Dear members of the House Energy and Environment Committee:

Thank you for this opportunity to comment on Oregon's energy and emissions policies.

I believe that Oregon's top long-term priority must be comprehensively planning and implementing policies that achieve zero greenhouse gas (GHG) emissions by 2050, and that this is technologically and economically practical. The physical implications of this goal include a ban on all new fossil-fuel infrastructure as soon as practical and accelerated public and private investments in clean-energy infrastructure. Such a plan would save Oregonians about $10 billion per year on fossil fuels that now poison us and exacerbate the climate crisis, and it would help clean-energy companies in Oregon.

Summary:

1. A practical, economy-wide price on GHG emissions is demonstrably far too low to directly affect demand for fossil fuels.

2. If the state chooses to raise revenue through a price on emissions, the efficiency of the spending must be optimized. Some states leverage public spending on clean energy projects by 3X to 12X through state-funded green banks, even as the state's investment is being returned.

3. Sector-specific policies are necessary in any case, and include mandates, fees on future emissions, rebates, etc.

More detail:

1. A practical, economy-wide price on GHG emissions is demonstrably far too low to directly affect demand for fossil fuels.

After searching for two years, I've found no evidence that any system of taxing or capping current GHG emissions has had any direct effect on reducing emissions [1]. The simple reason is that a practical price level on economy-wide emissions is far too low to have an effect on fuel demand. (Higher prices would also increase cross-border leakages.) Assertions that the RGGI or California cap-and-trade systems have reduced emissions are confusing correlation with causation. [2] A simple example of price signals is that US vehicle miles traveled (VMT) has barely changed since gas prices dropped in 2014, equivalent to about $150/MTCO2e.

Whether the price is implemented through a tax or a capping system makes little difference, since both need to be adjusted by regulators every two years or so [3]. The price collars and reserves for cap-and-trade systems effectively constrict price levels to act more like a tax. A tax would create more price and revenue stability than a complex system of auctions and trading, and would be far cheaper to implement.

Since the practical price signal cannot directly affect fuel demand, the only effect on GHG emissions is through funding emission-reduction projects. If the revenue is used to offset other taxes, as in BC or Washington's failed i732, or dividended back to taxpayers, as favored by ExxonMobil, the effect of the system on emissions would be negligible.

2. If the state chooses to raise revenue through a price on emissions, the efficiency of the spending must be optimized. Some states leverage public spending on clean energy projects by 3X to 12X through state-funded green banks, even as the state's investment is being returned.

The big picture is that decarbonizing Oregon will probably cost ~$100 billion over 30 years [4], and the state must strategize how this will happen. The actual price tag is elusive because most of our energy infrastructure will be replaced at least once over the next 30 years anyway, and the cost trajectories of clean energy keep enabling cheaper or negative-cost transitions. In any case, $3 billion invested annually implies careful state spending as well as significant leverage on public spending.

Oregon currently has a variety of piecemeal clean-energy programs, some with spending metrics, some without. Most are directed at improving energy efficiency (EE), but EE increasingly misses the problem of GHG emissions—we could double our efficiencies but not effect emissions unless we shut down fossil-fuel plants and vehicles. So the spending metrics need to focus on GHG emission reductions, and the metrics must be measured, tracked annually, and continuously improved.

A financial observation is that essentially all clean-energy infrastructure is cheaper to fuel and maintain than fossil-fuel incumbents—the wind and the sun are free, EVs are already cheaper to fuel and maintain that ICE cars, etc. So the clean energy infrastructure is cheaper to operate, and the main hurdle is financing it. As clean-tech keeps getting cheaper, we have deals like third parties offering to finance your PV array for a portion of the savings. That structure will spread, but it requires innovative and nimble financing organizations. *Why should the state grant money to upgrade private infrastructure, when it could instead loan the money?* That is what green banks do [5]—a green bank is a quasi-public organization initially funded by the state (or other jurisdiction), that leverages public money (typically by 3X to 12X), and also repays the state over time.

3. Sector-specific policies are necessary in any case, and include mandates, fees on future emissions, rebates, etc.

Sector-specific policies, such as renewable portfolio standards, funding efficiency projects, or subsidizing renewables, are the only policies that have demonstrated efficacy to date. [6] Each emissions sector has technology options and challenges specific to the sector, and most are already governed by various regulations.

As clean-tech options evolve, policymakers will need to quickly adapt to the cost

trajectories. For example, the LED lighting cost crossover happened last year and there is arguably no more need for subsidies or mandates because consumers generally prefer them. Right now electric vehicle (EV) deployment would benefit from subsidies and expanded infrastructure, but EVs will be the cheapest automobile option by about 2025. Cost trajectories of utility-scale renewable generation and storage options will obviate fossil fuel plants well before the end of their useful lifetime, so the legislature should force utilities to pay all costs of stranded fossil-fuel assets purchased from now on. If PGE wants to add a gas plant, then let them take the risk of it being obsolete in 3 years or 10 years, whether from future regulations, technology trends that render it uneconomic, or other shifts such as CAISO or improved demand-response, etc. If they think it's a good investment, fine--but don't expect ratepayers to rescue their bad decision.

Another potential sector-specific policy is to tax future emissions. Taxing *current* emissions only punishes the owners of fossil-fuel infrastructure. The lower your income, the less able you are to afford upgrades that are more efficient and cheaper. Instead of an economy-wide price on GHG emissions, any new building, vehicle, factory, etc. that has a low- or zero-emission alternative should be taxed up-front for its expected lifetime emissions, at a rate of $100/MTCO2e or more. Example: there are about five zero-emission vehicles (ZEVs) with >200 mile range and $35,000 price coming soon—the equivalent 30 mpg ICE model would burn about 5,000 gallons of gas over its average life, for a registration fee of more than $6000. If you don't want to pay it, then buy an equivalent ZEV. At an estimated $3.80/gallon cost of the toxic plus climate emissions, that's $19,000 in social costs that the buyer should pay for bringing a polluting vehicle into the fleet.

Conclusion

We are at a historic tipping point, both for global ecosystems and also for the global energy transition to renewables. Those states that act wisely now will be more competitive in the future.

Again, thank you for this opportunity to affect the future of Oregon.

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References

1. Food and Water Watch, *The British Columbia Carbon Tax: A Failed Experiment in Market-Based Solutions to Climate Change*, October 2016. http://www.foodandwaterwatch.org/insight/british-columbia-carbon-tax-failed-experiment-market-based-solutions-climate-change

2. For example, in 2016 the Congressional Research Service concluded that RGGI's *direct* effect on emissions is "arguably negligible". However, the revenues applied to energy efficiency projects likely had some impacts.
https://fas.org/sgp/crs/misc/R41836.pdf
The California Air Resources Board has not been tracking emission reductions from projects funded by cap-and-trade revenues.

3. Washington state's draft HB 1646 proposes an emissions tax, the price of which would be adjusted biannually. http://lawfilesext.leg.wa.gov/biennium/2017-18/Pdf/Bills/House%20Bills/1646.pdf

4. In 2014 the International Energy Agency estimated an investment of $44 trillion needed to decarbonize globally by 2050, but with a fuel savings of $115 trillion.
http://www.iea.org/newsroomandevents/pressreleases/2014/may/taking-on-the-challenges-of-an-increasingly-electrified-world-.html
Prorating 36,000 MMTCO2e globally to Oregon's 60 MMTCO2e says that Oregon could spend around $75 billion and save over $190 billion by 2050. Cost estimates from other analyses also triangulate to ~$100 billion to decarbonize Oregon. (Note that this average cost is >$1000/MTCO2e.)

5. Connecticut Green Bank's Comprehensive Plan for FY 2017 and 2018: http://www.ctgreenbank.com/wp-content/uploads/2016/11/CTGreenBank-Comprehensive-Plan-Fiscal-Years-2017-2018-11232016.pdf
New York Green Bank: https://greenbank.ny.gov
The Coalition for Green Capital http://coalitionforgreencapital.com seems a useful think-tank advocating green banks.

6. Oregon would benefit from an analysis like Laurence Berkeley Labs' 2015 study of California's existing and proposed emissions policies (all sector-specific).
http://newscenter.lbl.gov/2015/01/22/californias-policies-can-significantly-cut-greenhouse-gas-emissions-2030/