legislature passed and the Governor signed HB3543, which established voluntary greenhouse gas emissions reduction goals for the state. Regrettably, because our corporate leaders have not adopted adequate policies to reduce emissions, we are not on a trajectory to achieve the laudable goals established in 2007. Ten years later, it has become ever clearer that voluntary goals and the guidance of the Oregon Global Warming Commission are inadequate. We profoundly wish legislation were not necessary, but the time has come for us collectively across the state to accept reality; we must act to reduce emissions.

While some Oregonians prefer the Greenhouse Gas emissions Tax or Fee approach, the 2014 study undertaken by the Northwest Economic Research Center at Portland State University revealed that a charge as high as $160 per ton of emissions would not be adequate to achieve necessary goals. The advantage of a cap approach is that goals are met at a much lower cost per ton of emissions, and thus present far less of an economic challenge. Indeed, in California, the auction price per tonne of Carbon dioxide equivalent emissions fluctuated around $13 during 2014 - 2016 suggesting goals can be met at a much lower cost to the economy.

For these and many other reasons, Southern Oregon Climate Action Now enthusiastically supports the efforts embodied in the Clean Energy Jobs Bill to place a cap on the state's greenhouse gas emissions.

In addition to recognizing the need to cap GHG emissions, we also acknowledge that there exist human concerns associated with reducing the state's greenhouse gas emissions:

1) We understand that reducing emissions has the potential to impose burdens on the workforce as fossil fuel generation and infrastructure is replaced by renewable energy generation and infrastructure. To minimize the dislocation to workers, we strongly support both the requirement for High Road Standards in contract awards and the allocation of a proportion of any funds accruing from the auction of allowances to a just transition fund to support retraining.
2) We also acknowledge that some communities suffer greater health and environmental risk than other from the current fossil fuel economy (for example from the toxic by-products of oil refineries and coal mines). Similarly, we recognize that some communities can be more severely compromised than other from efforts to promote a transition in our energy economy away from fossil fuels and towards renewables. We thus support efforts to assign funds from the auction of allowances specifically to stimulate projects in and serving such communities. Since rural Oregon is particularly disadvantaged economically compared to our more urban centers, we also strongly support the allocation of funds to stimulate renewable energy development projects in rural Oregon.

In terms of the target of the policy, we are very conscious of the need to recognize that while carbon dioxide is the most critical of the greenhouse gases, it is not alone. Indeed, while the overall global impact of carbon dioxide (radiative forcing) increased little between the 2007 and 2013/2014 Intergovernmental Panel on Climate Change reports, that for methane doubled. This indicates the growing importance of other gases and the need to address them as well. With this concern in mind, we strongly support the charge embodied in the current proposal to DEQ to study the feasibility of assessing the full life cycle emissions of greenhouse gases with a view to incorporating these into the assessment of emissions and the requirement for allowances. In the absence of such an inclusion, we are in danger of adopting a proposal that encourages utilities to switch from coal to natural gas when the evidence strongly suggests that fugitive emissions (leakage) of methane during natural gas extraction, processing, and transmission make it as bad as, if not worse than, coal as a greenhouse gas emitter. We strongly urge retaining this component and, if anything, strengthening it.

Question 2: What changes would you suggest be made to cap-and-invest as it is currently being discussed to address the concerns you have?

It is not completely clear in the language of the bill what entities can voluntarily join the auction and buy allowances. While it seems reasonable to allow greenhouse gas emitters who do not meet the 25,000 ton threshold to join voluntarily, and it seems beneficial to the goals of the program to allow entities to buy allowance who might retire them rather than use them for compliance purposes, it seems questionable to allow financial institutions to enter the auction and buy allowance for speculative purposes so they can 'corner the market' on allowance, drive up prices, and resell the allowances at higher prices, to the detriment of our economy.

While, in principle, we support the notion of allowing polluters to meet their goals in part by investment carbon offsets, so long as these offset investments are certified to be activities that (a) reduce emissions or promote GHG sequestration, (b) would not have happened absent the offset investment, and (c) are preferentially (though not exclusively) distributed within Oregon to stimulate valuable projects in our state, we also urge that such an option be limited, as is currently the case, to a small proportion of the total emissions of any entity. We also appreciate the provision that such offsets may not be used in such a way as to maintain current behaviors (e.g. pollution emissions) that compromise specific communities.

Question 3: What opportunities do you believe exist for your organization/industry/constituents/ customers from implementation of a cap-and-invest policy as it is currently being discussed in Oregon?

The main opportunities that accrue to Southern Oregon should this bill pass would be in the arena of stimulating renewable energy / energy efficiency / energy conservation projects in the region. Such projects would offer substantial economic benefits for Southern Oregon, a region of the state that is currently economically disadvantaged.

In addition, passage of the bill would indicate to Oregonians, (and the nation and the world), that Oregon takes global warming seriously and has the political will to address it. This could prove invaluable in demonstrating to Oregonians (and Americans generally) that it is worthwhile continuing to promote and undertake action to decrease our individual and collective emissions.

Clean Energy Jobs Work Groups Comments
Submitted by Sustainable Northwest
10-8-17

What aspects of a cap and invest policy as it is being discussed in Oregon are you most concerned about for your organization/industry/constituents/customers?

- Impacts and costs to rural communities and natural resource related industries.
- Opportunities for investment in and development of distributed and community scaled renewable energy and energy efficiency projects.
- Role for forests and agricultural operations in comprehensive climate policy.
- Maintaining a robust and certain role for offsets and development of Oregon specific protocols.
- Use and distribution of program revenues.

What changes would you suggest be made to cap-and-invest as it is currently being discussed to address the concerns you have?

Statute amendments:

- Recognize an explicit role for working lands and natural infrastructure in greenhouse gas reduction, adaptation, and resilience as part of authorizing legislation.
- Require members or expertise in both natural resources and economic development on The Climate Investments Fund Grant Committee **Section 16(3)(d)*(I)(J)*** and Just Transition Fund Grant Committee. **Section 20(2)*(g)(h)***.
- Include forest and agricultural projects that limit or sequester greenhouse gases as eligible projects to receive preference under the Climate Investments Fund **Section 16(5)*(h).***
- Guiding considerations for investment of revenues in working lands projects should include:
    - ***Preferably, a determined percentage of program revenues would be set aside on an annual basis for these purposes, which would allow for greater certainty and the ability to enter into termed agreements with landowners.*** At a minimum, use of funds for working lands projects should be stated as an eligible purpose in the legislation.
    - Prioritize small landowners that would otherwise be unable to participate in a formal offset program due to acreage limitations or excessive transaction costs.
- Point for clarification: How do restrictions on offset credits in Section **10(3)(c)** pertain to covered entities in the transportation sector?

Topics for development and future rulemaking:

- Identify a suite of eligible program investments in working lands for greenhouse gas reduction and sequestration benefits. These would be further refined and developed in a rulemaking process, but could include:
    - Direct practice or performance payments to landowners for implementing actions that reduce and sequester greenhouse gases and achieve climate smart conservation. These could be termed lease agreements or practice specific actions similar to the California Healthy Soils Initiative or NRCS programs.
    - Fund conservation easements to maintain working forests, farms, ranches, and the diverse conservation and habitat benefits they provide.
    - For acres that are exiting federal NRCS conservation programs, enroll those existing acres into a new Oregon direct payment program to maintain sequestered carbon and climate benefits.

- Preference should be given to projects that can be aggregated and enrolled into long-term offset markets to ensure permanence of GHG reductions and leverage environmental credit markets.
- Identify a suite of eligible program investments in working lands for climate adaptation, resilience, and transition benefits. These investments may provide both direct carbon benefits, as well as mitigate the effects of climate change on the state's working lands, communities, and businesses. Sample investments could include:
    - Ecologically based forest restoration (thinning, prescribed fire, watershed improvements) to reduce wildfire risk to communities and carbon emissions.
    - Natural and mechanical water storage and delivery mechanisms (beaver dam analogs, transition from open canals to piping, wetlands) to respond to shifting precipitation patterns and impacts to ecosystems and agriculture.
- To the maximum extent practicable, program revenues should fund and leverage existing agency programs and staff capacity designed to achieve direct and ancillary carbon and climate related benefits. As needed, existing program statutes should be reviewed for amendment to improve their integration with Oregon carbon and climate policy, and access to program revenues. Doing so could reduce program implementation costs, achieve efficiencies in administration, capture and promote existing technical assistance capacity in project development and implementation, and establish greater alignment in agency direction to achieve comprehensive state climate goals.

What opportunities do you believe exist for your organization/industry/constituents/customers from implementation of a cap-and-invest policy as it is currently being discussed in Oregon?

- Increased investments in renewable energy, energy efficiency, and natural resource infrastructure and enterprises.
- Rural economic development.
- Valuation and compensation for the provision of ecosystem services (carbon sequestration, water, wildlife, soil retention, etc.)
- Potential infusion of capital and conservation benefits in Oregon to maintain forest and agricultural lands through the development and sale of offset credits to linked jurisdictions.

Clean Energy Jobs Work Groups Meeting #1 –

Question Responses prepared by Sean

Penrith, The Climate Trust. 10/9/17

DIRECTIONS: No later than one week prior to the second work group meeting, please send your responses to the questions below to committee staff (beth.patrino@oregonlegislature.gov or beth.reiley@oregonlegislature.gov). As you prepare your responses, please consult with others in your organization or industry, particularly any located in jurisdictions currently participating in the Western Climate Initiative.

Question 1: What aspects of a cap-and-invest policy as it is being discussed in Oregon are you most concerned about for your organization/industry/constituents/customers?

I am sharing a piece below that we released that addresses our concern:

> Bottom line | "Be among the first – coming in last is just a losing proposition."

The Dwindling Hourglass: We were given some homework last month. I participated in the Agriculture, Forest, Fisheries, Rural Communities and Tribes work group, which was one of four groups convened to review and make recommendations on specific components of a cap and invest (SB1070) program for Oregon. Representative Ken Helm, Chair of the House Committee on Energy and Environment, charged all attendees to answer a number of questions. The first question was, "What aspects of a cap and invest policy as it is being discussed in Oregon are you most concerned about?"

The work group meeting was underway when one of the attending legislators asked whether the importance of the matter merited such a compressed timeline for working on these components in order to introduce SB1070 for the short session in 2018. His inference was that we should wait.

The short answer to that legislator is a resounding, *Yes!* Here at The Climate Trust, the aspect we are most concerned about relative to the cap and trade program being contemplated for our state is **time**. A decade ago HB 3543 set the non-binding goals of reducing emissions to 10% below 1990 levels by 2020 and 75% by 2050. The conclusion by the Oregon Global Warming Commission is that we are due to miss our 2020 target by 11 million MTCO2e and by 22 million MTCO2e by 2035. Ever since I arrived in Portland in 2005, there have been discussions on how to best price carbon. Cap and trade, carbon tax, cap and fee and a greenhouse gas emission limit rule have all been debated. This culminated in the push for the Climate Stability & Justice Act (HB 3470) in 2015 that did not make it across the line.

I recently re-read a February 2016 article in Sightline. It was déjà vu. The author hopefully suggests that "In the short 2016 legislative session, Oregon lawmakers have a chance to pass the Healthy Climate Act SB1574, a bill that would enforce the climate pollution reduction goals Oregon legislators passed nearly a decade ago."

And here we are; September 2017 and we are contemplating yet another short session in the Oregon legislature in 2018. This is not about what impact Oregon's emission reduction impacts would have overall on global emissions as temperatures rise. This is about the billions of dollars of financial impact to our state resulting from lost recreation revenues, impaired natural resources, and a disappearing fishing industry.

Quebec authorized their cap and trade program in 2012-2013 and joined the Western Climate Initiative with Ontario and California in 2014. Clean Energy Canada documented perspectives of policy architects and stakeholders involved in the implementation of their cap and trade program. They found that the most significant rationale for supporting the program was that it prepared "Quebec to enter into a new, green economy as the system's primary economic benefit." The report's parting thought is valuable to us in Oregon; "Be among the first – coming in last is just a losing proposition."

I salute Rep. Ken Helm and Sen. Michael Dembrow for asking us to consider action before the sand runs out for Oregon.

Question 2: What changes would you suggest be made to cap-and-invest as it is currently being discussed to address the concerns you have?

1. We suggest that the bill specifically call out agricultural GHG mitigation as an item to be funded with targeted reinvestment revenue.
2. We advocate that the offset limit be maintained at 8%, as it currently stands in 1070. Certainty in significant, long-term demand for offsets will mobilize private capital in land-based GHG reduction projects. A reduced offset limit sends a signal of uncertainty to private investors, limiting interest in financing agricultural and forestry GHG reduction. The offset market can motivate agricultural and forestry GHG reductions at a faster pace and at greater scale than auction fund reinvestment because it sends a long-term price signal that can be depended upon, makes payments for verified reductions (outcomes) rather than anticipated reductions, and focuses on the most cost-effective reduction opportunities. (If you want to dig deeper on this, we discuss why the offset market leverages more private finance than the programs we have seen in California's Greenhouse Gas Reduction Fund in this How the offset market mobilizes investment in emission reductions today brief). Reinvestment of auction revenue is essential (especially for very small or difficult to quantify projects), but the strong demand for offsets created by an 8% limit is key to leverage private finance to achieve the emission reductions we need from agriculture and forestry and provide revenue opportunities for many rural parts of our state.
3. Create a process for drafting new offset protocols, like an Oregon forest protocol. In California, AB398 has created an Offsets Protocol Taskforce to this end.
4. While one of the objectives of cap and invest is to link with larger markets in the WCI, it is important to understand the criteria California will use to evaluate future jurisdictions as linkage candidates. Much of the discussion has been centered on California's AB 398, which extended their cap and trade program through 2030. However, it is California SB 1018 that sets out the

criteria by which their Attorney General's office will evaluate other cap and trade programs for potential linkage. Therefore, we caution against the use of AB 398 as a guiding document when considering linkages under SB 1070, when SB 1018 is the appropriate guidance to consider. (Please see our piece on linkage here: https://climatetrust.org/the-question-of-linkage-scorcher/

Question 3: What opportunities do you believe exist for your organization/industry/constituents/ customers from implementation of a cap-and-invest policy as it is currently being discussed in Oregon?

We believe a significant opportunity exists for Oregon-based dairies, forests and ranches to play as sources of offsets for SB 1070. These sources represents low cost reductions that ease the negative economic impacts of compliance, while promoting economic development opportunities in disadvantaged rural communities.

We believe Oregon is positioned to be an offset exporter if an Oregon program is able to link with California and Canada. Developing a forest protocol where small landowners can participate through aggregation, and an improved forest management project type that is more inline with Oregon Forest Practice Rules would be two significant opportunities for Oregon forest owners.

Developing protocols that include Oregon's agricultural sector would create new opportunities for farmers and ranchers in the state. Avoided Conversion of Grasslands is a clear opportunity for ranchers, and a no-till protocol for wheat and barley farmers would also be a huge opportunity, and win over some eastern Oregon constituents.

We also think it is important to direct a portion of any revenue generated through the sale of allowances back to forest restoration and conservation. We suspect it's going to be easier for west side forests to participate in any offset component of the program, so funds should be made available for east side forests to implement activities that have a direct climate benefit. Activities such as forest thinning on public lands, particularly in areas adjacent to private land or in the woodland-urban interface, should be included to reduce the risk of fire.

Keith Kueny

The Community Action Partnership of Oregon

10/10/17

Question 1: What aspects of a cap-and-invest policy as it is being discussed in Oregon are you most concerned about for your organization/industry/constituents/customers?

Each year the state of Oregon and the U.S. federal government fund, through Oregon Housing and Community Services (OHCS), numerous programs to offset high energy costs in low-income households. These programs include: LIHEAP, DOE-WAP, OEAP, and ECHO. While the need for federal money to fund initiatives has continued to grow, increasingly the federal budget has been strained by other competing funding priorities. However, Oregon Community Action Agencies have used the federal and state programs to create initiatives and achieve program goals with the use of private and local funding streams. Agencies have often have combined or "leveraged" their funds with other federal, state, local, and private sector resources. This report responds, in part, to evaluate the amount of leveraged funds created by OHCS energy programs. The Community Action Partnership provides energy assistance, weatherization, food and housing services for qualified low-income Oregonians. Our agencies paid onto 110,000 electric utility accounts in 2016.

Households are eligible when their total gross income is 60 percent or less than the statewide average median income as determined by the State of Oregon. Payment is made directly to the fuel vendor (electric, oil, propane, wood or gas company). If heat is included in rent, applicants can be paid directly. Direct payments can also be made to applicants who have already purchased their winter supply of fuel. It generally takes 3 to 6 weeks after the application is made before payment is received. Eligibility is based on the total gross household income received by all members living in the home at the time of application. This means that families sharing a dwelling must apply as one unit. Income includes: wages, unemployment compensation, TANF payments, Social Security, SSI, pensions, VA, grants and other regular payments. It does not include food stamps, loans, subsidies, etc.

Our concern is the overall impact of any increase in utility rates without an offsetting increase in low-income funds.

Question 2: What changes would you suggest be made to cap-and-invest as it is currently being

discussed to address the concerns you have?

Question 3: What opportunities do you believe exist for your organization/industry/constituents/

customers from implementation of a cap-and-invest policy as it is currently being discussed in

Oregon?

Between rising fuel costs, a lack of affordable housing and one of the highest hunger rates in the country, Oregon families face a unique set of obstacles when formulating household budgets. Low income households are especially hard pressed, many being forced to make difficult choices between “hard” costs (e.g. rent, mortgage payments) and more “discretionary” spending (e.g. food , transportation, health care).

Increasing energy costs disproportionately effect low-income households. The United States Department of Energy estimates that low income families pay an average of 12.6% of their income for energy expenses, compared with the average US family who pays only 2.7%. In some cases (e.g. elderly households with fixed incomes) the share of income spent on energy expenses can reach as high as 35%.1

Since its inception in 1979, Oregon's Weatherization program has helped thousands of households conserve energy, reducing utility expenses for low-income families across the state. Home weatherization programs help to ease the unequal energy burden felt by low income families—reducing the need for emergency utility assistance and allowing more dollars in household budgets to be spent on housing, transportation, health and food related expenses.

In addition to increasing family self-sufficiency through energy conservation, weatherization programs in Oregon and across the country have been recognized for their "non-energy related" benefits. A study by the Oak Ridge National Laboratory found that home weatherization increases household property values, maintains affordable housing, improves the environment through reduced consumption of fossil fuels and assists in national security by decreasing the use of imported oil.2

Another non-energy related benefit of weatherization programs involves significant economic impacts to local communities. Through increased household spending, generation of jobs and purchasing of materials--weatherization programs play an important role in local economic development. In many cases, when families pay their energy bills, the money is sent to out of town utility companies, "escaping" the local economy. When energy bills are reduced, the money is spent by families for goods and services within the community. Additionally, weatherizing homes directly provides jobs for local contractors and revenue for businesses who supply the materials necessary for weatherization procedures.

The economic "ripple effect" of Weatherization Programs in local economies goes well beyond these initial impacts. We believe if money will be generated by this legislation, there should be significant investment in Oregon jobs and homes.

Homework Assignment:
The Nature Conservancy
Submitted by Catherine Macdonald

Questions 1: What aspects of a cap-and-invest policy as it is being discussed in Oregon are you most concerned about for your organization/industry/constituency/customers?

The Nature Conservancy supports carbon pricing as an important element of a comprehensive strategy for reducing greenhouse gas emissions. Rather than any one aspect of the cap-and-invest policy described in SB 1070, we recognize the complexity of designing an effective economy-wide carbon pricing program that works for both urban and rural Oregon. We hope that the final legislation will first and foremost focus on achieving significant greenhouse gas emission reduction from emissions sources and sinks while:

1) Contributing to a just transition to a low carbon economy;
2) Being neutral to positive impact on Oregon's economy and business sectors, paying special attention to energy intensive and trade exposed sectors;
3) Harnessing the power of natural climate solutions – especially where doing so will provide co-benefits to help Oregon's fish and wildlife and people adapt to the unavoidable impacts from climate change;
4) Ensuring linkage with other jurisdictions in the Western Climate Initiative; and
5) Providing for effective and efficient governance and adaptive management.

Achieving all of these outcomes will require careful thought and balancing. The legislation, as currently drafted, includes provisions that, in our view, help to frame an approach to meet these outcomes. However, its ultimate success or failure will depend on additional modifications, and the quality of the data analysis and evaluation that informs rulemaking and implementation of the program.

Question 2: What changes would you suggest be made to cap-and-invest as it is currently being discussed to address the concerns you have?

Broadly, we recommend the following overarching approach to address our concern:

1. **Keep greenhouse gas emission reduction as job one.** To avoid irreversible impacts from climate change we need to significantly reduce emissions as quickly as possible.
2. **Where details matter, make sure they are defined to allow Oregon to join other jurisdictions in the Western Climate Initiative (WCI).** Being part of larger carbon marketplace will reduce administrative costs; lower the cost of compliance and provide more opportunities for Oregon businesses and landowners. With recent changes in the California Cap and Trade program, it will be important to be in close coordination with California and other jurisdictions in WCI to finalize language in the bill.

3. **Provide sufficient funding to conduct needed studies with enough rigor to inform rulemaking to best achieve the goals identified above.** Under resourcing this program will cost Oregonians more in the long run. In particular, the research referenced in Section 10 (2) as well as research needed to: (a) evaluate the potential impacts of the legislation on rural Oregon and low-income Oregonians; and (b) develop strategies to mitigate those impacts should be well resourced.
4. **Where possible, simplify the governance structure to maximize program efficiency and integration**. As currently proposed, three agencies and six stakeholder committees will be informing program implementation. How does the proposed structure compare to the governance structure for cap and invest programs elsewhere? If possible, the structure should be simplified. However, any structural changes should maintain a seat at the table for the agencies, entities and stakeholders that are needed to develop effective rules and guide sound investment of proceeds from the program.
5. **Strengthen the purpose statement, priorities and principles to help guide rulemaking and implementation.** Clear and consistent priorities and principles aimed at the all six outcomes described in answer to question one will be important. We would like to see stronger direction to allow for investments of auction proceeds in natural and working lands to increase carbon sequestration and provide co-benefits for adaptation to climate change and ocean acidification.
6. **However, avoid being overly prescriptive in the legislation to allow for effective adaptive management of the program.** Adaptive management will be critical to avoid unintended consequences and improve the program through time.

In addition to these broad overarching recommendations, we provide detailed edits to the bill in the attached Appendix.

Question 3: What opportunities do you believe exist for your organization/industry/ constituents/ customers from implementation of a cap-and-invest policy as it is currently being discussed in Oregon.

Just as there are potential impacts from adopting a carbon pricing program, there are risks to waiting. In addition to avoided costs from increased climate impacts, over the long-term, early investments in climate change mitigation and adaptation has the potential to significantly benefit Oregon.

With proper direction in the legislation and carefully crafted rules informed by rigorous studies and stakeholder input, a carbon pricing program such as this can:

- Support business innovation and help Oregon's economy;
- Minimize impacts to low income and rural Oregonians and contribute to a just transition to a low carbon economy; and
- Produce co-benefits to help Oregon adapt to the unavoidable impacts of climate change.

APPENDIX: Proposed Edits/Specific Questions relative to SB 1070:

Preamble Section:

Page 2, line 16, Insert the following –
"Whereas, greenhouse gas reductions from emissions sources and sinks can help address climate change and its impacts to human communities and ecosystems; and

Whereas, the state has a vested interest in protecting human communities, Oregon's economy and natural and working lands from the unavoidable impacts of climate change and ocean acidification; and"

Rationale: Clarifies that atmospheric greenhouse gases can be reduced through increased sequestration as well as avoided emissions;

Section 1: Greenhouse Gas Definitions:

Page 3, Line 20 – Correct spelling of hexafluoride

Page 3, Line 21 – Add the following definitions:
"Greenhouse gas reduction" includes the removal of carbon dioxide from the atmosphere through carbon sequestration as well as reduced or avoided emissions of greenhouse gases. (source: California AB 1608)
"Working lands" means lands used for farming, grazing, or the production of forest products.
"Natural lands" means lands consisting of forests, grasslands, deserts, freshwater and riparian systems, wetlands, coastal and estuarine areas, watersheds, wildlands, or wildlife habitat, or lands used for recreational purposes such as parks, urban and community forests, trails, greenbelts, and other similar open-space land. For purposes of this paragraph, "parks" includes, but is not limited to, areas that provide public green space.

Rationale: Provides additional language to further clarify that atmospheric greenhouse gases can be reduced through sequestration as well as avoided emissions; provides definitions of natural lands and working lands consistent with California laws.

Greenhouse Gas Cap and Investment Program
Section 6: Statement of Purpose:

Page 4, Lines 1-3 – Modify to read: "and to promote adaptation and resilience of this state's **natural and working lands**, communities and economy in the face of climate change **and ocean acidification**."

Rationale: Strengthens the purpose statement, to include adaptation of natural and working lands in addition to communities and our economy and recognizes that increased greenhouse gases in the atmosphere result in both climate change and ocean acidification. The bill's purpose should be to promote adaptation to all three critical elements and both impacts.

Sections 7 and 8: Rules Adoption and Implementation Oversight

Page 4, (1) – The Environmental Quality Commission should be directed to do additional research to inform rulemaking. In addition to the leakage study Section 10 (2), an analysis of the differential impacts to rural and low-income Oregonians should be done to guide rulemaking.

Page 4, Line 15-17 – Include **the Department of Forestry and the Department of Agriculture** to the list of agencies to be consulted by the Environmental Quality Commission in developing rules

Page 4, Line 44, Add (H) – **One member who represents a land conservation organization**

Rationale: Inclusion of these agencies and organizations can provide important input to rulemaking and program oversight relative to impacts to and the role of natural and working lands and the design of any new offset protocols.

Carbon Pollution Market
Section 10:

Page 8, Line 31 – Modify (D) to read, "…to covered entities ~~*that include, but are not limited to covered entities*~~ that are part of an emission-intensive, trade-exposed industry;

Rationale: Targets allowances to the entities most exposed to leakage.

Page 8, Line 36 – Strike ~~*three*~~ and replace with **multi-**.

Rationale: Adds flexibility in the legislation to allow the state to set/modify rules as needed through time.

Page 9,

Line 16 Insert **and** immediately after the semicolon (";"):
Line 18 (ii) – Strike out the semicolon (";") and insert in its place the following:
"any other greenhouse gas emissions reduction that otherwise would occur."
Lines 19 and 20 (iii) – Delete.

Rationale: The proposed changes to the language on additionality is intended to better align SB 1070 with the language of California's AB 32 and of the other jurisdictions in the Western Climate Initiative.

Section 11:

Page 10, Line 6: Insert after "annually" the following:
"for allowances from the current and previous annual allowance budgets and four auctions for allowances from the future annual allowance budget"

Rationale: This is intended to clarify that the maximum number of auctions annually indicated in line 6 should include four auctions each year for the current/previous vintage allowances and four auctions each year for the future vintage allowances, consistent with other Western Climate Initiative (WCI) jurisdictions currently implementing a linked carbon market.

Page 10, Line 19 – The legislation currently requires establishment of an auction floor price, which we support. What are the implications of not including the ceiling and price containment points (i.e. "speed bumps") that were included in AB 398? Will it impact our ability to link to California and the other jurisdictions in the WCI? How will it affect the performance of the program in Oregon?

Rationale: Linking to other jurisdictions in the WCI is critical to an effective carbon pricing program for Oregon.

Section 14:

Page 12, Line 21 - 24 – We support prioritizing investment of auction proceeds in impacted communities as defined in Section 9 (12). However, we would like a better understanding of the geographic extent of the impacted communities to help evaluate whether the proposed percentages make sense. Further, it might make sense to state that spending funds in impacted communities is a priority of the program in the bill and establish percentages during rulemaking to avoid unintended consequences and allow for efficient adaptive management.

Rationale: This change would facilitate adaptive management of the program to achieve the best outcomes for Oregon.

Page 12, Line 35 & 36 – Modify 4 (c) to read

To the maximum extent feasible and practical give funding preferences to projects that will result in

(A) the greatest greenhouse gas emission reductions**; and**

(B) co-benefits including but not limited to reducing risks resulting from climate change and ocean acidification and improving the resilience of natural and working lands.

Rationale: Better reflects the dual purpose of the legislation as stated.

Section 16:

Page 13, Line 29 – 33 – As stated in comments above, we support prioritizing investment of auction proceeds in impacted communities as defined in Section 9 (12). However, we would like a better understanding of the geographic extent of the impacted communities to help evaluate whether the proposed percentages make sense. Further, it might make more sense to state that spending funds in impacted communities is a priority of the program in the bill and establish percentages during rulemaking to avoid unintended consequences and allow for efficient adaptive management.

Rationale: This change would facilitate adaptive management of the program to achieve the best outcomes for Oregon.

Page 13, Line 29 – Modify (1) by adding the following statement to the end of second sentence

"including, but may not be limited to, renewable energy, carbon sequestration in natural and working lands, weatherization, energy efficiency, climate resilience and water conservation."

Rationale: Ties the Oregon Climate Investment Fund to the purposes of the legislation and clarifies the kinds of projects that would achieve the purposes.

Page 14, Line 20 – Insert a new:
(3)(d)(I): "Natural resources and carbon sequestration."
Rationale: Adds an important area of expertise to the grant committee.
Page 14, Line 39 – Insert a new (5)(h): "Enhance the resilience of natural and working lands"

Rationale: Adds an important outcome/criterion to the grant evaluation program.

Section 25:

Page 20, Lines 28 & 30 – Correct from ~~*(3) to (4)*~~ to **(5) and (6)**

Representative Ken Helm
900 Court St. NE, H-490
Salem, Oregon 97301

October 9, 2017

Re: Clean Energy Jobs Work Group on Agriculture, Forests, Fisheries, Rural Communities, and Tribes

Dear Representative Helm,

Thank you for chairing this important work group to examine the impact and potential opportunities for a cap-and-invest program on rural lands, communities and economies. While forests and other rural working lands—and the people who manage and own lands-- have much to contribute to mitigating and adapting to climate change, the current language of SB 1070 largely ignores their vital roles. This is both a missed opportunity to harness the vast carbon sequestration potential of Oregon's forests, to promote successful adaptation, and to build a more resilient rural economy and community. PFT has worked in Oregon for over 20 years, holds the largest forest conservation easements in the state, and has 25 years of experience working in climate policy. We appreciate the chance to both address your "homework" questions, and also take the liberty of making two suggestions for the legislation. These two recommendations are:

1. **25% of the Oregon Climate Investment Fund goes towards the restoration and conservation of forests and watersheds.**

2. **Oregon's offset program be fully compatible with the California market, especially with regard to the forest protocols, where the most utilized protocol is that for Improved Forest Management.**

These recommendations, and the comments below are also grounded in our involvement with the WCI (since inception) as well as with California's cap-and-trade program and forest offset protocols. We've developed forest carbon offset projects in multiple states and been engaged in a number of voluntary and compliance offset transactions.

Question 1: What aspects of a cap-and-invest policy as it is being discussed in Oregon are you most concerned about for your organization/industry/constituents/customers?

We are concerned that SB 1070 as it is currently drafted misses the opportunity to meaningfully engage rural communities by overlooking forests and other working lands. Forests and other lands are often the backbone of rural economies. Leaving out investment in these essential lands – which also sequester enormous amounts of carbon, provide irreplaceable wildlife habitat, and are essential to climate change adaptation – would be a missed opportunity to both to harness the power of these natural systems for climate benefits and engage an often overlooked constituency which has a key role to play in Oregon's emerging climate change policies.

As of the 2010 census, 19% of Oregon's population lived in rural areas.[i] While the 2016 unemployment rate statewide is down to 4.9% as of 2016, in some rural areas, the unemployment rate is as high as 7.8%.[ii] Employment in the forest industry can be significant in rural areas – in 2013, Oregon's forest sector employed more than 58,000 people and paid a higher wage than the statewide average.[iii] The forest sector is the second largest employer in the state, responsible for 11% of Oregon's economic output.[iv]

Question 2: What changes would you suggest be made to cap-and-invest as it is currently being discussed to address the concerns you have?

We suggest that 25% of the Oregon Climate Investment Fund goes towards the restoration and conservation of forests and watersheds. This would sustain jobs in rural communities, cost-effectively reduce greenhouse gas emissions, and support climate change adaptation efforts. Further, as noted in recent polling for a comparable climate initiative in Washington state, adding the forest and watershed elements to climate investments increased the positive support for that initiative by a full 20%.

Reinvestment of auction revenues in restoring and conserving working forestland and watersheds has economic benefits for rural communities. A nation-wide study found that investment in forests created more jobs per dollar invested than many other industries, including road building and fossil fuels.[v] Research on investments made by the Oregon Watershed Enhancement Board found that for every million dollars invested in forestry and watershed restoration, between 15 and 24 jobs were supported.[vi]

Investing in forests is also a cost-effective way to reduce greenhouse gas emissions as forests naturally take carbon out of the atmosphere. Oregon's forests store an estimated 2,555 million metric tons of carbon – which by some measures is the most amount of carbon stored in any of the contiguous United States.[vii] Protecting our forests from conversion and managing them for resilient carbon stores can safeguard and increase carbon stores – producing enormous returns on investment for climate change mitigation. For instance, California investments in forests have generated an average of 13 times more greenhouse gas reductions per dollar than the typical investment.[viii]

Natural systems are a central part of climate change adaptation. Wetlands will protect coastlines from rising sea levels, healthy forested watersheds will supply our cities with clean water, and natural and working lands will provide refugia to wildlife migrating in response to climate change. However, these essential lands have been degraded by a century of fire suppression, development, fragmentation, and past management practices. This cap-and-invest program represents an opportunity for Oregonians to systematically invest in the restoration and conservation of treasured forests and watersheds that supply cool, clean drinking water to millions, provide irreplaceable wildlife habitat, and are the cornerstone of many rural communities.

Question 3: What opportunities do you believe exist for your organization/industry/constituents/ customers from implementation of a cap-and-invest policy as it is currently being discussed in Oregon?

Carbon offsets have created incentives for forest stewardship and conservation under the proven California model. The current language of SB 1070 allows for carbon offset projects, and we suggest that Oregon's program incorporates the successful Forest Protocols used in the California system.

Like reinvesting auction revenue in restoring and sustaining working forests, using carbon offsets has many of the same benefits – for rural communities, wildlife, and carbon storage. Carbon offsets reduce the overall cost of the cap-and-invest system, while creating incentives for forest stewardship and conservation. Assigning a monetary value to the carbon benefits of forests prompts landowners to let their forest stands grow older, reforest former forest lands, and protect lands from conversion to development. The forest offset protocols and system that California established is now in use on over 2 million acres in 30 states[ix]. We recommend using same Forest Protocols in Oregon. This will also make linkage with California simpler and ensure that the offsets meet WCI standards.

Thank you for this opportunity to comment following the first work group meeting. We look forward to continuing to engage throughout this process. If you have any questions on these comments or if we can provide any additional information, please feel free to contact me at lwayburn@pacificforest.org or 415-561-0700 x14.

Sincerely,

Laurie Wayburn
President

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[i] https://www.census.gov/geo/reference/ua/urban-rural-2010.html
[ii] US Department of Labor, Bureau of Labor Statistics, *Local Area Unemployment Statistics Map.* Available at: https://data.bls.gov/map/MapToolServlet
[iii] https://www.qualityinfo.org/-/a-comprehensive-estimate-of-oregon-s-forest-sector-employment
[iv] https://www.oregon.gov/LCD/pages/forlandprot.aspx
[v] Garrett-Peltier, Heidi and Pollin, Robert. 2010. University of Massachusetts Political Economy and Research Institute. As cited in (http://grist.org/article/2010-02-01-the-jobs-are-in-the-trees/). Infrastructure multipliers and assumptions are presented in "How Infrastructure Investments Support the U.S. Economy: Employment, Productivity and Growth," Political Economy Research Institute, January 2009. (http://www.peri.umass.edu/236/hash/efc9f7456a/publication/333/).
[vi] Nielsen-Pincus, Max and Moseley, Cassandra. 2010. Economic and Employment Impacts of Forest and Watershed Restoration in Oregon. *Ecosystem Workforce Program, Working Paper Number 24.* University of Oregon.
[vii] USDA Forest Service, Forest Inventory and Analysis Program. 2014. Available at: http://www.fia.fs.fed.us/Forest%20Carbon/methods/docs/2014/Total%20forest%20carbon20140721.xlsx
[viii] https://www.pacificforest.org/ggrf-investments-natural-working-lands/
[ix] Data on ARB registered projects available at: http://database.v-c-s.org/VCS_OPR, http://www.arb.ca.gov/cc/capandtrade/offsets/offsets.htm, and https://acr2.apx.com/myModule/rpt/myrpt.asp?r=111

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October 6, 2017

Senator Michael Dembrow, Chair
Senate Environment and Natural Resources Cmte
Oregon State Capitol
Salem, Oregon 97301

Representative Ken Helm, Chair
House Energy and Environment Cmte
Oregon State Capitol
Salem, Oregon 97301

RE: Clean Energy Jobs Work Group—Meeting #1 Homework Questions

Dear Senator Dembrow and Representative Helm,

I am writing on behalf of the Union of Concerned Scientists (UCS) and our 14,000 supporters in Oregon to respond to the homework questions presented to stakeholders at the first set of Clean Energy Jobs Work Group meetings.

Question 1: What aspects of a cap-and-invest policy as it is being discussed in Oregon are you most concerned about…?

The following are existing elements of SB 1070 that we recommend retaining as important components of a cap-and-invest policy for Oregon:

- **Greenhouse gas emission limits (Sec 2(2) and Sec 10(1)(b))**—The bill would establish statewide greenhouse gas (GHG) emission limits of 20 percent below 1990 levels by 2025, 45 percent below 1990 levels by 2035, and 80 percent below 1990 levels by 2050. The bill would set the program's emissions cap in accordance with the proportionate share of emissions from entities covered by the program. We believe this level of ambition is very important to spurring investments and deployment of clean energy technologies that can put Oregon on a pathway to feasibly decarbonize the economy in mid-century.

- **Acknowledges importance of adaptation and resilience (Sec 6)**—The purpose of the bill is not only to reduce GHGs but also to promote adaptation and resilience in the face of climate change. As the damaging impacts of climate change grow, it is important for Oregon to protect people from the harm caused by climate change while simultaneously working to reduce emissions.

- **Covers four-fifths of statewide GHG emissions (Sec 9(21))**—The program would include all the major emitting sectors in Oregon: transportation fuels, electricity production (including imports), natural gas use, and the industrial

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sector. We believe it is wise to cover these emissions sources, which represent more than 80 percent of Oregon's emissions.

- **Allowance allocation and auctioning (Sec 10(1)(d))**—The bill auctions allowances after addressing leakage risks and distributing allowances to electric and natural gas utilities for the benefit of ratepayers. Auctioning is an important best-practice to prevent windfall profits and ensure public benefits from the program.

- **Addresses competitiveness concerns (Sec 10(2))**—The bill prudently includes provisions to minimize risks to emissions-intensive, trade-exposed industries, and to reassess these risks over time.

- **Ensures rigorous standards and limits for offsets (Sec 10(3))**—The bill includes strong standards for offsets, including that offset projects must be "real, permanent, quantifiable, verifiable, and enforceable" and that emissions reductions credited to the offset project "would not otherwise have occurred" if not for the project. The bill also places limits on the use of offsets, which is important to ensuring that significant reductions come from covered sources in the program. (We make recommendations on changes to the offset limit below.) We support the bill's proposal to allow for tighter offset limits for entities located in impacted communities.

- **Allows for linkage with other jurisdiction (Sec 10(5))**—The bill would allow Oregon to link its cap-and-trade program with other states or countries. This will create a more liquid market and allow greater opportunities for covered entities to pursue low-cost emission reductions.

- **Establishes an auction price floor (Sec 11(1)(d))**—The bill requires an auction price floor to ensure that a minimum price is achieved to help provide a market signal to encourage a shift to low carbon energy. This is an important design element that should be retained.

- **Uses of revenue (Secs 13-17)**—UCS appreciates that the bill utilizes revenues to fund a transition to a clean energy economy, protect low-income families and impacted workers, and improve the livelihoods of underserved and rural communities. The bill also wisely will ensure that investment decisions are rooted in analyses that include stakeholder involvement.

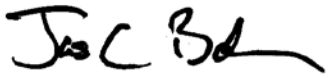
Question 2: "What changes would you suggest be made to cap-and-invest as it is currently being discussed to address the concerns you have?"

- **Tighter offset limit in early years of the program (Sec 10(3)(c))**—SB 1070 wisely limits the use offsets. In general, we believe that the proposal to limit offsets to 8% of an entity's compliance obligation for a compliance period is a reasonable restriction. However, in the early years of the program, the 8%

limit will represent the majority, if not all, of the required emissions reductions compared to baseline emissions. California had an 8% limit at the introduction of its program, and many stakeholders have been disappointed that emissions from large sources have not declined in the program's early years. Oregon would be wise to improve on the experience in California by further reducing the use of offsets in the early years of the program.

With the federal government's retrenchment on climate change, ambitious action by the Oregon Legislature to reduce carbon emissions and accelerate a clean energy transition has never been more necessary. We hope you will seize the opportunity in 2018 to craft practical, science-based solutions to put Oregon on a pathway to decarbonizing the economy and building a clean energy economy. Please don't hesitate to reach out if there are specific ways that UCS can support these efforts.

Sincerely,



Jason Barbose
Western States Policy Manager

Jamesine Rogers Gibson
Western States Senior Climate Analyst

Homework: Cap-and-Invest Work Group on Agriculture, Forests, Fisheries, Rural Communities, and Tribes

By Bob Van Dyk for the Wild Salmon Center (bvandyk@wildsalmoncenter.org)

October 9, 2017

Question 1: What aspects of a cap-and-invest policy as it is being discussed in Oregon are you most concerned about for your organization/industry/constituents/customers?

Wild Salmon Center wants the cap-and-invest policy to support investments in natural resources to help especially our rural natural resource communities adapt and prosper in the face of serious, negative effects of climate change.[1] Wild Salmon Center especially seeks measures to protect and improve fish habitat and to conserve sufficient and cool water for the communities that depend on these resources.

A warming climate promises many challenges for salmon, a cold-water fish, and new pressures on farming, ranching, fishing, and forestry communities. Significant changes in the timing and character of precipitation and stream flows are projected. According to the most recent Oregon Climate Assessment, "**The 2015 snow drought foreshadows mid-century normal conditions**" (p.6; bold in original). Floods will increase. Fires will increase. Sea level will rise. More people will move to Oregon.

We want the cap-and-invest policy to help invest in efforts to address these stresses on our natural resource base while also reducing emissions.

The current cap-and-invest framework contains three mechanisms to address our concerns for resilience and adaptation for natural resources.

One mechanism is the offset framework, which can provide incentives for landowners to adopt practices to store carbon and conserve habitat. We support efforts to ensure both offset goals and resilience/adaptation goals are advanced by the offset program.

The second mechanism is the Just Transition and Oregon Climate Investments funds. Some of the language regarding these funds could potentially provide resources for adaptation and resilience for our natural resources.

The third mechanism is resources dedicated to the State Highway Fund. From the current language, it is less clear that these resources will be available for adaptation and resilience of natural resources, though there are certainly potential investments to increase resilience that are directly related to highway spending, such as relocation of roads and removal of fish-passage barriers.

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1 The Third Oregon Climate Assessment Report of January 2017 by the Oregon Climate Change Research Institute provides an excellent and accessible summary of the effects of climate change on Oregon. Available here: http://www.occri.net/media/1042/ocar3_final_125_web.pdf

Question 2: What changes would you suggest be made to cap-and-invest as it is currently being discussed to address the concerns you have?

We would like to see greater clarity on the degree to which the policy will support investment in natural resources to assist with resilience to climate change. There is more work to do on specific changes to bill language.

Question 3: What opportunities do you believe exist for your organization/industry/constituents/ customers from implementation of a cap-and-invest policy as it is currently being discussed in Oregon?
Our answer is similar to the other questions above. The great opportunity we see is to increase and improve funding for investments in natural resources that can help sustain healthy fisheries, adequate water supplies, and resilient forests in the face of climate change.

WISEWOOD ENERGY

October 6, 2017

Clean Energy Jobs Work Group on Agriculture, Forests, Fisheries, Rural Communities, and Tribes
Attn: Beth Patrino and Beth Reiley, Committee Staff
Subject: Wisewood Energy responses to Work Group homework questions

Dear Chair Helm,

Wisewood Energy recently became aware of the SB1070 Clean Energy Jobs bill and the efforts currently underway to develop more detailed components of that bill. Considering the potential opportunities SB1070 may present to our clients and industry, we look forward to engaging with the Work Group on Agriculture, Forests, Fisheries, Rural Communities, and Tribes as the bill progresses. To that end, we offer the following responses to the homework questions made public after the Work Group's first meeting.

Wisewood Energy is a Portland-based private company that designs and develops community-scaled biomass heat and power projects. Our mission is to outfit communities and businesses with state-of-the-art biomass energy systems that strengthen local economies, lower heating costs and promote environmental stewardship. Our work primarily, but not exclusively, takes us to rural parts of the US West, including Oregon, California, Washington, Idaho, Montana, Colorado, and Alaska - all places with high and unpredictable fossil fuel costs, abundant forest resources, and often a cultural connection to and reliance on natural resources. We have had the privilege to work with clients in these areas to design modern wood energy systems that create greater energy independence, contribute to improved forest health, lower fuel costs, support the local economy, and reduce reliance on GHG-emitting fossil fuels. We also work with industry partners who have a waste wood problem, often paying to have clean material removed and hauled to a landfill, where it contributes to methane emissions. Examples of our projects can be found at the following link: http://wisewoodenergy.com/our-work/harney-county/

WISEWOOD ENERGY

Question 1: What aspects of a cap-and-invest policy as it is being discussed in Oregon are you most concerned about for your organization/industry/constituents/customers?

Because modern wood energy systems can provide a wide range of benefits to communities and businesses, including carbon benefits, we would like to see these systems be eligible as offset projects. New funding sources to design and install these systems will help in technology deployment, particularly in rural communities that can benefit most from these systems but tend to have the fewest resources. Our concern is that instead, modern wood energy systems will be excluded from eligibility due to misinformation and a lack of education about these systems, which will have a chilling effect on the industry and impede technically viable, environmentally responsible, and socially acceptable projects from being implemented.

Biomass energy systems are often lumped into one category, despite the wide range of technologies, feedstocks, scales, and impacts that can be associated with them. For example, modern wood heating is one of the most efficient biomass technologies, alongside cogeneration, often reaching efficiencies of 85% or more compared to 25% or less for standalone biomass power systems. Additionally, modern wood heating and community-scaled cogeneration require relatively small volumes of wood, allowing them to source fuel entirely from forest management residuals within the local woodshed, on a sustainable basis, indefinitely. Carbon emission impacts is another such characteristic that differs based on the type of system and project context. Community-scaled biomass systems can displace GHG-emitting fossil fuels while utilizing woody material that is a byproduct of forest health and management activities; a modest market for such material can both reduce slash pile burning in the area (which reduces air pollutant emissions), and help to offset the costs of doing fuels reduction treatments designed to reduce the frequency of high-severity wildfire. Studies have found that this type of scenario can have negligible to positive carbon impacts in the short term, compared to larger less efficient systems that would take decades to become carbon positive.

Question 2: What changes would you suggest be made to cap-and-invest as it is currently being discussed to address the concerns you have?

WISEWOOD ENERGY

We recommend that biomass energy systems be included in the cap-and-invest discussion, in particular as potential offset projects, and that this discussion be grounded in a realistic, scientific, and nuanced approach towards different types of biomass systems. We would welcome the opportunity to participate with other informed stakeholders to determine how best to account for biomass systems under a cap-and-invest program.

Question 3: What opportunities do you believe exist for your organization/industry/constituents/ customers from implementation of a cap-and-invest policy as it is currently being discussed in Oregon?

If modern wood energy systems are included as eligible offset projects, we believe this can create opportunities for our clients to access additional implementation funds. These systems have high capital costs relative to conventional energy systems, and despite feasible payback periods (and particularly with cheap fossil fuels), they can be difficult to capitalize in resource-strapped communities. We often find that clients need to get creative with financing, and potential funds as an offset project could be a valuable component of implementation. This would have ripple effects of contributing to regional forest restoration objectives, supporting the forest product industry, and creating opportunities for growing the local economy.

Please contact me if you would like to discuss any of the above in more depth. In the meantime, I look forward to engaging with the SB1070 process as it progresses.

Thank you and best regards,

Meagan Nuss

Project Development Manager
Wisewood Energy