Carbon Pricing Resources for Oregon Decision-makers

April 2015

We are already paying the price for global warming right here in Oregon, whether we're fighting record-breaking forest fires east of the mountains or watching our shellfish industry struggle. The impacts are happening faster and closer to home than many of us could have imagined, and Oregonians feel strongly that we have an obligation to protect our beautiful state and our children's future. That means tackling climate change by cutting pollution from coal, oil, and gas, and shifting to clean energy.

The good news is that here in Oregon, we can transition to a cleaner, safer, healthier economy that creates local jobs and a stable climate by investing in clean energy that we produce here in the state. We have the know-how, the cost-effective technologies, and the workforce in Oregon to seize this opportunity. And, as a state, we've already made a commitment to make this shift.

The oil and coal industries are trying to use their outsized political influence to block progress on clean energy solutions and take us backward. But Oregonians are ready to take charge of our own energy decisions and hold these polluters accountable. Oregon families already take responsibility for protecting our beautiful state. By enforcing the carbon pollution limits that are already in Oregon law we can ensure that major polluters also take responsibility for keeping our air and water clean and taking action to curb climate change. We can do this with a price on pollution—either a tax or cap—designed to cut carbon pollution and invest in local clean energy solutions that take our state forward.

For further questions or discussion on carbon pricing with Sightline researchers, please contact Sightline communications associate Serena Larkin at serena@sightline.org *or 206-447-1880 x111.*

Title Photo: Crater Lake by Scott (used under creative commons license)

Carbon Pricing Resources

CARBON PRICING, GENERALLY

NORTH AMERICAN AND EUROPEAN EXPERIENCE WITH CARBON PRICING

PATHS THAT OREGON & WASHINGTON COULD TAKE

WHAT'S GOING ON IN WASHINGTON STATE

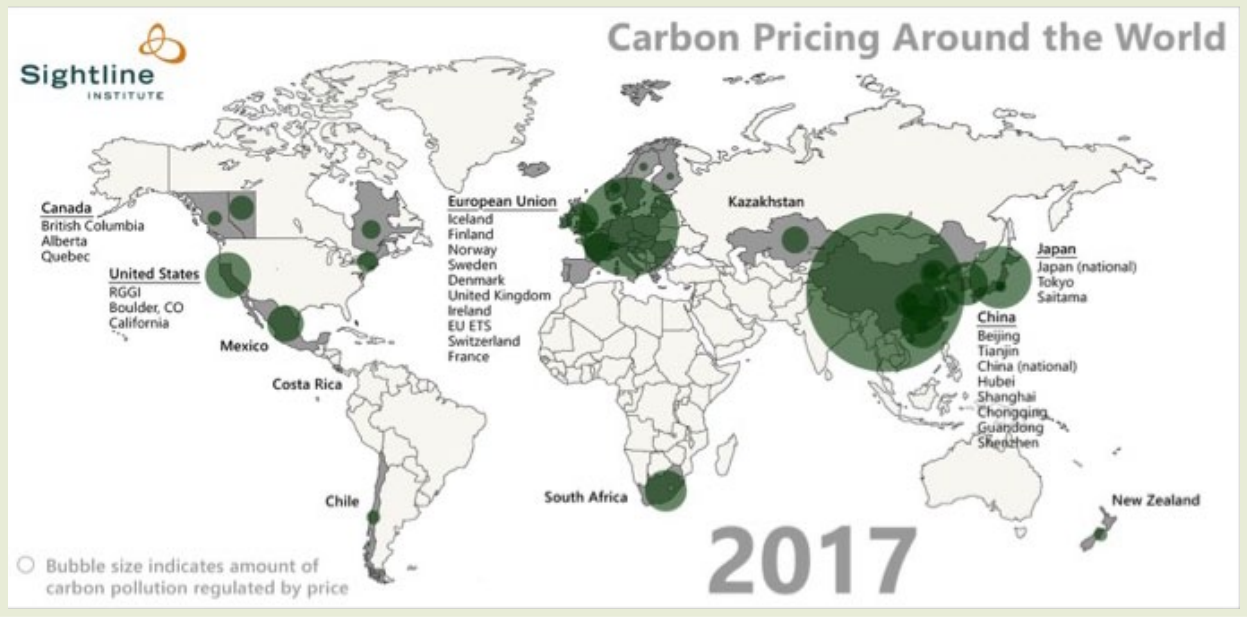
WHAT OREGON NEEDS TO KNOW

All the World's Carbon Pricing Systems in One Animated Map

By Kristin Eberhard
November 17, 2014

Link to Article Online

Oregon and Washington leaders are contemplating turbocharging their clean energy transition by instituting carbon pricing here in the Pacific Northwest. Will a cap or tax on carbon work? Has anyone else ever done this before? Why, yes. Since you ask: Scandinavian countries have been pricing carbon for more than two decades. The European Union Emissions Trading System (EU ETS) has been pricing carbon for almost a decade. US states and Canadian provinces have been pricing for years. Today, there are 39 (1) different programs that collectively put a price on 12 percent of all the greenhouse gas (GHG) emissions in the world. And when China's national program starts in 2016, **almost a quarter of global GHG pollution will carry a price tag to speed the changeover to clean energy**. The animated map below shows carbon pricing programs around the world, with the size of the bubbles indicating the amount of pollution priced.



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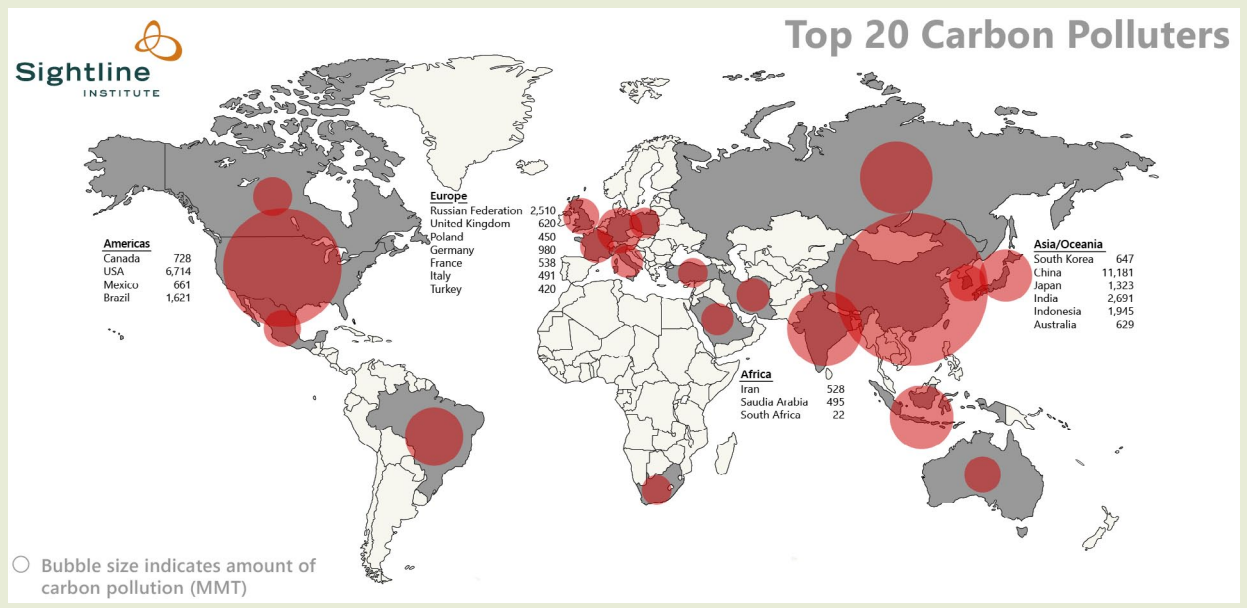
Carbon pricing programs come in many flavors: tax, cap-and-trade, or hybrids, and implemented at the level of country, region, state, or even city. (A fully sort-able table of the programs is at the bottom of this article.) The biggest program is the EU ETS, covering a little less than 2,000 million metric tons (MMT) of GHG emissions, or about 45 percent of all the emissions in the European Union. Japan's carbon tax is the next biggest player, covering about 800 MMT, or 70 percent of Japan's emissions. China, with several years of pilot project experience under its belt, is now committed to rolling out a cap-and-trade program in 2016 that will dwarf both the EU and Japan's programs, probably covering about 5,000 MMT of pollution. For reference: the entire world emits about 36,000 MMT, so China's

program alone will price about 13 percent of global emissions. To get a sense of how the carbon pricing programs relate to global emissions, the map below shows the world's biggest polluters. (You can also see countries re-sized by emissions here.) The US has a conspicuous mismatch between its large red pollution bubble and the lack of a green price bubble. President Obama, not to be outdone by the Chinese, has announced an agreement with China to cut carbon pollution. However, new Congressional leadership has vowed to move in the opposite direction by delaying and undermining federal efforts to cut pollution.



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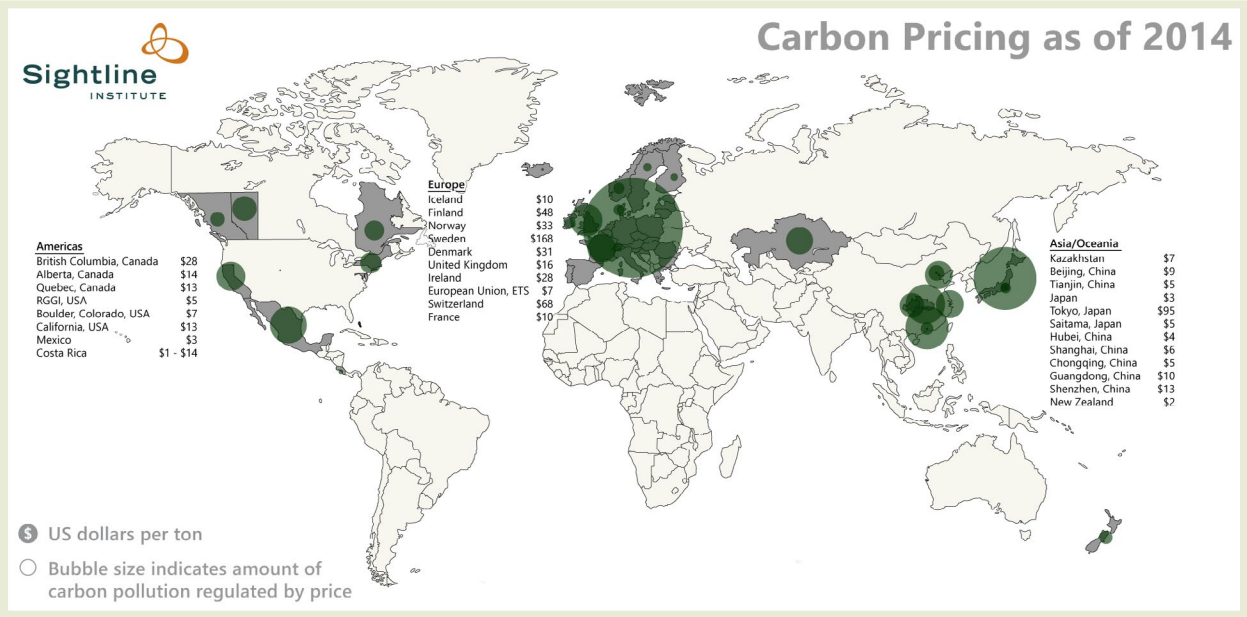
Here are a few questions about global carbon pricing programs that Pacific Northwest leaders might want answered:

(1) How high is the carbon price?

Prices range from $1 to $168 per ton, but most cluster between $10 and $30 per ton. For example, California's price is currently around $13 per ton, and British Columbia's price is currently around $28. The price outlier at $168 per ton is Sweden, where a high and persistent price has helped reduce pollution 13 percent in a decade. A carbon tax of $28 plus other policies have helped Ireland slash pollution more than 15 percent since 2008. This map shows current prices around the world.



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(2) How do they set the cap or tax?

Most cap programs aim to return to their own 1990 levels of pollution within 10-15 years. For example: California wants to get back to 1990 levels by 2020, New Zealand aims to reduce 5 percent below 1990 by 2020, and South Korea's target is 4 percent below 2005 levels by 2020. China aims to reduce its carbon intensity 40-45 percent below 2005 levels by 2020.

Economists recommend setting a tax based on the social cost of carbon—the cost that carbon pollution imposes on our economy, and therefore the appropriate price that polluters should pay. The US Environmental Protection Agency (EPA) estimates that the social cost of carbon is around $39 per ton, and you can argue the number higher or lower. For now, though, a price starting around $30 per ton would put Oregon or Washington in line with other programs and close to the economist-approved price.

(3) What is the program's scope?

Most carbon pollution comes from burning fossil fuels to generate electricity, to power businesses, to heat buildings, or to transport goods and people. Landfills don't burn fossil fuels, but they do spew methane pollution, a potent greenhouse gas. How to decide what pollution to include?

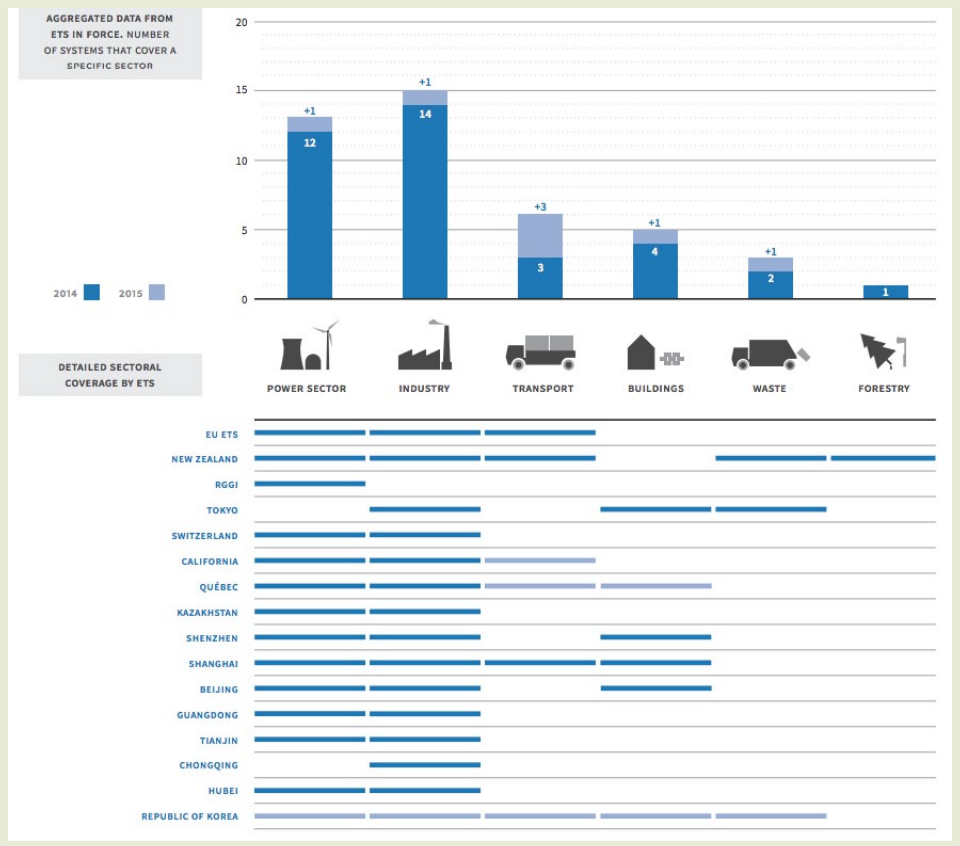
Almost all programs price pollution from electricity. An important question when pricing pollution from electricity is whether to price the power *generated* in the state (like RGGI and British Columbia), or the power *used* in the state (like California and Quebec). In the Pacific Northwest, many homes and businesses use power produced by coal plants outside the state: Oregon gets a third of its power from coal, and Washington gets 13 percent from coal. Most of that power—and soon all of it—comes from out-of-state plants.

Almost all programs price pollution from large industrial sources: usually only those that exude more than about 25,000 metric ton (MT) of carbon dioxide equivalent ($C0_2e$) per year. For example, California, Quebec, and Korea's programs only include facilities with more than 25,000 MT $C0_2e$ per year. Kazakhstan sets the threshold at 20,000 MT, and the Canadian province of Alberta only covers

firms with more than 100,000 MT per year. Setting a threshold insures that mom-and-pop shops do not pay the carbon price and that auditors only need to check up on a relatively small number of big businesses. For example, a 25,000 MT threshold would mean only about 48 businesses in Oregon and about 83 businesses in Washington would pay a carbon price. If the threshold were lowered to 10,000 MT, then still only 49 Oregon businesses and 85 Washington businesses would pay.

Less than half the global programs price transportation pollution. This is partly because transportation is often not a very big piece of the pie—in the EU, transportation accounts for only 20 percent of GHG emissions, and in South Africa it is just 9 percent, compared to 45 percent in Washington and 36 percent in Oregon. And it is partly because air quality agencies often already have experience regulating "stationary sources" such as power plants and factories but don't have the same experience with "mobile sources" such as cars and trucks. Like Oregon and Washington, transportation is the biggest contributor to emissions in California, so those emissions will be priced starting in 2015. Rather than price the pollution coming out of every tailpipe in the state, California priced carbon at the refinery.

Local or regional programs often do not have the authority to price pollution from electricity, so they instead price pollution associated with buildings in order to encourage more efficient use of resources within their borders. The graphic below shows a collection of carbon pricing programs, illustrating that most price the power and industrial sectors (first two columns), some price transportation and buildings (middle two columns), and a few also price waste and forestry (far right columns).



Sectors covered by carbon pricing (2014) *by* International Carbon Action Partnership
(Used with permission.)

(4) What do they do with the revenue?

Everyone has ideas for how to spend money. The money is important not only for political wrangling, but also for the effectiveness of the program. Spending the money on local cost-effective carbon reductions—as most RGGI states have done—helps keep the carbon price down by capturing low-cost reductions, and it also boosts the local economy. While a price on carbon sends the right signal to the private sector to direct investments towards low-carbon solutions, a price alone is not enough, and may even leave money-saving options on the table. That is because many pollution-cutting options (mostly energy efficiency improvements) are cost-effective even without a carbon price, but other market barriers block them. Using some of the money from a carbon price to pick this low-hanging fruit saves money and creates local jobs. By spending the money on energy efficiency, the nine RGGI states are set to add $8 billion—with a *b*—in net benefits to their local economies by 2020. Ireland has also invested some of its carbon tax in energy efficiency and local jobs. Costa Rica uses its carbon tax money to pay landowners to grow trees that further trim Costa Rica's emissions.

Spending carbon revenue in ways that help low-income people—as California is planning to do with some of its money—prevents the price from being regressive.

Using the money to cut other taxes—as British Columbia's revenue-neutral carbon tax does—can reduce the tax burden on workers and employers. British Columbia has reduced personal income tax and business taxes by $5.7 billion over the past 6 years. Ireland has also used some of its carbon tax to replace some income tax.

Be warned: cap-and-trade programs that give the allowances away for free have no money to spend. Cap programs can either auction the allowances to polluters and collect the money, or give the allowances to the polluters for free and collect no money. Some programs start out with a lot of free allowances to help give a soft start to the program, but most—for example, the EU, New Zealand, Korea, Kazakhstan—wean themselves off free allowances and shift to auctioning over time. In 2013, the EU started auctioning almost all allowances in the power sector and will phase down free allocation in others sectors to 30 percent by 2020. Some—for example, RGGI— auction almost all allowances from the start.

(5) How do they address competitiveness issues?

Pricing carbon in one state or country can make it hard for local carbon-intensive companies to compete with companies from states or countries that don't have a carbon price. To keep local carbon-intensive companies competitive, most programs try to identify and assist industries that face large price increases from a carbon price *and also* face competition from outside the state or country. Although only a few industries in Oregon and Washington would see a carbon price impact of more than 5 percent, those that are both carbon-intensive and trade-exposed will need assistance. The most common way to assist these industries is to give them a tax break—as Denmark does—or free cap-and-trade allowances.

Some cap programs use a sledgehammer approach and simply give away all the allowances for free. But, as the EU learned, free allocation can lead to windfalls for some industries that are able to pass the costs along to customers and pocket the difference. The more sophisticated programs use a scalpel approach and identify the industries that are vulnerable and then use an industry-specific benchmark when targeting those for assistance. For example, California and the EU both set benchmarks based

on the top 10 percent of the industry: those top factories will get all of their allowances free, but more-wasteful factories will only get allowances to cover how much they would emit if they were as efficient as the top performers. This policy rewards high performers within the industry and gives laggards a kick in the pants.

In Oregon, the industries that might deserve protection include producers of cement, lime, pulp and fertilizer. Together, these vulnerable industries account for 0.2 percent of jobs in Oregon. In Washington, the metal manufacturers and possibly cement, lime, gypsum and glass industries would likely deserve protection.

(6) How do they monitor, report, and verify carbon pollution?

A price on pollution doesn't do much to speed the transition to clean energy if you don't know how much carbon polluters are releasing. Some countries, including China, may have difficulty collecting reliable data about emissions. China's pilot carbon trading programs are developing better methods for and understanding of monitoring, reporting, and verification (MRV). Even the EU started out without good data and had to change course later. The best programs start with third-party verified emissions reporting and tracking systems from the outset. Oregon and Washington already have self-reporting programs in place but might want to add third party verification.

(7) What's better: a cap or a tax?

Wrong question. What matters are those pesky details. A well-designed tax can deliver the same benefits as a well-designed cap. Poor design can ruin either.

(8) Does anyone do both?

Several countries use both a cap and a tax. For example, Ireland taxes the sectors that are not covered by the EU ETS cap. Or, a tax can double up with a cap to increase the price in sectors that need a higher price to motivate long-term investments. For example, a carbon tax could be added on top of a cap in the transportation sector to motivate the infrastructure investments needed to provide true low-carbon options—extensive public transit, walk-able and bike-able land use, and new mobility options—in that sector. Both programs send a price signal that will spur the transition to a clean energy economy, but they can be mixed and matched to meet a state or country's specific goals. Switzerland designed its tax to act like a cap, self-adjusting to make sure it cuts pollution to certain levels.

Almost a quarter of all greenhouse gas pollution being spewed around the world is being, or soon will be, driven down by a price. I mean, Kazakhstan is doing it! Maybe it's time for Oregon and Washington to join the post-carbon transition.

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The Carbon Pricing Café

By Yoram Bauman
May 28, 2014

Link to Article Online

Welcome to the Carbon Pricing Café! Do you have a reservation? Let's see...oh yes, here you are: Washington State, table for 7 million. Right this way, please; we've got a spot for you by the window.

My name is Carbon Tax, and I'll be your server today. You may know my twin sister, Cap-and-Trade, who sometimes covers for me. Some diners seem to have a strong preference between us, but in truth it really doesn't matter that much; we can both deliver the goods.

(Besides, with all due respect to servers everywhere, when was the last time the most memorable part of a good meal was the service?)

We aim to provide a top-notch dining experience, and in order to do that our menu is limited. All we serve is *carbon pricing*, there are only a few really good entrées, and you only have to make two big decisions. (Remember, carbon tax and cap-and-trade are *not* entrée choices, and they don't factor into the big decisions. People seem to forget that we're your *servers*, not your meal.)

Two big decisions

Your first big decision is portion size: **How high a carbon price do you want?** Your answer will, of course, help determine how much carbon reduction you'll get, but it will also help determine your carbon pricing revenue. (For the sake of comparison, a carbon price of $30 per ton CO_2 —as in British Columbia—will generate about $2 billion a year in revenue. A carbon price of $12 per ton CO_2 —as in California—will generate closer to $800 million a year.)

This leads us to your second big decision: **What do you want to do with the resulting revenue?**

Let's take the $30 price and put the resulting $2 billion in context: Washington State GDP is about $375 billion a year, the state government budget is about $40 billion a year, and state government tax revenue is about $20 billion a year. (Federal grants and other revenue sources make up the rest.) From this perspective you can see that $2 billion is significant but not overwhelmingly dominant in terms of state finances.

You can allocate the revenue however you want, of course, but the choices could be daunting. If I may, my personal recommendation would be to break down the $2 billion into a $1 billion entrée and a few side dishes.

Entrées and side dishes

For the entrée, I think—and again, this is just my recommendation—that there are only three really good options for you:

- *Funding transportation infrastructure*, which faces a $1 billion-a-year shortfall just for maintenance;
- *Funding education*, which faces an even bigger shortfall (the capital budget might be an especially promising target here); or
- *Reducing the state sales tax* from 6.5 percent to 5.5 percent, which would pencil out to about $1 billion a year.

You may be surprised that I didn't mention the *dividend option* of taking the carbon pricing revenue and cutting an equal per-capita check to everyone in the state. Unfortunately we had to take this item off the menu because of legal concerns (the Washington State Constitution suggests that public money can only be given to the "poor and infirm") but you can still find this item at our sister restaurant, the Citizens' Climate Lobby Café in Washington, DC.

We also have some amazing side dishes. Remember that you can have more than one!

- *Financial support for low-income households*, perhaps through the Working Families Tax Rebate
- *Financial support for energy-intensive trade-exposed businesses,* perhaps by reducing or eliminating the business and occupation (B&O) tax for manufacturers
- *Financial support for clean energy and energy efficiency*, perhaps following the model of the Efficiency Maine Trust.

Some people believe that last item should be an entrée rather than a side dish, but I'm skeptical that clean energy and energy efficiency projects could usefully absorb $1 billion a year in Washington State. It would be like trying to fit a milkshake into a teacup.

Wine list

We also have an extensive (some would call it overwhelming) wine list. You'll probably be better off asking the chef to create a delicious pairing for you, but here are the details if you wish to peruse them:

Coverage: Will you include "carbon by wire" (i.e., the carbon content associated with imported electricity)? Will you include fuel used by airplanes and ships that travel outside the state? Also, as a side note, the legal consensus is that a carbon price *cannot* encompass coal or oil shipments that might pass through the state en route to Asia or elsewhere; applying a carbon price to these shipments would likely be a violation of the Commerce Clause of the US Constitution.

Dynamics: How will the carbon price change over time to achieve stronger emissions reductions in the future? And how will this affect the revenue side of the equation?

Point of administration: In general, the further "upstream" you go—toward importers, refineries, the other first-point-of-contacts in the state—the easier it is to administer the carbon price. But there may be legal or simplicity arguments for layering the carbon price on top of existing taxes or

regulations that are further "downstream." Regardless, it's important to note that much of the burden of the carbon price will end up being passed along to consumers; that's how economics works, and from a carbon-reduction perspective, you *want* end users of carbon-based fuels to have a financial incentive to reduce emissions.

Legal issues: Will there be federal constitutional issues, such as with the Commerce Clause? (This is of special concern for coal by wire, the key issue being whether in-state and out-of-state companies are treated equally.) Will there be state constitutional issues, such as with the 18th Amendment restrictions on motor vehicle fuel revenue? (According to a unanimous decision last year by the state supreme court the answer would seem to be no, but legal issues are not always what they seem.)

Dessert

Did you save room for dessert? If so, there are some special questions that apply only to one or the other of the carbon tax and cap-and-trade twins. For example, the law can treat "taxes" and "fees" in very different ways. Carbon taxes in particular may bring up state expenditure limits or the 18th Amendment restrictions on motor vehicle fuels.

For cap-and-trade, the most important question is, California or Do-It-Yourself? A DIY approach would allow the state to go its own way, but it would take years and a big administrative staff to get a cap-and-trade program up and running. Joining California's cap-and-trade system would simplify administration and implementation, but it would give Washington State less flexibility and make the state subject to the decisions of its much-larger neighbor regarding, for example, how to extend the cap-and-trade system into the 2020s.

Come back soon! And bring your friends and neighbors!

How was your meal? Delicious? I'm so glad to hear it.

Some people complain that our menu is confusing, but it's not really that hard, and fundamentally there aren't that many choices. You just have to figure out how strong of a policy you want (i.e., how high the tax or how tight the cap) and what to do with the resulting revenue (the revenue from a carbon tax or the economic value of permits from cap-and-trade) and your meal is complete.

One last thing: If you enjoyed your dinner, please tell your friends. Our business can only survive if our customer base includes a majority of the state legislature or a majority of the state's voters!

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Everything You Need To Know About Carbon Pricing Explained in Cartoon

By Yoram Bauman
June 2, 2014

Link to Article Online

One of my goals in life as an environmental economist is to harness market forces to fight climate change. And I like to find innovative ways to communicate that message: hence the stand-up economist gig, which started as a hobby and is now my full-time occupation.

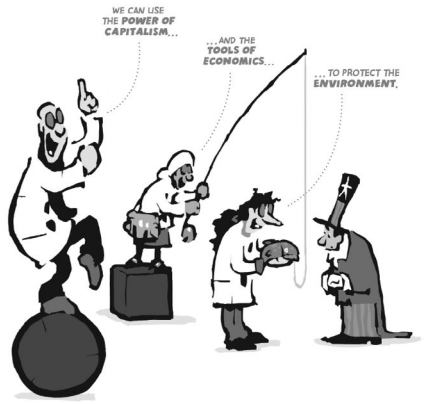
Another innovative communication approach is cartooning, and I'm delighted to share with you a chapter from my new book, *The Cartoon Introduction to Climate Change*, co-authored with and illustrated by Grady Klein. Grady and I also wrote the two-volume *Cartoon Introduction to Economics*, and both of those books touched on climate issues a bit. The new book provides an expanded treatment of climate science and policy using the same engaging cartoon format. (For more on our collaborative artistic process, see our Island Press Field Note that follows a page from idea to printed page.)

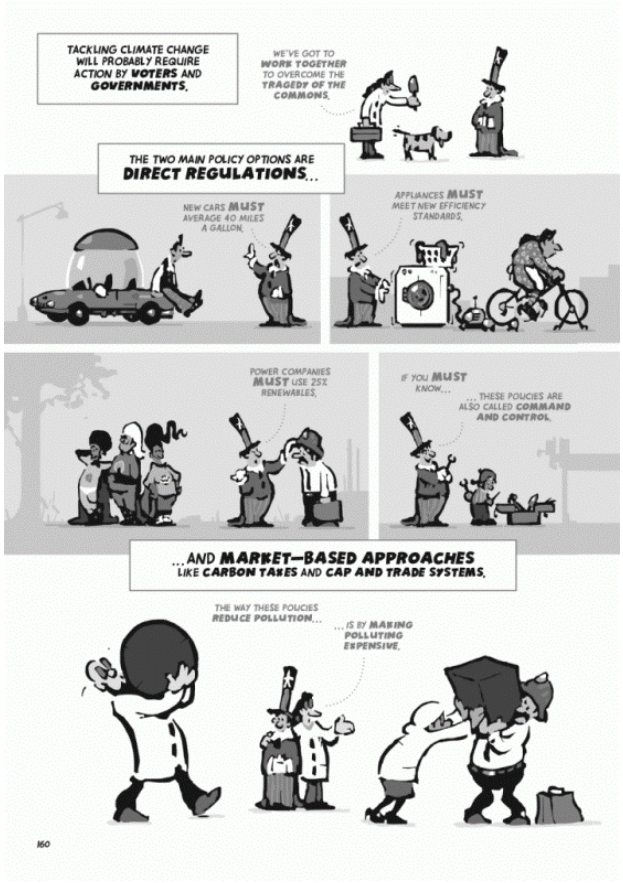
Cartooning has a bit of a bad reputation here in the U.S. in that people think it's "just for kids" silliness. But in fact, cartooning is a terrific way to convey information, and my books with Grady are based on the idea that something can be fun and intellectual at the same time. That's also true of my stand-up comedy career, and both the comedy and the books involve boiling down complicated topics and making them accessible to high school and college students and the general public.

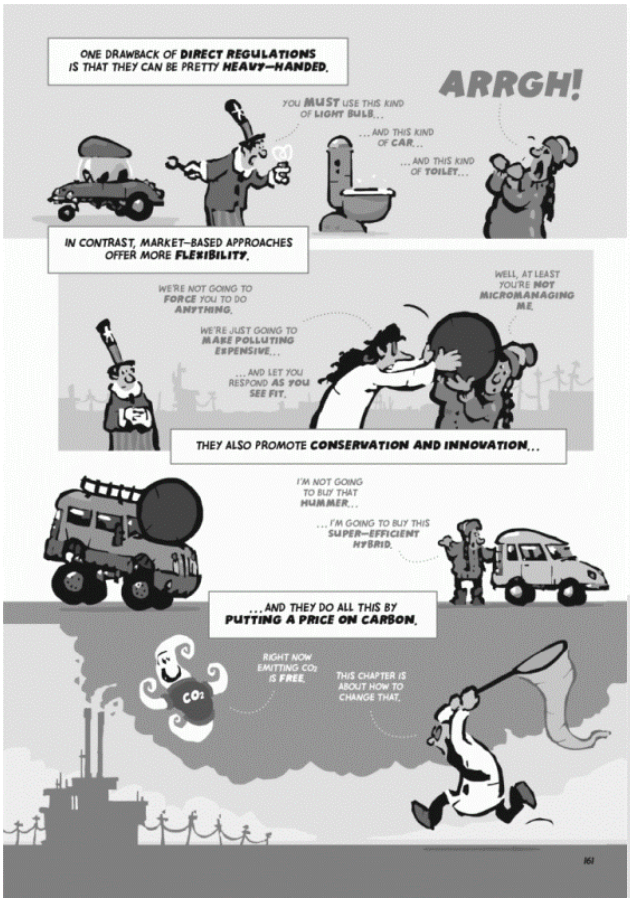
Other countries like Japan and France have a greater degree of respect for cartoon books—the 12 foreign translations of Cartoon Econ are outselling the English-language version—but if you'd like to judge for yourself then take a look at our chapter below on carbon pricing.

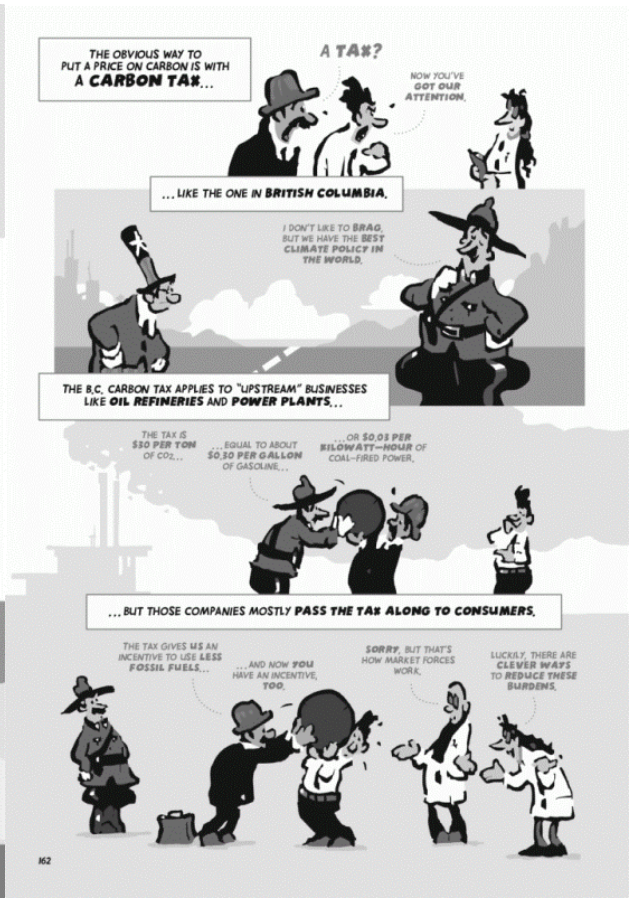
"Carbon pricing" is an umbrella term that includes both carbon taxes and cap-and-trade systems. They're both ways to put a price on carbon—in other words, ways to harness market forces to reduce carbon emissions. They've both been in the news a lot lately, but there's still a great deal of confusion about how they work and how they differ from each other and from more traditional regulatory approaches like fuel-economy standards. So, with that introduction, here's chapter 14 from *The Cartoon Introduction to Climate Change*:

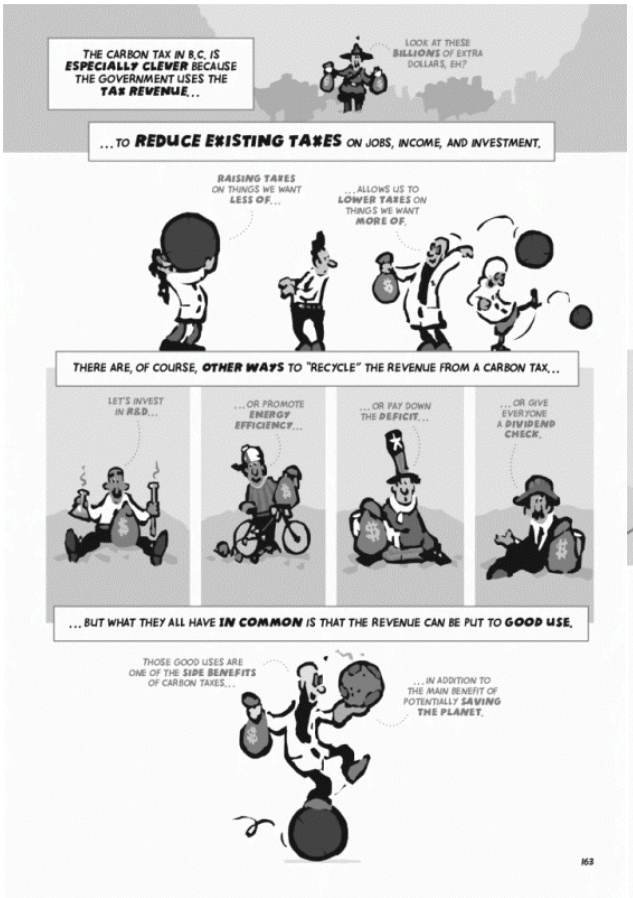
CHAPTER 14
PUTTING A PRICE ON CARBON



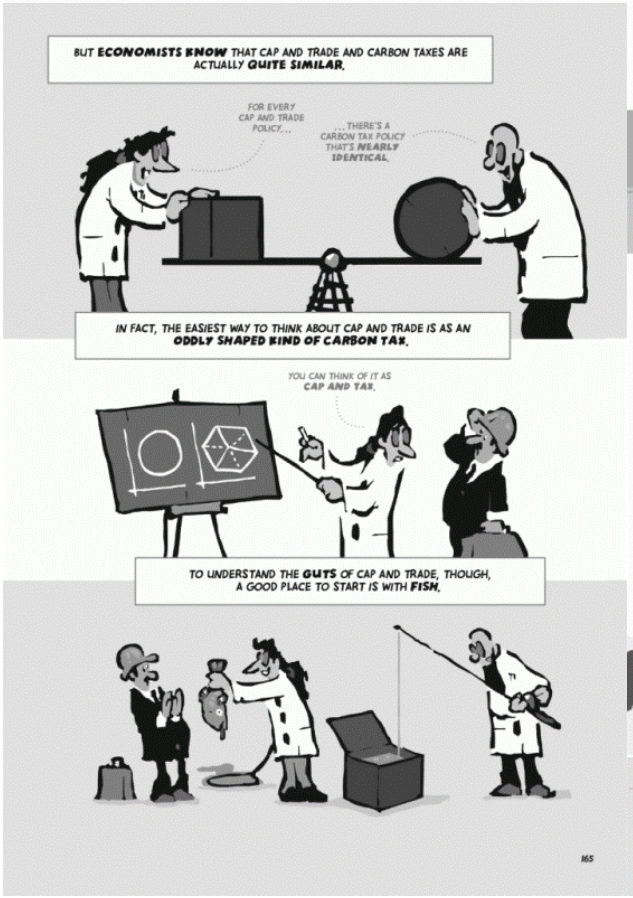


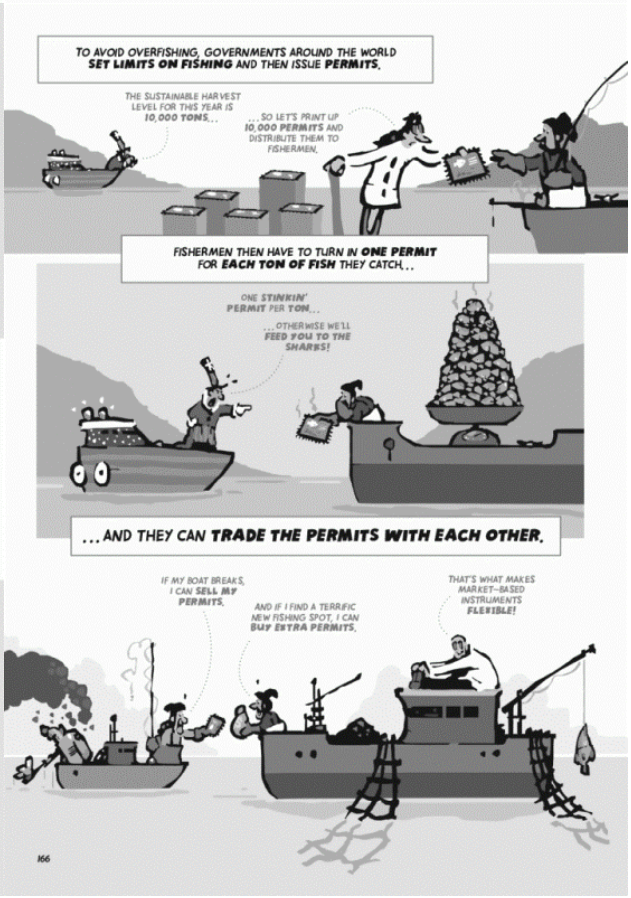


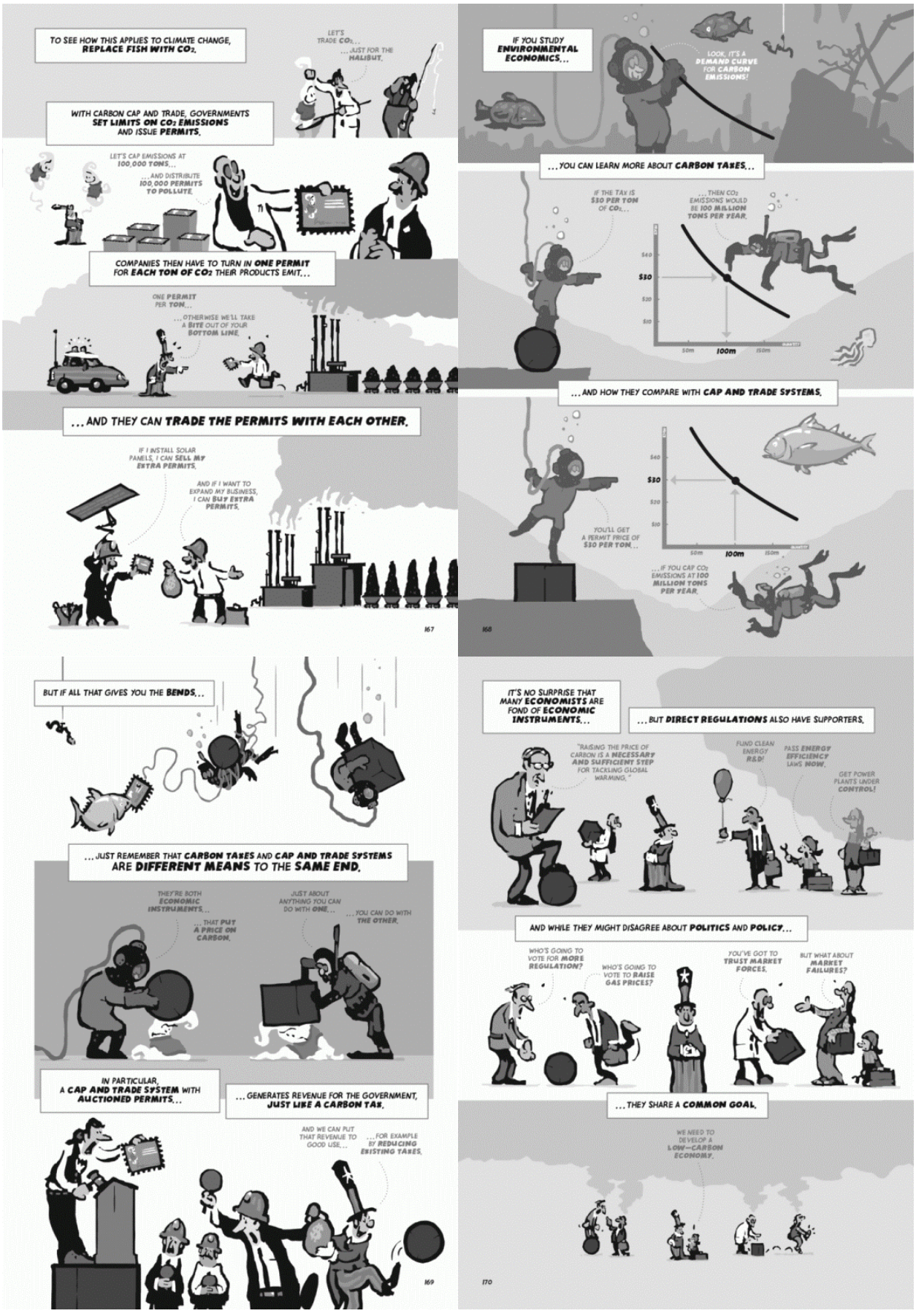



THE CARBON TAX IN B.C. IS ESPECIALLY CLEVER BECAUSE THE GOVERNMENT USES THE TAX REVENUE...
LOOK AT THESE BILLIONS OF EXTRA DOLLARS, EH?
...TO REDUCE EXISTING TAXES ON JOBS, INCOME, AND INVESTMENT.
RAISING TAXES ON THINGS WE WANT LESS OF...
...ALLOWS US TO LOWER TAXES ON THINGS WE WANT MORE OF.
THERE ARE, OF COURSE, OTHER WAYS TO "RECYCLE" THE REVENUE FROM A CARBON TAX...
LET'S INVEST IN R&D...
...OR PROMOTE ENERGY EFFICIENCY...
...OR PAY DOWN THE DEFICIT...
...OR GIVE EVERYONE A DIVIDEND CHECK.
...BUT WHAT THEY ALL HAVE IN COMMON IS THAT THE REVENUE CAN BE PUT TO GOOD USE.
THOSE GOOD USES ARE ONE OF THE SIDE BENEFITS OF CARBON TAXES...
...IN ADDITION TO THE MAIN BENEFIT OF POTENTIALLY SAVING THE PLANET.
163


ANOTHER WAY TO PUT A PRICE ON CARBON IS WITH CAP AND TRADE.
LIKE THE EMISSIONS TRADING SYSTEM IN EUROPE...
...OR THE GLOBAL WARMING SOLUTIONS ACT IN CALIFORNIA.
THE WAY POLITICIANS TALK ABOUT CAP AND TRADE CAN MAKE IT SOUND LIKE MAGIC...
WE'RE GOING TO CAP EMISSIONS...
...AND LET PEOPLE MAKE MONEY FROM TRADING.
WHAT'S NOT TO LIKE?
...A SPECIAL KIND OF MAGIC THAT HAS NOTHING IN COMMON WITH TAXES.
TAXES ARE BAD...
...TRADING IS GOOD!
164


BUT ECONOMISTS KNOW THAT CAP AND TRADE AND CARBON TAXES ARE ACTUALLY QUITE SIMILAR.
FOR EVERY CAP AND TRADE POLICY...
...THERE'S A CARBON TAX POLICY THAT'S NEARLY IDENTICAL.
IN FACT, THE EASIEST WAY TO THINK ABOUT CAP AND TRADE IS AS AN ODDLY SHAPED KIND OF CARBON TAX.
YOU CAN THINK OF IT AS CAP AND TAX.
TO UNDERSTAND THE GUTS OF CAP AND TRADE, THOUGH, A GOOD PLACE TO START IS WITH FISH.
165


TO AVOID OVERFISHING, GOVERNMENTS AROUND THE WORLD SET LIMITS ON FISHING AND THEN ISSUE PERMITS.
THE SUSTAINABLE HARVEST LEVEL FOR THIS YEAR IS 10,000 TONS...
...SO LET'S PRINT UP 10,000 PERMITS AND DISTRIBUTE THEM TO FISHERMEN.
FISHERMEN THEN HAVE TO TURN IN ONE PERMIT FOR EACH TON OF FISH THEY CATCH...
ONE STINKIN' PERMIT PER TON...
...OTHERWISE WE'LL FEED YOU TO THE SHARKS!
...AND THEY CAN TRADE THE PERMITS WITH EACH OTHER.
IF MY BOAT BREAKS, I CAN SELL MY PERMITS.
AND IF I FIND A TERRIFIC NEW FISHING SPOT, I CAN BUY EXTRA PERMITS.
THAT'S WHAT MAKES MARKET-BASED INSTRUMENTS FLEXIBLE!
166



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Four Carbon Cap-Tax Hybrids

By Kristin Eberhard
October 24, 2014

Link to Article Online

A tax and a cap are just different vehicles for delivering the same thing: a carbon price that holds polluters responsible for their pollution, drives the transition to clean energy, and staves off the worst risks of climate volatility. With a tax, you know the price in advance but not the quantity of carbon pollution per year; with a cap, you know the carbon but not the price.

Could Oregon and Washington create a cap-tax hybrid that is custom-made for the Pacific Northwest's unique circumstances, culture, and economy? Northwesterners are down-to-earth and pragmatic, resilient through changing conditions. A Northwestern climate policy should be the same: taking the best aspects of what has come before (BC's tax and California's cap) and hybridizing them into a robust policy that can ride out the rainy days.

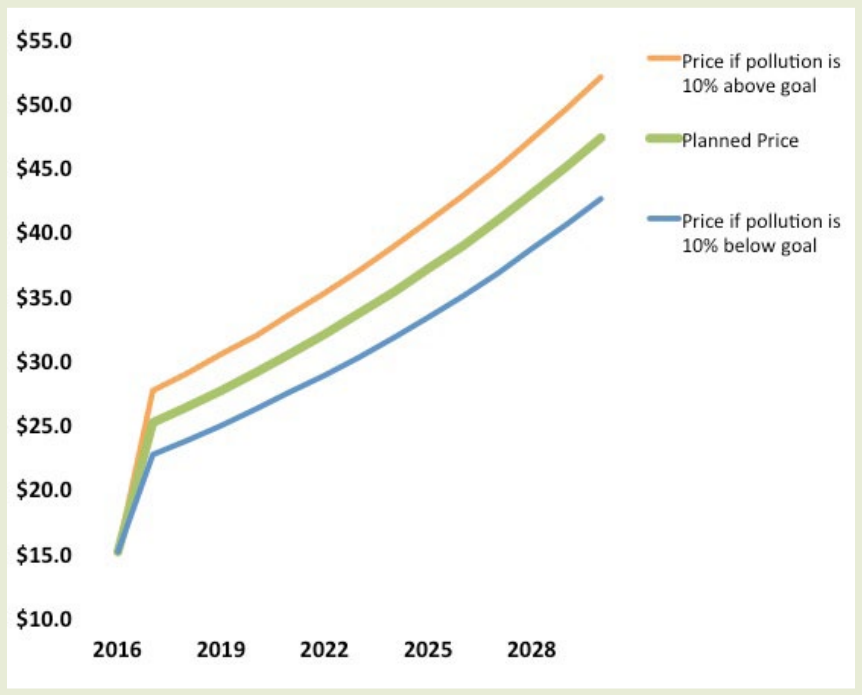
This article, the first of three about variations on carbon pricing, describes not just one but four cap-tax hybrids that could fit the Northwest like a fleece vest.

1. Use a self-adjusting tax to get the pollution cutting certainty of a cap.

Oregon or Washington could combine the price certainty of a tax with the pollution-slashing certainty of a cap. A self-adjusting tax is like the bumpers at the bowling alley. You pick a tax that aims for the carbon pollution trend to go right down the middle of the lane, but if your aim was bad, the automatic tax-rate adjustments act like bumpers, nudging pollution levels back on course. In Switzerland, a crude version of this approach is the law. The nation enacted a CO_2 tax in 2008 and later modified it to allow increases if the nation does not hit its carbon phaseout goals. Switzerland's 2012 ordinance set the tax at 36 Swiss francs (about US$37) per ton and authorized increases to 60 francs in 2014, 72 or 84 francs in 2016, and 96 francs in 2018. The federal environment agency automatically increased the tax to 60 francs in March 2013, because Swiss carbon pollution levels in 2012 hit the trigger threshold.

The Swiss plan has giant tax rate increases; the bumpers don't just nudge, they whack the ball back into the lane. Oregon or Washington could implement a subtler and smoother automatic carbon tax: one with tailored, pre-determined, pollution-triggered price adjustments to ensure the state meets its pollution trimming goals. How might this work? One simple example: the planned tax rate trajectory could be like the one that CarbonWA advocates: starting at $15, then up to $25 the second year, then rising at the rate of inflation plus 5 percent per year, as California's floor and reserve prices do. Every three years, an agency—perhaps the Department of Ecology in Washington or Oregon's Department of Environmental Quality (DEQ)—would run the numbers to see whether the state is sticking to its legally mandated schedule for trimming carbon pollution. If pollution was more or less than expected, the tax rate would bump up or down by the same percentage. For example, if pollution dropped 10 percent more than expected between 2015 and 2017, the tax would automatically drop 10 percent

from the planned rates for 2018-2020. It would be $24.80 per ton in 2018 instead of $27.60. The adjustments would be symmetrical, as illustrated in the chart below. If polluters spewed out 10 percent more carbon in 2015-2017 than allowed by law, the tax rate would step up by 10 percent in 2018-2020: $30.30 in 2018, instead of $27.60.



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An even more sophisticated, made-in-the-Northwest version of this bowling-with-bumpers tax might employ rate adjustments that phased in tax increases and decreases or that only adjusted the rate of change in the tax rate, rather than the underlying rate itself. For example, if there was too much pollution in 2015-2017, the tax might increase at a rate of GDP plus 10 percent per year, rather than 5 percent, for 2018-2020. It's easy to imagine refinements.

The important point is that this self-adjusting tax rate would give everyone price certainty within boundaries. Businesses would know the exact carbon price for the next three years, and they would know the price would be within a narrow range for each three-year period after that. This knowledge would allow them to make long-term investments based on the price. It would also ensure that Oregon or Washington would actually squeeze carbon pollution out of its economy on schedule—walking down the stairs to carbon-free at a predictable, measured pace. In other words, we'd get the simplicity and most of the price certainty of a carbon tax plus most of the climate-protection certainty of a carbon cap. And it'd be a uniquely Northwest solution, taking the best of BC and California.

Pros:

- Price certainty, within bounds.
- State will meet its carbon goals.
- Gets close to lowest-cost cuts.
- Motivates clean energy investments because businesses know the price will continue.

Cons:

- Price might be too high or too low for a few years at a time.
- Pre-determined price changes might not be sufficient if the original price was too far off.
- Less certain than un-adjusting tax on price; less certain than cap on carbon pollution.

2. Adopt a cap but authorize a tax as a backstop.

Oregon or Washington could start with a cap and authorize a tax as a fallback. The legislation would require state agencies to move forward with the regulations needed to join California's cap, but it would also spell out a carbon tax as a backstop. It could be an extremely simple carbon tax—almost a photocopy of the rules and regulations in British Columbia, for example. That way, tax authorities will not have to do drawn out rulemaking before launching the tax.

The legislation would also specify the conditions that would trigger the state to abandon the cap and implement the tax. For example, it could authorize the state revenue agency to begin collecting the tax on a specified date unless the state environmental agency first certified it had successfully joined California's cap and met other criteria: for example, the plan does not contain loopholes that endanger the state's legal commitment to its schedule of emissions reductions, and that there is no evidence of destructive gaming in the carbon market. Because the tax rate schedule was already authorized in the legislation, the switch could be fast.

Pros:

- State will meet its carbon goals.
- Takes advantage of the existing cap.
- Ensures action on climate.
- Protects against gaming or other problems with the cap.
- Motivates clean energy investments because businesses know the price will continue.

Cons:

- Price would not be in place for several years while agency goes through the rulemaking process.
- More complicated than a cap or a tax alone.

3. Start with a tax and transition to a cap.

Oregon or Washington could start a carbon tax immediately, and transition to a cap in a few years. The cap could start on the CarbonWA trajectory explained above, for example, or on a path to quickly catch up with British Columbia's current price of $30 per ton. This way the carbon price would already be in place as the state environmental agency went through its required public rulemaking to develop a cap. Once the cap regulations were ready, the tax rate then in effect would become the floor price in the state carbon auction. There would be no price volatility, as polluters would transition

smoothly from paying a tax of, for example in 2018, $26 per ton to purchasing allowances for a minimum of $28 per ton in 2019.

CarbonWA or BC's price trajectory would put Oregon or Washington's floor price well above California's floor price (currently $11.34), and likely above California's auction price (currently $11.50). The state's allowances would sell at their (higher) floor price for a few years until the market price caught up. This would create a price discrepancy between the states, but would ensure a quick and strong price signal as well as the certainty of keeping pollution under the cap. Alternatively, Oregon and Washington could set their starter tax rates to align with California's auction price for allowances—a slower start in pricing carbon but one that would make the transition to a cap simpler.

Pros:

- Price certainty for years.
- State will meet its carbon goals.

Cons:

- More complicated than a cap or a tax alone.

4. Implement a tax with a cap as a backstop.

Oregon or Washington could implement a tax but keep a cap at the ready. They could pass bills that authorize a carbon tax but also direct DEQ and Ecology to prepare the regulations needed to link to California and keep them on a shelf. Every three years, the agencies would review the tax to see whether it is paring pollution as needed. If pollution cuts fell short of pre-determined milestones, the state would abandon the tax and join California's cap. This policy would allow a fast switch from tax to cap because the agency already had the cap ready to roll. It would prod stakeholders to push for a tax high enough to wring pollution from the economy on schedule, because an inadequate tax would trigger the launch of cap and trade.

On the downside, this backstop plan would create a lot of work for the agency to write regulations that might never be used. It might even cause some businesses to not only pay the tax but also purchase allowances as a hedge against future risk. To prevent these downsides, the legislation could retain the authority to cap, without ordering the agency to write the regulations immediately. The agency would wait until the first three-year check-up to see whether the tax worked. If it did not work, the tax would stay in place while the agency went through the rulemaking for the cap. Once the rules were ready, the state would abandon the tax and join the cap.

Pros:

- Price certainty, if tax stays in place.
- Ensures action on climate.
- State will meet its climate goals.

Cons:

- Potential for wasted agency efforts.
- Duplicative compliance efforts by business that pay the tax and also purchase allowances as a hedge.

Northwest Hybrid Vigor

Every one of these options offers some perks that a cap or tax alone doesn't. Why stick with basic cable when you can bundle it with other services you want? Although they each could add value to the basic carbon pricing proposal, my personal favorite is number 1: the automatically self-adjusting carbon tax. It could start right away, send a clear signal that would spur immediate investments in clean energy, but elegantly course-correct to guide us to a cleaner economy and a safer climate.

The self-adjusting tax, with its calm resiliency to pollution ups and downs, is like northwesterners walking to work: we are prepared with a hood in case it pours or layers in case the sun comes out—but we're going to get there rain or shine.

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All You Need to Know About BC's Carbon Tax Shift in Five Charts

By Alan Durning and Yoram Bauman
March 11, 2014

Link to Article Online

When British Columbia enacted a carbon tax shift in 2008, many thought other jurisdictions would follow soon with their own ways of cashing in their carbon. Seven states and four provinces were working out the details of a huge carbon cap-and-trade market called the Western Climate Initiative. Candidates Barack Obama and John McCain were campaigning for president with promises of clean energy on the double quick; Senator Obama even pitched carbon pricing in his stump speech. Ottawa was murmuring about following the lead of Washington, DC, with a carbon cap or tax of its own.

Then history took a turn: financial collapse, bailouts, Tea Party, climate science denial, 2010 midterms, the fiasco at Copenhagen. The front in the war on climate disruption shifted from grand policy to fighting Keystone XL, coal trains, and other dirty-fuel infrastructure. Momentum abated for comprehensive laws at the state, provincial, and federal level that would gradually but persistently wean companies and households from fossil fuels by charging a small but rising fee for carbon pollution.

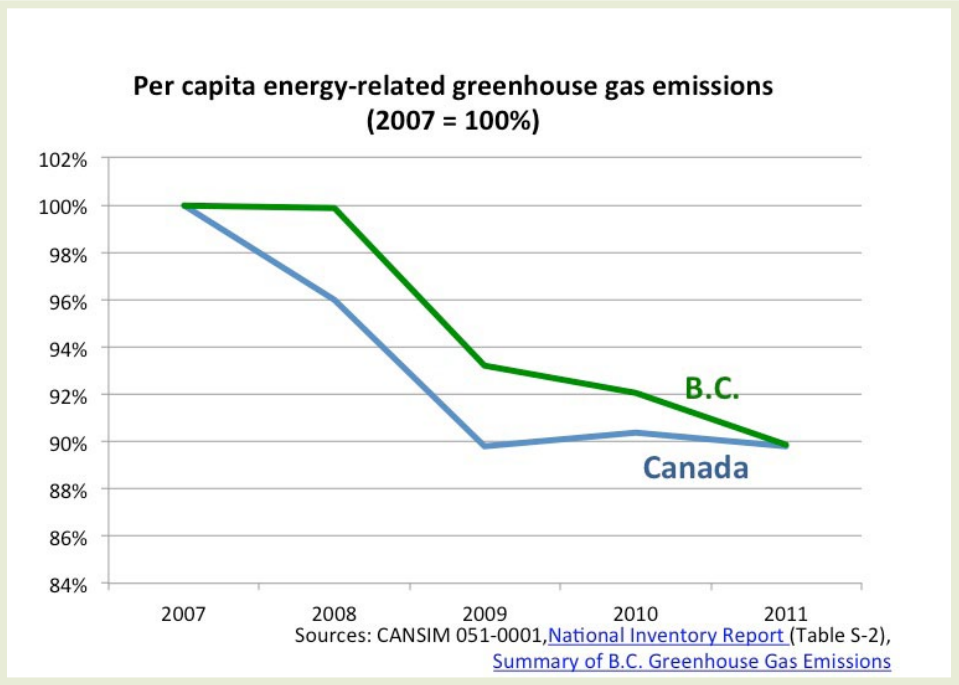
British Columbia then found itself alone: the only jurisdiction in North America with an appreciable, economy-wide price on global warming emissions. With this post, we launch a new series of articles on pricing carbon in Cascadia. Our ultimate focus will be Oregon and Washington, which sit between British Columbia, with its carbon tax, and California, with its new carbon cap (which we'll discuss another day). But the best place to begin is where Cascadian carbon pricing began: in Canada.

What's the latest on what BC's carbon tax shift has done to carbon pollution, the provincial economy, and public revenue?

1. Pricing carbon has reduced carbon pollution.

BC's carbon tax shift launched on July 1, 2008, with a rate of $10 per ton CO_2. It increased by $5 per ton each year through July 2012, when it reached $30 per ton. Since then, the province has arguably been waiting for other jurisdictions to catch up, so that fossil-fuel price differences do not become too large between British Columbia and other places. The tax has therefore stayed at $30 per ton—about 30¢ per gallon of gasoline or 15¢ per therm of natural gas. The tax applies to almost all fossil fuels burned inside the province. Certain agricultural sectors are exempt (see page 23), and by definition the tax does not apply to carbon emitted at non-BC power plants that zap power into the province, to "process emissions" from industries such as aluminum and cement manufacturing, and to fuels for planes and boats that cross provincial borders.

When you tax something, you get less of it. That's the point of taxing carbon pollution. What's happened to emissions in the province?



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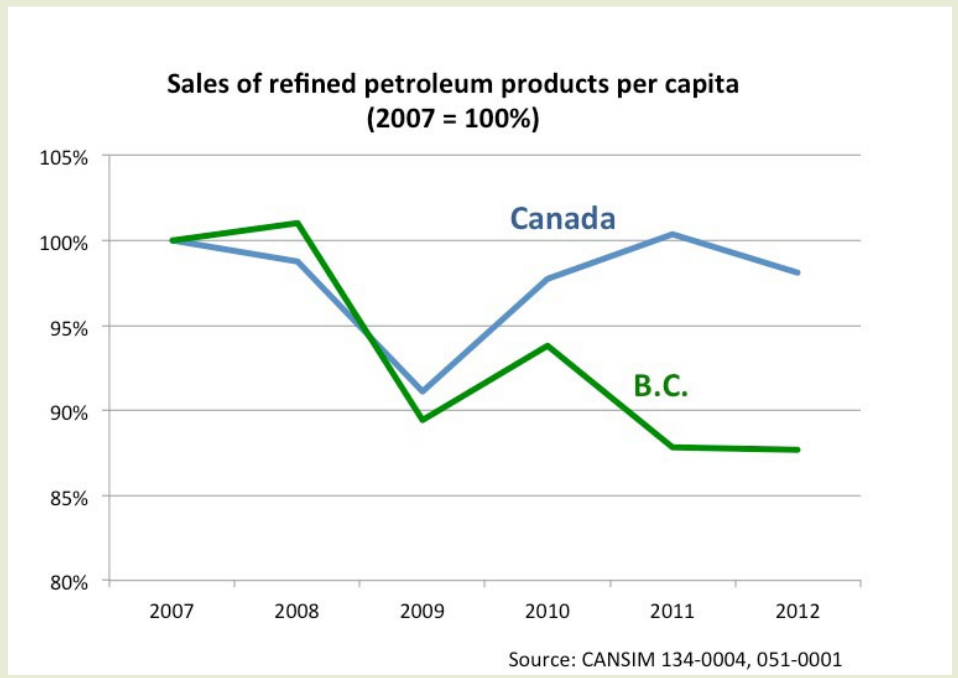
Energy-related greenhouse gas emissions in BC dropped by six percent overall (and nine percent per capita) between 2007 and 2011 (the latest year for which data are available).

Carbon pricing skeptics might note that emissions have also fallen elsewhere in Canada, and they have. In fact, between 2007 and 2011 Canada's energy-related emissions fell by an equal amount.

But the carbon tax shift was not the only thing happening—far from it. Other forces have also trimmed emissions, such as widespread fuel-switching from coal to gas in much of Canada. These electricity-related changes have had little effect in BC, though, which gets almost all of its electricity from hydropower. Meanwhile, some trends, such as the Great Recession, have suppressed emissions, while others, such as the natural gas boom in northern British Columbia, have boosted emissions. BC's tax shift is one influence among many.



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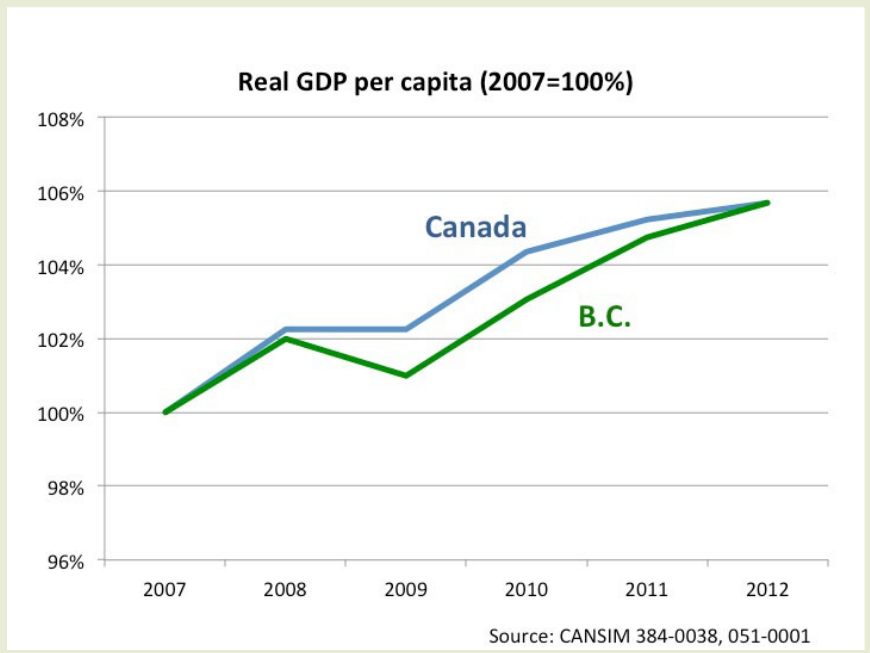
Petroleum products consumption—a trend less complicated by other factors than electricity or industrial emissions—may be the best indicator of the influence of the tax shift on carbon pollution. The province's per-capita combustion of motor fuels and other petroleum diminished by 15 percentage points in the first four years of the tax shift—10 full points more than in Canada overall.

2. The carbon tax shift has not hurt the economy.

Economies are whipsawed by massive forces all the time. The carbon tax shift has raised the price of petroleum products and natural gas by around 10 percent—less than their prices normally vary in a year anyway. Meanwhile, it's reduced corporate and personal income taxes. Economic theory suggests this swap of taxes will not hurt the economy and may even help. Some studies suggest that BC's carbon tax shift in particular will eventually give B.C. an economic boost.



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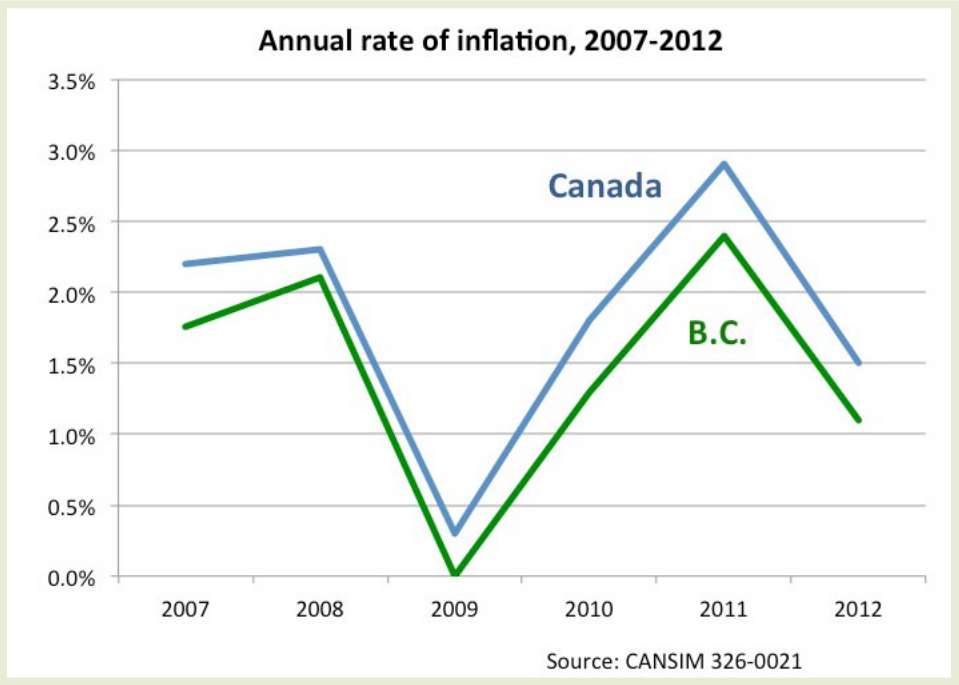
Still, you wouldn't expect to be able to discern much of an economic impact in aggregate statistics. After all, since the carbon tax started, the province has been rattled by a global financial meltdown, the bursting of a gigantic housing bubble in the United States (the principal market for BC commodities), a boom and then a slowdown in China (another principal market for BC goods), and cascading economic debacles in Greece and other parts of the Euro zone (a third major market for BC exports). The effects of a gradual, modest increase in fuel prices, offset by reductions in income taxes, are almost guaranteed to be lost in the noise of these other trends.

What is detectable is that BC's economy has roughly matched the Canadian economy overall in GDP growth; the economy has done just fine.

3. Pricing carbon has not caused inflation.

Will raising fossil-fuel prices drive up the price of everything else, triggering inflation the way that the oil price spikes of the 1970s did? No. On inflation, BC has done no worse than Canada overall. As the chart shows, inflation was lower in British Columbia than in Canada as a whole in 2007, before the tax shift started, and it has stayed lower ever since, neatly paralleling the national average a portion of a percentage point lower.



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4. The carbon tax shift has been revenue neutral.

By law, carbon tax revenue must go back to citizens and companies as tax cuts (see page 64): "tax reductions must be provided that fully return the estimated revenue from the carbon tax to taxpayers in each fiscal year." In practice, the tax shift has actually reduced tax revenue slightly overall: the carbon tax raised $1.1 billion in the fiscal year ending in 2013, for example, but offsetting tax cuts lowered other treasury receipts by $1.4 billion.

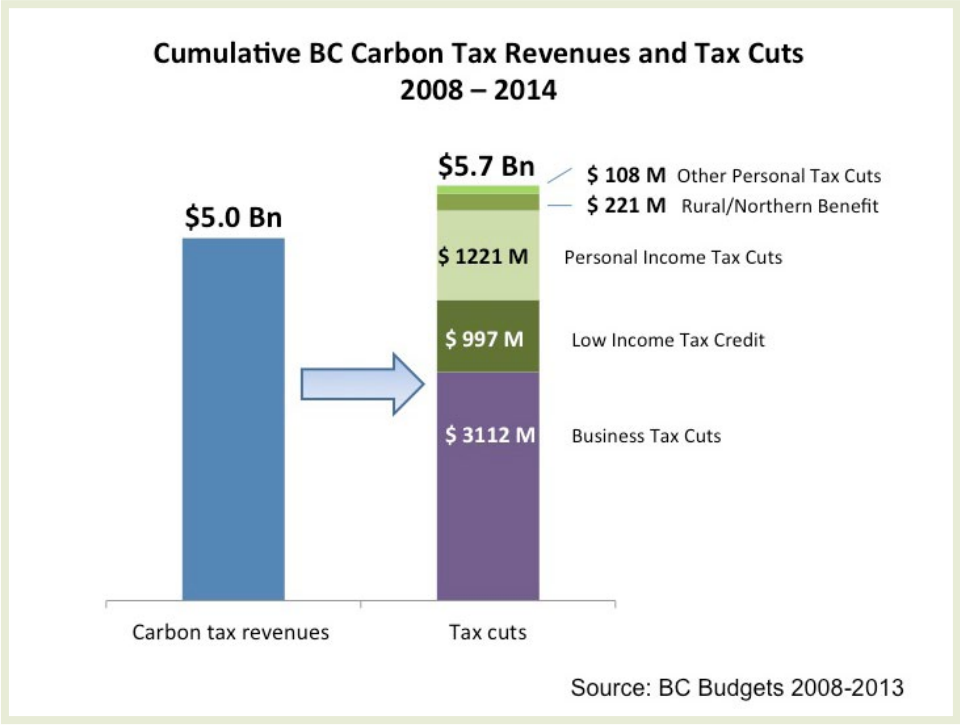

Chart from BC Budgets 2008-2013 (Used with permission.)

This chart shows revenues for the first six years of the program, during which net revenue declined by $700 million. The goal of the policy was not to reduce revenue, but the province has overestimated carbon tax revenue and therefore reduced other taxes by more than necessary to maintain revenue-neutrality.

5. BC's carbon tax shift is not perfect.

BC's carbon pricing system has flaws.

First, although BC's carbon tax shift made low-income families whole in its early years, it has since become mildly regressive. An expansion of tax credits for working families would make them whole again.

Second, the carbon tax shift is not likely to get the province all the way to its ambitious emissions reductions goals for the later years of this decade. In fact, carbon tax revenues (and the associated carbon emissions) are expected to begin rising now that the carbon price has stopped stepping upward each year to counteract the effects of population growth and economic growth.

Third, the value of offsetting tax reductions is expected to grow faster than are carbon tax revenue. In other words, the shift is yielding a revenue gap that's gradually growing.

All three of these issues could be addressed by returning to annual $5 per ton increases in the tax rate. This would help keep carbon pollution on a downward trajectory and at the same time would generate additional revenues that could be split between closing the revenue gap and providing additional tax reductions for low-income households.

Still, BC's carbon pricing system is the best in North America and probably the world. The province has finished the nitty-gritty work of drafting statutes and regulations to implement the system. Oregon and Washington could do worse than to copy them, word for word, into their tax codes, then make adjustments needed to match circumstances. (Washington, for example, cannot rebate the carbon tax revenue through its income tax, because it does not have one. Instead, it could reduce sales and business taxes and provide rebates to low-income families, perhaps through the Working Families Rebate.)

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10 Key Takeaways from BC's Polluters-Pay Model

By Kristin Eberhard
February 25, 2015

Link to Article Online

British Columbia has a world-class carbon tax. It's been working for almost seven years, cutting pollution and pumping money into other parts of the economy, like the pockets of businesses and households who now pay lower taxes. Jealous decision-makers down here in Oregon and Washington might be asking "Yes, but how how did they start taxing pollution and helping businesses and residents? How did they do it?" Clean Energy Canada set out to answer your anguished questions by interviewing 13 of the architects of British Columbia's carbon tax. Below are their 10 takeaways about a carbon tax, along with a little explanation and my take.

1. A carbon tax and a thriving economy can co-exist.

True, that.

Every single interviewee agreed that the carbon tax has not harmed the economy. Some interviewees noted that carbon-funded corporate tax cuts have helped attract businesses to the province.

Hear that, Oregon and Washington? Making prices tell the truth about the cost of pollution is at worst neutral for the economy and at best good for business.

2. You need strong political leadership to get a carbon tax in place. (Public concern about climate disruption helps, too.)

Gordon Campbell made this happen. As premier, he made climate change a priority, and made a carbon tax the centerpiece of British Columbia's budget. (It helped that the public in British Columbia placed a high priority on environmental stewardship. And while none of the parties initially came out swinging for a revenue-neutral carbon tax, parties across the political spectrum supported doing something to reduce climate pollution.)

Good news for the Evergreen State:

- Governor Inslee is committed to making climate change a priority;
- People in Washington are rightly proud of their state's environmental beauty;
- Washington has a big budget problem that a polluters-pay bill could help solve; and
- Washington state Republicans, while not actually supporting the polluters-pay principle, now say they, too, want to do something about climate pollution.

Possibly good news for Oregon:

- Oregon has strong enough Democratic majority in the legislature that if someone decided to become Oregon's Gordon Campbell, they would have a good chance of making it happen;

- Oregonians have a strong environmental ethic: we believe our environment is the top reason that Oregon will be a better place to live in 10 years, a strong majority believe in prioritizing the environment over economic growth, a supermajority believe that we need to make polluters pay for the costs they impose on the public, and most of us (72%) believe we need to do something about climate change.

3. Keep it simple: design a policy that's easy to administer thanks to broad coverage and minimal exemptions.

Simple, fair, and no loopholes are good policy principles. The BC tax covers all fossil fuel combustion in the province, and businesses appreciate that its streamlined design is less cumbersome than regulations. Unfortunately, British Columbia did a tiny bit of crumbling around the edges, creating exemptions that were politically necessary but almost certainly unwarranted. For example, they gave some subsidies to the agricultural sector, but recent academic research found little evidence that the agricultural sector was actually harmed by the carbon tax (meaning it got a windfall from the subsidies).

Advice for Oregon and Washington: keep it simple, fair, and resist pressure to create unwarranted loopholes.

4. Start with a low price.

The BC tax started at $10 per ton. That price translates to less than a dime per gallon of gas, so it didn't create a price shock in the first year of the program.

5. Commit from day one to a schedule of price increases, and stick with it.

British Columbia could have taken more of its own advice on this one.

The price started at $10 per ton in 2008 and went up $5 per ton for 4 years, reaching $30 per ton in 2012 and staying there. Most interviewees expected it to keep going up after 2012, and bemoaned the fact that they did not firmly commit to a longer schedule of price increases. $30 per ton is a good start, but not enough to complete the clean energy transition we need. The interviewees' advice (and mine) for Oregon and Washington would be to committed to a steadily increasing price schedule for at least 10 years.

6. Revenue neutrality helps address private-sector concerns and makes the policy more durable.

Revenue neutrality didn't win passage for the carbon tax, but it made it more difficult for business interests to attack. The revenue-neutral design addressed the fear that a new tax means bigger government—the tax guaranteed that the government would not get bigger, even going so far as to say the finance minister would not get paid if he could not show he had kept this promise. The design

also addressed the more personal fear that a new tax means a bigger tax bill for a particular business—lower-carbon businesses could lower their total tax bill as a result of the new tax. None of this turned the business community into cheerleaders, but it prevented or muted business opposition.

The more significant benefit of revenue neutrality came after the tax had passed: anyone trying to reverse the task now faces a formidable task. To reverse it, you have to *raise taxes* on business and households by over one billion dollars! Good luck with that.

7. On the other hand, revenue neutrality doesn't get you very far with voters.

Ah, yes: here is where reality so rudely intrudes on the economist's dream. "Tax the bads, not the goods" makes so much sense—why wouldn't everybody love it?! But here are some of the reactions that voters had to the BC plan:

- *Once the government collects new tax revenue, its not going to refund money back to us.* Not gonna happen. Voters simply don't believe the government will give money back to them. Even when the government actually gives the money back, people don't notice because their tax bill varies year to year anyway.
- *"Revenue neutral" means I will get a check for exactly the amount of money I paid toward the carbon tax, right?* Revenue neutral means the government will refund back as much as they took in, total. The individual impacts will vary: people with a higher-polluting lifestyle will end up paying more than those with a lower-polluting lifestyle. That's the mechanism that nudges the economy away from fossil fuels and towards clean energy. Unfortunately, people are disappointed when they figure this out.
- *What's the point? If you're just going to give it back, why collect it in the first place?* People want the government to invest in infrastructure and schools and other collective goods. The idea of collecting a tax and then not spending it on those important things is confusing.
- *Where did it go?* People want to see something for their taxes: roads and buildings getting built and maintained, schools hiring new teachers, solar panels and windmills going up. When none of that happens (because the money is getting refunded to them), they wonder why they approved the tax.

8. A carbon tax can't do everything; it needs to be just one component of a full suite of climate policies.

British Columbia first enacted other policies encouraging energy efficiency and clean energy. The tax was just one piece of the puzzle and selling it as such, and not as the great climate panacea, helped.

Oregon and Washington also have a suite of other clean energy policies—energy efficiency requirements, clean energy standards, and clean car standards—in place that could be strengthened to complement a carbon price.

9. Prepare for motivated, vocal—and not necessarily fact-based—opposition. You'll need active, engaged supporters and targeted communications strategies to counter the critics.

Even though rural residents were not in fact particularly disadvantaged by the carbon tax, their perception was that the government was trying to force them to do the impossible: give up their cars. And of course we know what the oil industry's playbook will be. Interviewees recommended that states or countries considering a carbon price should:

- Prepare for the long term.
- Engage a range of potential allies to support the policy both in the legislature and within their communities.
- Provide tailored information about what the policy will mean for specific groups. (Oregon's carbon tax study that looked at impacts by region has given us a step up on this point.)
- Ensure that the spokesperson is a skilled communicator.

10. Prepare for a cleaner environment, an enhanced reputation, and a thriving clean technology sector.

All interviewees agreed that the carbon tax has helped British Columbia cut pollution. British Columbia has 13 percent of Canada's population but 22 percent of its clean technology firms. That success in cutting pollution while growing the clean energy economy has given British Columbia a positive international reputation.

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17 Things to Know About California's Carbon Cap

By Alan Durning and Yoram Bauman
May 22, 2014

Link to Article Online

While Cascadian climate hawks have been fighting rearguard actions against proposed pipelines and coal trains, California has been rolling out an ambitious carbon cap. Such a cap is the principal alternative to a carbon tax—such as British Columbia's carbon tax shift—as a method for putting a price on carbon in Oregon and Washington. It's an option Oregon will consider next year in its impending revenue-reform debate. In Washington, the Golden State's cap appears to be the model that Governor Jay Inslee favors: he recently convened a panel of leaders to design a state "Cap and Market" system.

The panel, after deliberation, may conclude that the best choice is for Washington to simply photocopy California's rules and join the Golden State's system. California actually designed its carbon market so that other states can plug themselves into it. Or the panel could opt to design its own system. Either way, Cascadia's climate warriors would do well to study how their southern neighbor put a price on carbon, because the Golden State's rules form the dominant carbon trading market in North America. Just last week, the state auctioned more than 20 million carbon-emission permits at $11.50 apiece.

Here are 17 things worth knowing about that market. Some of them are details, even arcane ones, but the details of a carbon pricing system matter enormously. They matter more than whether the underlying mechanism is a tax or a cap. (Sightline laid out the details of good design in Cap and Trade 101.)

1. The cap is strong...until 2020.

California's carbon cap—the flagship in an armada of global warming policies launched in 2006 as Assembly Bill 32 (AB 32)—came into force in January of 2013, initially covering the electric-power sector and large factories with giant carbon footprints. Next year, it expands to the carbon dioxide from gasoline, diesel, natural gas, and other fossil fuels (and to other greenhouse gases such as methane). By then, the Cali cap will be the most comprehensive, though not the most aggressive, carbon-pricing regime in the world.

The crux of cap-and-trade is the cap itself: a legally enforceable limit on total climate-altering pollution. The cap diminishes over time, gradually squeezing carbon out of the economy.

The Air Resources Board, a branch of the California Environmental Protection Agency, designed and enforces the cap. ARB issues one permit for each ton of carbon dioxide emissions allowed each year. Once the cap is fully phased in next year, just about everyone who sells fossil fuels or fossil-fuel-powered electricity into the California economy will have to obtain enough permits to cover the emissions from their fuel or electricity.

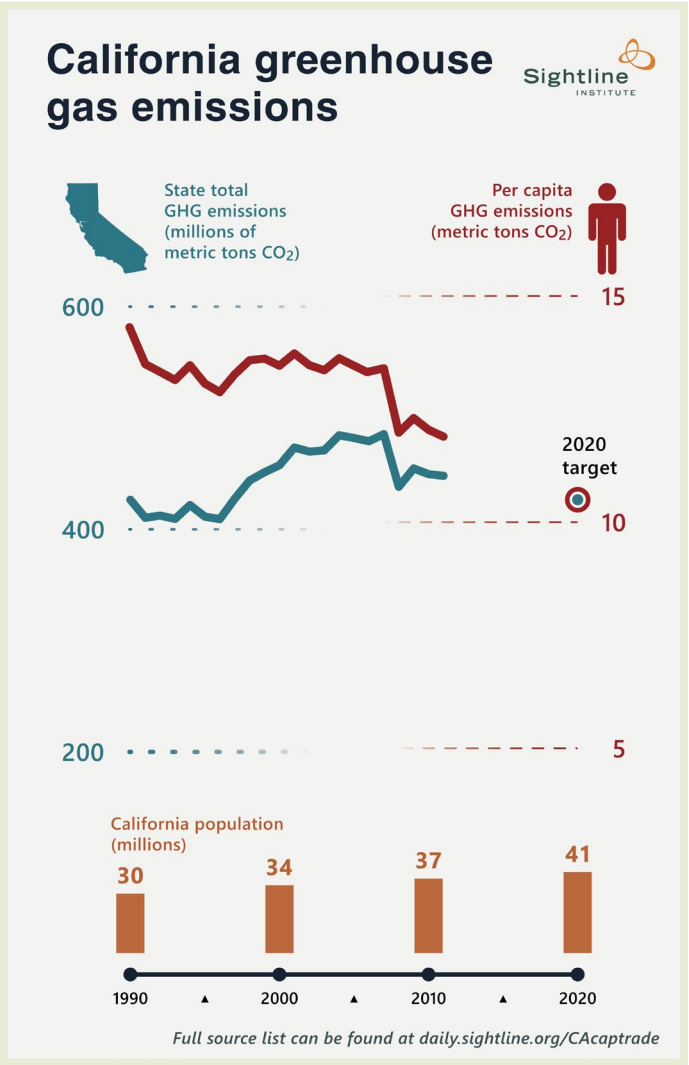
The total supply of emissions permits will step downward by 2-3 percent per year for the rest of this decade so that emissions return to the 1990 level by 2020. After 2020, the same annual cap will likely

apply, but as of yet, the legislature has not told ARB to ratchet down permits further. The state is under a non-binding executive order to reduce emissions an additional 80 percent by 2050, and the legislature has begun debating a continued downward trajectory of permits. But the program's future depends on whether climate hawks retain sufficient influence in Sacramento.

2. Is it working? So far so good.

California's cap is new, so it's too soon to make unequivocal statements about its effectiveness. Complete emissions data from the Golden State are only available through 2011—two years before the launch of the cap. So far, though, ARB's systems of rules and enforcement mechanisms seem well crafted and appear to be functioning as intended. Barring some unforeseen political change, we expect they will trim emissions as intended through 2020.

Overall, the state's emissions (shown below) rose from 1996 to 2007, then dropped with the Great Recession and have since plateaued. To return to 1990 levels by 2020 will require a 5 percent drop below the 2011 level. Because California's population continues growing quickly, emissions per capita will have to drop even more, as the figure shows. (Sources for the figure are at the end of the article.)



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3. Most of the dollar value of the permits will benefit the public.

The "trade" in cap-and-trade means that the companies regulated under the cap can sell their emissions permits if they have more than they need or buy permits from others if they're short. These emissions permits are like shares of stock or commodities such as pork bellies: their value varies and you can sell them for cash.

Many cap-and-trade systems distribute emissions permits for free—an approach Sightline has long criticized as regressive and a reward to dirty industries. Sightline, like most policy analysts, prefers auctioning permits, so that the public retains their full value and can invest it in public purposes, such as buffering low-income families against higher energy prices.

Next year, when the cap expands, ARB will auction most of the new permits—those for petroleum and other fuels. That's great news, and it will account for about half of all permits in the years ahead. As for the rest of the system—the permits covering electricity, large factories, and other sources of greenhouse gases—well, it's complicated. But the bottom line is that, even though ARB has been

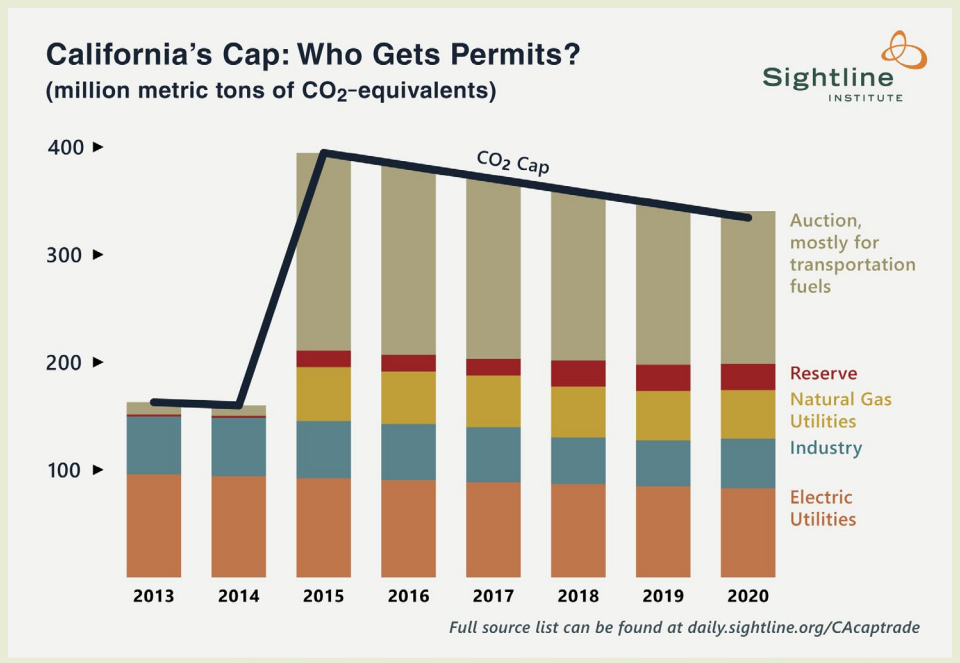
distributing about 90 percent of emissions permits for free in 2013 and 2014, it's devised policies that are hard to criticize too harshly. By our estimation, most of the dollar value associated with the permits will either be captured in the auction or be allocated in a way that provides at least indirect benefits to the public.

First, ARB is not grandfathering permits—distributing free permits to large industrial facilities based on their past emissions. Instead, it has devised a formula that provides free permits (shown in blue in the figure below) to large industrial companies whose products compete head-to-head with products from outside of California. The goal is to prevent putting California industries that sell into out-of-state markets at a disadvantage. The formula goes further and gives extra permits to the firms that have done the most to reduce their emissions. It's not a perfect policy. It still siphons money to the state's biggest carbon polluters, and no formula can capture all the nuances of market competition. Still, it's not grandfathering.

Second, ARB is distributing most of its free permits to electric utilities (orange in the figure below) and, starting next year, to natural gas utilities (yellow, below). The utilities get the permits for free, but the California Public Utility Commission requires all investor-owned utilities to sell their permits in ARB's auction. Of course, the utilities then need to buy permits to cover their own emissions. The point of this Rube Goldberg device is to determine the dollar value of the permits: the CPUC orders utilities to devote all of the proceeds from the sales of their permits for the exclusive benefit of their retail customers.

For example, the CPUC ordered Pacific Gas and Electric, the giant private utility that serves much of northern California, to give "climate credits" averaging $35 to residential customers as line items on their April bills. It will do so again in October. That's enough money to offset the pocketbook bite of carbon pricing—the increased price of PG&E electricity—for many customers, especially low-income households. Because the credits come as a flat amount that is the same regardless of how much power a household uses, they don't diminish the economic incentive to reduce emissions. And they counter the regressive nature of carbon pricing: poor families get the same credit as rich families, although poor families use far fewer kilowatt-hours. In effect, California has hacked together a crude cap-and-dividend system through its utilities.

Climate credits are progressive in another way as well. California offers discounted power rates and energy-saving services for qualifying low-income families, further trimming their bills. Climate credits consequently stretch further.



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4. The cap will hurt working families some, despite Cali's best efforts.

California chose to take imperfect action and address regressivity through policies like utility credits. These credits are a blunt instrument for sharing carbon-pricing revenue. They allocate credits one per electric meter, whether the meter serves one person or eight. A better policy would distribute climate credits through refundable state income tax credits and the electronic benefit transfer system. The tax and benefit systems have the subtlety and comprehensiveness to distribute climate credits to those who need them most.

Californian climate hawks had bold plans for just such low-income rebates, one advocate told us. Unfortunately, she said, "The lawyers came in and shut down the party." Legal and political constraints made rebates impossible. In California, new taxes must win supermajority support in the state legislature, while state agencies can impose fees authorized by simple majorities. AB 32 passed by simple majority in 2006, granting power to ARB to establish cap and trade. To defend the system against lawsuits arguing that cap and trade is an unauthorized tax, ARB must collect and spend auction revenue in conformity with legal definitions of a fee.

To qualify as a fee, a revenue stream has to pass a set of legal tests, among which is that the fee pays for programs closely aligned with the fee itself. Tax revenue can be spent on whatever the legislature chooses; fee revenue can only flow to programs that advance the purpose of the fee. A tax can pay for schools or police or state parks and anything else the legislature chooses, but a garbage-collection fee must pay for garbage collection.

In the case of cap and trade, the purpose of the program is to reduce greenhouse-gas emissions, so California's auction revenues must fund emissions-reduction programs. Distributing the proceeds as rebates to poor families or as dividends for all Californians would be to treat auction revenue as a tax. The whole cap-and-trade program might then be vulnerable to a lawsuit.

Utilities are regulated private companies, not public entities, so the closest California could come to rebates for working families was its utility hack: free permits, mandatory auctions, mandatory "climate credits." For the poorest families, who consume little power and pay discounted rates, these credits provide a net gain: their value is far greater than costs these families will see as a result of the higher power prices associated with the carbon cap in the electricity and industrial sectors.

That's good news, because, next year, when the auction expands to petroleum and more, household costs are likely to begin rising more and the state has only weak tools—two of them—for further buffering the poor.

First, economy-wide energy efficiency standards and investments paid for with cap revenue will help trim the energy consumption of California households. They'll have more efficient appliances, vehicles, and homes, and, for some, energy consumption may decline more than prices rise.

Second, California has committed that at least 10 percent of auction funds will go to clean-energy and climate-protection programs in neighborhoods where disadvantaged people are disproportionately represented. It also requires that 25 percent of auction proceeds go to projects that particularly help disadvantaged communities in some way.

Project-by-project investments in building retrofits, better transit, and other green infrastructure—no matter how desirable they may be—cannot buffer all working families from the pocket-book effects of putting a price on carbon. But they'll buffer many families.

California's cap is distorted by the supermajority voting requirement in the state constitution. Oregon has a similar, though less extreme, supermajority rule for new revenue. Washington, however, does not. The Evergreen State may therefore be able to do better by its working families in its carbon pricing system than California does.

5. California may soon get more than $1 billion a year from its carbon auction.

Look at the olive area that dominates the chart above. That area mostly represents permits for transportation fuels. Starting next year, the state will begin auctioning these permits and placing the revenues in a Greenhouse Gas Reduction Fund.

How much revenue will come into the fund depends on the auction price of permits, of course, but it's likely to exceed half a billion dollars in the next fiscal year. That figure could increase to as much as $2 billion a year for the rest of the decade or roughly $50 a year for each of the state's 38 million residents.

The state is supposed to invest these funds in programs that reduce carbon pollution. The state's investment plan sketches expenditures in sustainable infrastructure, energy efficiency upgrades, natural resource conservation, solid-waste reduction and recycling, and low-carbon transportation systems. Governor Jerry Brown has proposed dedicating $250 million in 2014 to the controversial high-speed rail line in development between Los Angeles and San Francisco.

Whether the Golden State will do a good job of managing its carbon auction proceeds is a great, unanswerable question. Time will tell.

6. The scope is almost comprehensive.

By the end of 2015, the Cali cap will cover 85 percent of California's greenhouse gas emissions, including non-fossil-fuel emissions of carbon from cement manufacturing and "minor greenhouse gases" such as methane. It even includes "carbon by wire," that is, the emissions from out-of-state coal and natural gas plants that sell electricity into the state's grid. Following what appears to be a standard adaptation of IPCC measurement rules, however, California does not include in its emissions inventory—or in its carbon pricing policies—fuel used to power planes or ships with destinations beyond the state border.

For comparison, the BC carbon tax covers only fossil fuels burned inside the province; it does not include carbon by wire or fuel used by planes or ships leaving the province. Altogether, the BC carbon tax shift encompasses about 70 percent of provincial greenhouse gas emissions. The Northeast states' Regional Greenhouse Gas Initiative (RGGI) covers only electricity, and not carbon by wire. The European cap-and-trade system covers electricity and industry but not motor fuels. California's program, although its current carbon price is lower than that in British Columbia and some European carbon taxes, will soon be the most comprehensive in the world. And as the cap gets tighter it may gain depth to go along with its breadth.

7. The cap requires zero paperwork from most Californians.

Any carbon price has to actually attach to fossil fuels at specific, physical locations. ARB made life easy for itself by choosing locations that would limit the number of companies it would need to regulate: in the entire state, only an estimated 350 businesses have legal obligations under the cap. Some of these companies' 600-or-so regulated facilities are "upstream," such as power plants, while others are "midstream," such as wholesale petroleum distribution centers, but all of them are convenient chokepoints in the fossil fuel economy. In short, most Californians will see the impacts of carbon pricing in their fuel bills—and in the funding it produces for clean-energy solutions and utility rebates—but they'll never fill out of a form.

8. The cap smartly allows "banking," not "borrowing."

The Cali rules allow regulated entities to save permits issued this year for use in a future year (banking) but not to borrow permits from future years to use now (borrowing). California's permits have a "vintage year" and can be used at any point during or after that year. This is good policy, as it adds flexibility for participants and stabilizes permit prices without blowing a hole in the cap.

9. Trading is tightly regulated, as it should be.

The first permit auction took place in November of 2012, and it and subsequent auctions have gone smoothly. Any individuals or entities that register can participate in the trading of permits, which is good thing for the smooth functioning of the carbon market. ARB has also introduced a variety of market monitoring efforts. For example, the state enforces limits on how many permits one may hold and disclosure rules require that the authorities know who owns each permit at any point in time. Such policies provide safeguards against market manipulation and fraud of the type recently documented in Wall Street high-frequency trading and "dark pools." Gaming of this type is unlikely in any event, as Sightline has argued, but ARB is not taking chances.

10. California carefully restricts and monitors offsets.

California allows regulated facilities to substitute qualifying offsets—such as reforestation programs and methane captured from livestock manure digesters—for 8 percent of their emissions permits. Critics have argued that California's offset provisions are far too generous, endangering the integrity of the cap. Early offsets in the European cap-and-trade program sometimes proved dubious as to their true net effect on global carbon pollution.

We'll have to wait and see the effect of California's offsets, but ARB's regulations suggest that the agency is taking an appropriately hard line. Its offset restrictions may be the toughest in any cap-and-trade system. All offsets must be third-party verified, sited within the United States, provably "additional" to what would have otherwise happened, and from within only five categories so far. The limited availability of offsets that pass those tests may prevent offsets from meeting anywhere close to their theoretical maximum of 8 percent of permits per regulated facility.

11. California's cap folds in the climate benefits of a carbon tax.

On May 16, ARB auctioned almost 17 million one-ton carbon permits for $11.50 each, plus another 4 million that will not be valid until 2017, for $11.34 each. Between auctions, permits trade on private markets. Their price has trended downward (see page 12) as more auctions have taken place, revealing that emissions reductions are perhaps easier to come by than previously expected. That price translates, very roughly, to 1 cent per kWh of coal-fired power or a dime per gallon of gasoline (except that gasoline doesn't come under the cap until 2015). In comparison, the BC carbon tax started at $10 per metric ton of CO_2 in 2008 and increased to $30 per ton (US$27.50) in 2012, where it has remained.

The February auction price was just above the reserve price—the minimum bid allowed. The reserve price started at $10 per ton in 2012 and goes up annually by 5 percent plus inflation. This escalating reserve price accelerates emissions reductions if they prove inexpensive. It establishes a predictable floor beneath which the carbon price will not fall, and that price floor tells the entire energy economy that cheap carbon is forever gone, just as a carbon tax would. The inflation-adjusted price of carbon will be no lower than $15 a ton in 2020. By 2031, assuming extension of the program, the floor price will be above $25.

12. California's "reserve" could speed the transition beyond carbon.

Some cap-and-trade systems set top prices called "pressure valves" that threaten to blow holes in the cap by allowing waivers and exemptions. California's does not. Instead, it has a "price containment reserve" (shown in red in the figure above). ARB holds back a few percent of permits from each auction and deposits them in the reserve. If carbon prices rise across a high trigger, some of these permits go to auction, helping to tame prices. This reservoir of permits not only serves as a shock absorber against price spikes, it also tightens the cap in regular years. ARB projects that permit prices will stay below the trigger price; if that happens, the state will actually end up below 1990 levels in 2020.

13. The governor can put the cap on hold.

Less admirable about this policy is a poison pill buried in AB 32. To win passage, proponents of the bill had to include a provision that allows the governor to suspend the program for a year in case of "extraordinary circumstances, catastrophic events, or threat of significant economic harm"—terms that a science-denying future governor might exploit for political purposes. Indeed, gubernatorial candidate Meg Whitman pledged to do so in her race against Jerry Brown. The governor cannot suspend the state's income tax or speeding laws in any circumstances. Why should she or he have unilateral authority to suspend its carbon cap?

14. The cap is only part of California's approach.

California's carbon cap is only one facet of AB 32. It's a critical one—the backstop and guarantor of all the others—but it's not alone.

In fact, by some measures, the cap is not even the main event. The latest ARB estimate suggests that 80 percent of the promised emissions reductions will come from "complementary policies" such as a Low Carbon Fuel Standard, Advanced Clean Car Standards, and a Renewable Electricity Standard. The cap-and-trade program "cleans up the rest."

Economists tend to dislike this type of complementarity. The philosophy of cap-and-trade is for the market, not public agencies, to choose how to tame carbon pollution. On the other hand, energy markets are riddled with flaws and oddities (such as payback gaps, split incentives, and other principal-agent problems), so the traditional arguments for relying entirely on market incentives are not bullet-proof. Ultimately, it's a battle between market failure and government failure.

California's approach—for better or worse—is to wear both belt and suspenders: put a price on carbon but also implement regulatory policies in an effort to fix market failures. The other policies, if they work, trim emissions and thereby keep the price of permits—though not necessarily the overall cost of reducing emissions—lower than it might otherwise be. Policy analysts argue over the costs and benefits of each complementary policy, but regardless of whether the strategy makes policy sense it definitely made political sense: support for the complementary policies helped to carry along the less-popular carbon price.

15. California voters support AB 32, including the carbon cap.

In 2010, elements of the oil industry aimed a ballot measure at the carbon cap, and the rest of AB 32, by offering voters a chance to suspend them "until unemployment drops to 5.5 percent or less for a full year." By a whopping 62-38 percent margin, voters declined, affirming their support for a clean-energy transition.

16. The courts have so far approved the cap.

In the courtroom, the news service Marten Law notes that AB 32 "has withstood the many challenges it has faced" (updates here and here). Challenges keep coming, but so far, none of them has damaged the law.

17. California's cap is designed for others to join; Quebec already did.

California's cap is connected with Quebec's, enabling refiners, power generators, and other carbon-market participants in the two jurisdictions to trade carbon allowances and offsets. Joint auctions are in the offing. This link is one of the few remnants of the Western Climate Initiative, which tried in 2007 to create a multi-jurisdictional carbon price in seven states and four provinces.

Picking up where WCI left off, the premier of British Columbia and the governors of California, Oregon and Washington signed an agreement in October of 2013 to launch the Pacific Coast Action Plan on Climate and Energy. California's cap anchors its south and BC's carbon tax anchors its north. Oregon and Washington, sandwiched between them, have two models of carbon pricing to choose from and, perhaps, join. California has even articulated the conditions a jurisdiction must meet to join its cap and trade system (here, here, and here, on page 95). Washington and Oregon policymakers will no doubt be examining these terms closely in the months ahead.

Research assistance by Pablo Arenas. Thanks to reviewers Kristin Eberhard, Anthony Eggert, Elizabeth Hardee, Katie Hsia, Alex Jackson, and Erica Morehouse for comments on a draft of this article.

Sources for figures: Emissions trends in the first figure are from US Census Bureau *and* California Department of Finance *(population); emissions data from California ARB for* 1990-2004 *and* 2000-2011*, with data for 2000-2004 using an average of the (slightly different) figures from these two sources. Emissions include most greenhouse gases, including "carbon by wire" from imported electricity, but not including aviation or boat fuel used for out-of-state travel.*

Carbon cap permits in the second figure are from California Air Resources board, assembled and analyzed by Natural Resources Defense Council, San Francisco. To make the chart more readily understood, this chart somewhat simplifies categories of permits.

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Meet Reggie

By Kristin Eberhard
June 26, 2014

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Carbon pricing's time may have come. California Governor Jerry Brown is crusading for climate regulation, Washington Governor Jay Inslee is considering cap and trade, and government leaders in Oregon are contemplating a carbon tax. New US Environmental Protection Agency (EPA) carbon regulations may drive states across the country to join the Northeast's well-established cap-and-trade program.

What's that you say? You didn't know the Northeast has the oldest carbon pricing program in the US?

Despite years of seamless market operations and nearly $1 billion in auction revenue reinvested in the local economy, the Northeast's Regional Greenhouse Gas Initiative (RGGI—pronounced Reggie) has gone largely unnoticed out here in the Northwest.

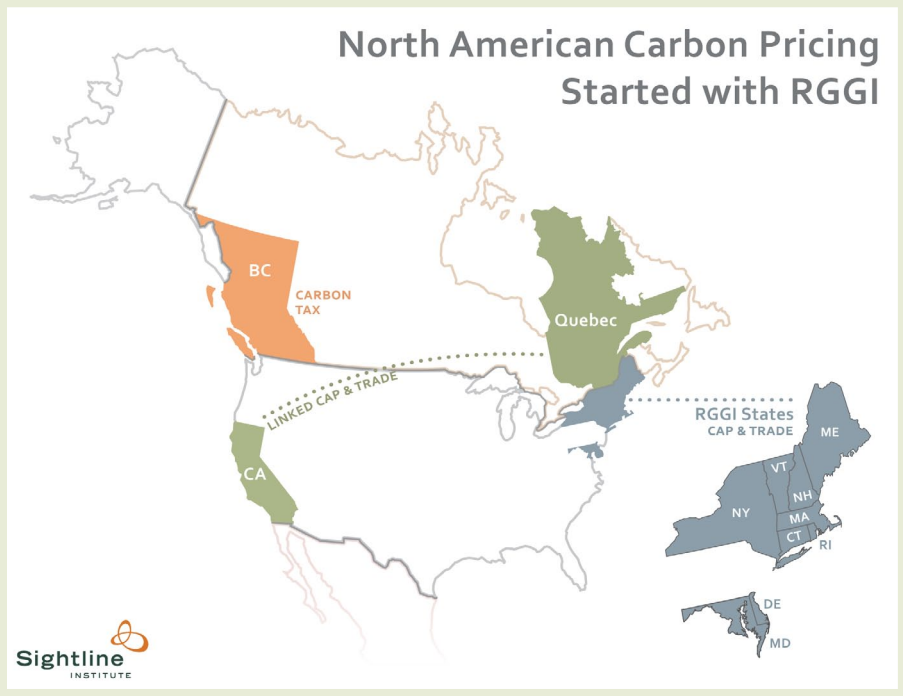
So here are four things that will help you understand RGGI.

1. RGGI has been operating seamlessly for years.

RGGI was established in 2005, held its first auction of CO_2 allowances in 2008, and the cap was implemented in 2009. After a 2012 program review, the states agreed to an Updated Model Rule in 2013. RGGI has held 24 quarterly auctions to date, selling more than half a million allowances and collecting nearly $1 billion in auction revenue. All that, with nary a hint of market manipulation or price volatility.

2. RGGI is a multistate cap-and-trade program.

Nine Northeastern and Mid-Atlantic states participate in RGGI (currently: Connecticut, Delaware, Massachusetts, Maryland, Maine, New Hampshire, New York, Rhode Island, and Vermont. New Jersey was originally a member but dropped out in 2009. That withdrawal was overturned in court, so New Jersey may rejoin). To participate, each state signs a memorandum of understanding and then enacts



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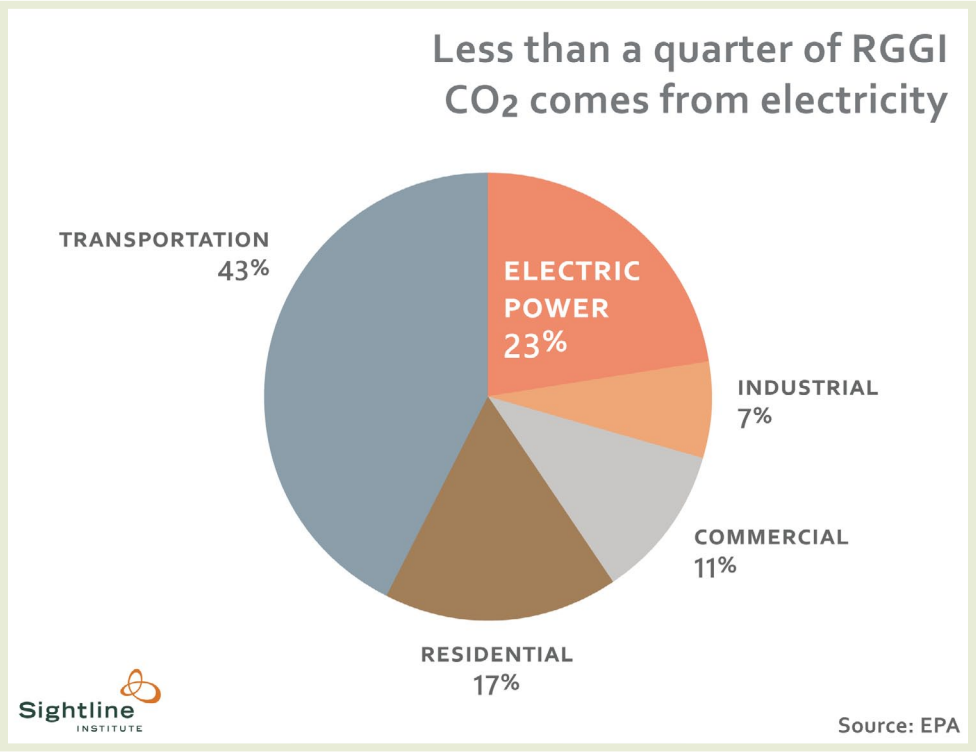
its own statute and regulations—modeled after the RGGI Model Rule—establishing a state cap-and-trade program. Although states may distribute their own allowances (tradable in every participating state), most just use the central quarterly auction.

3. RGGI only covers CO_2 emissions from in-state electricity generation.



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RGGI covers emissions from in-state power plants that are at least 25 megawatts. Electricity emissions are only 22 percent of CO_2 emissions in the nine states, compared with the national average of nearly 40 percent. If new EPA rules drive other states to join RGGI, its impact will grow.

RGGI also does ***not*** cover imported electricity—electricity generated outside the RGGI states but used by homes or businesses inside the RGGI states. This raises the concern that RGGI states could cut in-state dirty power but increase imports of dirty power from out of state, in effect "leaking" emissions across the border. Only about 10 percent of RGGI electricity sales come from imported power, and the Congressional Research Service says RGGI has not leaked yet.

RGGI does ***not*** cover other greenhouse gases, such as nitrogen oxides, both of which are covered in California.

4. RGGI is designed to keep the price low and steady.

Cap-and-trade programs and carbon taxes use the market to cut carbon pollution. With cap and trade, the pollution limit is certain but the price is not; with a tax the price is certain but the reductions are not. Cap-and-trade programs use "cost containment" mechanisms to give emitters more certainty about the price and more flexibility in responding to it. RGGI's cost containment mechanisms :

- **Three-year compliance periods.** Complying every three years rather than every year lessens price volatility by smoothing out annual variations in the weather or the economy.
- **Soft price ceiling.** If the auction price exceeds certain price triggers ($4/ton in 2014, rising to $10.75/ton in 2020), allowances are released from the "cost containment reserve" (CCR) to dampen the price. This feature, added with the 2013 update, was triggered in the March 2014 auction, but not in the June auction. Unlike California's reserve, which takes allowances out of future periods, the CCR allowances are extra, so they raise the cap. Because they are limited (only 5 million in 2014—about 5 percent of the cap—and 10 million per year thereafter), they don't increase emissions as much as a "hard" price ceiling would by releasing unlimited allowances to keep the price below the trigger.
- **Price floor.** RGGI's minimum auction price (currently $2/ton) and its soft price ceiling create certainty that allowances will likely trade within a fairly narrow range.
- **Banking.** Emitters can hold allowances and use them later. (RGGI prohibits borrowing allowances from future periods. This prevents procrastination, forcing emitters to start cutting pollution from the outset.)
- **Offsets.** Power producers can use offsets—greenhouse gas reductions from other sectors, such as landfills and forests—to account for up to 3.3 percent of their emissions. California is more generous, allowing offsets for up to 8 percent of compliance obligations.

Source: Charts designed by GoodMeasures.biz *with data from* EPA State Energy CO2 Emissions.

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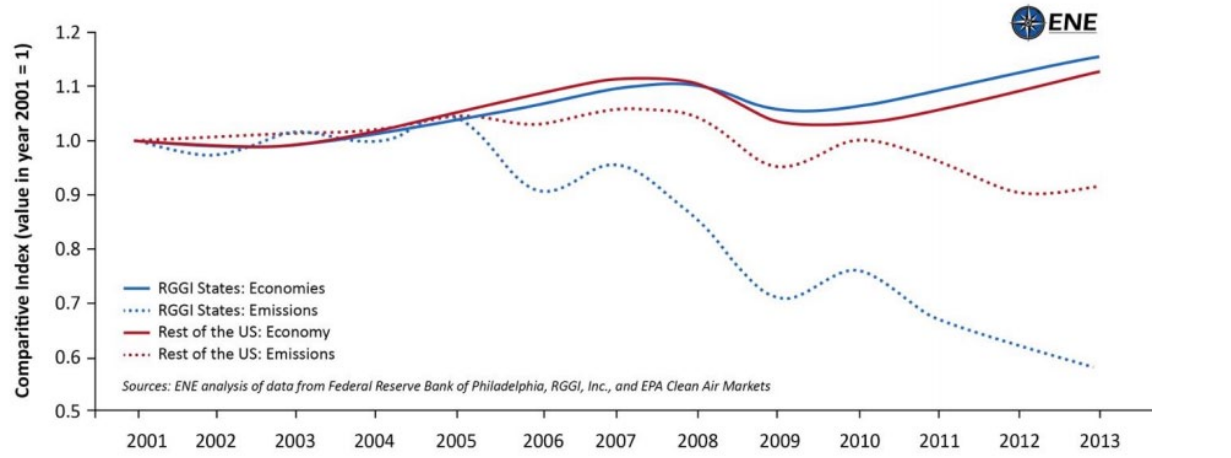
Reggie Recommends

By Kristin Eberhard
June 27, 2014

Link to Article Online

1. Yes, you can lower emissions without harming the economy.

RGGI's CO_2 emissions from electricity dropped by more than 40 percent between 2005 and 2012 while the region's economy improved. The entire US economy has been slowly backing away from its unhealthy, codependent relationship with energy use, but RGGI's economy has really broken it off. Below, RGGI CO_2 emissions (blue dotted line) steeply declined from 2005 to the present, while RGGI state economies (blue solid line) improved. The US's failure to cut emissions (dotted red) as fast as RGGI hasn't helped the economy (solid red).

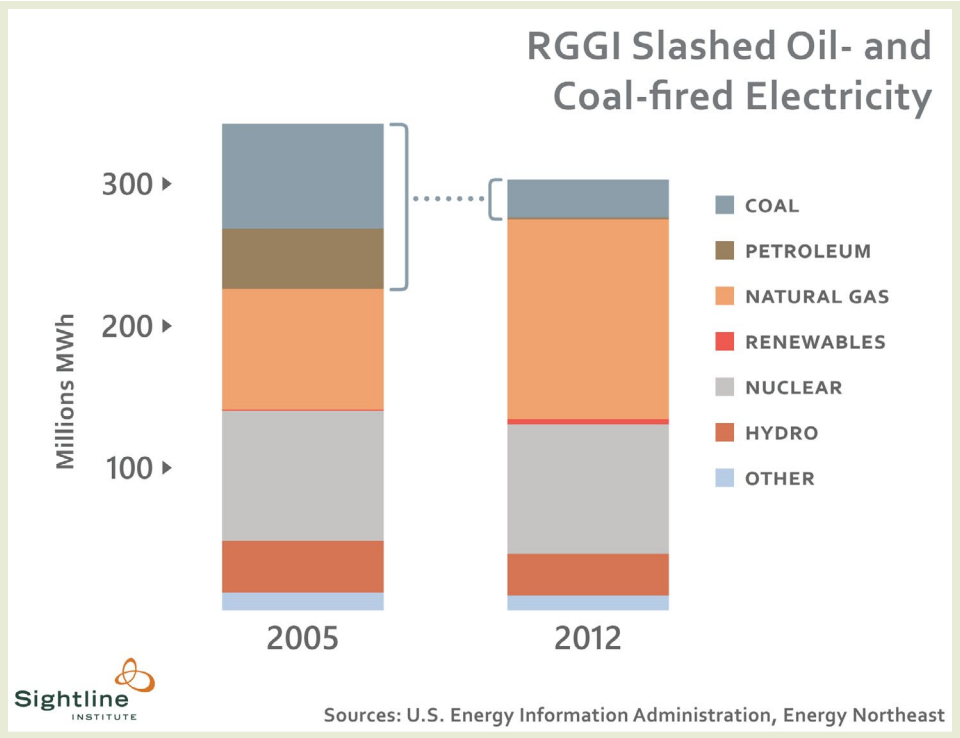


RGGI Performance To-Date and the Path Ahead, May 2014 *by* ENE *(Used with permission.)*

The big secrets to scaling down emissions while maintaining a healthy economy are: 1) increase energy efficiency, and 2) decrease imports of dirty out-of-state power. That should make Cascadia's ears perk up: we have some great energy efficiency experience, and most of our dirty power comes from out of state.

Some of the dramatic decrease in RGGI's emissions was due to lower electricity consumption, driven partly by energy efficiency programs funded by RGGI auction revenue. Some was due to shifting away from coal and petroleum.

Below, you can see that total electricity use in the RGGI states was lower in 2012 than in 2005. You can also see the changing fuel mix: coal and petroleum (red and brown) generated one-third of RGGI states' power in 2005, but only 10 percent in 2012! Natural gas (orange) rose from one-quarter to nearly half. This change was driven by several factors, including: 1) the price of natural gas dropped relative to the prices of coal and oil, 2) coal capacity decreased as coal plants were retired or converted to natural gas, and 3) RGGI's price for carbon piled on to widen the price gap.



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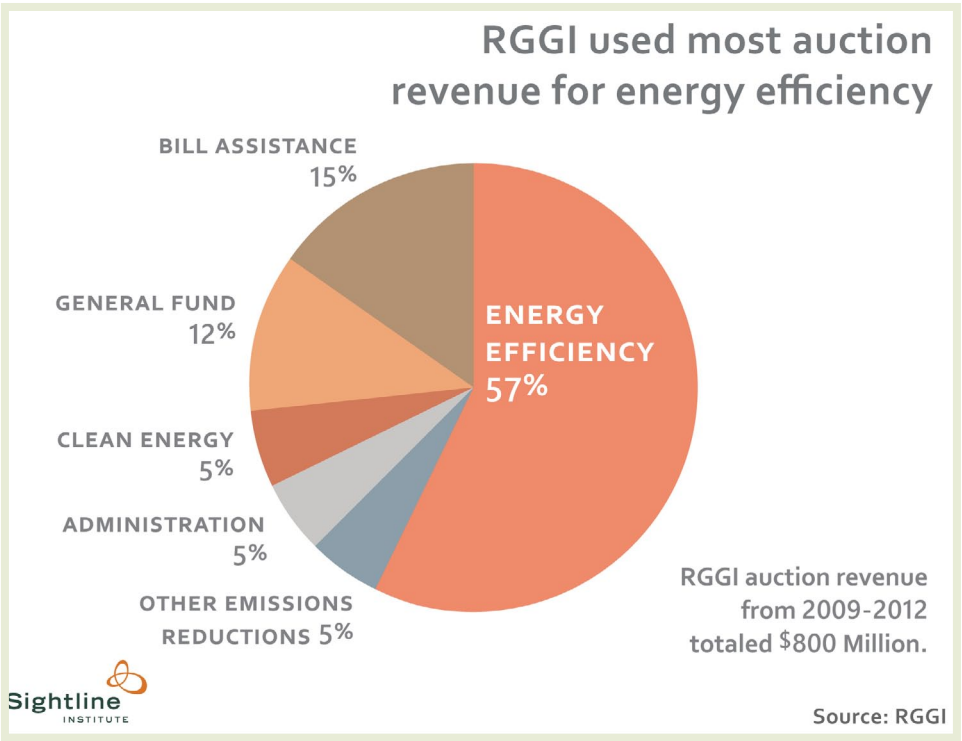
2. Investing auction revenue in energy efficiency is a good idea.

As Sightline has long pointed out, giving allowances away for free, rather than making emitters buy the allowances in an auction, is regressive and counter-productive. Auctioning allowances enables states to use the value of the allowances for the public good. So, hooray! RGGI states auction almost all allowances in the central quarterly auction, collecting nearly $2 billion in revenue so far.

The RGGI memorandum of understanding requires member states to use at least 25 percent of allowance value for "consumer benefit," but RGGI states have chosen to far exceed that minimum, using more than three-quarters of auction revenue for investments in energy efficiency, clean energy, and direct-bill assistance to help customers.



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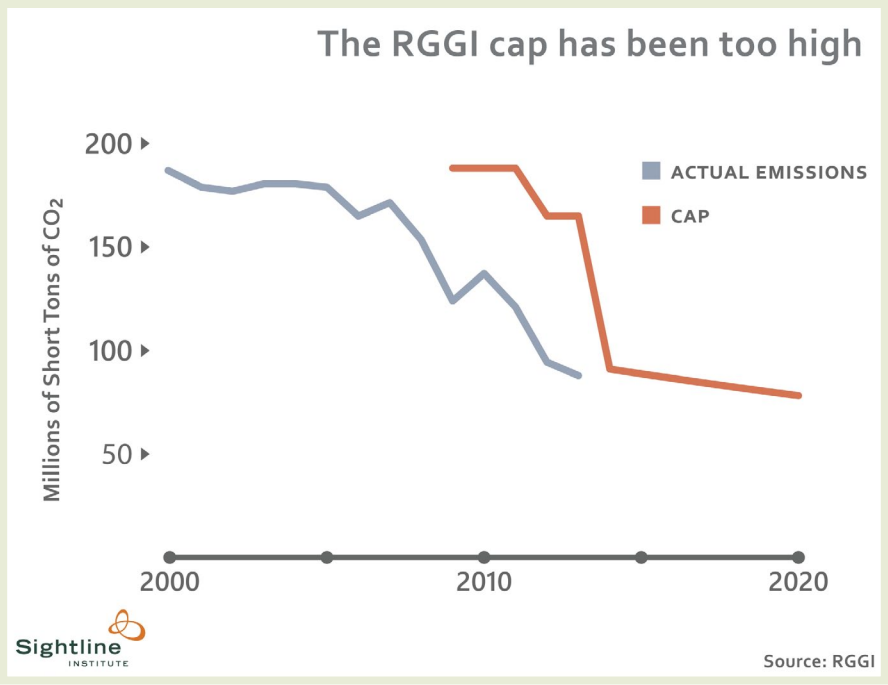
The programs RGGI invested in during just its first 2.5 years will add $1.6 million in net benefits to RGGI state economies and create 16,000 jobs. If RGGI continues auctioning and investing, it could add over $8 billion in net benefit and add 57,000 job-years of employment by 2020. These benefits come mainly from energy efficiency programs that lower bills for the participants and pare regional prices by reducing demand. Shifting from out-of-state power to in-state energy efficiency also keeps money in the local economy. Energy efficiency is six times more job-intensive than fossil fuels; as efficiency replaces fossil fuels in the resource mix, it creates jobs.

3. Cascadia can set a lower cap.

In a cap-and-trade program, a low cap allows less pollution, meaning the price to pollute will be higher, equivalent to a higher carbon tax. A high cap allows more pollution, meaning the price will be lower.

As often happens, RGGI overestimated the cost of cutting pollution and set the cap too high. That's an understatement. "Too high" might mean the cap was just a bit lower than actual emissions, only requiring a little emissions trimming. RGGI's cap was ***much higher*** than actual emissions. In the chart below, the blue line shows actual emissions in the nine RGGI states, and the red line shows the RGGI cap. That's not how it is supposed to work. The cap is supposed to be lower than historical emissions, forcing reductions. At least RGGI had a price floor. Allowances sold at the minimum price—less than $2 per ton—for many quarters.



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Cleverly, RGGI built a 2012 program review into its design to catch and correct exactly this type of mistake. As a result of this review, RGGI updated its cap, and the new, tightened cap went into effect in 2014 (see steep drop in the red line below). As a result, the most recent auction price was $5 per ton. But even the new and improved cap may be too permissive: 2013 actual emissions were lower than 2014's tightened cap, and RGGI's 2020 soft price ceiling of $10.75 is lower than California's most recent auction price of $11.48 per ton. To be effective, the cap needs to be low enough to shave emissions.

Lessons for Cascadia—keep the cap low by:

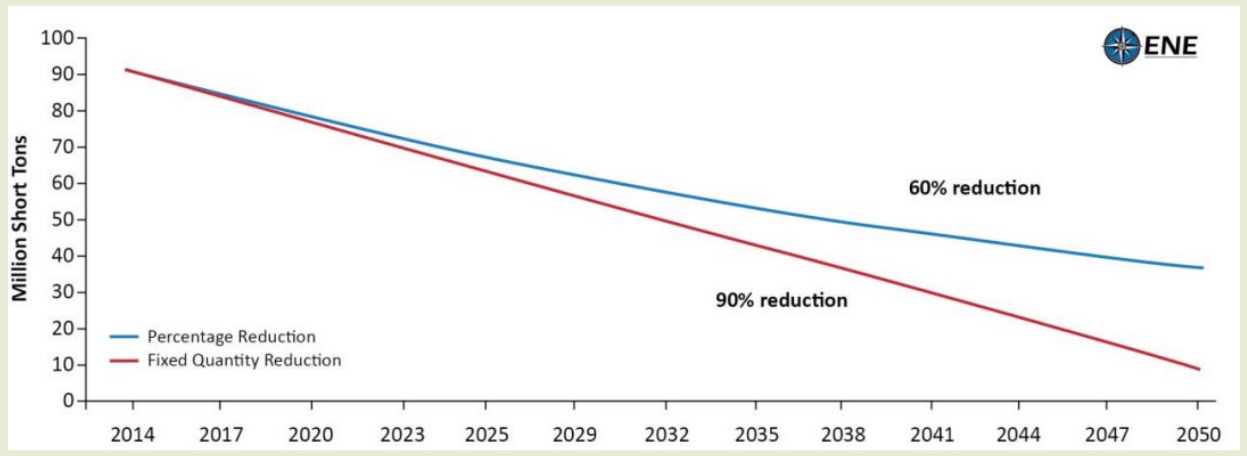
- using actual emissions data,
- considering the experience from older programs like RGGI when projecting emissions, and
- building in periodic reviews to allow adjustments as more data become available.

4. Cascadia can commit to a longer-term price.

The current price is important, but the future price matters even more. Energy emissions are driven by decisions about long-term investments, such as what kind of power plant to build. Once built, each plant will be around for half a century or more. It's hard to change course quickly. Power producers have few options for responding to the carbon price this year; they have many options for responding to the price 20 years from now. Motivating power producers to build clean power is the real clout of the carbon price.

Like California, RGGI only contains a binding cap through 2020, so investors cannot plan around a long-term carbon price. Cascadia could do better by committing to a longer-term price.

Even if RGGI's cap extends through 2050 at its current rate of curtailment, it would only cut emissions 60 percent by 2050, which is less than California's more aggressive (but nonbinding) goal to slash emissions 80 percent below 1990 levels by 2050. To get to a low-carbon economy, we need an aggressive goal.



RGGI Performance To-Date and the Path Ahead, May 2014 (2) *by* ENE *(Used with permission.)*

5. Cascadia can price more carbon.

In-state electricity is important, but imported electricity and cars, trucks, factories, and farms also spew carbon. For climate leadership, we need to include all major sectors, as does California's cap-and-trade program.

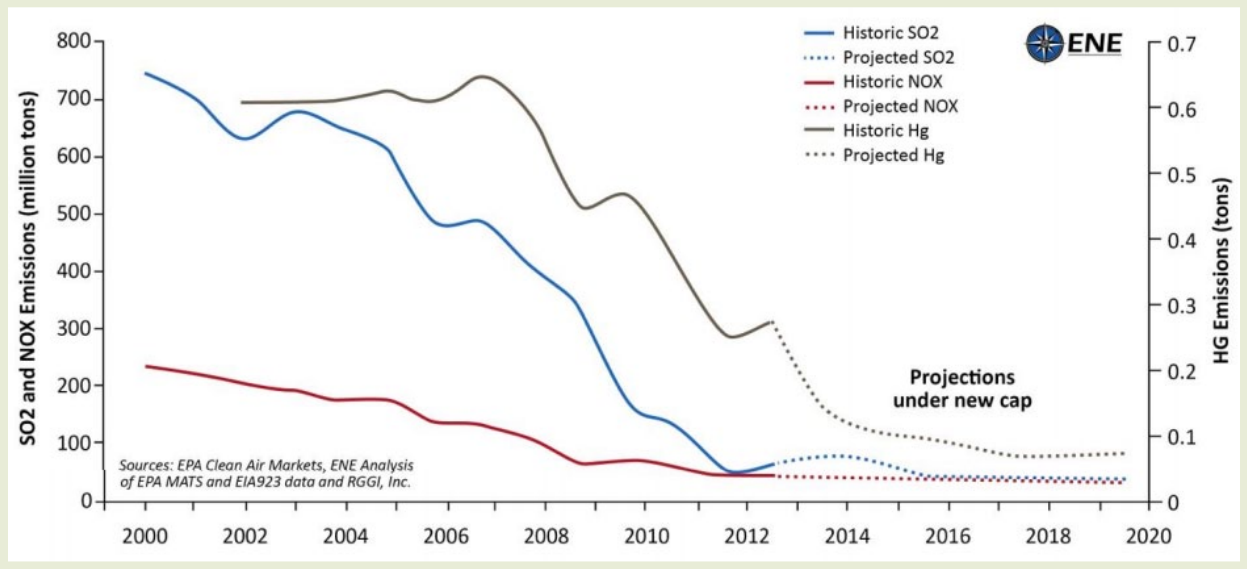
Especially important is for Cascadia to put a carbon price on imported electricity, since a lot of its electricity emissions come from imported power. Ignoring this could undermine the program by "leaking" emissions across state lines.

6. You can trim pollution *and* energy prices.

Electricity prices in the RGGI region have dipped by 8 percent on average since RGGI took effect. In the rest of the United States, they rose 6 percent. RGGI-funded energy efficiency programs may have decreased total energy demand—and prices. At a minimum, we can conclude that RGGI did not increase prices.

7. Bonus! Slashing carbon also cuts toxics.

Sulfur dioxide (SO_2) and nitrogen oxides (NOx) can trigger asthma attacks, increase the risk of infectious disease, and form ozone that contributes to pneumonia, bronchitis, heart attacks, stroke, and risk of premature death in children and older adults. Mercury harms brains and developing babies. Bad stuff. The good news is that when you invite "CO_2 pollution reductions" to the party, it brings along its buddy "toxic pollution reductions." RGGI has pushed down these toxic pollutants by 35 percent and 82 percent already, and it is projected to trim them another 50 percent or so by 2020. Cascadia can get the same bonus.



RGGI Performance To-Date and the Path Ahead, May 2014 (3) *by* ENE *(Used with permission.)*

NOTES on Sources: "RGGI slashed coal and oil-fired electricity" from US Energy Information Administration, *Detailed State Electricity Data*; Environment Northeast, *RGGI Emissions Trends*, January 2011. "RGGI used most auction revenue for energy efficiency" from RGGI, Regional Investment of RGGI CO_2 Allowance Proceeds, 2012, February 2014. "RGGI cap has been too high" from RGGI, *2009-2011 Allocation*; RGGI, The RGGI CO_2 Cap; RGGI CO_2 Allowance Tracking System, *Annual Emissions Report*. These three infographics by GoodMeasures.Biz.

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Four Carbon Pricing Pitfalls to Avoid

By Kristin Eberhard
July 2, 2014

Link to Article Online

Despite its widely discussed woes, every year the European Union Emissions Trading System (EU ETS) cuts more carbon pollution than the entire state of Oregon spits out. That's no small feat. The EU cap-and-trade program limits carbon dioxide emissions from more than 11,000 power stations and industrial plants in 31 participating countries, covering 45 percent of the EU's total greenhouse gas (GHG) emissions. The market has operated for nearly a decade with no price manipulation and no deleterious economic impacts, and it is on track to reduce pollution 21 percent below 2005 levels by 2020.

Nonetheless, the early years were rocky for Europe's carbon-pricing pioneer. Here's what Oregon and Washington can learn from the EU's missteps.

1. Set the cap right

1.1 Use actual emissions data.

The EU ETS began with a pilot phase from 2005 to 2007. During this phase, to quell industry fears and opposition, the EU gave companies carbon allowances for free. Because the EU did not have verified emissions data, it asked companies to estimate the number of allowances they would need. Unsurprisingly, some power plants and industrial facilities used over-optimistic growth projections and overestimated their future emissions, so the EU handed out more allowances than needed. When verified emissions data became available in 2006, participants realized that there were too many carbon allowances in the market, and the price crashed.

California learned from this experience and began collecting verified emissions data years before starting its cap-and-trade program. It then based its cap on actual emissions, not self-reported estimates. Cascadia can avoid over-allocation and price shocks by setting its cap based on verified emissions data. It can help the market function smoothly by making this data publicly available and keeping it transparent.

1.2 Count other carbon-cutting policies.

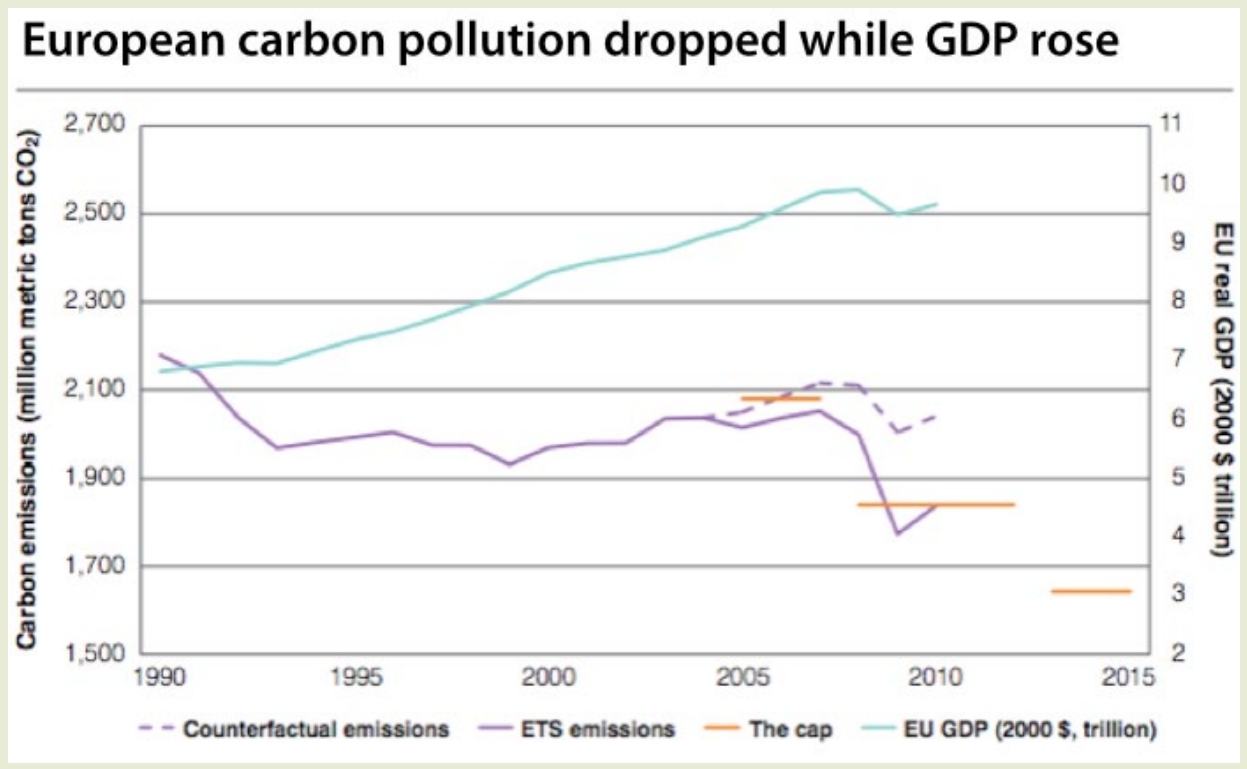
The EU also neglected to account for other carbon-cutting policies, like its 20 percent renewable energy and energy efficiency goals. These other policies worked, pollution dwindled, and the cap was left even higher and dryer. Cascadia can set a more aggressive cap by factoring in its other GHG-paring policies.

1.3 Don't be afraid of affecting GDP.

Like the Northeast's Regional Greenhouse Gas Initiative (RGGI), the EU ETS shows that we can reduce emissions without harming GDP. The chart below shows that EU GDP (aqua) grew while the cap (orange) required emissions (purple) to decline. As is often the case with programs to scale

down pollution, naysayers predicted that the ETS price would be too high and that it would harm the economy. It turns out that the ETS has curtailed pollution at such low cost that the carbon price may be too low to stimulate further investment.

The lesson for Cascadia: Don't bet against our own ingenuity. Push back against the inevitable political pressure to overestimate the costs of cutting pollution. Chicken Little has been wrong again and again. We can set a tight and fast-declining cap. Given the opportunity and the incentive, people will find ways to trim pollution.



Source: Environmental Defense Fund, The EU Emissions Trading System: Results and Lessons Learned, *2012 (used with permission).*

2. Create confidence in the future market

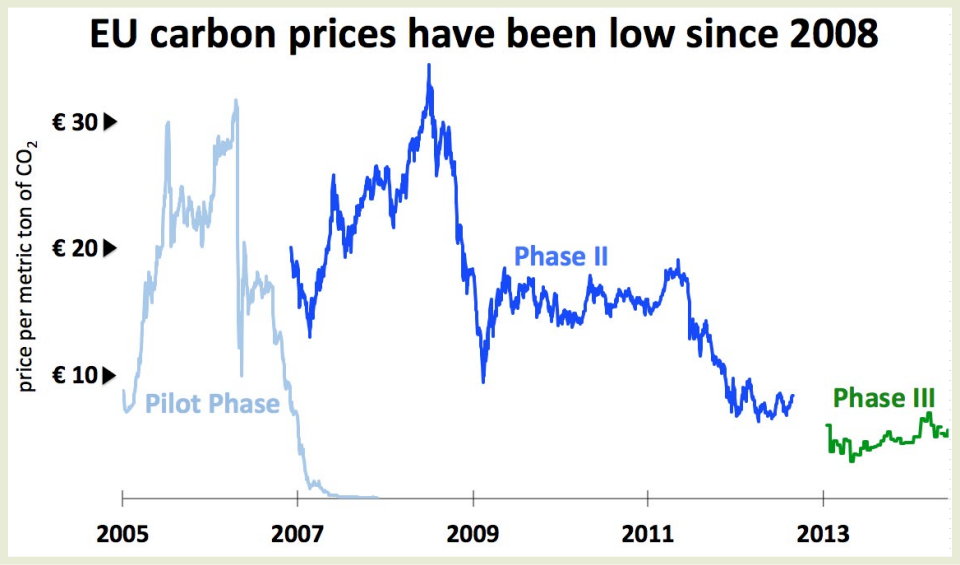
The long-term price on carbon drives long-term investment decisions. For example, despite the low price during the second half of the pilot phase, the ETS still reduced carbon by 1 percent per year because companies anticipated a tighter cap in Phase II (2008-2012). During Phase II the ETS trimmed emissions by even more (about 3 percent per year).

However, pollution trimming in Phase III (2013-2020) is now undermined by persistent oversupply of allowances and by the fact that the cap is uncertain past 2020. Although the EU has a target of 40 percent below 1990 levels by 2020, the current trajectory is too high to meet that goal or the EU's 2050 Roadmap goals. Although the EU aspires to a permanent cap, its current trajectory is still too high. The current cap reduces at 1.74 percent per year, but to slash emissions to the levels needed in 2050 the cap would need to descend by around 2.4 percent per year.

Recognizing the surplus and the possibility that the market may not be inspiring the future paring of pollution, in 2012 the European Commission suggested six possible market reforms. But the process

to implement reforms has been slow and politically fraught, with market prices following political decisions. This year the EU took its first action to mitigate the oversupply by "back-loading," or delaying until 2019, about half of the allowances scheduled to enter the market in 2014. The EU is also considering establishing a market stability reserve to further shore up the future market. The reserve creates confidence that supply will not build up excessively.

The back-loading decision injected some confidence about the market, but it does not address the cap's trajectory to 2020 and beyond.



EU carbon prices have been low since 2008. Data from European Environment Agency and Intercontinental Exchange. (Used with permission.)

Cascadia's programs could learn from Europe's by including the following features from the start:

- A long-term, ambitious trajectory
- A review and reform mechanism
- Cost containment measures
- Transparent information

2.1 Set a good long-term goal.

Cascadia can extend its carbon price to at least 2050 and aim to chop emissions by 80 to 90 percent. A cap that doesn't last long enough will not motivate long-term action. Announcing the entire trajectory from the start gives everyone a crystal clear message about the enormous opportunities open to them if they invest boldly in a post-carbon future.

2.2 Build in a review mechanism.

A carbon-pricing program cannot permit political meddling, but it should be able to respond to new information in a timely and orderly fashion. RGGI's built-in review allowed the RGGI states to adjust the cap after the 2008 economic downturn, whereas the EU ETS, with no built-in instrument for change, is still struggling to respond to events from more than five years ago. A review mechanism that strikes the balance between certainty and flexibility can increase confidence in the price.

2.3 Include price stability measures.

Built-in cost containment mechanisms such as banking, a price ceiling, and a market stability reserve can reduce price volatility and curb the urge to unnecessarily trigger the review mechanism. In Phase II the EU ETS began to use banking to help decrease price volatility, but is only now contemplating establishing a market stability reserve that would automatically withdraw allowances from the auction when the cumulative number of unused allowances gets too high. Cascadia can follow California and RGGI's lead and include a package of these cost-containment measures.

2.4 Make information easily available.

The EU ETS used national registries until 2012, when it finally instituted a single Union Registry. Balkanized information about the market impedes smooth functioning and long-term confidence. A centralized and transparent source of information starts the market on the right foot. Transparency also helps prevent fraud.

3. Avoid windfall profits

In the first phase, unregulated power producers got their allowances for free but still charged customers a carbon price. Customers paid higher prices, and power producers pocketed the money. This development was not a surprise. It was, however, a design flaw, and it played out almost exactly as predicted.

3.1 Auction allowances.

The simplest way to avoid windfall profits is to auction allowances instead of giving them away for free. The EU ETS started with zero auctioning in the pilot phase and a mere 3 percent auctioning in Phase II. Now it auctions 100 percent of power sector allowances and is moving toward auctioning 70 percent of industry allowances in 2020. RGGI neatly avoided any windfall profits by auctioning almost all allowances from the start. California auctions most allowances.

3.2 If you must give away allowances for free, do it wisely.

If it is politically impossible to auction all allowances, Cascadia can, at a minimum, use the right information to decide how many allowances to give away.

Again in this situation the EU hamstrung itself at the outset. It initially allocated allowances based on each facility's past performance. This scheme rewarded poor performers and dis-incentivized efficiency improvements. To correct course, the EU has since started allocating allowances to industrial facilities based on a benchmark set at the top 10 percent of performers in the sector. This rewards efficient facilities and encourages others to step up their game. And the system keeps upping the ante: most industries received 80 percent of the benchmark in 2013, but that will decrease to 30 percent in 2020, and there will be no free allocation by 2027. Cascadia can set benchmarks based on top industry performers and allocate allowances based on that benchmark, not based on (possibly poor) past performance.

The EU feared that a carbon price could put many industries at a competitive disadvantage, so it showered all emitters with allowances. The EU improved its policy starting in 2013; now only firms in sectors specifically identified as "emissions-intensive trade exposed" will receive 100 percent

allowances up to the benchmark. California has also gone to great effort to identify sectors that would be at a competitive disadvantage and used allowance allocation to keep those sectors competitive.

Oregon and Washington would do well to carefully identify industries that do need to be protected from competitive disadvantage and not protect those that don't need such safeguarding.

4. Be careful with offsets

4.1 Only allow high-quality offsets.

The initial design of the Clean Development Mechanism (CDM), an offsets program that allows EU factories to meet their cap by paying for pollution reductions in developing countries, contained flaws that allowed participants—particularly plants in China producing a particularly potent GHG called HFC-23—to manufacture credits without producing real reductions. One of the key concepts in the world of offsets is "additionality"—the idea that emissions reductions must be beyond the reductions that would have occurred anyway.

During the pilot phase, 20 percent of CDM projects had "unlikely or questionable" additionality, meaning they probably would not have pared pollution at all. The CDM Executive Board has since strengthened its verification process, and the EU has decided to phase out the more questionable projects. In fact, post-2012, no offsets from China or India will be allowed. California has put countless professional hours into developing high-quality compliance offset protocols, and the EU has now significantly improved its offset process. Cascadia can take advantage of their work.

4.2 Limit the quantity of offsets.

Starting in 2013, the EU restricted offsets to no more than 50 percent of required reductions for the period 2008-2020. In practice, this means that existing ETS-regulated carbon polluters may substitute offsets for up to 11 percent of the emissions allowances they are obliged to hand over in each compliance period. This ratio is more permissive than California's 8 percent limit or RGGI's 3 percent limit. Offsets are just another cost containment measure. If Cascadia has a robust package, there is no reason to allow excessive offsets.

Conclusions

The EU ETS stumbled at the outset with overabundant free permits, inadequately regulated offsets, no mechanism for course-correction, and an insufficiently certain time horizon. It is much broader than RGGI, covering 45 percent of emissions in 28 countries (compared to 22 percent in nine states), but it has spent years bandaging over its design flaws to catch up to where RGGI and California started. Oregon and Washington can avoid most of the EU's mistakes by simply joining California's system or copying British Columbia's carbon tax shift. However, both options would still leave Cascadia without enough certainty into the future, and a BC-style tax shift would not have enough carbon coverage. If Oregon and Washington really want to hit it out of the ballpark, the states could join California's system and commit to a cap through 2050. Or Cascadia can emulate British Columbia's system but cover more kinds of climate pollution and commit to continue increasing the carbon-tax and decreasing income taxes.

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California, Here We Come

By Alan Durning and Kristin Eberhard
August 4, 2014

Link to Article Online

Editor's note: Washington's Carbon Emissions Reduction Taskforce is weighing alternative carbon-pricing proposals. Recently, Yoram Bauman presented the case for Washington to adopt a BC-style carbon tax swap. Now, Alan Durning and Kristin Eberhard share the argument for Washington to join California's cap-and-trade club.

The good news is that Washington State may be getting serious about a price on carbon. The other good news is that Washington does not have to start from scratch; it can adopt California's off-the-rack state cap-and-trade system. It can even improve it. This approach not only lets Washington take advantage of the years of work California put into designing its system but may also help drive down carbon costs, minimize some of the cross-border problems of state-by-state regulation, and create regional momentum. Below, we describe the benefits of joining California, and recommend the ways Washington could improve on California's excellent system.

Enjoy the Benefits of Joining

Good design

California spent a lot of effort studying the European and Northeast cap-and-trade programs and building a stronger program. It has a strict cap, comprehensive scope, upstream regulation, and anti-gaming protections. It auctions most allowances and limits offsets. By the time Washington goes through its own public process, California's program will have been operating at full scale for several years, so Washington would be joining a fully functioning and mature program. By that time, carbon polluters in the Evergreen State will have a lot of information about the past and projected carbon price, and they will be able to make wise investments from the outset.

Minimize costs

A larger market can drive down costs. The market will seek out the lowest-cost ways to cut pollution in both states, resulting in a lower overall carbon price than either state would get on its own.

Reduce cross-border issues

One of the hardest things about taking state action on global climate change is figuring out how to address pollution spewed outside the state because of demand from people inside the state. Electricity is one tricky example of this. Power lines don't stop at state borders. Washington exports electricity to California and Canada, but it also imports coal power from Montana and Wyoming. Governor Inslee is committed to stopping "coal-by-wire" from coming into Washington, and California's cap-and-trade program is one of the only carbon pricing systems that addresses imported power. By joining together, Washington and California can untangle a few strands of the electricity web. If all western states join the program, there will be no need to extricate particular power plants or lines because all the power plants and all the customers will be inside the program.

Build momentum

Plus, Washington could start a trend. Joining California's cap-and-trade program could create momentum for other states to follow suit. It would be easier and less costly for companies operating across state borders (such as utilities serving customers in multiple states) to comply with a single program instead of deciphering multiple state regulations. Washington might even create a trend for other states to follow of using California-style cap-and-trade to comply with the Environmental Protection Agency (EPA)'s new coal rules.

Be Better than California

Extend through 2050

Although a California Executive Order sets an ambitious pollution reduction target through 2050, California's cap is only certain through 2020. By the time Washington is up and running, 2020 will only be a few years away, so Washington will need to set a longer timeline. Washington's cap can create a binding commitment to the state's existing targets of reducing carbon 25 percent below 1990 levels by 2035 and 50 percent below 1990 levels by 2050.

Cover jet fuel

Washington is one of the top 10 states in consumption of jet fuel. Washington can add jet fuel to the list of sources of pollution it includes in its cap.

Limit offsets even more

Offsets allow polluters to purchase credits for verified pollution reductions outside the cap. California allows each polluter to use offset credits for 8 percent of its total emissions. For example, if a refinery has reduced its pollution as much as possible by implementing energy efficiency retrofits, but it still pollutes 100 tons of carbon dioxide equivalent (CO_2e) (just a round number—a refinery would actually pollute more than 25,000 tons CO_2e per year). The refinery can then buy 92 allowances from the auction and 8 offset credits from third parties. It might be able to get offset credits cheaper than allowances from, say, a methane digester that is capturing methane on a farm and turning it into electricity instead of letting it escape into the atmosphere. The advantages of this arrangement are that it lowers the costs for the refinery, and it creates a funding mechanism for the farm to build methane digesters. The risks are that the farmer was going to install the digester anyway so he got a windfall profit, or that the digester does not continue operating as planned so pollution is not slashed as expected.

California has been more thorough than other programs in reducing these risks. Offsets must be real, additional, quantifiable, permanent, verifiable, and enforceable (section 95802(14)). California experts and stakeholders spent years developing a few well-documented protocols for offsets. California has adopted just five offset protocols, and all projects must be in the United States. However, to ensure the program cuts pollution as intended, Washington could put two additional safeguards in place:

1. Washington could limit the number of offset credits a polluter may use from California's eight percent to four percent of its total emissions (closer to RGGI's 3.3 percent).

2. Only allow the existing domestic offset protocols. Do not allow any future international offsets that California may eventually accept.

Spend the Money Differently

California is somewhat constrained in its legal use of auction revenue, but happily, Washington does not face the same limitations. Washington's guiding priorities for spending money should be:

- Help low-income families
- Build the systems and infrastructures that give northwesterners a true option to choose a low-carbon lifestyle
- Strengthen the program so it is not vulnerable to being reversed or weakened in the future

Accordingly, we recommend spending the money on the following:

- Dividends for all state residents. This will offset the costs of the carbon price and make it harder for future politicians to roll back the program because people will not want to give up their checks. This option is somewhat complicated to implement in Washington, because the state has no personal income tax through which to administer rebates. Furthermore, the state constitution does not permit distribution of state funds to individuals unless they are indigent. Still, the legislature could pass a refundable personal sales tax exemption, for which residents could complete a simple annual application. The state's yet-to-be-funded Working Families Rebate is structured this way.
- Additional dividends for low-income families, through the Working Families Rebate. Low-income families can be hit the hardest by a carbon price, so they need more protection from its impacts.
- Invest in energy efficiency retrofits, especially for low-income families and small businesses. This is a double win: energy efficiency is the cheapest way to reduce pollution, and targeting low-income households and small businesses lends relief where it is needed most.
- Investment in low-carbon infrastructure, particularly better transportation options. Low-income households often have limited transportation options and so they have the least ability to change their lifestyle in response to a carbon price. They can't just buy a Prius. Instead, we can increase public transit, bike, and pedestrian infrastructure, especially in low-income communities.
- In our ideal world, carbon revenue would all go to dividends and greening the energy economy, but we know that the Washington legislature confronts a gaping hole in the state's education budget. Spending carbon revenue on schools is another reasonable choice, especially if it is to build and repair school facilities in ways that also improve their energy efficiency.

California has the program, and Washington can get with it.

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There's Plenty of Room at Hotel California

By Kristin Eberhard
July 28, 2014

Link to Article Online

Pretend you're the governor of Oregon or Washington, or the head of a key committee in the state legislature in Salem or Olympia. Let's say you're convinced: Climate change is real, it's a huge risk, and we need a fast, smooth transition beyond carbon fuels. Putting a price on carbon is the single best way to nudge the whole economy in that direction.

What do you do? Designing an entire carbon pricing system from scratch… that's a lot of work! Isn't there an "off-the-rack" option available? There is! There *are*, actually. British Columbia's carbon tax shift is ready to copy. Or, if you prefer to link up with the best US carbon market, California has spent the past eight years building a state-of-the-art cap-and-trade program and writing all the rules and regulations to go with it. Not only that, but Oregon and Washington have already done some of the groundwork for linking to California by contributing to the Western Climate Initiative's 2010 framework.

Linking isn't just a way to avoid recreating the wheel. It has a lot of benefits: it can cut the cost of reducing pollution, reduce the risk that emissions will "leak" across state borders, trim the costs of administering the program, and make it simpler for multi-state entities to comply because the rules are the same across borders.

That all sounds great. What do you need to do? Here is a summary of what Oregon or Washington would need to do to link, with comparisons to California's linkage with Quebec this year.

Enact State Policies

Before linking with California's cap-and-trade program, Oregon or Washington would need to pass laws and develop regulations putting the following policies in place:

Cap

Oregon or Washington would need to enact a cap as stringent as California's: reducing emissions to 1990 levels or lower by 2020. Washington and Oregon already have sufficiently strict goals in place: Washington aims to reduce emissions to 1990 levels by 2020 while Oregon has a stricter target of 10 percent below 1990 levels by 2020.

> Compare: Quebec's target is 20 percent below 1990 levels by 2020. Like California, Quebec's program covers six greenhouse gases and starting in 2015 will cover approximately 85 percent of Quebec's emissions, including imported electricity. The cap declines at a rate of about 4 percent per year from 2015 to 2020.

Offsets

Offsets requirements at least as strict as California's. All offsets must be real, additional, quantifiable, permanent, verifiable, and enforceable. By definition, offsets must come from outside the capped sectors. This means that energy efficiency cannot be an offset if the electricity sector is capped, otherwise the reductions would be double counted. Oregon or Washington could simply adopt some or all five of California's compliance offset protocols: US forests, urban forests, livestock, ozone depleting substances, and mine methane capture. Or they could develop their own equally strict protocols. Or they could not allow offsets at all, avoiding one of the trickier regulatory challenges in a cap-and-trade system.

> ***Compare:*** Quebec has adopted three offset protocols: livestock manure management, landfill gas capture, and destruction of ozone depleting substances from foam. Quebec will likely be a net purchaser of allowances and offsets from California.

Reporting and Verification

A reliable system for reporting and verifying emissions is a cornerstone of effective policy. It allows authorities to set the cap based on actual emissions, not on speculation. California emitters must comply with California's reporting regulation and use its on-line reporting tool. Oregon and Washington already have greenhouse gas (GHG) reporting protocols in place. However, to avoid possible self-reporting errors, California also requires business to get an independent verification of emissions. Oregon and Washington would need to add third-party verification of emissions before joining the cap-and-trade program.

> ***Compare:*** Quebec has a similar mandatory reporting regulation.

Allowance Tracking and Auctioning

Oregon and Washington companies would need to use the Western Climate Initiative, Inc. (WCI, Inc)'s Compliance Instrument Tracking System Service (CITSS) to issue, track, and monitor the trading of allowances. Using a joint tracking system makes the program more secure and lowers administrative costs.

Though not required, Oregon and Washington would probably want to hold joint auctions with California and Quebec to increase market liquidity and avoid unnecessary administrative overhead of running parallel auctions. Quebec and California are holding a practice joint auction in August and plan to hold the first joint auction in November 2014.

Strong Enforcement

California is serious about enforcement, and Washington and Oregon would need to be too. California entities face a hefty incentive to buy enough allowances to cover their emissions: for every ton that they fall short, they have to turn over four times as many to comply after the deadline. (Section 95857(b)(2)). If an entity falsifies or omits information, it will have to pay fines and may even face criminal penalties. About 350 businesses are regulated under the California cap. Oregon and Washington would each have just a fraction of that number so it will be a relatively small administrative burden to make sure they are all playing by the rules.

Communicate with California

Linking requires good communication between the linking jurisdictions. California and Quebec staff formed several workgroups to discuss specific aspects of implementation:

- Tracking System Workgroup
- Auction and Monitoring Workgroup
- Management Workgroup
- Consultation Committee

Oregon and Washington already have open lines of communication with California through the Pacific Coast Collaborative. Oregon and Washington would probably want to join California, Quebec, and British Columbia on the Board of Directors for WCI, Inc. State staff might also want to form some workgroups like the ones above.

Follow the Process

Oregon and Washington's state agencies would of course need to follow their own Administrative Procedures Acts when implementing the cap-and-trade program in each state.

California also has a law specifically governing linking of cap-and-trade programs. The California Air Resources Board (ARB) must notify the Governor that it intends to link. The Governor, with advice from the Attorney General, has 45 days to find that the linking jurisdiction meets the four requirements below, and to present his findings to the legislature.

1. The linking jurisdiction has adopted GHG reduction requirements, including offsets, at least as stringent as California.
2. California can enforce its own law against any regulated entity within the linking jurisdiction.
3. The linking jurisdiction has enforcement provisions at least equal to California's.
4. The linkage will not impose liability on California.

Once both jurisdictions have complied with their own state process requirements, they may sign a linkage agreement similar to the one California and Quebec signed in September 2013. They may also wish to prepare a Linkage Readiness Report as California and Quebec did in November 2013.

Timeline

The whole California-Quebec process took about five years, but Oregon or Washington might be able to trim that to three years. Here are the steps:

Pass legislation and enact regulations:

- Quebec took a little over two years from the time it passed legislation enabling cap and trade (June 2009) to the time it implemented its cap and trade regulations (Dec. 2011).
- Oregon or Washington would also need two years (possibly more) to go through the rulemaking process.

Harmonize with California:

- Quebec took an additional year to harmonize its regulations with California and allowing linking (Dec. 2012).
- Washington and Oregon could skip this step by harmonizing from the start.

Authorize linking and sign a Linkage Agreement:

- California took about 9 months to amend its regulations to enable linking and for the Governor to issue his findings that the linkage met requirements.
- This process could probably be condensed to about 4 months because California will not need to rewrite the rules, it will only need to authorize a new trading partner.

Hold joint auctions:

- From the time they were officially linked (Jan. 1, 2014), Quebec will take eight months to hold the first practice auction (Aug. 2014) and 11 months to hold the first official joint auction (Nov. 2014).
- Washington and Oregon could be auction-ready from the time they sign a linkage agreement.

In Conclusion

The linking framework is in place. If Oregon or Washington implements a well-designed cap-and-trade program with the elements above, then it will be straightforward to negotiate a linking agreement with California. So, if you were the governor of Oregon or Washington, or a committee chair in Salem or Olympia, you'd have a simple, off-the-rack option for putting a price on carbon.

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Why Washington State Should Adopt a BC-style Carbon Tax

By Yoram Bauman
July 25, 2014

Link to Article Online

Editor's Note: Washington's Carbon Emissions Reduction Taskforce is on the job, weighing alternative carbon-pricing proposals. Some members of the panel have asked what our ideal policy would be for Washington State. Yoram Bauman shares his thoughts today. Alan Durning will share his argument for a California-style cap-and-trade system, with key modifications, another day.

If I had my druthers, Washington State would push for a BC-style revenue-neutral carbon tax. Full disclosure: I'm part of the CarbonWA.org campaign to put just such a policy on the ballot in Washington State in 2016. In this article you'll find information on the latest iteration of the CarbonWA policy proposal.

The BC approach

The basic idea behind the BC approach is to phase in a carbon tax on fossil fuels and pair it with broad-based tax reductions that benefit most households and businesses—which BC does by reducing personal and corporate income taxes—plus targeted tax reductions that focus on communities that may be disproportionately affected by the carbon tax, such as low-income households. (To match the language I've used in previous posts, the broad-based tax reduction is the entrée and the targeted benefits are the side dishes.)

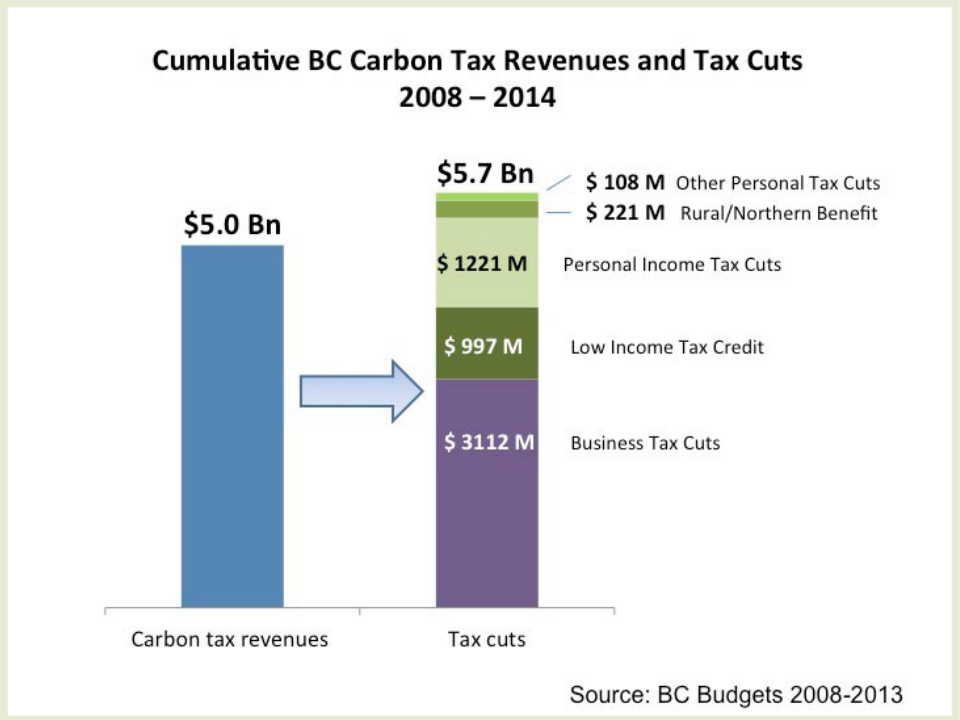


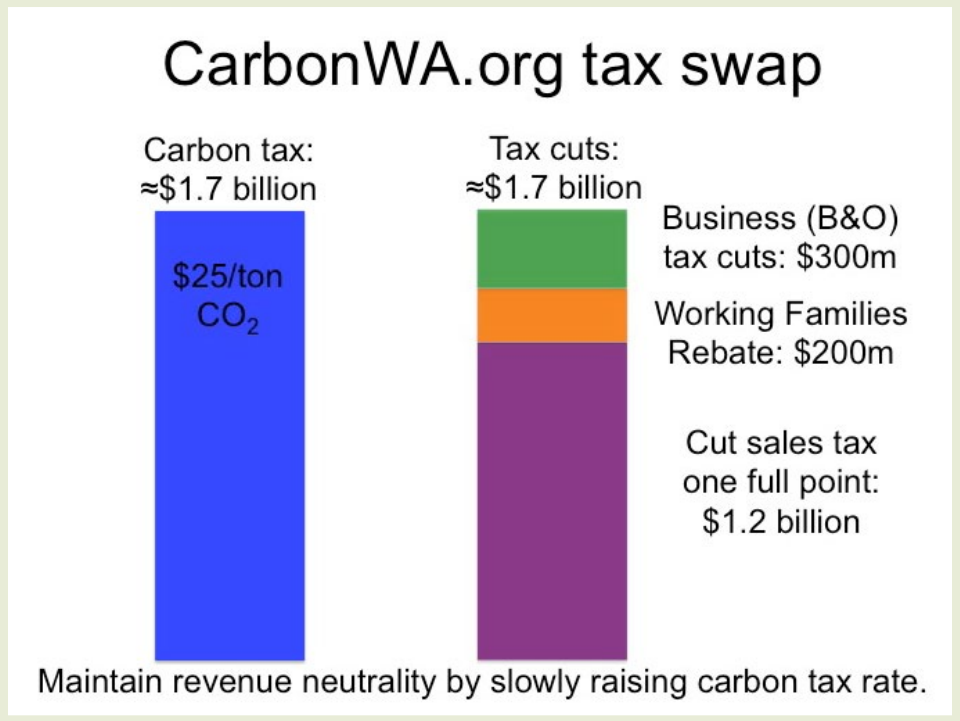
Chart by BC Budgets 2008-2013 (Used with permission.)

Adapting the BC approach for Washington State

Something very much like the BC approach might work in Oregon, which, like BC, has an income tax. But Washington State has no income tax, so the CarbonWA proposal is for the entrée to be a reduction in the state sales tax, which generates revenue from just about all of the state's households, businesses, and organizations, and for the side dishes to be targeted benefits for low-income households, manufacturers, and small businesses.

More specifically, the latest proposal from CarbonWA.org is to reduce the state sales tax rate (currently 6.5 percent) to 6.0 percent in year 1 and to 5.5 percent in year 2 and beyond. (City and county sales taxes would be unchanged, so in most parts of the state the result would be a reduction in the total sales tax rate from about 9 percent to about 8 percent.) A one-percentage-point reduction in the sales tax may not sound like much, but sales taxes generate revenues of $2,000 a year or more (see Table 9-1) from most households in Washington State; a one-percentage-point reduction would save many households almost $300 a year. Not coincidentally, that's also what an average household would pay for a BC-style carbon tax, so in broad strokes this policy would mean that an average household would pay about $300 more for fossil fuels and about $300 less for everything else. (Results may vary for individual households, so CarbonWA.org is developing a carbon tax swap calculator that will allow you to see how it pencils out for your household.)

The sales tax reduction is the entrée, but there are side dishes for three groups of special concern in terms of carbon tax impacts: low-income households, small businesses, and energy-intensive trade-exposed manufacturers. For low-income households, the CarbonWA.org proposal will fund the Working Families Rebate, a policy based on the federal Earned Income Tax Credit that will provide up to $1500 a year for 400,000 working families in Washington State. (See the great work of the Washington Budget & Policy Center, but note that they're assuming a 10 percent credit, while we're assuming a credit of 15 percent in year 1 and 25 percent thereafter.) For small businesses, we will triple the small-business tax credit for the business and occupation (B&O) tax. For manufacturers we will reduce or eliminate the B&O tax for manufacturing. And note that the state Department of Revenue estimates (see Table 9-3) that business purchases generate 36 percent of state sales tax revenue, so all businesses—like all households—would save from the sales tax reduction.



Tax Swap by CarbonWA.org *(Used with permission.)*

All those incentives would cost almost $2 billion a year, and we will recoup that money with a carbon tax. The carbon tax would start in year 1 at $15 per metric ton of CO_2 (equal to about $0.15 per gallon of gasoline or 1.5 cents per kWh of coal-fired power) and increase in year 2 to $25 per ton. Thereafter it would go up 5 percent per year in order to maintain revenue neutrality by keeping pace with inflation, economic growth, and carbon reductions. Like the BC carbon tax, the Washington State carbon tax would apply to the carbon content of fossil fuels burned in the state; unlike the BC carbon tax, it would also apply to the carbon content of imported electricity (carbon by wire) and to the carbon content of fuel loaded onto planes and boats heading out of the state. We are considering a peak rate of $100 per ton, which would occur in about 2050, and we are also considering exemptions for fuel used by farmers and public transportation systems (see Table 17) that total about 2 percent of fossil fuel consumption.

The big idea, again, is not to increase or decrease state tax receipts but to shift them in a revenue-neutral way so that more-polluting commodities and activities becomes more expensive and less-polluting commodities and activities becomes less expensive. Carbon emissions will gradually decline (BC has seen reductions of 10-15 percent), and money in and money out will be in rough balance for the next two or three decades. Beyond that, revenue neutrality is a bit less certain, but what is certain in that longer time frame is that tax reform will be necessary anyway. (For example, if there's no carbon tax revenue in 50 years, then there will also be no gas tax revenue, and hence no money for road maintenance.) And keep in mind that our tax swap amounts to about 10 percent of state government tax revenue, so from a budgetary perspective the "worst-case scenario" (of zero fossil fuel emissions!) features only a 10 percent reduction in state tax revenue.

Thinking strategically about the political context

Now for the politics: The benefits of a revenue-neutral carbon tax are twofold: If we win, it will be terrific; if we lose it will still be OK. We need to think strategically about both outcomes because carbon pricing is what is known in political circles as a heavy lift. Success is not impossible, but it's certainly not a slam dunk.

First, let's think about what happens if a carbon tax loses. Losing would, of course, be unfortunate, but it wouldn't be the end of the world. In large part that's because nobody expects a carbon tax to win ("It's got the word 'tax' in it," "You can't be honest with voters," "Nobody will vote for a gas tax," etc.). Those expectations are misguided—the polling basically suggests that carbon tax proposals are neither doomed nor less popular than cap-and-trade proposals once all the arguments are on the table—but it's nonetheless true that those expectations do exist.

The bottom line, misguided though it may be, is this: If a revenue-neutral carbon tax loses, the chattering classes will say, "Duh!" If a cap-and-trade system loses, the chattering classes will say, "Climate action has no public support."

A loss for cap-and-trade would be especially damaging because of the national implications. Right now there's a cap-and-trade system in California and some East Coast states, and folks who are keen on these policies want to take them national. A win in Washington State would build momentum toward national action, but a loss would be a significant setback. That's not true for carbon taxes because there's no momentum to lose; all we have is the world's best climate policy in a West Coast province of Canada that most folks ignore.

That's an additional benefit of a carbon tax: Even if it doesn't pass, we will raise the profile of the BC carbon tax. The old joke is that the most boring headline in the world is "Worthwhile Canadian Initiative," but a revenue-neutral carbon tax campaign in Washington State would help bring more attention to the BC success story.

Finally, there's some chance that a carbon tax proposal would reduce emissions even if it loses and doesn't become law. Evidence from BC suggests that the carbon tax has reduced motor gasoline emissions much more than expected because of "salience." My own interpretation here is that the carbon tax was in the news every day for a long time, so consumers responded not just to the price increase but also to the news stories. It therefore seems plausible that news stories by themselves—about legislative or ballot measure proposals to implement a carbon tax—could reduce carbon emissions even if the carbon tax never happens. (This would make a great PhD dissertation topic. Of course, the really great dissertation would be to follow the successful implementation of a carbon tax.)

Building on the best climate policy in the world

Let's be honest: Everybody in the climate world can tell happy stories about how great it will be if their particular policy gets implemented. But I think the carbon tax story is especially compelling. This policy means we will be putting a price on carbon that is on par with BC's carbon price, which is the highest broad-based carbon price in the world. A price of $25 per ton of CO_2 is double California's price and many multiples of the carbon prices on the East Coast and in Europe.

Passing a revenue-neutral carbon tax—and following through by keeping it revenue-neutral—wouldn't just be a win for left-wing tree huggers. It would also be a win for all the brave conservatives, including local champions like Todd Myers as well as national figures like Hank Paulson and Bob Inglis, who have stuck their necks out for revenue-neutral carbon taxes. This is important because ultimately the goal is not to solve climate change in Washington State but to lay the groundwork for national and international action, and national action will almost certainly require votes from conservatives. Getting those votes will be hard, but a BC-style carbon tax is our best hope. (Remember that the BC carbon tax itself was passed by a right-of-center government.)

The upside, then, is that Washington State follows the path of British Columbia: carbon emissions fall, revenue neutrality works out as promised, and (grumbling aside) voters and both major political parties accept the carbon tax swap as part of the fiscal and environmental landscape. Like British Columbia, Washington State could then focus on building a strong economy and serving as a model for North America and the rest of the world.

A BC-style revenue-neutral carbon tax is a policy that makes sense for the economy and for the environment in Washington State. The politics play out in such a way that the policy has a limited downside if it loses and a great upside if it wins. That combination—low risk, high reward—makes for a great investment.

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Why the Carbon Pollution Accountability Act Is a Big, Awesome Deal

By Kristin Eberhard
December 18, 2014

Link to Article Online

In Washington and across the Northwest, we are already seeing devastating impacts of climate change. In Hood Canal and Puget Sound, shellfish are being destroyed by an acidifying ocean, declining snowpack threatens water supply on both sides of the Cascades, and record-setting wildfires have ravaged Eastern Washington communities.

The good news is that we can do something about it. We at Sightline are always saying that a well-designed program can hold polluters accountable while transitioning the Pacific Northwest to a clean and prosperous future. Yesterday, Washington Governor Jay Inslee unveiled a package of climate policies, including the Carbon Pollution Accountability Act. So the big question: Is the Governor's proposed program well-designed?

Here's the one-word answer: Yes!

Seriously. It's killer.

First, there are several aspects of Washington's proposal that would make it truly first in class:

- **100 percent auctions**—no free giveaways to polluters. The Northeast states auction almost 100 percent, but California has some giveaways to industry.
- **80 percent* coverage from outset**—the Northeast's program only covers 22 percent of the states' pollution, and California's only covered 45 percent for the first few years. Washington would cover almost all pollution right from the start.
- **Fast start**—since Washington's would not be the first program out of the gate, it could be the fastest. Many other jurisdictions have already written the rules for holding polluters accountable, so Washington would jet ahead to actually making them pay within a year and a half.
- **Helps low-income people**—carbon pollution and carbon fees both disproportionately impact low-income people, and many other programs have not taken that into account in their design. Washington proposes to build in help for those who need it most.
- **Invests in Washington**—the proposal would keep the money in the state by investing heavily in education and transportation choices.

Who are the polluters?

Large power plants, refineries, and factories that emit more than 25,000 metric tons of greenhouse gas pollution per year will have to pay for their pollution. These are not small mom-and-pop businesses or individuals; there are only about 130 large polluters in Washington.

How will polluters pay?

They will have to buy pollution "allowances" or permits equal to the amount that they pollute. Every ton of pollution they cut by making their operations more efficient is one less allowance they have to pay for. Allowances will be auctioned off every quarter, and polluters can bid in the auction. Many other programs designed to make polluters pay stumble on "allocation" and give away some of the allowances for free. Washington's proposal is notable for its simplicity and transparency: Polluters pay. Period.

How much will polluters pay?

Prices will probably start around $12 per ton for the state's biggest polluters and will tick up gradually over time as less pollution is allowed and allowances become scarce. Think of it like a game of musical chairs: In the first year, there will be enough allowances to go around, but each year a few chairs will be removed (the allowed pollution level will go down by 2 percent per year) until Washington reaches the legally allowed level of pollution—44 million metric tons (MMT) in 2050.

How much will WE pay?

The oil companies and their political allies are going to start beating the drum and repeating "gas tax." It happened in British Columbia. It happened in California. They'll do the same thing again in Washington. But it's not because they care about consumers' pocketbooks or because the change in gas price is something most people will notice—the slow and steady price change of perhaps 12 cents per gallon will be swamped by the natural volatility of oil prices that swing up and down by that much and more. In a single week. With no warning.

Oil companies will talk ad nauseam about gas prices and the "gas tax" because they want to protect their profits, not because they are concerned about consumers. If we don't hold polluters accountable, prices will continue to fluctuate as the oil and coal companies continue to rake in profits from us. But if fossil fuel prices tell the truth about their real costs, there will be predictable accounting for the true costs of dirty fuels, and entrepreneurs, businesses, and individuals will all be looking for better, cheaper, safer, healthier alternatives. We'll use the revenue to help speed those alternatives.

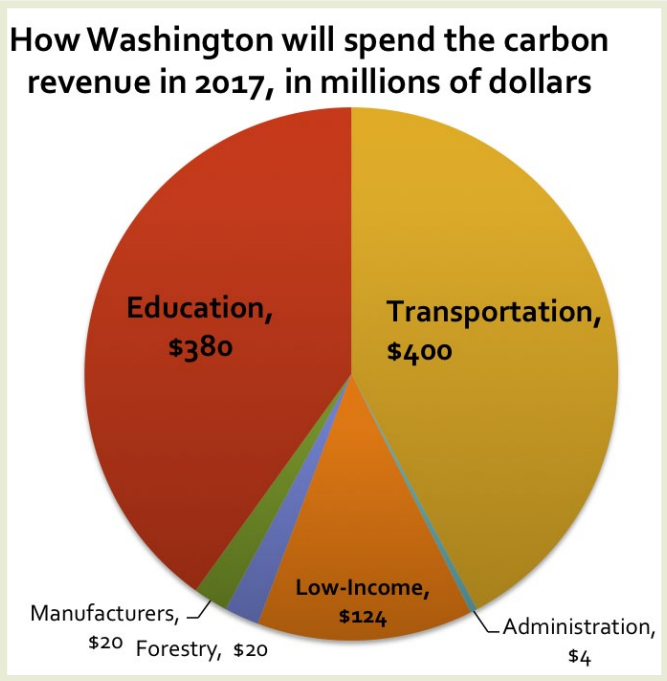
How much total money are we talking, here?

The plan estimates that polluters will pay $947 million in state fiscal year 2017 (the program starts July 1, 2016). Polluters will probably pay even more in future years as our air becomes cleaner and cleaner, possibly generating $4 billion per year for the Evergreen state in 2030 and beyond.

How will Washington spend the money?

Governor Inslee proposes that Washington invest most of the money in K-12 education ($380 million per year) and on transportation ($400 million per year). About $100 million will help low-income families though the Working Families Tax Rebate—a program that was set up in 2008 but never

funded. Another $15 million will go to a Public Housing Trust Fund that helps low-income people, seniors, and farmworkers afford housing. Twenty million dollars will fund forestry and rural investment programs, and $20 million will help Washington manufacturers who might be vulnerable to out-of-state competitors that still spew pollution for free.



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These spending priorities are not the best, but they are pretty good. The best uses of carbon revenue are investments that help spur the transition to a clean energy economy, that help low-income people pay increased energy prices in the short-term, and that grow the middle class.

- The only piece of the pie above that arguably spurs clean energy is the **transportation** piece, and it is a mixed bag. Some of the money will go toward transit operations, biking and walking infrastructure, and electric vehicles (all fantastic). Some will go toward safety improvements like improved signals and illumination, as well as general maintenance (all good and important things, but not direct contributors to the clean energy transition). The only hitch is: By funding maintenance, the carbon revenue will free up gas tax revenue for urban highway expansions, such as the 520 bridge and I-405 expansion. Highway megaprojects accelerate sprawl, boost pollution, and cost a fortune.

  With driving in Washington flattening out or maybe even declining, building new megaprojects is a big waste of money. I wish the carbon pollution fee did not enable them in any way. That said, the beauty of a hard carbon cap is that highway expansions will not increase greenhouse gas pollution. The cap will see to that. Megaprojects may be ill-conceived and wasteful. They may squander resources better used on other things. But the cap itself will ensure that overall pollution declines. (And, of course, megaprojects have powerful backers in Olympia, so disappointed as I am, I'm not surprised to see them in the plan.)

- Helping **low-income** people is an important part of the policy, one that other jurisdictions have forgotten—kudos to Washington for making sure the pollution program does not worsen the already bad inequality.

- Helping to fill the big **K-12 education** hole is an important use of the revenue. It stops sending money to out-of-state fossil fuel companies and instead invests it directly in the people of Washington. That's a good thing.

Will polluters be able to cheat?

Washington will require polluters to report their pollution and to get an independent audit of their reports. Remember, there are only 130 really big polluters in the whole state, so they won't be able to hide dodgy math in a pile of paperwork. Washington also plans to use what other pollution-limiting programs in Europe, the Northeast states, and California have learned in order to protect against any potential market manipulation.

Europe learned the hard way that a poorly designed offsets program can open the door for scurrilous companies to manipulate regulators, so Washington will have tight controls on offsets: They must be approved projects, no more than 8 percent of emissions, independently verified, and purchasers of offsets are liable for their integrity.

Making polluters pay sounds good, but does this proposal actually help speed the transition to clean energy?

Governor Inslee is proposing an entire package for transitioning beyond carbon. Right now, Washington has several efforts underway to encourage clean energy, but those efforts are fighting into the headwind of competition from fossil fuels that don't have to pay the true price for their pollution. Making polluters pay will put wind in the sails of Washington's clean energy efforts. The Governor's policy package includes:

- **Electric Vehicles:** extend tax incentives and create an EV infrastructure bank.
- **Zero Emission Vehicles:** adopt a Zero Emission Vehicle program.
- **Clean Fuel Standard:** reduce the average carbon content of fuels.
- **Sustainable Transportation Planning:** increase transportation efficiencies and enhance multimodal planning.
- **Clean Energy Fund:** increase funding available for advanced clean energy technology.
- **Solar Energy Incentives:** improve the incentives for solar energy.
- **Get Off Coal:** speed the transition away from coal-powered electricity.
- **Clean Technology Development:** support UW's efforts in advance clean energy technologies and climate science research.
- **Improve Energy Efficiency in Buildings.**
- **Improve Energy Efficiency in Agriculture.**
- **Improve Energy Efficiency in Industries.**
- **Improve Energy Efficiency in State Government Operations.**

What's the bottom line?

Washington is already paying the price for pollution, whether it's kids' asthma, dying shellfish and struggling seafood industries, or wildfires. We can't ignore the cost of climate impacts right in our backyards. And right now the biggest polluters dump as much as they want into our air for free—leaving the rest of us to bear those costs. Washingtonians are all doing their part to keep Cascadia clean and green. It's time for big fossil fuel polluters to step up and take responsibility too.

* If the program covered all emissions from transportation, electricity, natural gas, and industrial facilities, it would put a price on 90 percent of Washington's emissions. However, some industrial facilities may be too small to be covered, shaving off a few percent, and if the program does not cover the Centralia coal plant, that takes coverage down another 5 to 7 percent. Total coverage would likely be between 80 to 83 percent.

Update: The Governor has released the full bill's draft language. *It turns out the bill would exempt the Centralia coal plant from the program. Centralia is scheduled to be completely shut down in 2025, but in the meantime, it contributes 5 to 7 percent of Washington's emissions,* depending on the year. *Exempting Centralia from the program while including g other power plants could give Centralia a competitive edge, causing it to run more than it otherwise would in the years remaining before it shuts down.*

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Four Charts Show Carbon Pollution Accountability Act is Still Awesome

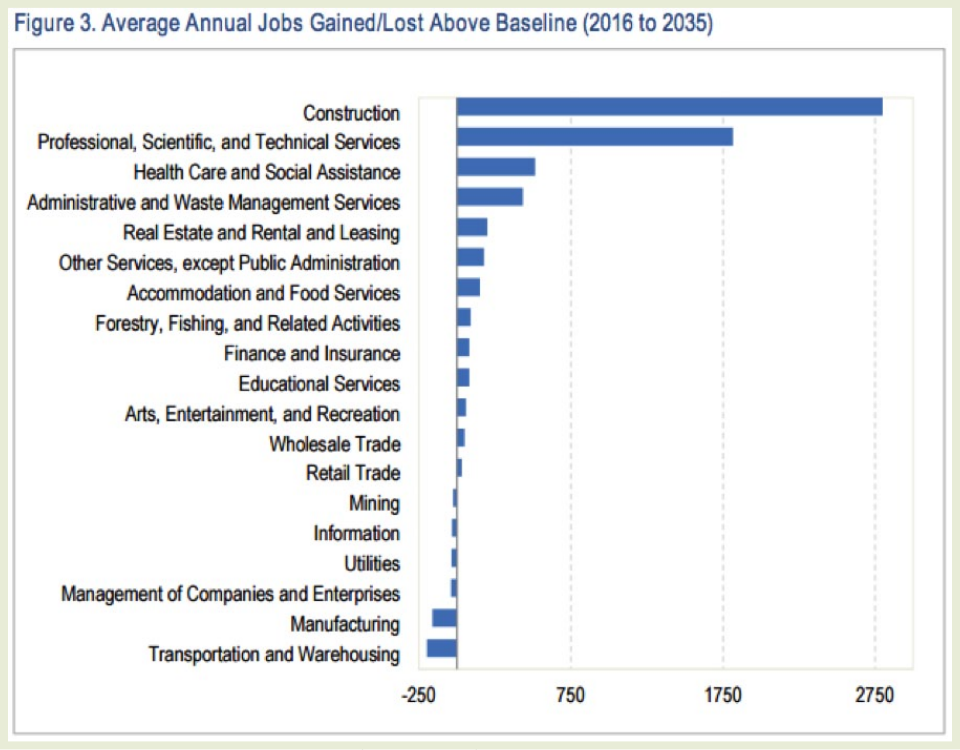
By Kristin Eberhard
March 24, 2015

Link to Article Online

As the Carbon Pollution Accountability Act, now HB 1314, wends its way through committee hearings, new economic analysis and revised revenue estimates are popping up. It's still the same pollution-cutting, clean-energy-spurring bill you know and love, but the new numbers show it will send even more money to Washington public schools, and it will also grow jobs. Less pollution, more clean energy, better schools, and more jobs. I think that qualifies as awesome.

Less pollution means more GDP and more jobs, especially construction jobs

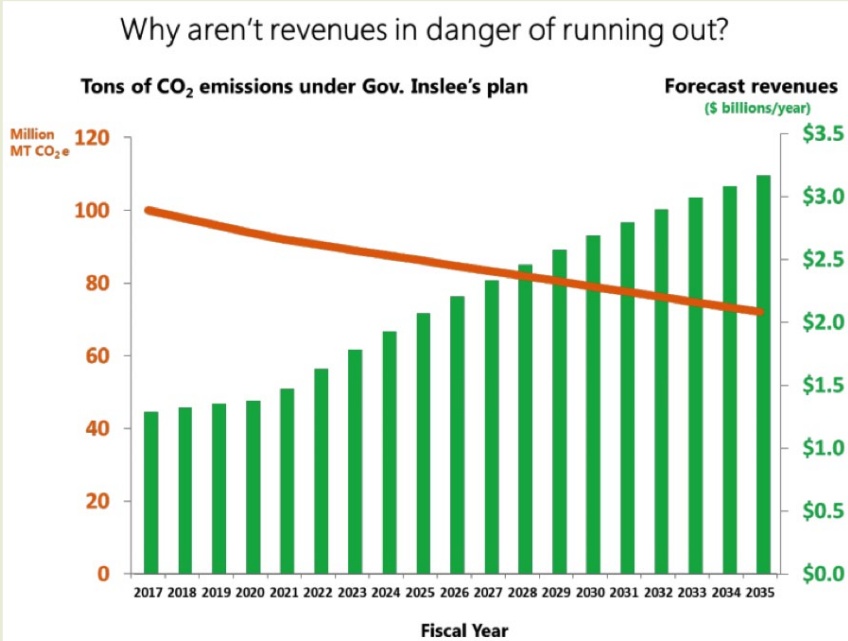
Last week, the Office of Financial Management (OFM) and the Governor's office presented findings from OFM's new economic analysis of the Carbon Pollution Accountability Act, Washington HB 1314. The OFM economic modeling, unsurprisingly, showed results similar to Oregon's recent modeling of a potential state carbon tax: GDP and jobs grow slightly faster in a future where Washington transitions from fossil fuels to clean energy than in a future where we continue with pollution-as-usual. The differences are small, because the pollution-limiting program would be a minuscule 0.3 percent of Washington's gross state product of $381 billion. But GDP and jobs are a little higher with the polluters-pay than without, due to investments in schools and roads. The biggest job gains between 2016 and 2035 would be in the construction sector (see OFM graph below), since a large chunk of the pollution revenue would go to building and maintaining Washington's roads.



Jobs Gains and Losses *by OFM*

The revenue will not run out

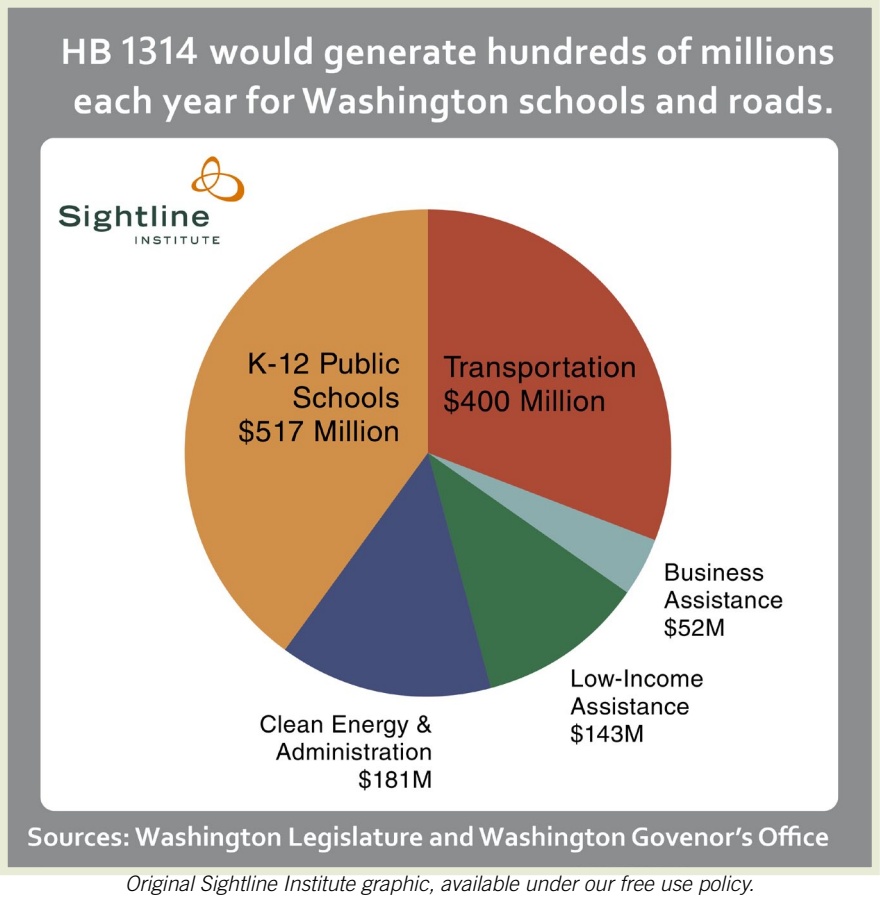
Assuming pollution prices start at $12.90 per ton in 2016 and slowly rise to $44 per ton in 2035, total revenue will start at $1.3 billion in fiscal year 2017 and increase to $3.2 billion in 2035. Prices have to keep rising in order to drive pollution downward (orange line in graph to the right), so revenue (green bars in graph to the right) increases for decades.



Projections of revenue and pollution *by Governor's Office (Used with permission)*

More money for schools

Increased projected revenue plus HB 1314's slight adjustments to the amount of revenue going to each category means the revenue pie chart (below) looks a little different than when the Act was first proposed. Most of the money still goes to K-12 public schools and transportation, but now there is even more money for schools: an estimated $517 million in the first year. Half a billion would go part of the way to meeting the legislature's court-mandated education funding requirements.



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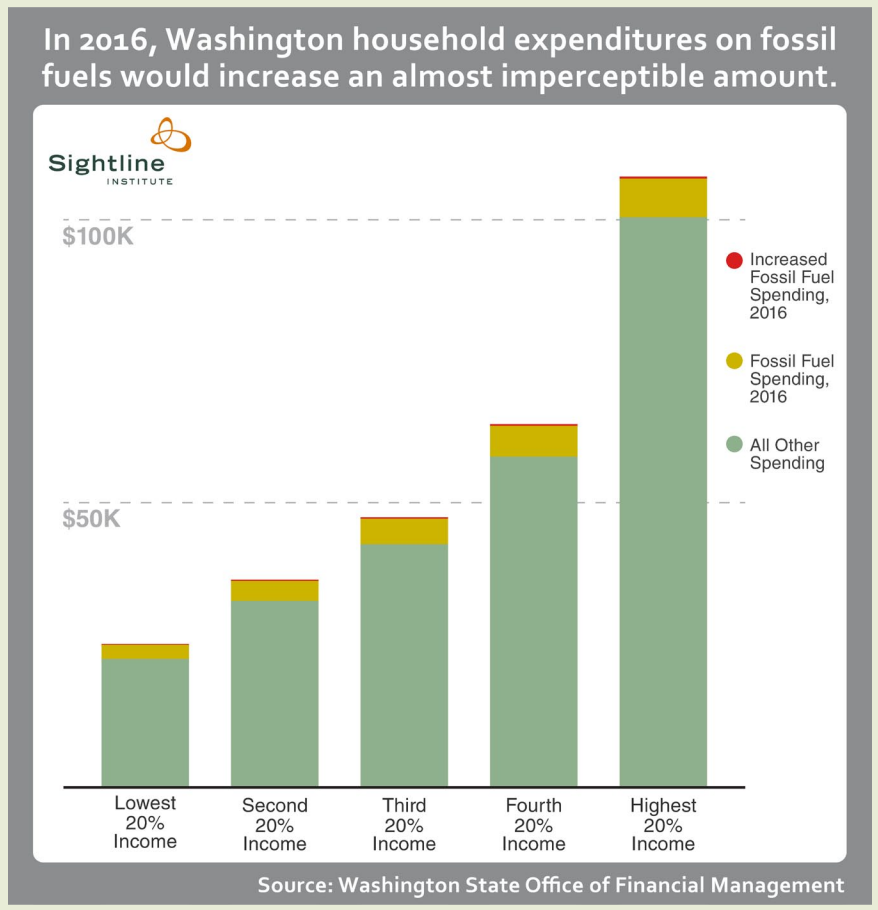
In the first year, households would see a tiny bump in fossil fuel expenditures

OFM's economic analysis modeled the fossil fuel cost impact on households at different income levels. As fossil fuel companies pass on the cost of their pollution permits to customers, fossil fuel prices would rise: gasoline would go up about 12 cents per gallon, and electricity up about half a cent per Kwh. In the first year of the pollution program, 2016, the lowest income households would pay about $144 per year more for fossil fuel energy. However, because some of the pollution-permit revenue would fund a Working Family Tax Credit of $223 per household, many of the lowest-income families would completely recoup their costs.



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Of course, the point of transitioning off fossil fuels is that Washington households will ultimately spend less of their money on fossil fuels. In the first year, households will see a very tiny—0.36 to 0.65 percent (orange area in chart below)—increase in annual expenditures due to increased fossil fuel costs. But as time goes on and Washington weakens fossil fuels' stranglehold on the economy, household spending on fossil fuels will decrease.

Refineries, not fuel distributors, will purchase permits

HB 1314 makes refiners, rather than fuel distributors, purchase permits. Since there are fewer refineries, fewer than 100 facilities will likely need to purchase pollution permits. This new estimate is down from the previous list of up to 130 facilities. There are several facilities right on the cusp of the 25,000 million metric tons cut-off, so the exact number of facilities is hard to pin down. But the bill would update Washington's existing reporting requirements for large facilities in order to get more clarity on who is in and who is out before the program moves forward.

OFM carefully ran the numbers and found that making polluters pay and reinvesting the money in Washington would trim pollution, grow jobs and the economy, fund schools, maintain roads, while holding working families and vulnerable businesses harmless. You don't find deals like that very often!

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The Washington Carbon Emissions Reduction Taskforce Report

By Kristin Eberhard
November 17, 2014

Link to Article Online

Twenty-one Washingtonian leaders from business, labor, public interest, and public health communities and federal, tribal, and local governments walk into a room to discuss the best way to price carbon in the Evergreen State. What comes out after several months? A unanimous report that says: we should do this. With caveats and cautions and needs for more research of course, but the bottom line is that Washington will not achieve its statutory carbon targets without a price, and Washington can design a price—whether a cap or a tax—to protect public health and the economy and make the transition to a post-carbon world.

In April, Governor Inslee established a Carbon Emissions Reduction Taskforce (CERT) to provide recommendations about the design and implementation of carbon pricing in Washington. Today, the 21-member panel—with individuals drawn from business, labor, public interest, and public health communities and federal, tribal, and governments—released its unanimous recommendations. Here is my summary and commentary on their findings.

CERT's Findings

CERT members unanimously agreed on four findings. Stripping away the cautious consensus wording and hedging (the report says "thoughtful" 15 times in 27 pages), here is my interpretation of those findings, found more in the small print than in the bold headlines:

1. There isn't a meaningful difference between a cap and a tax. But if we do either one and do it well, we can inspire other jurisdictions to take action too, making it easier for everyone to go post-carbon.

2. On the topic of doing it well, Washington needs to carefully design its price to meet the criteria discussed below.

3. The price should work with complementary policies. In particular, the transportation sector needs an integrated approach with land-use policies, transit oriented development, and alternatives to current single occupancy vehicles such as adequate transit, zero emissions vehicles, and alternative fuel infrastructure. Washington could invest carbon revenue in clean energy and transportation options for a smooth transition to a post-carbon economy.

4. More analysis is needed, particularly around impacts on businesses and low-income communities.

CERT Evaluation Criteria

The negative bars are all money-savers even without making prices tell the truth about carbon The CERT developed eight criteria for evaluating carbon pricing options, and offered some thoughts on each. These criteria are useful for legislators wanting to design the price right, and CERT members' informed perspectives can help move the conversation forward. Here is a brief run-down of the criteria and CERT's thoughts.

CERT says a carbon price should:

- **Actually cut pollution.** On this, CERT members generally agreed a cap is better than a tax at guaranteeing legally mandated amounts of pollution reduction.
- **Shift investments away from pollution and towards clean solutions.** On this, CERT members generally agreed a tax is better than a cap at providing price certainty. However, CERT members saw that experience from other jurisdictions offers ways to design a cap with more price stability. Furthermore, political certainty over the long term (that is, the price will stay in place and not get overturned with every new political wind) is just as important as price certainty for motivating investments in a post-carbon economy.
- **Minimize implementation costs and competitiveness impacts on Washington businesses.** Many CERT members agreed that a regional approach would eliminate competitiveness concerns, because neighboring jurisdictions would pay the same carbon price. Short of that, CERT members agreed carbon pricing in whatever form is cheaper than command-and-control policies. If implemented well, offsets can play a role in keeping costs down. Some CERT members note that industries should not get windfall profits at the expense of citizens, so all or most allowances should be auctioned.
- **Maximize economic benefits in Washington.** To do this, CERT members discussed using carbon revenue to: address competitiveness impacts, reduce pollution, help low-income people who are impacted by price, and invest in adaptation. Some members offered more specific ways to maximize economic benefits in a transition to a low carbon economy by investing in: energy efficiency, smart growth, public transit, clean energy job training, building more wind and solar, enabling clean fuels at the ports and maintaining existing transportation infrastructure (but not starting up new expensive highway projects that will not be needed in an era of declining driving).
- **Minimize costs and protect low-income communities.** Those who have done the least to change the climate are the ones who suffer the most. Washington's policy should at a minimum not make low-income people worse off and could provide transportation and economic opportunities. Some CERT members suggested that Washington could use California's model and use 25 percent of the revenue to benefit disadvantaged communities and 10 percent to directly invest in these communities. Members also noted the need to help low-income families and communities of color access cost-saving options. Finally, they noted a need to help rural communities that drive more.
- **Reduce public health risks, especially for vulnerable populations.** CERT recommends holding polluters accountable and generating positive impacts for disadvantaged communities. Washington could use carbon revenue to improve air quality in communities that endure high pollution burdens.

- **Be administered effectively.** CERT members noted that a tax is easier to administer than a cap. However, linking to the existing California/Quebec cap would let Washington leverage the administrative infrastructure those jurisdictions have already paid to put in place.
- **Influence and catalyze national and international action.** A regional approach will be more influential than Washington going it alone. The most obvious path to a regional approach is to link to the California/Quebec cap.

What does it all mean?

Like all consensus documents, the CERT Report is careful. What is notable is that, despite the diverse interests represented, all of them agreed carbon pricing is an important and efficient way to cut pollution and a carbon price could be implemented through a well-designed cap or a tax. CERT members thought long and hard about how a carbon price could impact Washington businesses and citizens, and they did not throw up any of the tired excuses for inaction that we see at the national level. They concluded that Washington faces rising seas, acid oceans, dying forests, shifting water availability, and increasing heat waves. Given the choice between letting these crises engulf the state and designing a price system that addresses cost and competitiveness concerns, 21 Washington leaders said: let's price carbon. Thoughtfully, of course. In a way that helps Washington not just cut pollution, but transition smoothly and cost-effectively towards a healthy post-carbon economy, of course. But Washington can do this. Especially in light of the recent China-US agreement on carbon pollution, the time might be right to nudge the United States forward on climate action, and Washington could be in a position to nudge.

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Can We Depend on the Money?

By Kristin Eberhard
October 13, 2014

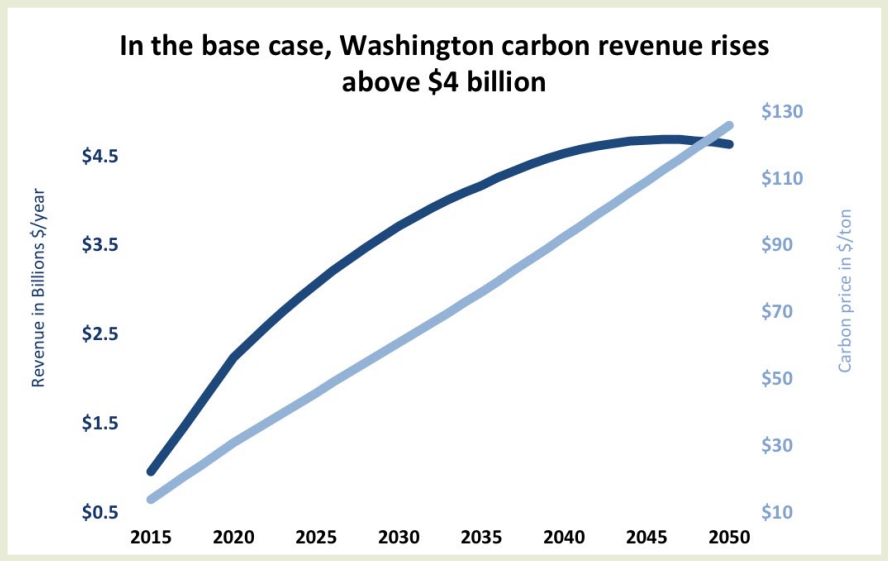
Link to Article Online

Is carbon revenue too flighty for Washington to depend on it to solve some of its budget woes—including the State Supreme Court's McCleary mandate to fully fund education? If a carbon price is successful at cutting pollution, won't the revenue stream dry up as the pollution dwindles? The answer is no. Price and pollution are related; the price must progressively increase to continue curtailing pollution. If Washington keeps ratcheting down the pollution, it will receive a carbon revenue stream that will steadily rise for the next two decades and then flatten out in the 2040s.

Because it is difficult to make predictions, especially about the future, I offer three plausible price scenarios based on what we know. We know that pollution responds to price. We know that complementary policies, such as investments in energy efficiency, can work with a price to cut the cost of paring pollution. Each of the scenarios below assumes the Evergreen State hits its existing pollution abatement goals: getting back to 1990 levels of pollution by 2020, then cutting to 25 percent below 1990 levels by 2035, then slashing to 50 percent below 1990 levels by 2050.

Base Case: What the US Price Models Predict

The top US carbon price models suggest that, to cut pollution 50 percent below 2005 levels by 2050, a carbon price will need to rise to around $30/ton by 2020, $75/ton by 2035, and $125/ton by 2050. This is roughly equivalent to Washington's 2050 goal of 50 percent below 1990 levels by 2050. The main factors that could change the prices are: population growth, complementary policies, and technological advances. Washington is not meaningfully different from the United States on these factors: expected population growth is similar to the national average; Washington would adopt some policies that help capture cheap pollution-trimming opportunities—like energy efficiency—that are otherwise blocked by market barriers; and any technological advances in coming years would be shared across the country. For these reasons, this US price scenario is a reasonable estimate.



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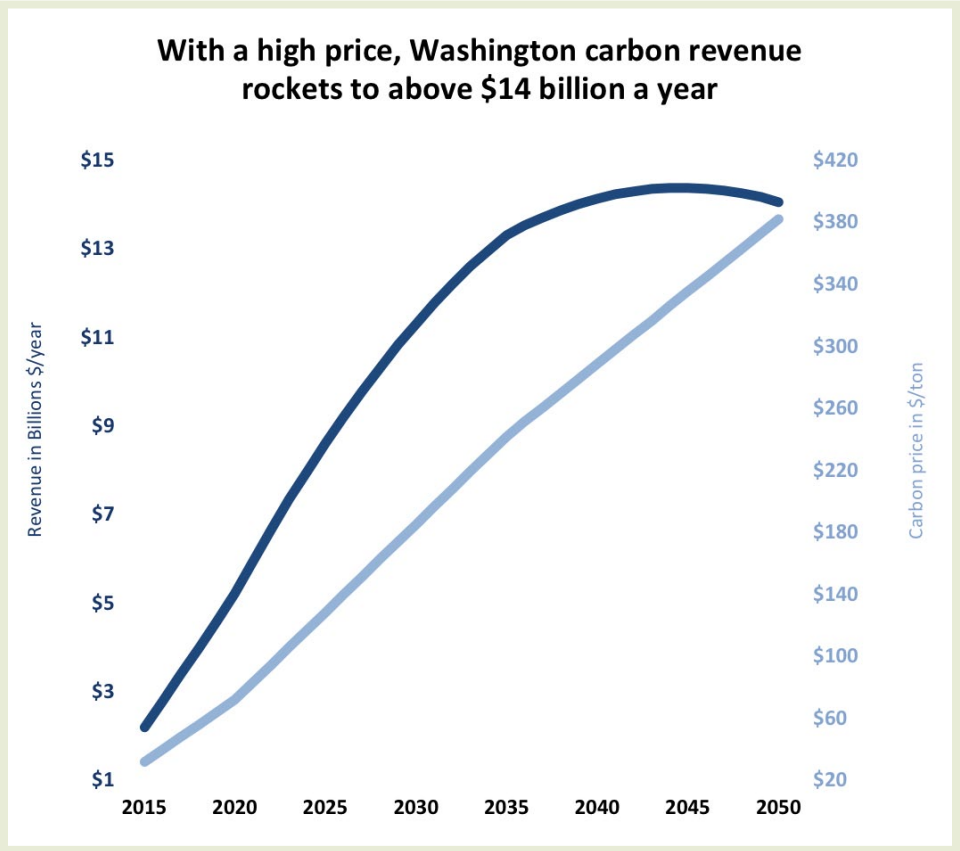
Washington would collect more than $2 billion per year in carbon revenue by 2020, steadily rising until revenue flattens out at around $4.2 billion per year in the 2040s. That's around 12 percent of Washington's tax base.

High Price: No Complementary Policies

Instead of using a multi-pronged policy approach similar to California, Washington could rely on price alone to lessen pollution. While it is unlikely that Washington would eschew all other policy options and pursue price alone, it is worth seeing what this strategy would look like. It would require a much higher price: a recent analysis concluded that price alone would need to reach $70/ton in 2020 and $240/ton by 2035 to get Washington to its goals. A higher price means more revenue: more than $5 billion in 2020, rising to more than $14 billion a year in the 2040s. This scenario is the only one in which revenue tapers slightly in the final years—it drops from $14.3 billion in 2046 to $14.0 billion in 2050. Washington could choose to continue de-carbonizing its economy even more after 2050 by pushing the price even higher. Doing so might result in a flat revenue stream. In the near term, in this scenario, carbon prices would generate around 30 percent of Washington's tax base.



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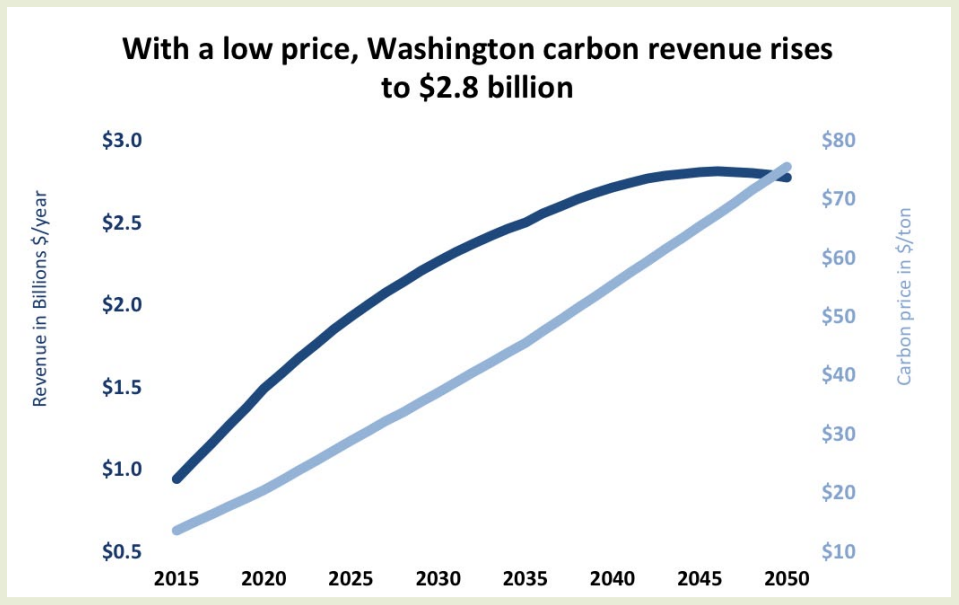
Low Price: Everything's Peachy

The US price models suggests that if cutting pollution turns out to be cheap due to factors such as successful complementary policies, pollution responding more readily to price increases, technological breakthroughs, or low population growth, then the price could be only $20/ton in 2020, $45/ton in 2035, and $75/ton in 2050. In that case, the revenue stream would be more flat and stable: Washington would collect $1.5 billion in 2020 and around $2.8 billion annually in the 2040s; around 9 percent of the tax base. That's much less than the other scenarios, but it's still a king's ransom.



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Count on It

Carbon revenue won't dry up. It could be only 9 percent of Washington's tax base or it could be 30 percent, but it will be a steadily rising revenue stream for many decades. It wouldn't be wise to bank on $14 billion per year, but Washington could conservatively count on $1-2 billion per year for many years.

Technical Notes:

- Washington's 1990 GHG emissions were 88.4 MMT. This means the state's goals are to emit 88.4 MMT in 2020, 66.3 MMT in 2035, and 44.2 MMT in 2050. A carbon price would likely cover emissions from electricity, transportation fuels, and residential, commercial, and industrial sectors. The 1990 emissions for those sectors were 73.6 MMT. This means that the 2035 and 2050 priced emissions would be 55.2 MMT and 36.8 MMT.
- Washington's 2005 emissions were 94.8 MMT. Reducing by 50 percent would mean 47.4 MMT, which is close to the 44.2 target for 2050. So the modeling for reducing 50 percent below 2005 levels by 2050 is roughly equivalent to Washington's goal.
- The Energy Modeling Forum (EMF) has been modeling carbon prices for decades. The forum is the most robust conglomeration of carbon price forecasts that I am aware of. It utilizes many different models with a range of assumptions. The 2012 EMF modeling shows a range of prices for achieving GHG reductions of 50 percent below 2005 levels by 2050: from $40/ton to $500/ton, with most clustered around $100-$150/ton. The 2014 modeling similarly shows the nine models and eight scenarios clustering around $150/ton. I used a "most likely" price scenario that falls in the middle of the range of EMF forecasts.
- Synapse Energy did an analysis in 2013 to project likely US CO_2 prices. It references the EMF modeling as well as the carbon price forecasts that utilities use in their Integrated Resource Plans. It concluded that the likely 2040 price for a medium reduction target would be $60/ton, or $90 for a

more aggressive target. This is slightly lower than the EMF models, presumably because Synapse's prediction was influenced by the utility forecasts, which are lower than the EMF forecasts. I believe the EMF models are more accurate than the utility forecasts because utility forecasts take into account political and business strategies that are not reflected in the EMF modeling. I used a "most likely" price scenario that is very similar to but slightly higher than Synapse's—my scenario assumes $92/ton in 2040.

- In 2011, University of Washington PhD candidate Keibun Mori analyzed the impact of a carbon price on GHG emissions in Washington State, including a sector-by-sector price elasticity analysis. He concluded that a tax of $70/ton would be required to reduce Washington emissions to 1990 levels, and $240/ton to meet Washington's goal of reducing 25 percent below 1990 levels by 2035.
- Cutting pollution often turns out to be cheaper than expected. Many economists have assumed that price elasticity for energy—particularly transportation fuels—is very low, but recent fluctuations in gas prices and subsequent changes in driving have undermined this assumption. I wanted to make sure that the 2011 analysis used the most recent information on fuel price elasticity. In 2012, the Victoria Transport Policy Institute conducted a review of the literature on gasoline price elasticity of demand and found that the long-run fuel price elasticity ranges from -0.4 to -0.8. This indicates that increasing the price of gas by 10% will lead to a 4 to 8 percent reduction in driving. This range mirrors the gasoline elasticities that Mori used in his analysis.
- Portland State University studied the impact of a carbon price on Oregon GHG emissions. Its 2013 report concluded that a carbon price of $100/ton would be needed to reduce Oregon's emissions to 1990 levels by 2030. This is slightly higher that the Washington estimate, but within range. PSU is currently conducting a deeper analysis of a carbon tax, due to be released in November 2014.
- Canada's National Round Table on the Environment and Economy concluded in 2009 that the country would need a price of $100/ton to achieve the goal of cutting 20 percent below 2006 levels, and $300/ton to achieve the national reduction goal of 65 percent below 2006 levels by 2050. This is close to the range of the EMF models.
- Point Carbon, a market group rather than a research group, has issued several forecasts of California carbon prices. Considering that its 2011 prediction was that prices would dramatically rise to $75/ton by 2020, but its 2013 prediction was 80 percent lower—only $15/ton by 2020—its modeling seems unreliable. I did not use it for this article.
- Note that California's 2050 target is more stringent than Washington's—80 percent below 1990 levels, compared to just 50 percent below 1990 levels. If Washington joins California and California extends its cap to 2050, the two states will need to negotiate a mutually acceptable 2050 reduction goal. If Washington chooses the more aggressive goal, emissions would decrease and prices would increase.

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NERC's Oregon Carbon Tax Report

By Kristin Eberhard
December 10, 2014

Link to Article Online

We are already paying a high price for fossil fuels: strange and severe weather, asthma and cancer cases, a Northwest economy weakened by huge bills for importing coal, oil, and gas, and the political vice grip that Big Oil has on our democracy. Last year, Portland State University (PSU) gave the Oregon legislature a teaser about how to face those problems with a carbon tax. Intrigued by the possibility of holding big polluters accountable and generating revenue for Oregonians, the legislature asked for more information, and this week PSU's Northwest Economic Research Center (NERC) delivered. The new and expanded analysis concludes that charging carbon polluters would cut pollution and it could create jobs and raise wages. If Oregon spends the money right.

What scenarios did NERC model?

NERC modeled carbon taxes ranging from $10 to $150 per ton of greenhouse gas pollution. The tax would apply to pollution from burning fossil fuels, such as coal, petroleum, and natural gas. It would tax pollution from coal burned outside the state to generate electricity used by Oregonians. In each scenario, the tax starts at $10 per ton in 2014, and then goes up slowly and smoothly, rising just $5 or $10 each year. Knowing that the price to pollute is slowly rising over time gives dirty energy producers the time and the motivation to start investing in clean energy. NERC ran scenarios with prices that maxed out at $10, $30, $45, $60, $100, $125, and $150.

How much carbon pollution can a carbon tax cut?

In every scenario other than $10 and $30 per ton, a carbon tax would enable Oregon to meet its 2020 goal of trimming pollution 10 percent below 1990 levels by 2020. In the graph below, the blue line is the "baseline" or business-as-usual expectation for pollution, and the dotted line is Oregon's 1990 level of pollution. The red line is $10 per ton tax—it cuts pollution, but not below 1990 levels. All the other lines cut pollution well below 1990 levels.

However, NERC found that even $150 per ton (the purple line), by itself, would not let Oregon reach its 2050 goal of slashing pollution 75 percent below 1990 levels.

This finding is consistent with other states' experience trimming carbon: a price works best when paired with other policies. It's the wind in the sails, not the sails. For example, the same economic model concludes that in California a price of $50 per ton will cut carbon 10% below 1990 levels by 2020. But California is on track to cut pollution to 1990 levels with a carbon price currently hovering around $13 per ton, and expects to slash 80 percent below 1990 levels by 2050. California's price is lower than the models predict because the Golden State is using other policies—like aggressive energy efficiency programs—that work with the price to cut pollution faster and cheaper than a price alone. Indeed, NERC reported that a carbon tax would complement many of the policies Oregon already has in place, such as the Renewable Portfolio Standard and Clean Cars program. Currently, those

programs each valiantly struggle forward against the headwind of fossil fuel prices that don't reflect their true costs. Holding big polluters accountable with a carbon tax would make prices tell the truth about carbon pollution, thus smoothing the path for Oregon's other policies to do their jobs.

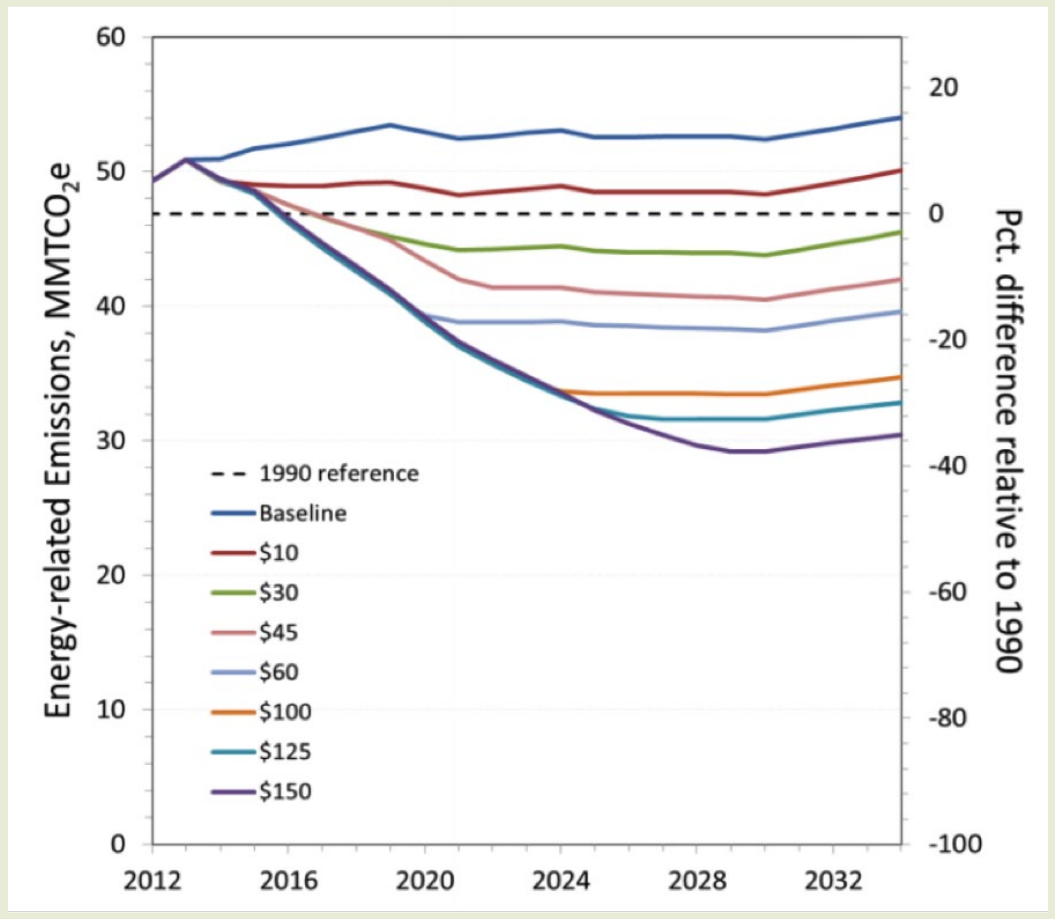


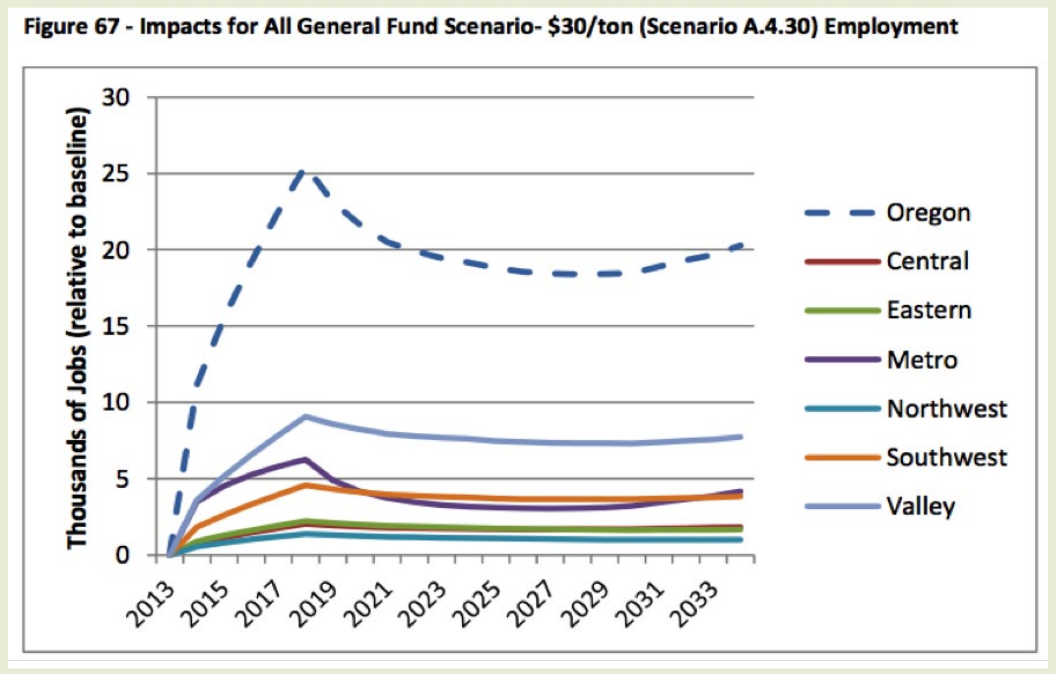
Image *by NERC.*

How much money could a carbon tax raise?

A $30 tax—the same as British Columbia's carbon tax—would raise about $1.4 billion per year in Oregon. The maximum tax modeled—$150—would raise about $4.5 billion. To put this in perspective, Oregon's General Fund is about $7 billion per year, and total annual expenditures (including from federal and other funds) are about $27 billion per year. So a carbon tax could provide a meaningful chunk of revenue to the state.

Can carbon revenue create jobs?

NERC found that by holding polluters accountable for their pollution and then reinvesting that money in the state, Oregon could create jobs. A $30 per ton carbon tax that supplements the state's General Fund—meaning it gets spent mostly on education and health—would create thousands of jobs across the state (dotted line). The Willamette Valley region (lavender line in the graph below, and red region in the map further down) would get the biggest jobs boost.



Employment in Scenario A430 by NERC

Not only could a carbon tax reinvested in the state create jobs, it would give everyone a raise. In the $30 per ton tax going to the General Fund scenario, compensation (wages and benefits) would increase by about 1 percent across the state (dotted line in the chart below), and by about 2 percent in the rural Central (red line), Southwest (orange line), and Northwest (teal line) regions. Rural regions get a bigger benefit because more General Fund money is spent per person in rural areas. Most of the new jobs

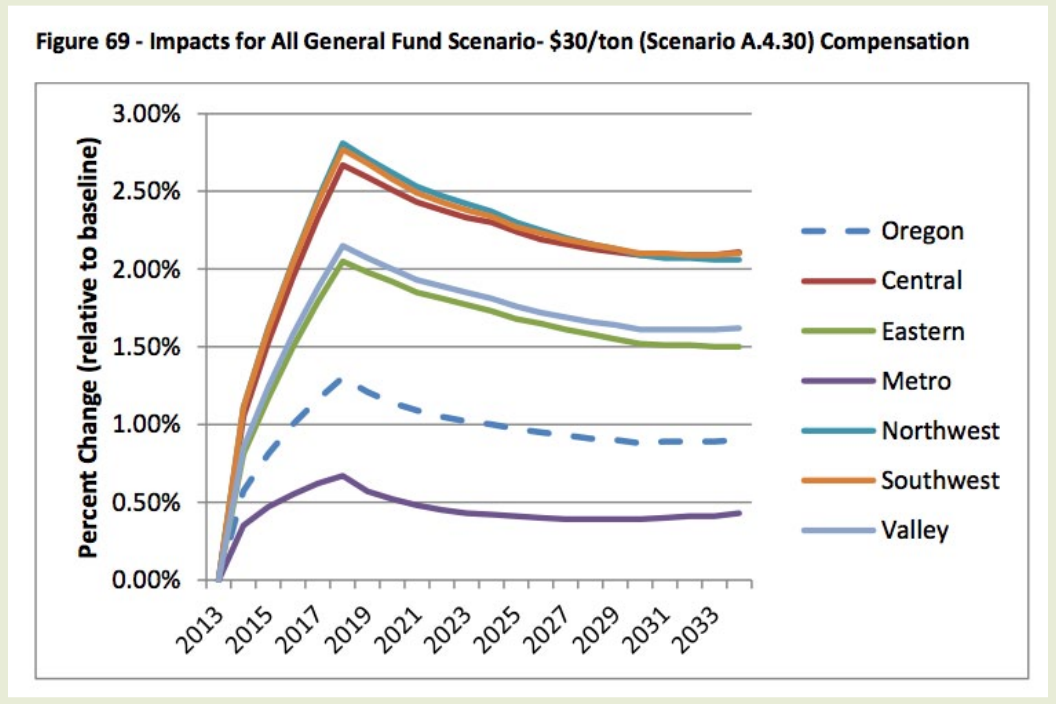


Image *by NERC*

would be construction jobs to build or maintain schools, roads, and prisons.

Wait, won't a new tax destroy jobs?

Under every scenario NERC modeled, jobs growth in Oregon was strong. The worst scenario NERC was able to come up with is the tax revenue could get stuck in financial reserve funds and not spent in the economy at all. Taking money and locking it away is obviously a bad move for the economy. This worst-case scenario would result in 1 percent slower job growth compared to business as usual—see the red line in the graph below, slightly lower than the dotted business-as-usual line. On the flip side, the green line shows how investing the money would grow jobs slightly faster than business-as-usual.

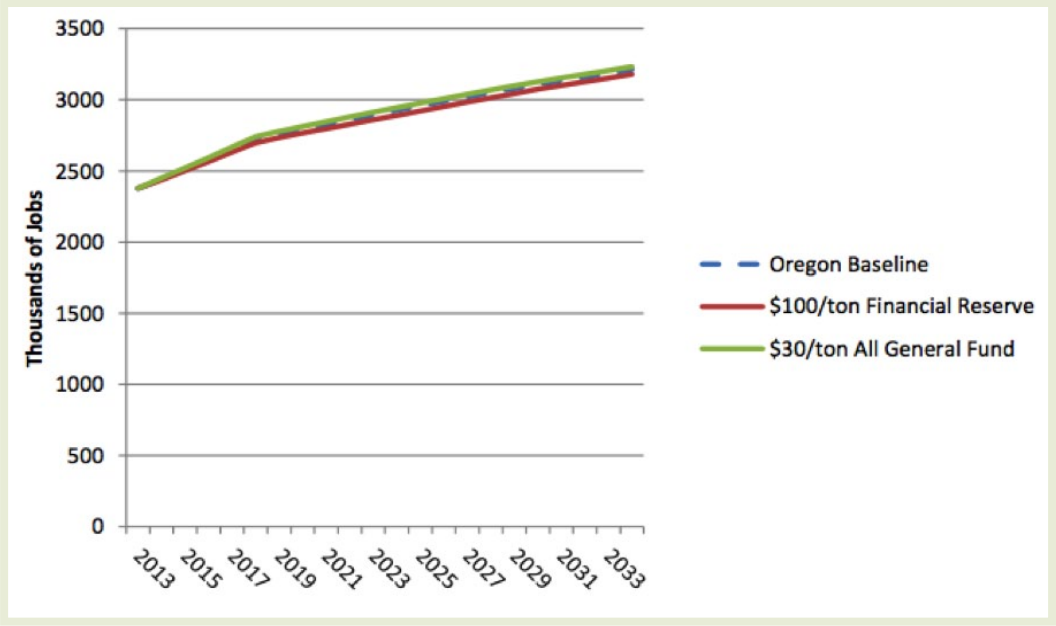


Image *by NERC*

Using the money to reduce personal income taxes would also create a slight drag on job growth, though not as much of a drag as stashing the money in reserves. Higher-income people pay higher taxes, so a tax break would help them more than lower-income people. Higher-income people are more likely to save the extra money, which doesn't help the local economy, while lower-income people will likely spend money from a tax break immediately, giving the economy an immediate boost. But even if individuals do spend their tax break, they may use it to buy food or products that were produced outside of Oregon, thus losing some of the local economic benefits.

The best way to help Oregon's economy is to invest the money in the state. The best in-state investments are local projects like energy efficiency, schools, and road maintenance. In the scenarios where the government spent the money on these types of projects, jobs and wages increased, especially in rural areas.

Won't a tax hurt rural people because they have to drive more than urbanites?

The Portland Metro region—green in the map below—emits 60 percent of the state's pollution and so would pay 60 percent of the tax. The Valley region—red in the map—emits 20 percent of the pollution. The remaining 20 percent of emissions is split relatively equally between the other four regions.

Image *by NERC*

In all scenarios, the tax hits the Metro region harder than it hits the rural regions. More of the energy-intensive commercial and industrial activities—such as outdoor gear companies and breweries—are concentrated in the Metro region, so Metro emits more pollution per person than rural areas: 43 percent of people in the state live in Metro, but they emit 60 percent of the state's pollution. Metro would pay more of the tax and would also be responsible for more of the pollution reductions. Most of the reductions would come from industries tightening their efficiencies and burning less fossil fuel.

NERC did not specifically analyze the driving cost impacts, but its results showing more jobs and higher compensation in rural areas compared to urban is consistent with a 2013 analysis showing that rural drivers do not actually drive more miles than urban drivers: rural drivers take longer trips, but take them less frequently than urban drivers, so urban drivers actually slightly more miles per year than rural drivers. With miles driven about the same and more industries in the metro area, it turns out the tax hits urbanites harder than rural dweller.

How would a carbon price affect people of different incomes?

The lowest quintile of income-earners in Oregon spends 25 percent of their income on energy (gas, electricity, natural gas, and home heating fuel) while the highest earning quintile spends only 4 percent. This means that a carbon tax hits the lowest income-earners the hardest. However, NERC found that a rebate of just $14 to $100 per tax filer (depending on his or her income, region, and the level of the tax) would make him or her whole. In other words, with a small amount of assistance, poorer Oregonians would not be hurt by the carbon tax, and their communities could benefit from increased investment. The state would not need to create a new bureaucracy to administer this assistance—it could use existing channels such as the low-income bill assistance and low-income weatherization programs.

What should the legislature take away from all this?

Charging polluters for the carbon they dump in the air can cut carbon pollution and raise revenue. If Oregon spends carbon money upgrading homes, businesses and schools to be more efficient and improving the maintenance and safety of roads across the state, it will create jobs and raise wages, especially in rural areas.

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How Much Do We Spend on Fossil Fuels?

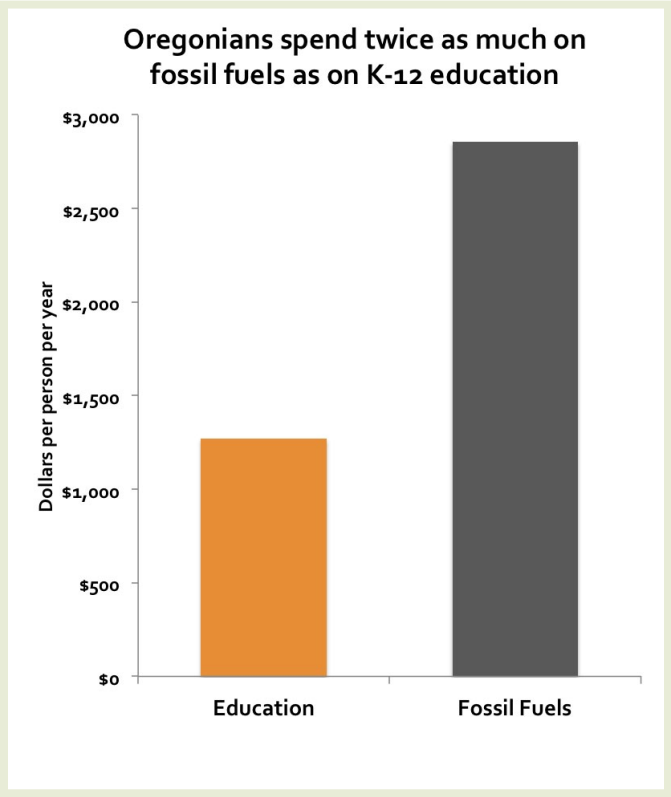
By Kristin Eberhard
December 29, 2014

Link to Article Online

If you could choose how much of your money to spend on fossil fuels compared to K-12 public schools, how would you divvy up your dollars?

Here's where your money actually goes:

- If you live in Oregon, you spend around $1,300 per year on K-12 education and around $2,800 per year on fossil fuels.
- If you live in Washington, you spend around $1,500 per year on K-12 education and around $3,200 per year on fossil fuels.



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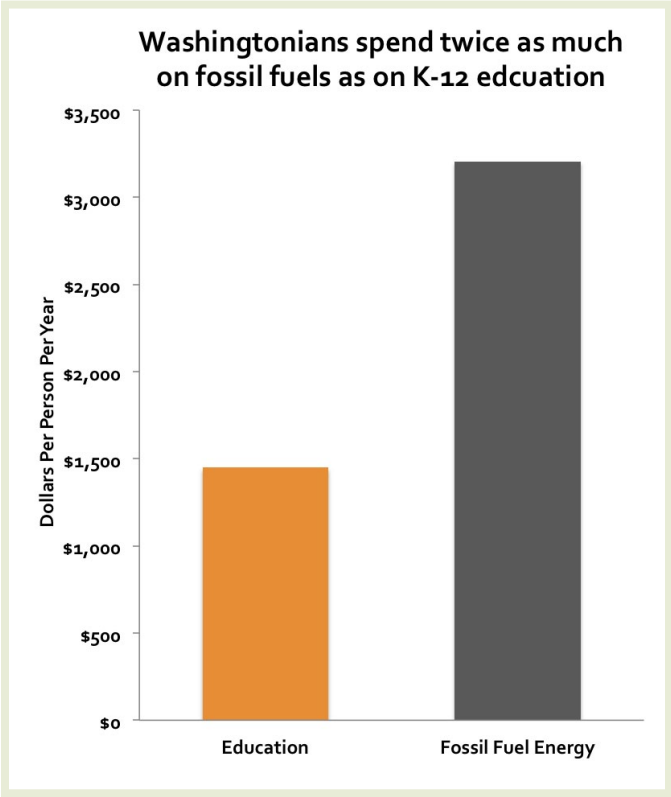

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How much of your money stays in the state?

Most of the money you spend on education creates jobs in your state—it pays teachers, maintenance workers, administrators, and food service workers. Very little of your education money leaks out of the state; some supplies and food are purchased from out of state and some money pays for, well, fossil fuels to run the school buildings and power the school buses. In addition to being a local job creator, public education also creates an educated workforce that creates prosperity for the state. Despite these benefits, both Oregon and Washington spend less than the national average per K-12 student.

In contrast, most of the money you spend on fossil fuels flies straight across the border. Two-thirds to three-quarters of the price of fossil fuels pays for the raw resources—crude oil, coal, and natural gas—but neither Oregon nor Washington produce any fossil fuels, so all that money goes elsewhere. One-quarter to one-third of fossil fuel money stays in state: Washingtonians pay about 15 percent of the total cost of oil to in-state refineries, both Oregon and Washington pay for in-state coal power plants (although Boardman and Centralia are both scheduled to close down within a decade), and distributing the oil or power within the state accounts for less than 10 percent of the price. But even in-state fossil fuel expenditures don't create many jobs. A million dollars invested in oil or natural gas only creates one direct job compared to investing in building retrofits, which creates seven times as many.

Making polluters pay for education

I'm going to guess that, given your druthers, you wouldn't choose to spend twice as much money on out-of-state, planet-polluting fossil fuels as on job-creating, next-generation-empowering public schools. But perhaps you feel stuck—you have to get to work somehow, your groceries have to get to the store somehow, you have to turn the lights on, and even the Pacific Northwest's abundant hydropower can't light the whole region by itself. To get unstuck, we need to transition to a clean energy economy where you don't feel trapped by fossil fuels and where the legislatures see a path to properly fund K-12 education. The first step is to hold polluters responsible for their pollution. In Washington, Governor Inslee's proposal to make polluters pay for their pollution and to invest the money in schools and transportation projects would do just that. In Oregon, watch for similar proposals in the year ahead.

Technical Notes:

Oregon

- Oregon now spends around $5 billion per year on K-12 public schools. In 2013, Oregon increased its state K-12 budget by about $1 billion, allocating $6.55 billion to K-12 education for the 2013-2015 biennium, or $3.275 billion per year. Schools also get about $1.55 billion per year from local taxes and a smaller amount from federal funds.
- I divided $5 billion by Oregon's population of 3.93 million to get per capita spending of around $1,300 per year.
- According to Energy Information Administration (EIA) data, Oregon spends $11.2 billion each year on fossil fuels—petroleum, natural gas, and coal.
- I divided $11.2 billion by Oregon's population of 3.93 million to get per capita spending of around $2,800 per year.

Washington

- For the 2012-2013 school year, Washington spent $10.1 billion on K-12 education. The money came mostly from state taxes, with about 20 percent from local taxes, 9 percent from federal taxes, and a small amount from other revenue.
- I divided $10.1 billion by Washington's population of 6.971 million to get per capita spending of around $1,500 per year.
- According to EIA data, Washington spends $21.2 billion each year on fossil fuels—petroleum, natural gas, and coal.
- I divided $21.2 billion by Washington's population of 6.971 million to get per capita spending of around $3,200 per year.

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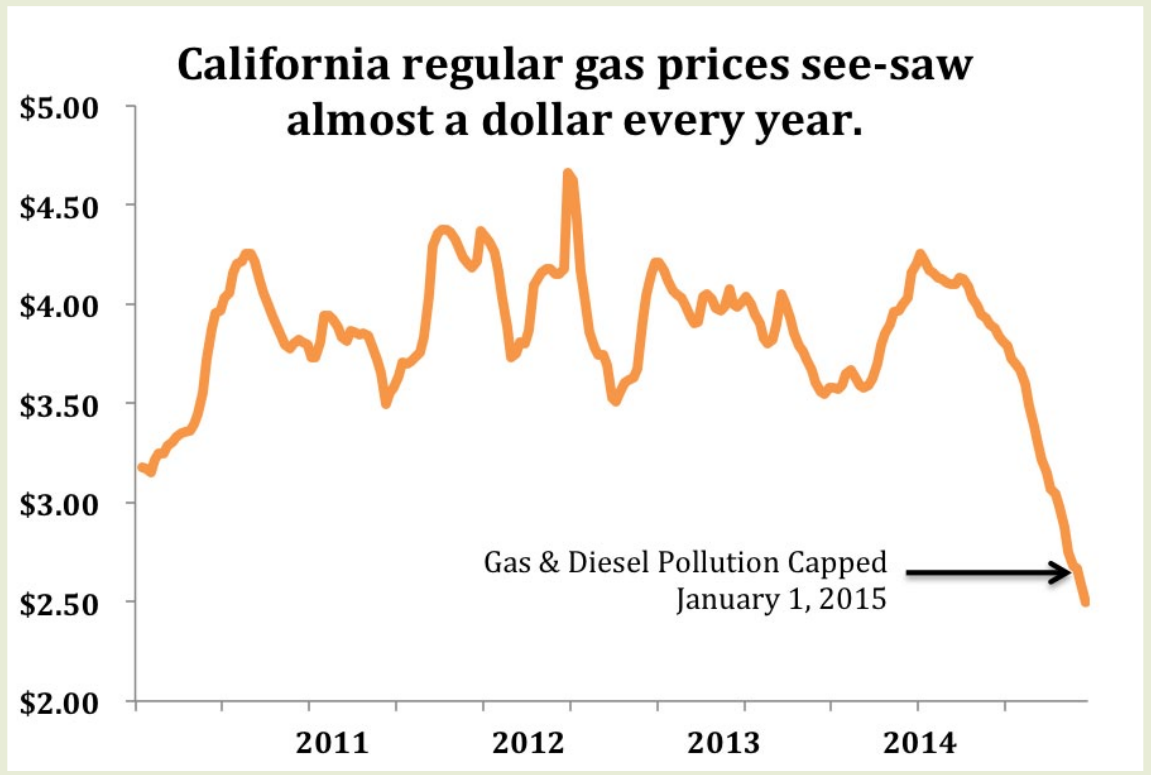
How the Oil Industry Will Try to Kill Carbon Pricing

By Kristin Eberhard
January 21, 2015

Link to Article Online

As Oregon and Washington contemplate a carbon tax or carbon cap, the oil industry is revving the engines for an astro-turf scare campaign here. The oil lobby spends a million dollars a month in California. As Oregon and Washington start thinking about holding them accountable, the oil lobby is turning its scare machine our way.

Governor Inslee has proposed a plan that would cap carbon pollution in Washington and move the state slowly but surely away from fossil fuels—away from what oil and coal companies sell—and onto clean energy. California has capped pollution from power plants and industrial facilities since 2013; when gas and diesel came under the cap this year, most economists estimated it would cost customers about a dime a gallon. But the powerful Western States Petroleum Association warned voters and legislators about a "hidden gas tax" that could cost families 76 cents a gallon of gas. Now that California has been holding polluters accountable for a few weeks, what has the price impact been? The price tag for clean air—maybe a few cents a gallon—was lost in the noise of gas prices that rise and fall ten times that amount every few months.



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There are two things that Oregon and Washington can learn from Western States Petroleum Association's "Wolf!":

1. **Industry will try to scare us** with hyper-inflated cost estimates. Oil and coal have a long history of over-blown cost estimates aimed at scaring decision-makers away from making oil and coal take responsibility for their pollution. Experience—with the Clean Air Acts of 1970 and 1977, the 1990 amendments, and now with California's carbon cap—show that industry cost estimates are often way off-base.

2. **The cost of cutting pollution gets lost in the noise.** The price of gas will almost certainly continue to fluctuate, whether we hold polluters accountable or not. A dime a gallon is less than the amount that gas see-saws up and down in an average month, and a fraction of the rollercoaster that gas prices ride in any given year. That seems like a fair price to pay for clean air, transitioning the Pacific Northwest to a clean energy economy, and doing our part to stabilize the climate.

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A Carbon Pollution Policy with All the Fixin's

By Kristin Eberhard
December 16, 2014

Link to Article Online

A purely regulatory approach to cutting carbon is like Thanksgiving dinner without the turkey. But just charging polluters without any other policies is like eating turkey by itself with no cranberry sauce or stuffing to make it delicious, no mashed potatoes, green beans and yams to round out the meal, and no pie to sweeten the experience. In Oregon and Washington, we want the full dinner. Here's how serving up a carbon price carefully paired with other policies makes for a delicious meal.

Policies can complement making polluters pay in the following ways:

- Keep costs down by slashing carbon that a price can't reach because of market barriers
- Achieve other benefits—cleaning the air, developing new clean tech industries—in addition to trimming carbon pollution
- By doing both of the above, complementary policies can pick the low-hanging fruit as well as the exotic fruit and put them all together in one reasonably priced basket.

How to read a marginal abatement cost curve

To explain how this works, I need to show you some marginal abatement cost curves. That name sounds intimidating—like something you'd need an advanced degree to understand. But they're actually simple and incredibly informative. Think of them as the stair steps of opportunity.

The cost curve immediately below is for Australia. I'm using it because it is especially easy to read and understand. A marginal abatement cost curve takes many possible discreet steps to pare pollution (aka, "abatement") and lines them up from left to right according to their cost. Cheap options for reducing or capturing carbon are on the left; expensive ones are on the right. The vertical axis shows the cost of cutting carbon pollution in dollars per ton. The horizontal axis shows the total million metric tons (MMT) any given policy could cut. The idea is to climb the stairs from left to right, starting with the cheapest options and working your way up to the more-expensive ones.

On the left side of the graph you see negative bars, meaning Aussies could save money by enacting these policies. The further right you go, the more expensive it gets to trim emissions. The wider the bar, the more MMT it could cut. The color-coding in this example shows you that most of the money-saving options are in making buildings (light blue) and transportation (dark blue) more efficient, that there are many low-cost options for reducing emissions or soaking up carbon by protecting or replanting forests (green), and that higher-cost options are in the power sector (gray).

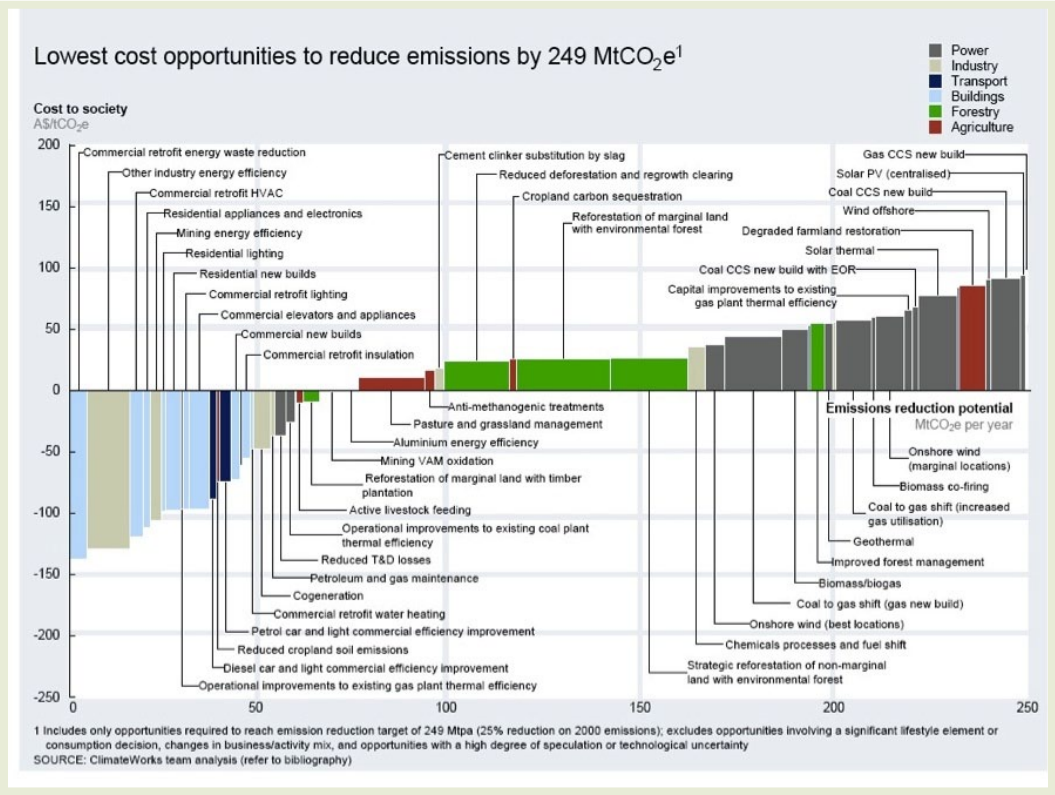
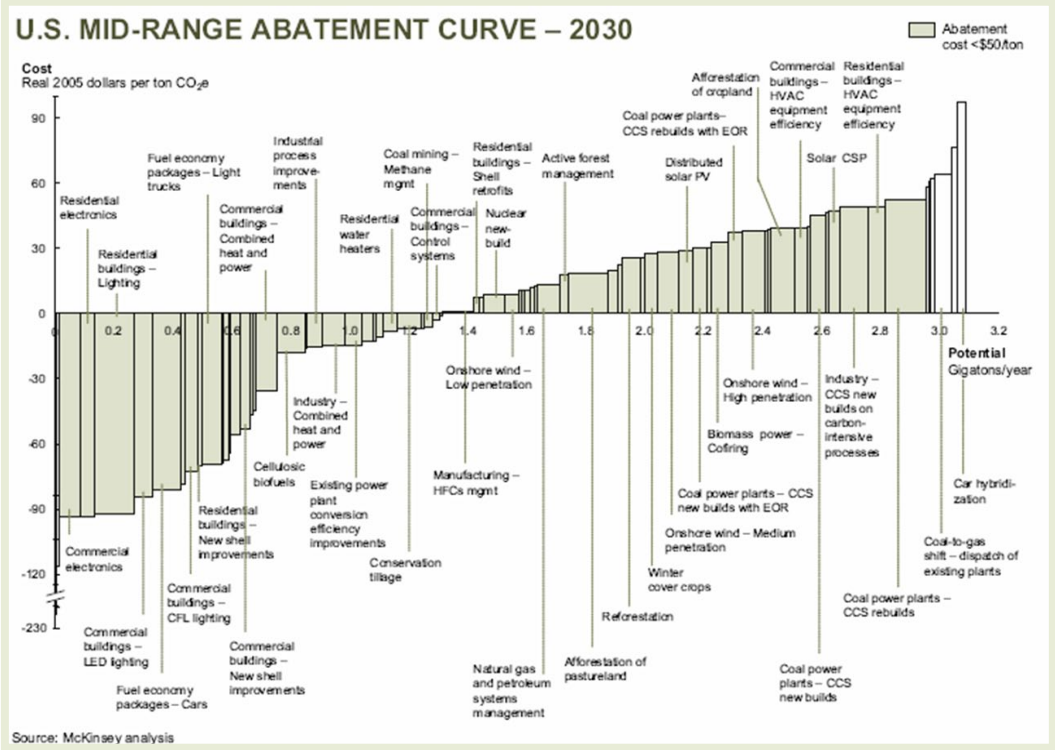


Image *by Climate Works Australia*

Below is a US curve from the consulting firm McKinsey & Company.



MACC–US Mid

The negative bars on the left side—the things that actually save money while cutting pollution—are mostly ways to make appliances, buildings, and vehicles more efficient. For example, by putting all our gadgets and lights on an energy diet we can chop down pollution while also saving cold hard cash. Above, you will see the bar labeled "Residential buildings – lighting" could reduce pollution by about 100 million metric tons (MMT) (the axis shows gigatons) and save $95 per ton. "New shell improvements" means insulating new buildings better so they use less energy for heating and cooling. "Fuel economy packages" for cars and trucks means getting more miles for your dollars. Above, the bar labeled "Fuel economy packages – cars" show that the United States could cut about 50 MMT of pollution and make $80 per ton. These policies are like salad: the guilt-free option you should try to fill up on first.

On the right side are the more expensive actions. The very last blue bar, "Coal power plants – CCS rebuilds" means that retrofitting existing coal plants with carbon capture and storage technology could cut about 120 MMT of pollution at a cost of about $55 per ton. Adding CCS to coal plants might be like the unappetizing holiday fruitcake that you never get around to eating. "Distributed solar PV" and "Solar" are also on the right half of the graph, but the prices of these options has fallen steeply since McKinsey completed this analysis in 2007.

Why, why, WHY are we not already doing things that could save money AND cut pollution?

The negative bars are all money-savers even without making prices tell the truth about carbon pollution. The fact that we have not done these things yet shows that something other than cost is blocking us. There is a market failure or other barrier. Examples include:

- Imperfect information**:** it is easy to compare the sticker prices of two refrigerators but hard to compare their lifetime costs—purchase price plus electricity bills to keep the fridge humming day after day for 10 years or more.
- **The "**split-incentive**" or "**principal-agent**" problem:** the person paying the electricity bill has a big incentive for the building to be as efficient as possible, but the architects, builders and landlords who design, build, and maintain the building may not care so much. They aren't paying the bill.
- **Another example of split incentives:** TV set-top boxes (the box that funnels cable or Netflix into your TV) use almost as much energy when they are off as when they are on. Manufacturers ship them with the default setting to stay at full power because. . . what do they care about your electricity bill? Customers could re-set them to power down when idle, but it's hard enough to program the internal clock much less figure out the energy-saving options.
- **Upfront cost vs operating costs:** Tax policy favors higher operating costs. Operating costs can be written off, but capital costs are taxed for 30 years. This dichotomy encourages inefficient buildings that cost less to construct and more to operate. Similarly, an efficient car might save thousands of dollars over the years, but a cash-starved purchaser may not be able to swing a higher purchase price today.

Examples of other barriers to cost-saving solutions include:

- It is cheaper and more efficient for people to live close to each other and close to amenities like grocery stores and doctor's offices, but land use planning has historically oversupplied suburban housing and undersupplied urban housing.
- Charging for car insurance based on how much you actually drive saves money, but state laws may prevent insurers from offering it, and people might not sign up because they don't understand the benefits.
- Although energy efficiency savings add up to billions of dollars across Cascadia, the amount of money that individuals can save is typically one percent or less of their disposable income. Not very motivating.

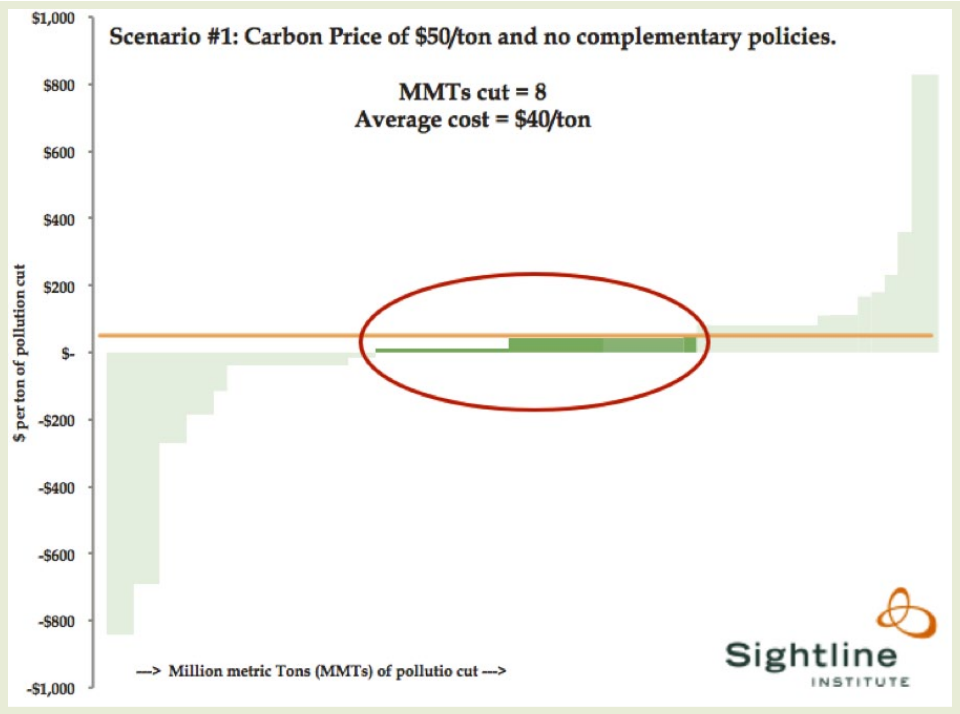
Charging carbon polluters will make money-making carbon-cutting tactics save *even more money*, but the price won't overcome whatever barriers are already blocking them.

In 2012, the Oregon Department of Energy did a marginal abatement cost analysis. In the graphs below, I look at three scenarios: (1) skipping the complementary policies (turkey by itself), (2) using only the policies that get negative-cost policies (healthy salad), and (3) a carbon price plus a mix of high-cost and low-cost options (full dinner).

Scenario 1: Charge carbon polluters, use no complementary policies

A carbon charge of $50 per ton will curtail the pollution that costs between $0 and $50 per ton. For example, preserving a forest that sequesters carbon might cost $12 per ton, so in the absence of a charge on spewing pollution into the air, those forests will get cut. But if polluters pay $50 per ton, preserving that forest transforms from a $12 per ton cost to a $38 per ton profit. For the sampling of Oregon policies that I am using for illustrative purposes, a carbon price of $50 per ton (the orange line in the graph below) would cut 8 MMTs of pollution (the darker green boxes) at an average cost of $40 per ton. This is a turkey dinner with just turkey. Not very satisfying.

(Reminder: the cost curve below only includes a sampling of all the policies Oregon could pursue, so the MMT and $ per ton numbers are only helpful in comparing one scenario to another within the bounds of this article, not for making any conclusions about the tons and costs in Oregon more generally.)



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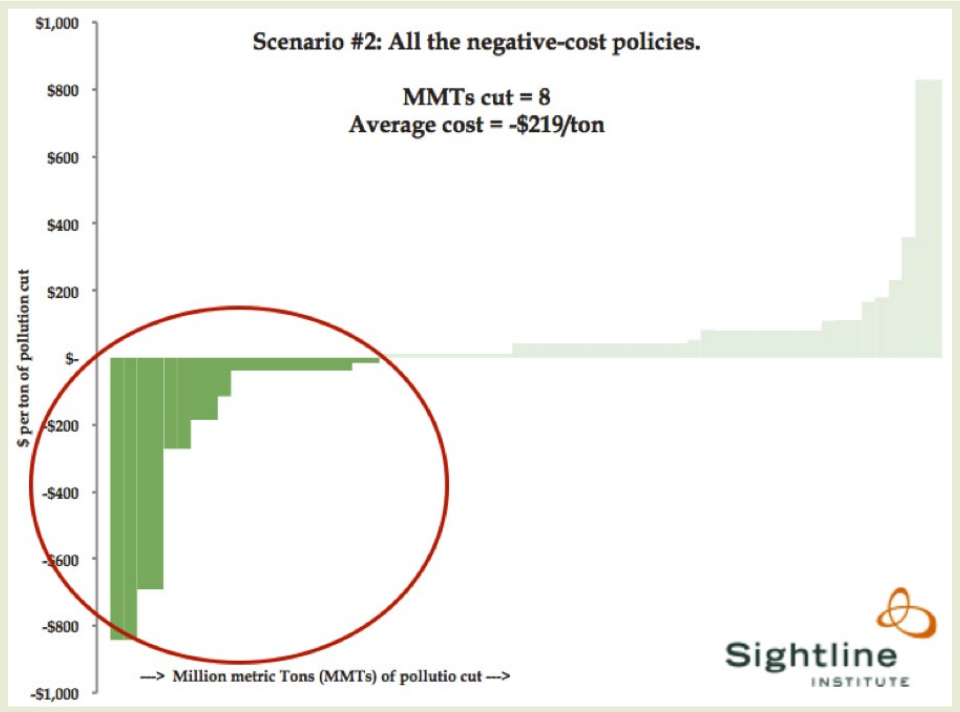
Scenario 2: Get all the low-cost stuff

What if we go after *all* and *only* the cheap stuff? If we could formulate policies designed to overcome all the market barriers, we could cut 8 MMTs of pollution at an average savings of $219 per ton (darker green bars in the graph below).



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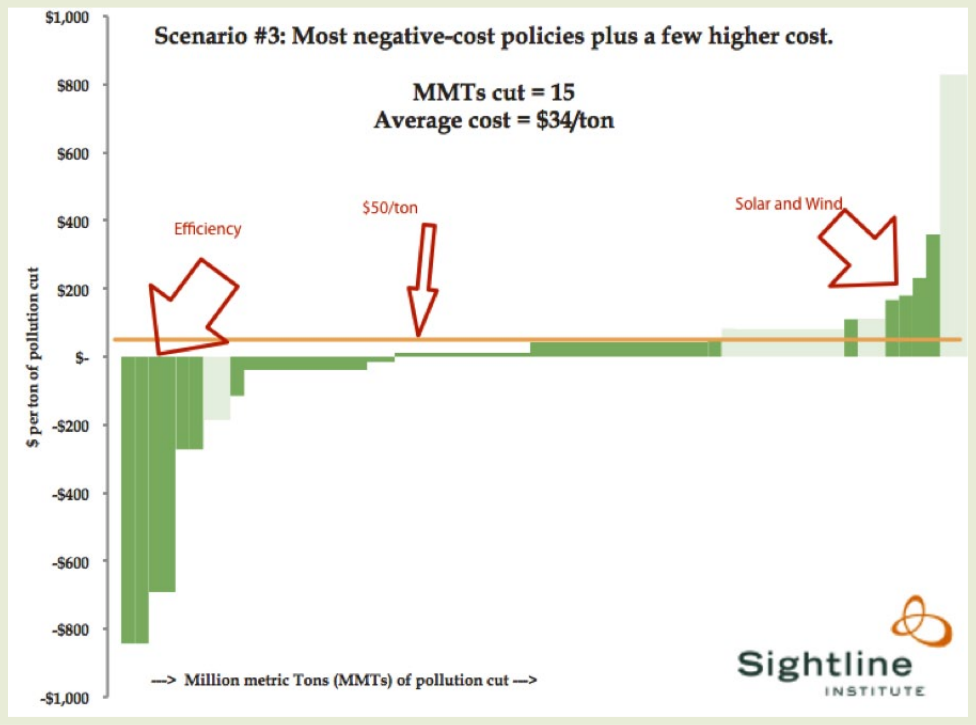
Scenario 3: A combination platter

Say we go after a lot of the low-cost options, but we don't have the right policy tools to overcome all the market barriers. We use a price to capture all the lower-cost options. And we also have reasons for wanting some higher-cost things—say, rooftop solar—because it has advantages other than just cutting carbon—like promoting energy independence and driving new technologies to competitiveness by helping them get up to scale. A combination of a $50 per ton charge on polluters plus policies aiming at most of the cost-saving energy efficiency plus high and low cost policies could cut 15 MMTs of pollution at an average savings of $34 per ton.



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Complementary policies keep costs down

A price without other policies would miss a huge swath of cost-saving carbon-cutting options. We would have to fill up on turkey alone, which would be both more costly and less tasty than the alternative.

Why charge for carbon pollution at all?

If sides are so cheap, maybe we should ditch the turkey and go vegetarian! Maybe we should forget the carbon price and just implement policies designed to achieve all the negative cost options. Not so fast. There are several reasons that approach might not work out as well as hoped:

- **Economists don't know everything.** All due respect to economists. The marginal abatement cost curves are estimates. The Stanford economists who analyzed a cost curve for California's AB 32 made clear that many of the cost estimates are very uncertain. Using an economist's estimates as gospel that guides all policies could lead a state astray.

- **Agencies can't do everything.** As I have detailed, even if we were sure that the estimated cost curves are right and we wanted to set agencies to the task of overcoming all the market barriers to the low-cost options, agencies might not have the necessary authority and jurisdiction to accomplish the task. A carbon price is in the background of any combination of policies, constantly nudging the economy towards clean choices.
- **We can't predict the future.** Even if economists were omniscient and even if the agencies were omnipotent, things can change. What if the state writes all the regulations and puts all the enforcement mechanisms in place to encourage a certain type of traffic and parking management that should cut emissions at a negative cost. But then, 20 years from now, most people are hiring self-driving-car service to get around, rather than driving themselves in their own car. The state's traffic and parking management policies were carefully designed around the assumption that most people are driving and parking their own car, so those policies are now irrelevant.
- **We want innovative future solutions.** A marginal abatement cost curve measures the solutions we know about and can measure now. Prescriptive policies aim for a specific outcome in a certain world, but making polluters pay for their pollution sends the signal that we need to invest in clean solutions and encourages innovative solutions. A carbon price sends the market signal that we are moving from dirty energy to clean, and innovators will respond with new ways to bring about a clean energy economy.

Better together

We urgently need to hold polluters accountable so that we can move into a clean energy future. Targeted policies can cost-effectively diminish pollution and achieve other benefits such as energy independence and improved public health. But we also need to navigate a longer-term shift in our economy in an uncertain world. A carbon price can guide that shift. In the end, the best dinner serves up turkey, sides, and dessert.

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Why Price Carbon—Can't We Just Regulate It?

By Kristin Eberhard
November 24, 2014

Link to article online.

Most Americans—including most Republicans—want to regulate carbon pollution. Oregon and Washington have already set legally binding limits on the climate-changing gas. Next, climate change warriors in Olympia and Salem are trying to make those limits enforceable. They're considering hard emissions caps enforced through limited permits and complemented by an array of targeted policies.

But what if Oregon and Washington's lawmakers fail to insert sharp incisors in their beyond-carbon rules? Desperate for revenue to fulfill its McCleary obligations, Washington might pass a modest carbon tax not designed to slash pollution. Oregon might do the same, for its own revenue reasons. Such taxes would nudge the states' economies toward a clean-energy transition, it's true, but they would not guarantee that emissions drop to the statutory goals.

And, I shudder to ponder it, but the legislatures might simply refuse to price carbon at all, at least not yet.

In fact, a few state legislators, briefed on the fine points of carbon pricing, have rolled their eyes at the political challenges and said, "Why do we have to price it? Can't we just regulate it?" Polls suggest some voters would actually prefer direct regulation. The logic is seductive: Polluting is irresponsible behavior. Polluters should knock it off. If they don't, authorities should make them.

This article describes that scenario: what would it look like if we just make polluters emit less carbon?

Regulating our way to a post-carbon world

Unfortunately, "just make them" is not an elegant picture. The authorities in charge of "making them" would be state agencies, but clashing jurisdictions, inadequate legal tools, administrative silos, and potentially perverse incentives across economic sectors make a purely regulatory approach to carbon limits a fourth or fifth or tenth best approach. Still, it'd be better than nothing. It would limit pollution, albeit in a splintered and probably costly way. In any event, it's important to understand the regulatory options, just as I reviewed other imperfect but conceivable paths beyond carbon.

Paradoxically, some of the policies state agencies would implement might be quite effective if implemented as complements to a carbon cap, because they help cut pollution inexpensively and bring other benefits like new jobs or cleaner air. But they would work less well without a price as a backstop. In the absence of a cap (or self-adjusting tax), each agency could only quash pollution if granted authority to write and enforce strong new rules—authority on a scale that legislatures have rarely granted.

Here are three variations on the agencies-in-charge path, which, to make more fun, I'll describe as if you, Dear Reader, were the entire state legislature of either Oregon or Washington:

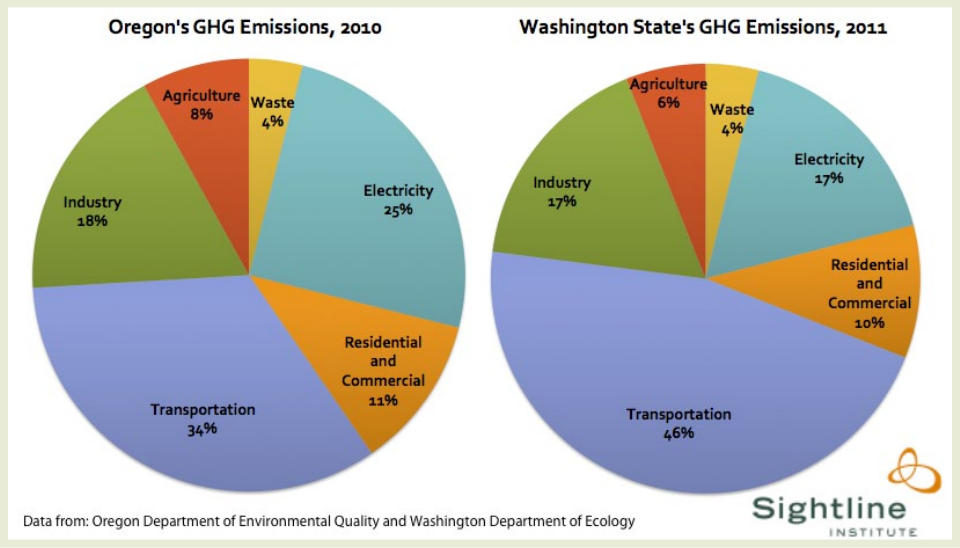
1. You (the legislature) make state agencies responsible for hitting their own pollution target

You could write your existing carbon reduction goals into the statutory duties of your agencies. You could set emissions targets for each sector of the economy—transportation, industry, agriculture, utilities, and so on—and then give the appropriate one of your agencies the legal authority to push their sector to its target.

First you would need to pick a pollution number for each sector. The simplest formula would be to require each sector to meet its share of the state's goals by itself: in Oregon, each sector would have to slash pollution 75 percent below its own 1990 levels by 2050; inWashington, each sector would have to cut pollution 50 percent below 1990 by 2050. If you thought it was unfair to hold each sector to its own 1990 benchmark—maybe because in 1990 Oregon had a nuclear power plant that made that year's power sector emissions lower than subsequent years—you could instead require each sector to shave some percent below current or forecast emission levels. Or you could set sector pollution limits based on how easy or difficult you think (or you guess? or industry lobbyists tell you?) it will be to move that sector off carbon.

Say you get past that first (difficult) hurdle and choose a number for each sector. Whew. Now you get to pass the buck to the agencies! These are the sectors that generate greenhouse gas (GHG) pollution in Oregon and Washington, and the agencies that you might want to put in charge of each:

- **Electricity:** Oregon Public Utilities Commission (OPUC) and Washington Utilities and Transportation Commission (WUTC)
- **Transportation:** Oregon Department of Transportation (ODOT) and Washington State Department of Transportation (WSDOT)
- **Industry:** Oregon Department of Environmental Quality (ODEQ) and Washington Department of Ecology
- **Agriculture:** Oregon Department of Agriculture and Washington State Department of Agriculture
- **Solid Waste** (mostly methane from landfills): Oregon Department of Environmental Quality (ODEQ) and Washington Department of Ecology.



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You would give each agency authority to create new regulations or ramp up existing regulations to make sure it hit the pollution target you set for it. This approach could avoid, for example, the Washington Court of Appeals' conclusion in Cascade Bike v. Puget Sound Regional Council that the regional planning council was not obligated to reduce carbon pollution. You would make clear that each agency is obligated by law to cut pollution and any agency that fails to do so will have to answer to you and the courts.

Here are some examples of the policies these agencies might enact:

- The Oregon Public Utilities Commission could increase the state's renewable portfolio standard from 25 percent to 40 percent or more.
- The Washington Utilities and Transportation Commission could require utilities to invest more money in energy efficiency.
- The Oregon Public Utilities Commission could raise the cap on the amount that industrial customers pay towards energy efficiency so that the Energy Trust of Oregon could go after more industrial efficiency projects.
- The Washington Department of Transportation could require the state's 14 Regional Transportation Planning Organizations and counties engaged in planning to push compact and transit-oriented development.
- The Oregon Department of Transportation could require Oregon's ten Metropolitan Planning Organizations to prioritize increased walkability, bikability, and transit access.
- The Oregon Department of Agriculture could require dairies to install methane digesters.
- The Washington Department of Ecology could require local governments to recycle 80 percent of the solid waste stream.

Unfortunately, these agencies might be hamstrung by a lack of authority. You would need to delegate enormous power to the agencies or risk failing to make the pollution cuts that are already enshrined in state law. Here are some examples of the policies that agencies might need you to give them more authority for:

- Oregon's Utilities Commission might need the authority to tighten the state's emissions performance standard.
- Washington's Utilities Commission might need the authority to require energy performance disclosures for private buildings.
- The Department of Transportation might need the authority to impose a VMT tax or other way to price pollution from driving and use the revenue to invest in transit options.
- The Department of Transportation might need the authority to impose a carbon fee and fund compact development and transportation projects.
- The Departments of Environmental Quality and Ecology might need authority to implement a product stewardship framework to force manufacturers to take responsibility for their products, cradle-to-grave.

Finally, there are many areas where you would not really be able to hold one agency accountable for a sector's pollution because there is a mismatch or overlap between agencies and emissions. For example, what authority does the Department of Transportation have over the Regional Planning Organizations? What authority does the Department of Ecology have over local governments' recycling programs? Here are some examples where the point agency just doesn't have the power to do what you need them to do:

- Building codes are an important tool for improving energy efficiency, but the utilities agencies don't oversee them. The Washington State Building Codes Council, advised by the Washington State Department of Commerce, advises the legislature on changes to the building code. The Washington Utilities and Transportation Commission could only request that the Building Codes Council advise the legislature to improve the code. Similarly, in Oregon, the Building Codes Division develops and adopts statewide building codes. In other words, the Commission in charge of meeting pollution goals would only have the power to beg two other government bodies to make needed changes.
- Appliance efficiency standards are another tool for getting cheap clean energy by using less electricity to get the same cold beers out of a more efficient fridge. Many appliance standards are out of state hands because they are regulated by the federal government, but for those appliances left to state jurisdiction, the Oregon Department of Energy and the Washington State Department of Commerce are in charge. If the Oregon Public Utilities Commission and Washington Utilities and Transportation Commission were the agencies responsible for hitting a carbon pollution number, they would have to ask the Energy and Commerce departments for help, but would not have the authority to take action themselves.
- In the transportation sector, the main opportunities for cutting pollution from individuals' driving (as opposed to trucks moving freight around) are (1) to make cars burn fuel more cleanly, (2) to use cleaner fuels, and (3) to give people better options for getting around without driving as much.
    - In the first category, Oregon and Washington have already taken the critical step of passing a Clean Car Law.
    - In the second category, Oregon and Washington are contemplating a Clean Fuels standard, but you (the legislature) would need to act. If you instead gave an agency sufficiently broad authority to enact a Clean Fuel Standard if it chose to, the agency you would give this authority to would be ODEQ/Ecology. The Departments of Transportation would be dependent on you and ODEQ/Ecology to properly implement a policy that would help meet their responsibilities.
    - The third category requires changes in land-use laws to plan cities around people rather than cars, and funding for transit so people can get around those well-planned cities. A comprehensive state climate package could make the needed changes to land-use planning requirements and dedicate some of the carbon revenue to transit funding. But making the Department of Transportation answer for all transportation GHG pollution in the state is tricky. Land-use planning is under the purview of regional planning bodies and counties and cities, not the state Department of Transportation. You would need to give the Department of Transportation authority over the regional planning bodies (not popular), or make them answer for pollution that they have no control over (not fair).

- The Washington Department of Ecology—not the Department of Agriculture—regulates air emissions from the agriculture sector and also collaborates with agriculture on water. In Washington, you might want to put Ecology in charge of agricultural emissions, rather than putting the State Department of Agriculture in charge but forcing them to ask for Ecology's help. (The Oregon Department of Agriculture is responsible for air and water pollution, so you would put Ag in charge).
- Agencies from different sectors might even work at cross-purposes. For example, electric vehicles can slash pollution from the transportation sector. But OPUC/WUTC, desperately trying to meet the goals you assigned them, might kneecap any attempts to add electricity demand from electric vehicles.

Many of these policies would work better as part of a state-wide climate strategy that you design, rather than developed helter-skelter by a few agencies trying to rise to the (potentially impossible) task of achieving sector-by-sector pollution targets.

Pros:

- Price certainty of carbon tax, if included.
- Agency accountability for meeting pollution targets.

Cons:

- Difficult for legislature to formulate fair targets for each sector.
- Difficult to give agencies the necessary authority.
- Agencies working in silos could unwittingly work at cross-purposes.
- The agency with the responsibility for meeting the goal will need to ask other agencies for voluntary help.
- Balkanized approach would be less efficient than economy-wide price and could discourage cross-sector technological innovations, like electric vehicles.

2. You authorize agencies to implement climate policies but do not assign specific pollution targets

If you can't pass a statewide cap ***or*** tax ***or*** sector-based pollution targets (*sob*) you might fall back on sector-based policies and hope those are enough. Like the scenario above, you would pass a bill requiring all state agencies to reduce GHG pollution to meet the state's climate goals, but you would not set enforceable targets for each sector. This would be like California's program, but without the cap to ensure the state actually reduces pollution. The agencies would need to develop and enforce policies designed to move their sectors toward a clean, low-carbon future, but they would not be required to reach a certain pollution target. The big disadvantage of this approach relative to the one above is that, if the state failed to meet its statutory targets, there would be no one to answer for that failure. Not you, not the agencies. There would just be a big state-wide shrug. An important advantage is that you would not be limited to putting a single agency in charge of the entire sector, so you could avoid some of the inter-agency awkwardness described above. Your bill could call out all the relevant agencies mentioned above and ask them to implement whatever policies are within their power to move the state towards its GHG targets.

Pros:

- Agencies would have authority to implement climate policies.
- The legislature could tap multiple agencies to work towards climate goals.

Cons:

- Agencies would not be accountable for meeting pollution targets.
- Difficult to give agencies the necessary authority.
- Agencies working in silos could unwittingly work at cross-purposes.
- Balkanized approach would be less efficient than economy-wide price and could discourage cross-sector solutions, like electric vehicles.

3. One agency to rule them all: you put DEQ/Ecology in charge

Instead of setting sector-by-sector targets and picking a (possibly impotent) agency to put in charge of each sector, you could put one agency in charge of everything. In Oregon that would be the Department of Environmental Quality, and in Washington the Department of Ecology. Your bill would shift the burden onto ODEQ/Ecology to figure it all out, and give them the authority to order other agencies to toe the line. This would avoid the problem of not being able to pick a single agency for each sector, and would also make someone—namely, ODEQ and Ecology—responsible for getting the state to its climate goals. But other agencies might not appreciate being ordered around by ODEQ/Ecology, and ODEQ/Ecology would not have the in-house capacity and expertise to formulate all the needed policies.

Pros:

- Agency accountability for meeting pollution targets.
- ODEQ/Ecology could try to orchestrate a more coordinated state-wide effort.

Cons:

- Legislature would have to delegate enormous powers to ODEQ/Ecology.
- ODEQ/Ecology would have to order other agencies around.
- ODEQ/Ecology would not have the capacity to do everything needed to get the state to its goals.

Maybe regulating our way is not the best way

Many of the policies described above are important pieces of the climate puzzle for Oregon and Washington. But they work best when they fit together. You (the legislature) are in the best position to put together the whole picture. A statewide cap or bumpered tax would make polluters—not state agencies—ultimately responsible for pollution cuts, and an accompanying comprehensive package of policies, coordinated across agencies, would capture low-cost carbon-cutting opportunities. But shifting the onus away from polluters and onto state agencies could create a difficult morass of conflicting motivations and could result in perverse results, like the Public Utilities Commissions fighting against electric vehicles. Asking agencies to cut pollution is better than not cutting pollution at all, but it is not the best option—not by a long shot!—for Oregon and Washington to meet their statutory GHG obligations.

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Carbon Pricing and Northwest Businesses

By Yoram Bauman
August 7, 2014

Link to Article Online

Many business owners and workers worry that carbon pricing will hurt local economies. They need to know: How would carbon pricing affect businesses and job creation in Washington and Oregon? In particular, how would it affect energy-intensive businesses that compete in national and international markets with companies not yet covered by carbon pricing? Will these energy-intensive, trade-exposed (EITE) businesses, like steel and aluminum manufacturing, still be able to compete with businesses outside the state or will carbon pricing send their sales plummeting? Will pricing carbon in the Northwest just send production and carbon pollution elsewhere? In other words, will carbon emissions "leak" to out-of-state firms?

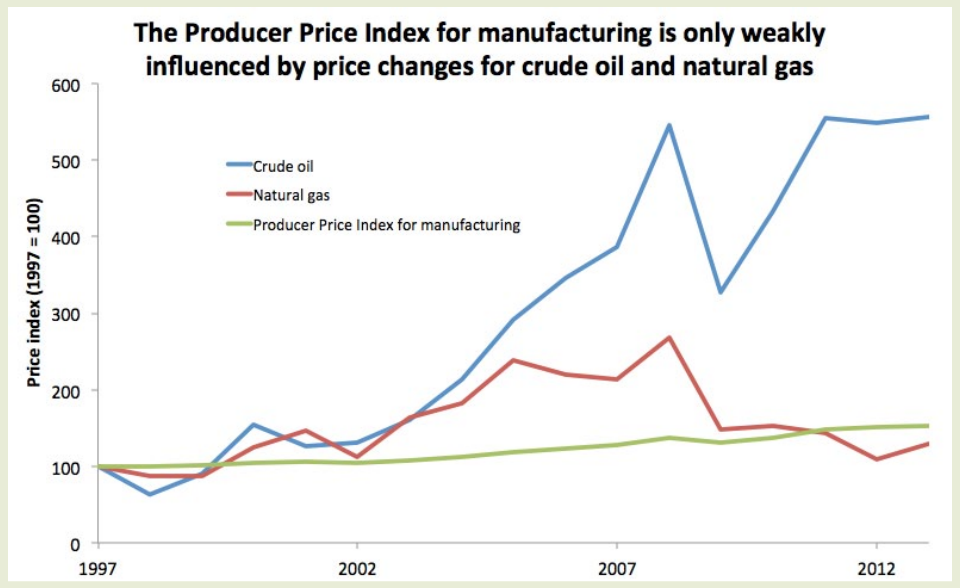
The answer? Most businesses are not energy-intensive and consequently would be essentially unaffected; they might even benefit from carbon pricing if they receive offsetting reductions in existing taxes. However, a small group of energy-intensive businesses, only some of them trade-exposed, would be substantially affected by a price on carbon. Fortunately, there may be ways to partially and perhaps fully address those impacts, for example by reducing existing taxes on manufacturers.

In this article, I will spell out that answer, industry by industry, for Oregon and Washington. I assume a carbon price of $25 per ton of CO_2. That figure is based on the proposal for Washington State that I'm working on with CarbonWA.org, and it's close to the $30 carbon tax in BC. If you're more interested in a California-style system, divide most of the carbon pricing financial impacts by two because permit prices there are roughly $12 per ton at the moment. For simplicity, I concentrate on CO_2 from fossil fuels, which account for more than 75 percent of the total. A more-complete review would need to study more thoroughly the handful of industries with significant emissions of other greenhouse gases (GHGs) or of CO_2 from other sources.

Who pays a price on carbon?

There are three ways to see that direct impacts of a carbon price on most businesses would be modest. The first approach is anecdotal: let's consider a hypothetical energy-intensive business that spends 50 percent of its revenue on petroleum fuels. (That's very roughly in the ballpark for an airline or a trucking company.) A carbon price of $25 per ton of CO_2 works out to about 25 cents a gallon, so to keep the math simple let's call that an extra 10 percent in fuel costs. Overall costs, then, increase by 5 percent. And since our hypothetical energy-intensive business sees a carbon pricing impact of only 5 percent, the vast majority of businesses—retailers, software companies, etc.—are going to see an impact that is much, much smaller.

The second approach is to look at actual data from an energy-intensive sector of the economy—manufactured goods—and notice how stable prices have been despite the wild price changes in oil and natural gas over the past 15 years. The impacts of a $25 carbon price would be much less than these natural price swings, and if these natural price swings haven't had a strong impact on the selling price of manufactured goods then it's clear that the vast majority of businesses will not be greatly affected by a carbon price.



Data sources: Prices for crude oil (U.S. first purchase price) and natural gas (industrial price) from EIA; Producer Price Index (for total manufacturing industries) from BLS. Original Sightline Institute graphic, available under our free use policy.

The third and final approach is to consider the data from the Carnegie Mellon Economic Input-Output Life Cycle Assessment (EIO-LCA) model, which breaks down the economy into 428 sectors and tracks the direct and indirect carbon emissions associated with each one. (The sectors are not of equal size: "retail trade" is one sector, and so is "power generation and supply," and so is "tortilla manufacturing.") The exact numbers from this model need to be treated with caution. For one thing, the model uses 2002 data and fossil fuel prices have changed since then. For another, national models like EIO-LCA don't reflect the electricity mix in the Pacific Northwest. Still, the general results are informative.

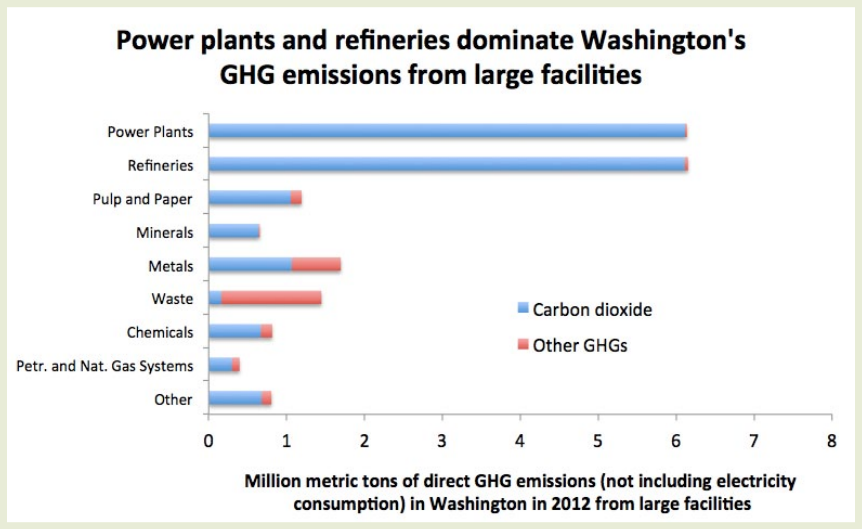
Using the model, I estimate the impact of a $25 carbon price on each economic sector. Of the 428 sectors, only 2 (power generation and cement manufacturing) would see costs go up by an amount equal to more than 10 percent of revenue. Another 14 sectors would see a carbon price impact of 5-10 percent of revenue; examples include carbon black manufacturing, fertilizer manufacturing, and industrial gas manufacturing. The next 60 or so sectors—including pulp and paper mills, glass manufacturing, fishing, and air and truck transportation—would see a carbon price impact of 2.5-5 percent. The next 200 or so sectors would see a price impact of 1-2.5 percent; manufacturing still dominates this group, including most types of food and beverage manufacturing, but the group also includes various sectors of agriculture, forestry, mining, construction, and even a few unexpected sectors like colleges and universities. The final 150 or so sectors, with a price impact of less than 1 percent, include retail trade, software publishing, and high-value-added manufacturing such as aerospace.

A good summation comes from quoting "Who Pays a Price on Carbon?" a 2010 study of household and business impacts by economists Corbett Grainger and Charles Kolstad that uses an earlier version of the EOI-LCA model: "There are remarkably few sectors [of the economy] that see substantial cost increases." They add that "what constitutes substantial is a subjective judgment" and I would add that whether businesses are trade-exposed matters here as well. A cost increase of (say) 3 percent is unlikely

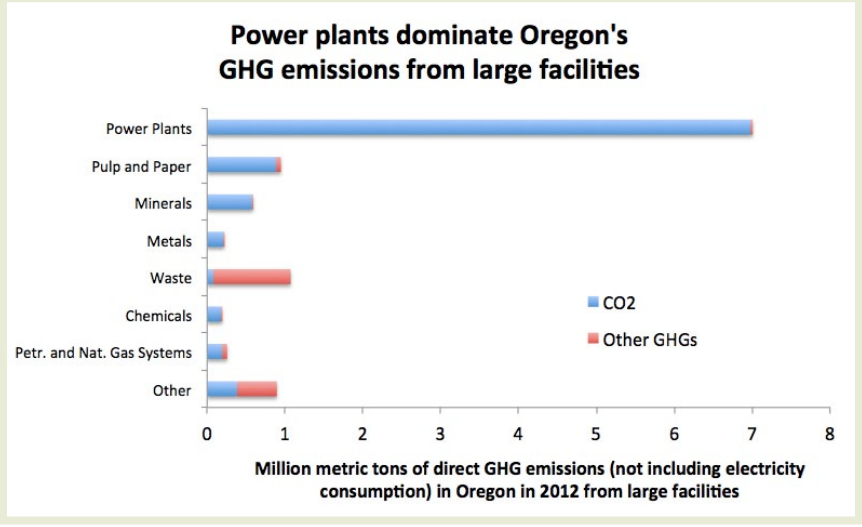
to significantly affect a business that will be able to raise its prices to compensate; the same cannot be said for a business that competes nationally or internationally, and consequently cannot raise prices, because that 3 percent will have to come out of the firm's profit margin. (Typical profit margins for non-financial companies range from 5-10 percent according to investment advisor Jon Shayne. As another point of comparison, business and occupation [B&O] taxes in Washington State are 1.5 percent for most businesses and about 0.5 percent for manufacturing.)

Focusing on the Pacific Northwest

To bring these numbers down to the level of Washington and Oregon, consider EPA data on direct GHG emissions (not including electricity consumption) from large facilities, including all facilities that generate more than 25,000 tons of such emissions per year. For context, that level of emissions roughly equals the combined emissions of 1,000 households. In 2012, only 90 entities in Washington and 63 entities in Oregon made the cut for the EPA database.



Data source: EPA. Original Sightline Institute graphic, available under our free use policy.



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Power plants and refineries

The dominant carbon polluters are power plants in Washington and Oregon and oil refineries in Washington. Each of those 3 sectors generates emissions of more than 6 million metric tons of CO_2. At $25 per metric ton, pricing carbon would cost each sector more than $150 million.

That's a lot of money, but remember that these are huge industries. For example, the Washington Research Council reports that the five oil refineries in Washington produced about 3.7 billion gallons of motor gasoline in 2011, plus a roughly equal amount of other products such as diesel and jet fuel. About half of their products are consumed in-state, including about 2.6 billion gallons of motor gasoline. Some $150 million in carbon pricing revenue divvied up among approximately 7.5 billion gallons of petroleum products is only about two pennies a gallon.

You might think that big industries like this would generate a lot of tax revenue for the state under the existing tax system. And you'd be right: the Washington Research Council estimates that the petroleum industry paid about $105 million in business and occupation (B&O) taxes and $163 million in other taxes, mostly the hazardous substance tax.

These existing taxes create an opportunity for a swap. Eliminate the B&O tax for refineries, and those $105 million in tax savings would be in the ballpark of the $150 million cost of a $25 carbon price. (Of course, the impact on individual companies would depend on their specific business practices and B&O tax liabilities, and since those are proprietary all we can do is express an interest in doing case studies on this topic. Also note that the Multiple Activities Tax Credit—under which refinery products sold in-state are subject to the B&O tax for selling rather than for manufacturing—may limit the tax savings to only about $60 million [figure 10.2])

A tax swap would give refineries a strong incentive to reduce emissions (every ton of reduced emissions would be $25 in savings) without greatly increasing their overall tax bill—or encouraging them to move production out of state. Besides, refineries may not be terribly exposed to trade competition anyway. No one has built a large refinery in the United States since 1977, and the two refineries in British Columbia—the Chevron refinery in Burnaby and the Husky refinery in Prince George—have not reduced their output since the province implemented its revenue-neutral $30 carbon tax. Likewise, Washington refineries have not cut output, even though the dollar value of B&O taxes paid by refineries has more than tripled since 2003 (Appendix A). The B&O tax is a tax on gross receipts, not profits, so if the price of crude oil goes way up then refineries pay much higher taxes, even if they're not seeing any increase in profits.

Refineries in Washington or British Columbia may deserve tax reductions to offset the cost of a carbon price, but the purely economic case is tenuous.

Similar and additional questions about trade exposure arise with electric utilities. These businesses are regulated monopolies. They are subject to different types of economic pressures than most businesses. In any case, as with refineries, the $150 million carbon pricing bills for electric utilities in Washington and in Oregon should be seen in the context. For example, Washington's largest electric utility, Puget Sound Energy (PSE), provided more than 22 million megawatt-hours of electricity in 2012 and had revenues of $2.2 billion. Based on PSE's fuel mix disclosure reports, a $25 carbon price would cost the company about 1 cent per kilowatt-hour. That's about a 10 percent increase of its retail prices.

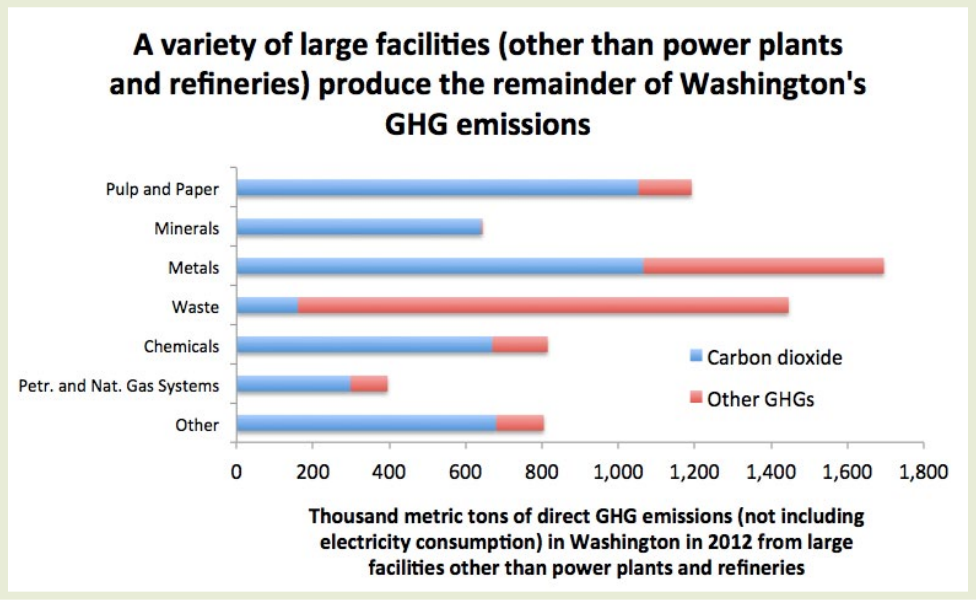
If Washington chose to provide tax reductions to address the impact on electric utilities, it could trim the public utility tax, which utilities pay in lieu of B&O tax. The state's Tax Reference Manual estimates that electricity providers pay about $225 million a year. Washington is roughly divided between public utilities like Seattle City Light that get a lot of hydropower and private utilities that are more carbon-intensive, so focusing just on the private utilities (because they are the ones that would be hit hard by a carbon price) would correspond to a public utility tax of about $100 million a year. As with refineries, that's in the ballpark of that sector's carbon pricing liabilities in Washington.

Opportunities for an electric utility tax swap in Oregon may be more limited. The relevant existing taxes in Oregon appear to be the corporate income tax and perhaps the electric cooperative tax, and according to the state's Legislative Review Office (pages A7 and C21), utility tax payments totaled only about $3 million and $7 million, respectively, in 2010.

In any event, utilities are closely regulated by state utility commissions, and commissions will presumably allow utilities to pass carbon costs through to power consumers. Utilities, therefore, may not suffer in the least from a carbon price. (Consumers, for their part, could be compensated for power price increases with reductions in sales taxes, per-capita rebates, or other ideas discussed in two of the previous posts in this series.)

Other manufacturers

What about large emitters other than power plants and refineries? The EPA data show that emissions excluding these two industries totaled 7 million tons in Washington and 4.1 million tons in Oregon. At $25 per ton, that's $175 million for Washington and $103 million for Oregon.



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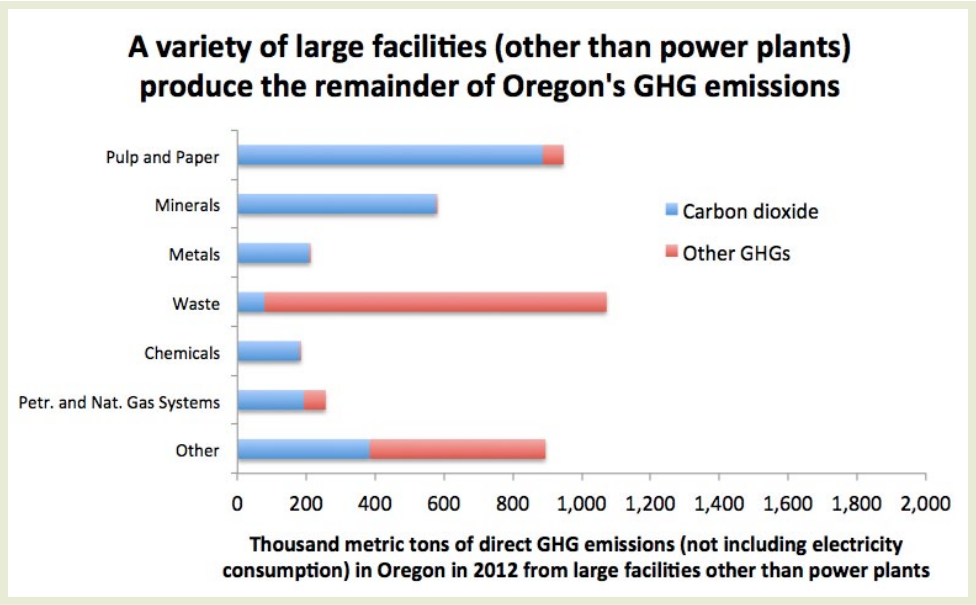

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Carbon pricing liabilities in these sectors of the economy depend on the coverage details of the carbon price itself. The figures above reflect what might happen in a California-style system that covers most if not all GHG emissions. A BC-style system that just targets fossil fuels—or, to be more accurate, a large subset of fossil fuels—would not include the red (non-CO_2) gases. And even the blue (CO_2) bars in the figures overstate the actual impacts of a BC-style carbon tax because, for example, about half of the CO_2 from cement production is from non-fossil-fuel-related chemical processes. For the sake of approximation, though, the blue bars shown in the figures above—only CO_2 emissions, excluding power plants and refineries—total 4.6 million tons in Washington and 2.5 million tons in Oregon. At $25 per ton, that's equal to a carbon pricing bill of $115 million in Washington and $63 million in Oregon.

How do these potential carbon pricing liabilities—on the order of $75-175 million in Washington and $40-100 million in Oregon, depending on the details of the policy—compare with existing taxes on manufacturers? In Oregon, the state Department of Revenue collected $49 million (page C21) in taxes from mining and manufacturing businesses in 2010. In Washington, the Department of Revenue estimates that manufacturing B&O taxes totaled $160 million in 2011. As noted, about $60 million of this came from refineries, leaving $100 million in B&O taxes for manufacturers other than power plants and refineries. In both states, then, existing taxes on large manufacturers are (in aggregate) in the ballpark of the additional direct cost of a $25 carbon price.

Beyond manufacturing

Moving beyond manufacturing entirely, the EIO-LCA model suggests that most other businesses would see a cost increase of less than 1 percent as a result of a $25 carbon price.

Moreover, in Washington State there's a way to address carbon pricing impacts on many non-manufacturing businesses. I've argued previously that reducing the state sales tax by a penny (from 6.5 percent to 5.5 percent) is an excellent way to "recycle" carbon tax revenue, and that would benefit

businesses as well as households. In fact, the state Department of Revenue estimates (table 9-3) that business purchases account for 36 percent of state sales tax revenue. The state sales tax generates more than $7 billion a year, so a 1-cent reduction would be $1.2 billion. More than $400 million of those tax reductions would accrue to businesses. [Update: A more recent DOR tally has businesses accounting for 32 percent of state sales tax revenues, so their share of the tax reductions would be $380 million.]

Let's look at a specific example. Information from trucking companies is proprietary, but there's a fairly similar entity that opens its books to the world: King County Metro. (You could argue that public transit systems should get an exemption from a carbon price, but never mind that for now.) According to its 2012 Annual Management Report (page 11), Metro uses about 10.6 million gallons of diesel fuel a year, so a $25 carbon price would work out to about $2.7 million a year. But Metro also spent $110 million on "transit fleet procurement" (that is, buses). And it pays state sales tax on those buses, so a 1 percentage point reduction in the sales tax would save it about $1 million, trimming Metro's hypothetical carbon-pricing hit by 37 percent. That doesn't entirely eliminate the impact of a hypothetical carbon tax, but it provides a substantial reduction. And most businesses are much less carbon-intensive than King County Metro.

The bottom line

When it comes to carbon pricing, the business world divides into three groups: businesses that are not energy-intensive, businesses that are energy-intensive but not trade-exposed, and businesses that are both energy-intensive and trade-exposed.

The first group includes the vast majority of businesses in Washington and Oregon. These businesses would pay relatively little in carbon pricing costs, and a reduction in sales taxes in Washington State would almost certainly offset costs for most of them. (If you're especially concerned about small businesses, you could triple the small business B&O tax credit; that would save small businesses about $100 million a year.) Opportunities for a tax swap are less obvious in Oregon, but remember that the impacts of carbon pricing on businesses in Group One is quite small.

The second group consists of businesses that are energy-intensive but not trade-exposed. Refineries and power plants might fit this description, but let's consider two less-energy-intensive examples that provide more clarity: local trucking and construction. Any company that wants to truck something around the Pacific Northwest or build something in the Pacific Northwest needs to conduct those business activities in the Pacific Northwest. All such companies would consequently pay the carbon prices associated with those business activities, and the laws of economics suggest that the market price of those business activities would increase accordingly. That's all well and good because those business activities generate a lot of CO2: true-cost accounting means that those activities *should* be more expensive.

The third group consists of businesses that are both energy-intensive and trade-exposed, and the fact that they get an acronym (EITE) speaks to their importance. In an ideal world, there would be no businesses in this group: an ideal world would have an international carbon price instead of a state carbon price, and with an international carbon price all energy-intensive businesses would end up in Group Two. In the real world, however, states are leading the way on carbon pricing, and that obligates us to pay special attention to energy-intensive businesses that face out-of-state competition.

Fortunately, Washington and Oregon can reduce or eliminate impacts on EITE businesses by using about 10 percent of the revenue from carbon pricing to reduce or eliminate existing taxes on manufacturers. The relevant numbers may or may not balance for individual firms but in the aggregate they're pretty close for a $25 carbon price. (And I'm looking for businesses that are willing to open their books and do a case study—anonymously if desired—-so if your business is interested please contact me!) That suggests that properly designed carbon pricing policies in the Pacific Northwest can pencil out for the business community and can help point the way forward for the nation and the world.

Research assistance by Summer Hanson. Thanks to Mia Reback and Jon Shayne for research guidance and to Quintin Barnes for feedback on a draft of this article.

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Oregon has a climate law implementation problem

By Kristin Eberhard
April 9, 2015

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Most parents are familiar with the slight panic of not knowing if you really have a way to enforce a rule you made for your kids. You've been clear that it is not OK to chew gum at the dinner table, but now what? Reach in his mouth and pull the gum out? Carry him to his room? Stop dinner until he complies?

Oregon is facing a similar dilemma: the Beaver state has had climate change pollution goals in law for eight years, but doesn't have a mechanism to meet the legal pollution limits. Oregon House Bill 3470—the Climate Stability & Justice Act of 2015—would create the framework to fairly and cost-effectively phase out fossil fuels. Here's why HB 3470 is the bill Oregon has been waiting for:

It commits Oregon to meet its existing, scientifically-based, climate pollution limits

The Intergovernmental Panel on Climate Change (IPCC)—an international scientific body collecting and reviewing the work of thousands of scientists—has determined that if we want to avoid 2 degrees Celsius of warming this century, we must cut global greenhouse gas pollution 41 to 72 percent below 2010 levels by 2050. Wealthier countries that emit more must cut more to stay within our global means. Oregon could do its part by attaining its current goal of reaching 75 percent below 1990 levels by 2050.

HB 3470 would make binding Oregon's existing science-based limits of 10 percent below 1990 levels by 2020 and 75 percent below 1990 levels by 2050. The bill requires the Environmental Quality Commission to develop an action plan for ensuring the state does not exceed its statewide emission limits.

It could create a solid cap on pollution

Oregon is already doing a lot to cut pollution and help transition to clean energy. But no policy measure can substitute for setting a solid cap on the greenhouse gas emissions that are allowed into the atmosphere; it's our ***firm guarantee*** that we will meet pollution targets.* A cap on pollution works kind of like musical chairs, where chairs are pollution permits and the players are tons of greenhouse gas pollution. Oregon decides how many tons of pollution (players) to allow each year and only creates that many permits (chairs). The largest emitters—about 70 coal plants, oil refineries, and large manufacturers—must buy permits in quarterly state auctions. Each year, the number of permits (chairs) dwindles, meaning fewer tons of pollution (players) are allowed. Energy companies will improve the efficiency of their operations and switch to clean fuels so they can keep delivering energy, but with fewer tons of pollution attached. Investment dollars will flow away from fossil fuels and towards clean energy solutions. Oregonians will stop sending millions of dollars to out-of-state fossil fuel companies, and instead put their money to work on clean solutions and jobs right here.

HB 3470 requires Oregon to meet its existing climate goals. The Environmental Quality Commission's action plan may include regulations and market-based compliance mechanisms, such as an enforceable safety cap.

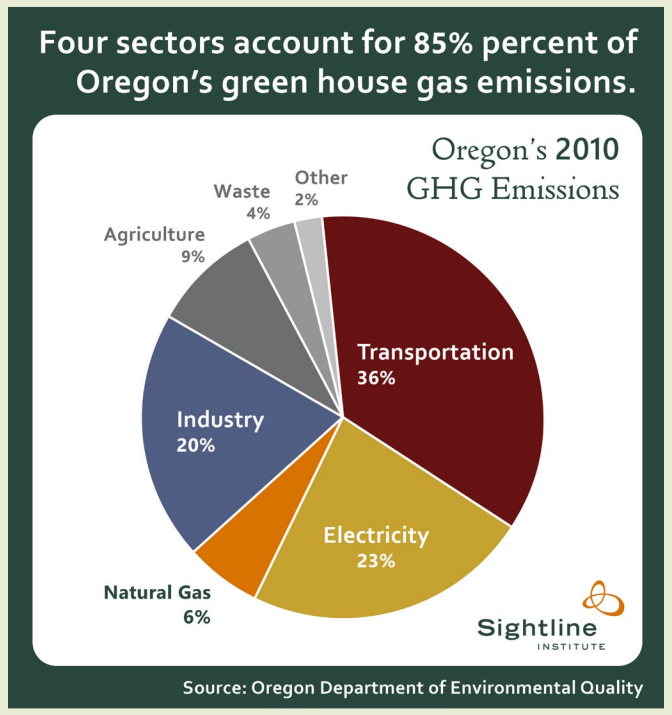
The cap covers all major greenhouse gases

Carbon dioxide (CO_2) is the Justin Timberlake of greenhouse gases, but its old 'N Sync band mates—methane, nitrous oxide, hydroflourocarbons, perflourocarbons and sulfur hexafluoride—deserve some recognition. In the first two decades after it is released, methane will induce 85 times as much warming as the same amount of CO_2. Nitrous oxides are 268 times as potent as CO_2 over 20 years. To actually cap pollution, an Oregon law needs to cover not just the heartthrob, but the whole band.

HB 3470 covers the warming potential of all six greenhouse gases.

The cap covers all major sectors of the economy

Eighty five percent of Oregon's emissions come from four major sectors: transportation, electricity, industrial sources, and natural gas.



By covering those four sectors, a cap can ensure Oregon hits its statewide pollution goals. Exempting one or more of these major sources would break the safety cap and Oregon wouldn't be able to control its pollution. British Columbia, California and Quebec all limit pollution from all major sectors. But the northeast states only capped electricity emissions, so 78 percent of those states' pollution is still leaking out, uncapped.

HB 3470 covers significant greenhouse gas emitters in every sector. The bill leaves it up to the Environmental Quality Commission to specify how big a polluter must be in order to be "significant," but most other jurisdictions use a threshold of 25,000 million metric tons (MMT) of carbon dioxide equivalent per year, meaning that only very large power plants, refineries, and factories are regulated. A 25,000 MMT threshold would mean only around 70 large facilities in Oregon would be regulated—small businesses, and even big business that don't sell or burn fossil fuels, would not have to purchase permits.

It strives for equity

Low-income residents and communities of color are disproportionately impacted by climate change. They are hardest hit by air pollution and by economic disruption, and they have the fewest options for responding. Any attempt to address climate change in a fair and equitable manner must help these communities thrive.

HB 3470 strives for equity by:

1. Appointing an environmental justice advisory committee to assist in developing the state's action plan.
2. Directing "public and private investment toward benefitting disadvantaged communities and providing opportunities for beneficial participation by small business, schools, affordable housing associations, and other community-based institutions."
3. Ensuring that programs to cut pollution "do not disproportionately impact low-income communities."

It gets the best bang for the buck

We urgently need to curb climate change, but that doesn't mean we should haphazardly throw money at the problem. The most important way to avoid gold-plated pollution reduction programs is to use a cost-effective market-based mechanism, such as a cap enforced with permits. If polluters have to pay for every ton of pollution they release, they will think carefully about how to eliminate as many tons as possible by investing in efficiency retrofits and switching to cleaner fuels. Letting businesses make their own decisions about how to squeeze pollution out of their operations will result in lower-cost results than putting a public agency in charge of micro-managing business operations across the state. In addition to using a cap-and-permit system, a bill can also call out cost-effectiveness as a criterion for evaluating reduction options.

HB 3470 requires the Environmental Quality Commission to consider "market-based compliance mechanisms" and to maximize "cost-effective reductions."

It coordinates local, state, regional and national efforts

Local governments are taking bold climate action, Oregon is already taking action on climate on various fronts, regional fuel and power markets would benefit from a systematic western regional approach to climate, and the EPA's Clean Power Plan encourages regional coordination to meet national climate pollution reduction goals.

HB 3470 encourages all levels of coordination. Importantly, the bill doesn't make Oregon reinvent the wheel. California has been successfully operating a cap-and-trade program for years. In 2014, Quebec joined the California cap, and now Ontario, Canada is considering joining. Oregon could benefit from joining California's existing program, including saving itself a lot of administrative headache.

By maximizing existing climate efforts within and outside the state, HB 3470 would most effectively leverage Oregon's efforts.

It course-corrects

Other cap-and-trade programs have realized a few years in that they need to make some changes: better emissions data becomes available, or other circumstances changed. Without a built-in course-correction mechanism, it can be hard to revise when necessary.

A lot could change between now and 2050. HB 3470 builds in resiliency by setting new interim goals every five years. If circumstances change or new information arises, the Climate Stability & Justice Act will adapt.

Oregon could meet its climate goals with HB 3470

Oregon's got climate goals. HB 3470 creates a framework for fairly and cost-effectively meeting those goals.

** A self-adjusting tax that automatically changes to keep pollution reductions on target. From a policy perspective, a cap on pollution and a tax on pollution can have the same effect, but from a legal and logistical perspective, a tax in Oregon faces bigger : it must win votes from three-fifths of legislators, and Oregon's Constitution specifies that money from vehicle fuels can only be used for highway purposes.*

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What If Polluters Paid and You Got the Money?

By Kristin Eberhard
April 2, 2015

Link to Article Online

What if we could click our ruby slippers and transport ourselves to a magical place where polluters pay and we all get checks in the mail? The Oregon legislature is considering two bills that would take us there.

When designing a program to make climate polluters pay, one of the most important decisions is what to do with the money. Northeast states and California invest in energy efficiency and transportation. British Columbia gives tax cuts to people and businesses. Two Oregon bills contemplate mailing out dividend checks. If Oregon passed a polluters-pay-plus-dividend bill, the air would no longer be a free dumping ground for pollution, clean energy would be on an even playing field with fossil fuels, and each Oregonian would get a check for $500-$1,500 every year. Sound too good to be true? It's not. Here are the details, Q & A style.

What are these Oregon dividend bills and what do they do?

HB 3176 would charge fossil fuel sellers a fee for each ton of pollution, starting at $30 per ton and increasing by inflation plus $10 per ton every year. All the money would go into a Trust Fund. Each September, the Department of Revenue would mail every Oregon taxpayer and taxpayer dependent a check for an equal share of the money.

HB 3250 would do roughly the same thing, but instead of creating a set fee schedule it would create a set number of pollution permits that fossil fuel sellers could buy in an auction. Each year, less pollution would be allowed and fewer permits would be available. By 2050, Oregon's climate pollution would be 85 percent below 1990 levels. As permits become scarce, the price would go up.

Why are there two bills? Is one better than the other?

Both bills lead to the Emerald City, but they encounter different lions, tigers, and bears along the way.

HB 3176's tax could be implemented quickly, with little administrative overhead. But it would need a constitutional amendment. Article IX section 3a of the Oregon Constitution conscripts all taxes on motor vehicle fuels for use on highways, not dividends for Oregonians. HB 3176 would also need to garner support from 60 percent of legislators, because Article IV section 25 of the Oregon Constitution, as amended in 1996 by Measure 25, requires three-fifths of legislators to approve tax increases. Alternatively, the legislature or voters could reverse the Measure 25 amendment and reinstate majority rule in Salem, as Washington's supreme court did in 2014.

HB 3250, on the other hand, could pass by simple majority in the legislature and would not be subject to the limitations on gas taxes. But the Department of Environmental Quality would have to set up a permit and auction system, which would take time.

Why give everyone a check?

We all own the sky. Clean air is a shared asset. If a private company wants to use our air, it should have to pay us. Just like shareholders get a dividend check from company profits, Oregonians could get a dividend check when fossil fuel companies appropriate the atmosphere.

Would charging polluters and paying dividends to Oregonians really help Oregon transition to clean energy?

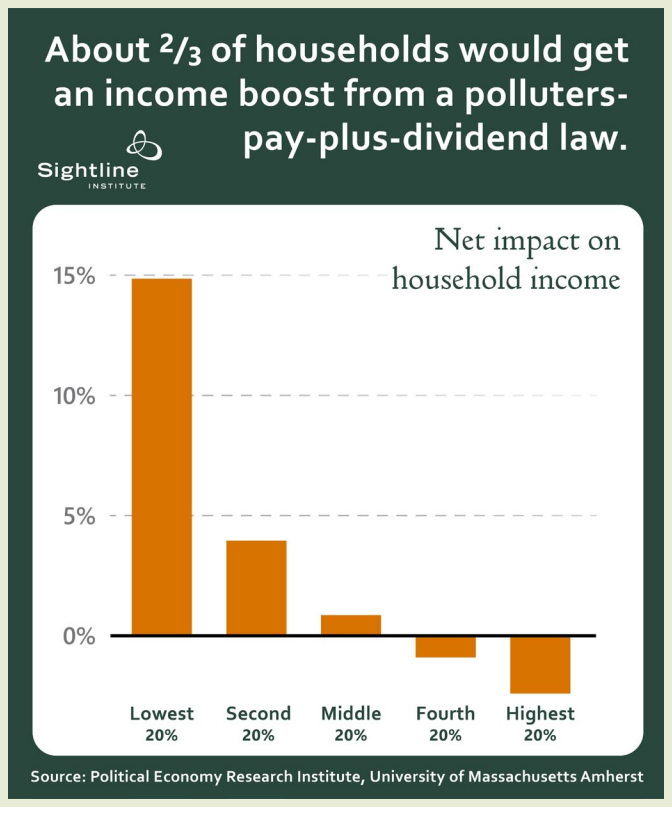
If fossil fuel companies paid a fee to dump their pollution—just like you and I pay a fee to dump our trash—it would level the playing field between energy sources. Solar and wind continue to grow faster than anyone predicted, but they could grow even faster if fossil fuel sellers weren't getting a free lunch. In a fair competition—where fossil fuels aren't stealthily passing their costs along to us in our health bills, fire department bills, water bills, and damages to our shellfish industry—clean energy would prosper and fossil fuels would wither.

But don't we need the money to fund clean energy?

We have most of the technologies we need to transition to clean energy. We just need to scale up. Utilities and private companies can invest in scaling up. Setting a hard cap or increasing tax on pollution will make clean energy more competitive than ever, whether or not the proceeds of capping or taxing are dedicated to clean-energy subsidies.

Will the dividend checks go away?

Not until the latter half of the century. To avoid the worst effects of climate change, we must facilitate an orderly, multi-decade, transition from fossil fuels to clean energy. As permits become rarer they would also become more valuable, so the Trust Fund and dividend checks would continue to grow for decades before leveling off mid-century. Even with the aggressive pollution cuts science requires, we will still use some fossil fuels in 2050. Eventually the Trust and dividend checks would wane as we move towards a 100 percent clean economy by the end of the century.



Polluters will pass costs along to consumers—won't that hurt low-income people?

About two-thirds of households would be richer with a polluters-pay-plus-dividend law. While low-income households spend more of their money on fossil fuel energy compared to better-off households, they still don't spend that much. Low-income Oregonians' fossil fuel costs would rise about $100, so the $500 dividend check would leave them $400 better-off.

Upper-income families spend much more money, so they would see a slight (2 percent, according to an analysis of a nation-wide cap and dividend law) increase in expenditures, even after the dividend check. But wealthier households often have options to oust fossil fuels, by retrofitting their homes, for example, or buying clean energy from their utilities or putting solar panels on their rooftops or buying more efficient cars.

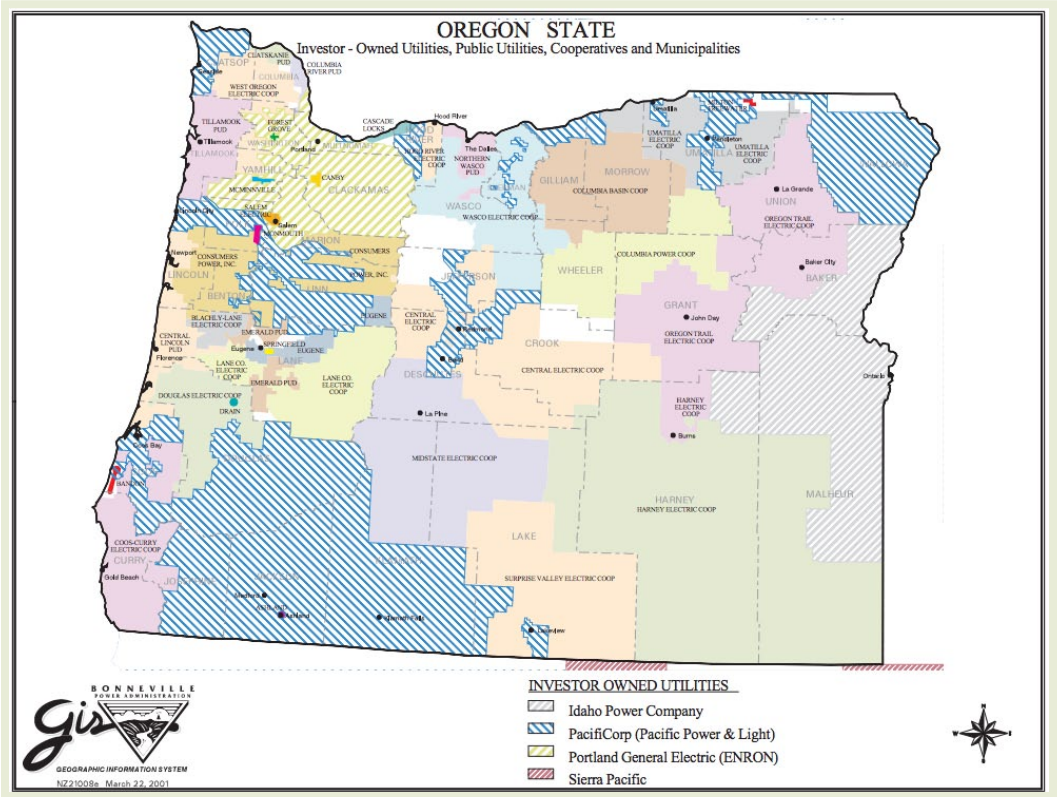
Polluters will pass costs along to consumers—won't that hurt people in rural Oregon?

No. People in rural Oregon, on average, would make money from a polluters-pay-plus-dividend law.

Say what?

It turns out, rural Oregonians emit about half as much pollution as urban. Portland State University modeled a carbon tax in Oregon and found that 43 percent of Oregonians live in the Metro region but emit 60 percent of the pollution. Non-Metro Oregonians would pay 40 percent of a carbon tax but would get 57 percent of the value back in dividend checks.

This is partly because rural Oregonians, on average, have cleaner electricity than urban. Most of rural Oregon—about 30 percent of the state overall—gets electricity from consumer-owned utilities (COUs: public utilities, cooperatives, and municipal utilities). COUs get 85 percent of their power from carbon-free hydro. COU customers pollute less, and therefore would pay less, than Pacific Power customers who get 67 percent of their power from coal, or Portland General Electric customers with 30 percent coal.



Contrary to popular myth, rural Oregonians do not all drive more than urban residents. According to a 2012 survey, people in rural Western Oregon drive about 7 percent ***less*** than urban Oregonians, while people in rural Eastern Oregon drive about 13 percent ***more***. Rural eastern Oregonians might pay about $2 per month more than urbanites. The $500 dividend check would more than cover that difference.

Is this just another "tax-and-spend" plot to grow the government?

Not at all. The money would go from fossil fuel sellers to Trust Fund to dividend checks. Public agencies would not spend any of it.

Is this just about climate change or is it more than that?

Climate change threatens the Pacific Northwest, but it is not the only threat. Cascadia's middle class is also imperiled. Readers of Thomas Piketty's *Capital In the 21st Century*, or even of *Rich Dad, Poor Dad* know that rich people mostly don't get rich by working (labor income), they get rich and stay rich and make their kids rich by owning assets that produce non-labor income. Because non-labor income grows faster than labor income, and the US tax system favors non-labor income over labor income, almost all the economy's gains in productivity accrue to the people who own companies, stocks, and property. Wages for middle-class workers—people who work for their living—have flat lined.

To resuscitate the middle class, we need to find a mechanism for more people to own assets that generate non-labor income. We could give everyone an ownership share in common assets such as our money supply, air, land, and water. A carbon pollution dividend could be the first step toward such shares.

Is anyone else considering this idea?

Members of the US Congress have introduced several dividend bills. The "Healthy Climate and Family Security Act" would pare pollution to 80 percent below the United States' 2005 emission levels by 2050. Fossil fuel companies would buy permits at auction and deposit the fees into a Trust Fund. The administrator of the Fund would send checks every quarter to all Americans with social security numbers.

Alaska already has a dividend program. The Alaska Permanent Fund is not about pollution, but it ensures that all Alaskans get a dividend from their rightful share of the state's resources. A Republican Governor created the Alaska Permanent Fund and Sarah Palin expanded it, explaining that a state's resources should be for the "benefit of the people, not the corporation, not the government, but the people of [the state]." Since 1982, the Fund has paid out $19 billion in dividends to Alaskans.

Why doesn't everyone love this idea?

A polluters-pay-plus-dividend law should appeal not only to liberals who want to stop climate change, but to everyone who would like to get a check every year. Even Fox News conservatives like Bill O'Reilly and Lou Dobbs agree that certain resources belong to The People and energy companies

should have to pay into a Fund that pays out to citizens, putting “a little dollar sign next to what it’s worth to be a citizen.”

Why aren’t we doing it already!?

Many people think it sounds too good to be true. They can’t believe the state treasury will really send everyone a check. They can’t believe we could really break fossil fuels’ stranglehold on our economy. And fossil fuel interests know that if each man, woman, and child in Oregon starts getting a $500 check, there will be no going back to the free lunch.

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