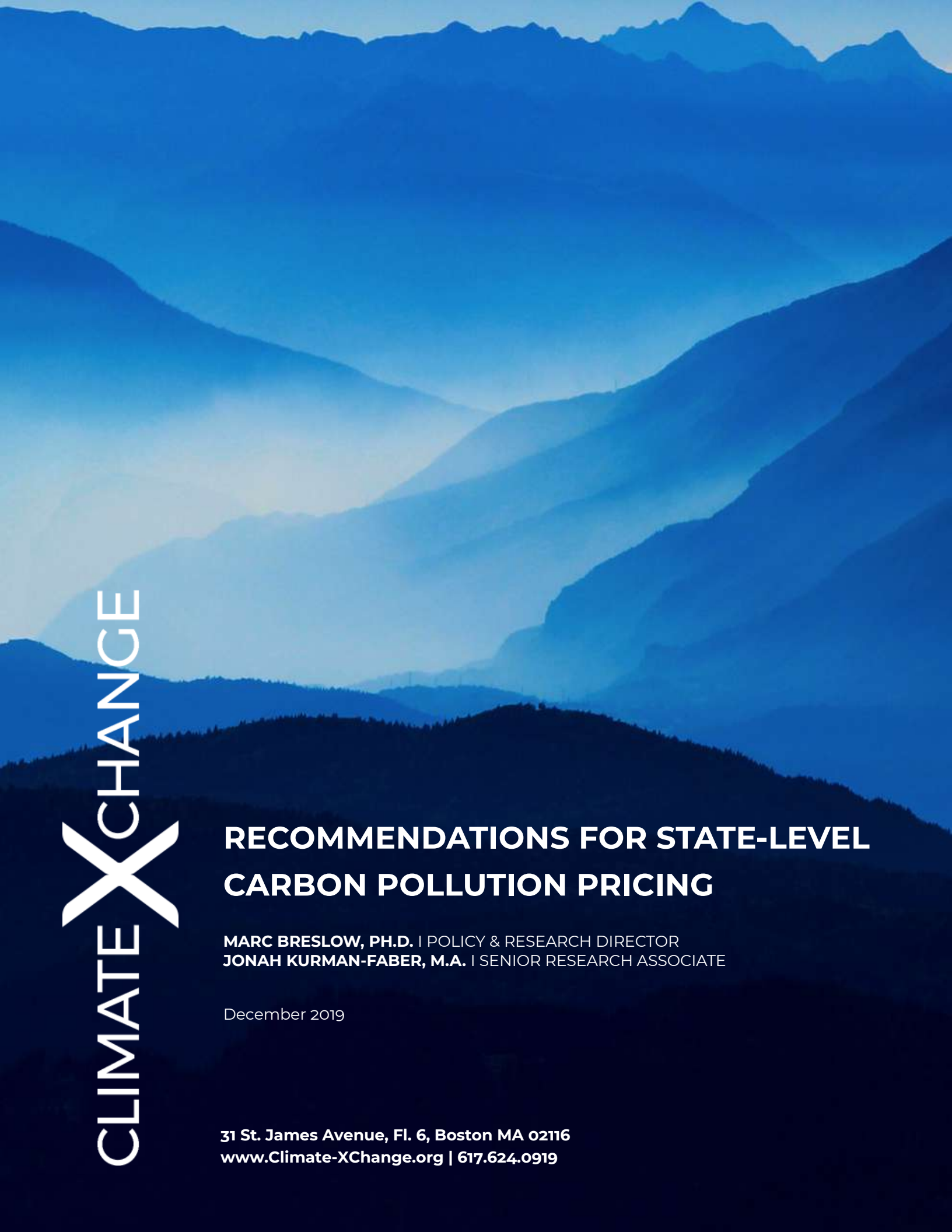

CLIMATE XCHANGE

RECOMMENDATIONS FOR STATE-LEVEL CARBON POLLUTION PRICING

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CONTENTS

I. EXECUTIVE SUMMARY

We make a number of recommendations for legislation to institute carbon fee/tax or cap-and-trade systems, addressing three principle facets of a carbon pricing policy:

- Which sources of greenhouse gas emissions (GHGs) should be covered;
- How the revenues should be used; and
- How the system should be administered.

The recommendations above apply largely to both fee/tax and cap-and-trade systems. However, there is a 4th aspect, on which these two systems diverge – how will the fee/tax rate be set, or alternatively how will the cap on emissions be set? For this aspect, the discussion of each system will be given separately.

In most cases we anticipate that either system will be implemented by legislation, either proposed by legislators or by the executive branch. However, it is also possible to implement carbon pricing via executive branch action, in which a state agency (or several in different states) draw up regulations that cover the same issues as the ones discussed above and below. Depending on existing state laws, it may be possible for the governor to implement a system without legislation, using for example the state's clean air law.

Which sources of GHG emissions should be covered?

We recommend that pollution pricing apply to all fossil fuels combusted within the state, whether produced in-state or imported. Fuels exported from the state could be included, based on the local environmental damage that their extraction and processing causes, even though their combustion is the responsibility of the consuming states.[1] Electricity used in the state should be covered as well, whether it is generated in-state or imported.

Other GHG sources should be addressed if they are significant. Some of them are: methane leakage from stages of production of natural gas prior to combustion; net lifecycle emissions from combustion of biomass and biofuels; other greenhouse gases such as refrigerant chemicals; and unusually high lifecycle emissions from particular fossil fuel sources.

We recommend that pollution pricing apply to all fossil fuels combusted in the state, whether produced in-state or imported.

Carbon fee/tax: what should the fee per ton of carbon dioxide equivalent (CO_2e) be over time?

We recommend that the fee start between $10 to $20 per metric ton of carbon dioxide equivalent, and increase by $10 each year or by a percentage annually, possibly including an inflation indicator. In addition, the price can continue to increase as long as the state is not on target to reach its GHG reduction goals. However, given recent scientific warnings concerning the intensifying dangers of the climate crisis, and estimates of the social cost of carbon, higher rates would be justified.

Cap-and-Trade: setting the cap level and allowance price over time

To have a cap-and-trade system that reduces emissions substantially below what they would have been without it, emissions projections without and with the system need to be accurate. This includes the baseline, the business-as-usual forecast, and the projections of emissions with different cap levels in place. If projections of emissions are too high compared to what would have happened anyway, then the cap may not constrain emissions much if at all.

Further, other provisions of the system that can cause actual emissions to go above the scheduled cap levels over time must be carefully controlled. These include "leakage" of emissions to surrounding states or nations, "offsets" that allow companies to pay for reducing emissions outside the regulated sectors, and "banking" of allowances for future use.

Finally, it is important that the price levels for permits (allowances) to emit GHGs have

[1] Generally states count imported fuels towards the state's emissions. For electricity, the Western Climate Initiative counts imports from outside the region, but the Regional Greenhouse Gas Initiative does not.

appropriate minimums and maximums. The minimum must be high enough to keep the program impactful, while the maximum must be high enough that the state(s) do not sell additional allowances unless absolutely necessary.

How should the revenues be used?

We recommend that the funds generated be used to: provide rebates (or exemptions) to vulnerable households and employers; transition assistance to workers and communities in fossil fuel-related industries; create incentives to expand clean energy and low-emissions transportation; and provide funding for resilience-building in the face of climate change impacts. In addition, we recommend that a substantial portion of funds invested in clean energy and other climate programs go to disadvantaged communities.

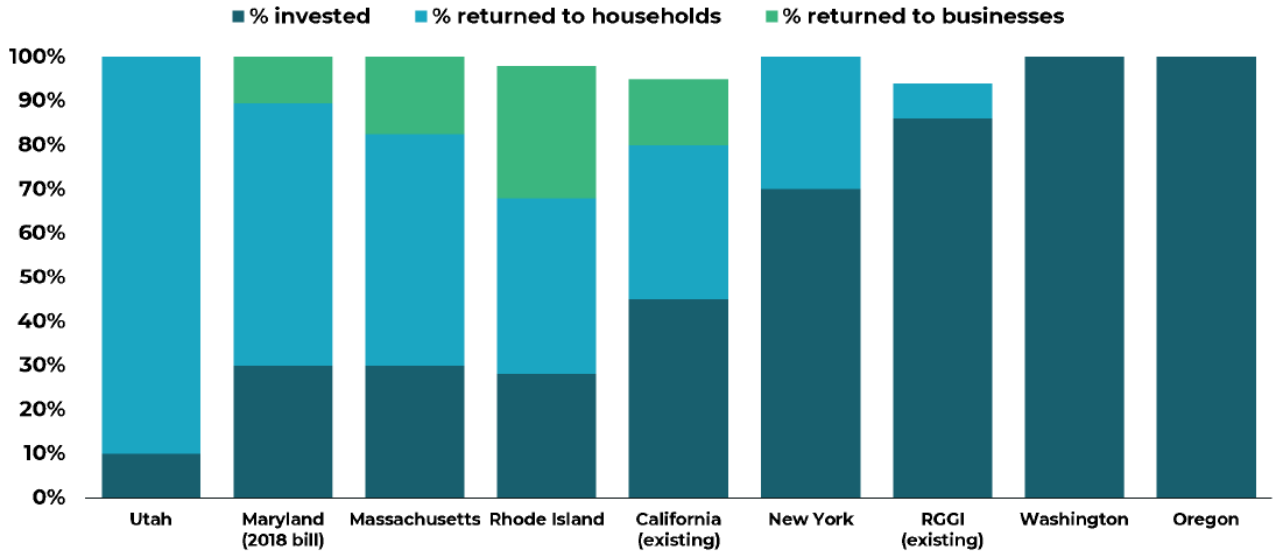
Of greatest importance is protection for low- and moderate-income households. Based on studies done for other states, we recommend that around 60 percent of funds be used for household rebates, up to 20 percent for assistance to employers (particularly manufacturing and agriculture), and at least 20 percent for clean energy and the other purposes noted above. However, a number of states have chosen to use most of the revenue for investment in clean energy, and this choice is subject to local political and economic conditions. We also recommend that higher rebates be provided for rural residents, and that public transit agencies be exempted from the fees or fully rebated for their increased costs.

Administrative design choices

A number of administrative aspects are crucial to an effective and equitable carbon pollution pricing system. For example, carbon fees should be collected at the first point of sale or transfer within the state. To ensure that low-income households are protected, state agencies should be mandated to see that all such households receive their appropriate protections. For the same reason, policy should exempt rebates from being considered as income in calculating eligibility for other state programs that provide low-income assistance.

For both households and employers designated to receive assistance, rebates should be provided in a timely fashion. To build support for the program, rebates should be provided in a manner that is highly noticeable to recipients, while also keeping administrative costs low. Finally, the state's environmental agency should have general responsibility over programs that incentivize clean energy, low carbon transportation, and resilience building, but could delegate administration for portions of this to other agencies with the appropriate expertise.

Figure ES-1: Proposed uses of revenue in state fee/tax bills and existing cap-and-trade



II. INTRODUCTION

The climate crisis is the most pressing threat to humanity and the planet, endangering human health, safety, livelihoods, and ecosystems around the world. Virtually all nations, and many U.S. states, have made commitments to drastically reduce their greenhouse gas (GHG) emissions, based on a scientific consensus that they must be reduced by at least 80 percent by mid-century or earlier in order to avoid the worst impacts.

The federal government and state governments have a variety of policies that are designed, at least in part, to reduce emissions, mainly of CO_2 from burning fossil fuels. These include policies to improve the fuel efficiency of vehicles, energy use in buildings, and to promote the development of renewable energy.

Most analyses, however, show that existing policies, in their current form, are inadequate to achieve the deep, long-term GHG cuts that are necessary to stabilize our climate. There is a high level of recognition worldwide, especially among policymakers and economists, that putting a charge on GHG pollution that corresponds with the damage it causes to society is the most cost-effective means of reducing that pollution. Such "carbon pollution pricing" is in effect today in many countries and in parts of the United States, either through direct fees or taxes per ton of CO_2 emitted, or through caps on emissions that are lowered over time (known as cap-and-trade systems).

Since 2014, Climate XChange has worked extensively on the research, design, implementation, and evaluation of carbon pollution pricing proposals as well as existing programs in several states, including Massachusetts, Maryland, New Mexico, Rhode Island, New Hampshire, Connecticut, California, New Jersey, New York, and Colorado. This report draws on research studies, policy design documents, and proposed legislation from a number of other states during the past few years.

Putting a charge on GHG pollution that corresponds with the damage it causes to society is the most cost-effective means of reducing pollution.

The primary goals of a carbon pricing system, toward which it should be designed, include:

- Making a major contribution to reaching the state's GHG reduction targets
- Making that contribution through both a price incentive and investment in programs that directly reduce emissions.
- Protecting low- and moderate-income households, and other vulnerable people such as those currently employed in fossil-fuel related industries, and helping them transition to clean energy––while still providing a price incentive for households to reduce their emissions.
- Providing assistance to, or exempting employers who have high energy costs and face substantial competition from companies in areas not subject to a carbon price.
- Making a positive contribution to employment and the health of the state's economy.
- Functioning administratively in a manner that is effective while not being overly burdensome or costly.
- The recommendations below are designed to help guide the design of bills or regulations, to address these goals within the specific context of a given state. Section III, sub-sections B, E, and F apply equally to both fee/tax and cap-and-trade systems. Section (III)(C) applies to carbon "fee" or "tax" systems, while (III)(D) applies to cap-and-trade systems.[2]

[2] See, for example, *Regional Cap and Trade: Lessons from the Regional Greenhouse Gas Initiative and Western Climate Initiative*, Jonah Kurman-Faber and Marc Breslow, Climate XChange, 2018, https://climate-xchange.org/wp-content/uploads/2018/08/Cap-and-Trade-Report-10.03.2018-compressed.pdf

III. RECOMMENDATIONS FOR CARBON PRICING POLICY

A. FEES/TAXES VERSUS CAP-AND-TRADE

Carbon fees/taxes set a concrete price on GHG emissions, which is relatively easy to administer, but does not guarantee the level of emissions reduction that will result. In contrast, cap-and-trade systems set a cap on emissions, which in theory yields a definite emissions reduction. In practice, however, the result of cap-and-trade programs depends on the design decisions made and how they interact with changing market forces. These design decisions can result in the system being responsible for only a small emissions reduction.

However, cap-and-trade programs have historically been easier to pass politically, because public officials are not held responsible for imposing a particular increase in the prices of fossil fuels. With a cap, the price increase does not get set in advance, but is rather a result of the supply and demand for permits (usually called "allowances") to emit carbon dioxide (or other GHGs) within the cap.

Sections (III)(C) and (III)(D) below address the different ways that emissions are determined with fees/taxes and cap-and-trade systems, and give our recommendations for how to structure policies to make them most effective.

B. WHICH SOURCES OF GHG EMISSIONS SHOULD BE COVERED?

1) Which fossil fuels should be covered by the fee/tax?

Recommendation: Cover all fuels that are consumed within the state, including those that are imported, leaving out any sector that is already covered by another carbon pricing system, or accounting for it in the bill. Consider exempting fuels that are exported from the state.

Explanation: The intent of the policy is to place a fee on all use of fossil fuels within the state. In some states, one sector of the economy is already covered – primarily those in the Regional Greenhouse Gas Initiative, which covers the electricity sector in ten states in the Northeast/Mid-Atlantic U.S. If a sector is already covered, it should be exempted from the bill, or covered only to the extent that the bill's GHG fees are higher than those in the existing system.

Fuels exported from the state are a trickier question. Adding carbon fees to their prices would affect the competitive position of the state's exports relative to those of other states. For this reason, the state may want to exempt exported fuels. In addition, the fact that importing states should take responsibility for emissions that are due to their consumption of energy, suggests that states exporting to them do not need to take responsibility for these emissions, as doing so would constitute double-counting.

On the other hand, fuels that are extracted from the ground or processed within the state, but then exported or used to generate electricity which is exported, may cause severe environmental problems within the state, such as from the impacts of extraction. For this reason, the pollution fee/tax could also account for these other impacts, which take place locally rather than globally. Another method of counting these damages would need to be used rather than emissions of CO_2, that relates to the in-state damage from the handling of these fuels.

Electricity is more complicated than petroleum and natural gas, because it is difficult to precisely identify the sources of imported and exported power, and to know how many tons of CO_2 are consumed in the state. For the existing cap-and-trade systems, the Regional Greenhouse Gas Initiative (RGGI) does not require that imported electricity hold emissions allowances, which causes an unknown amount of "leakage" of emissions to states that export electricity to the RGGI region. In contrast, the Western Climate

The result of cap-and-trade programs depends on the design decisions made and how they interact with changing market forces.

Adding the impact of leakage to the fee on natural gas increases the incentive to convert to renewables rather than to expand gas use.

Initiative, which includes California and Quebec, does include imports and exports of electricity in its accounting procedures.

Excluding electricity imports gives an unfair advantage to out-of-state generators, with the potential to drive electricity production out of the state. Even if it is not possible to identify the exact generating plants the imports derive from, it should be feasible to put a fee on the average CO_2 emissions intensity from whichever source (independent system operator, or ISO) the electricity came from.

2) Should methane leakage be included?

Recommendation: Include leakage to the atmosphere of unburned methane from all processes prior to burning within the CO_2e charge on natural gas consumed in the state. Use best estimate available of leakage rate, and an average of the 20-year and 100-year global warming potential (GWP) of methane; the latter based on IPCC analysis.

Explanation: When burned, natural gas has lower CO_2 emissions than coal or petroleum, and this is enhanced because gas-fired plants tend to be newer and more efficient than older coal-fired plants. However, a fraction of the gas leaks into the atmosphere before it is burned, at the wellhead, while traveling through transmission and distribution pipes to the ultimate points of consumption, and at other points in the distribution system. This unburned methane is a much more powerful GHG gas per pound than CO_2, so this leakage is a serious problem.

An estimate of the impacts of leakage should be included in the carbon fees (better termed GHG fees) imposed on consumption of natural gas for electricity generation, heating, and other purposes. Adding the impact of leakage to the fee on natural gas increases the incentive to convert to renewables rather than to expand gas use.

There is substantial uncertainty concerning the leakage rate of methane during all stages prior to burning, and whether it is more appropriate to use its 20-year or 100-year global warming potential (GWP) number. Methane leaves the atmosphere more quickly than CO_2, so its impact is higher over 20 years than over 100 years. Some researchers have also argued for a higher GWP of methane versus CO_2. Nevertheless, legislation should specify that regulators are to use the best estimates available of the impacts of methane leakage, given the particular conditions in their state, including the materials distribution pipes are made from.

The California Air Resources Board (CARB) has been using a 1.2 percent lifecycle leakage rate for gas produced from fracturing of shale rock;[3] while one recent academic study puts the leakage at 2.3 percent.[4] With CARB's leakage rate and GWP for methane, and taking an average of the 20 year and 100 year potential numbers, methane leakage adds 21 percent to the CO_2e from combustion of natural gas. These numbers may come down over time as leakage rates are reduced.

Contrary to earlier thinking, burning of biomass and biofuels to generate electricity, heat buildings, and operate vehicles is not carbon-neutral.

3) How should biomass and biofuels be handled?

Recommendation: Contrary to earlier thinking, burning of biomass and biofuels to generate electricity, heat buildings, or operate vehicles is not carbon-neutral, except in certain restricted cases. Each such fuel should be given a GHG rating per unit of energy produced, based on the best available evidence. Due to the complexity of making such ratings, which often need to be

[3] Appendix C: CA-GREET 3.0 Technical Support Documentation, California Air Resources Board, Table C.2, Methane Leakage Assumptions.
[4] "Assessment of methane emissions from the U.S. oil and gas supply chain," Ramon A. Alvarez et al., Science June 21, 2018, abstract [EDF], http://science.sciencemag.org/content/early/2018/06/20/science.aar7204

specific to the geographic source of the fuel, if possible rely on a trustworthy outside source, such as academic research or a government agency like the California Air Resources Board.

Explanation: In the past, it was commonly assumed that renewable biomass and biofuels derived from plant sources were carbon neutral, because trees, crops, and plants cut down for use as fuel would be re-planted. More recent research, however, has found this not to be the case for many sources of biomass and biofuels. For trees, the actual combustion emits more CO_2 per unit of energy produced than coal. Replacement trees absorb CO_2, but it takes many years before the new trees can absorb as much as those cut down for fuel.[5]

Food crops, such as corn used for ethanol or soybeans for biodiesel, take up land that could otherwise be used for growing food, which then tends to lead to forests being cleared to create more cropland, including rainforests in tropical countries. Growing and processing certain crops, like corn, also tend to be fossil-fuel intensive.[6] For these reasons, the lifecycle CO_2 emissions of biofuels and biomass need to be evaluated and carbon fees placed on their use.

4) Should other greenhouse gases be included?

Recommendation: Include all other GHGs that each constitute, according to the best estimate available, more than one percent of the state's overall emissions. Give the state's environmental agency the authority to exempt particular GHGs, based on its showing that covering them would be unfeasible.

Explanation: There are several greenhouse gases besides CO_2 from fossil fuels and methane, that contribute significantly to total GHGs in most states. These include refrigerants (HFCs), SF6 (used in electrical transmission equipment), CO_2 from burning biomass, biofuels, and solid waste, and nitrous oxides. To the degree feasible, carbon fees should be placed on the release of such gases. To do so, reasonable estimates must be made on the extent of leakage of such gases as HFCs and SF6, which are normally contained within pipes and industrial materials.

While such estimates may be difficult to make, including these gases within the system provides an incentive to limit leakage, which can be done through careful maintenance and proper disposal of old equipment. However, the agencies in a particular state may not have the capability to regulate these gases, and if so they should be exempted.

5) Should lifecycle emissions be included?

Recommendation: In addition to emissions during the actual burning of fossil fuels, consider including fees for emissions during earlier phases of the fuel cycle, if these constitute more than 10 percent of the emissions from burning – as occurs with petroleum from the Canadian Tar Sands. Such a provision is only needed if these fuels are actually used in the state.

Explanation: For some geographic sources and extraction methods of fossil fuels, emissions prior to combustion can be significantly higher than typical for that fuel. Of greatest concern at present is oil from the Canadian Tar Sands in Alberta Province, much of which is exported to the United States. Because the crude oil is embedded in a sand-like geological formation, extracting it and separating it from the sands is an energy-intensive industrial process that adds 15 to 20 percent to its overall emissions. If any Tar Sands oil is consumed in the state, these process emissions should be included in the carbon fees. If this source is not used in the state then such a provision is probably unnecessary at present. If

Of greatest concern at present is oil from the Canadian Tar Sands in Alberta Province.

[5] See for example, *Biomass Sustainability and Carbon Policy Study*, Manomet Center for Conservation Sciences, Thomas Walker et al, prepared for the Massachusetts Department of Energy Resources, June 2010, https://www.mass.gov/files/documents/2016/08/qx/manomet-biomass-report-full-hirez.pdf.

[6] See for example, *Report of the Advanced Biofuels Task Force*, Chapter 2: The Energy and Environmental Lifecycle of First Generation and Advanced Biofuels, Executive Office of Energy and Environmental Affairs, Commonwealth of Massachusetts, April 2008.

We recommend that prices per ton start relatively low in order to provide time for society to adjust to and accept the charges.

lifecycle emissions are included it would be expeditious to make use of calculations done by outside parties to quantify them, such as the California Air Resources Board.

An example of sample legislation to consider would be Massachusetts House Bill 1726, 2017-2018 legislative session, which would direct that state's energy or environmental agencies to issue a report to the legislature within three years of implementation, as to whether emissions that take place outside the state, from the extraction, refining, transportation, etc. of fossil fuels, should be included in the carbon pollution fees.[7]

C) FEE/TAX SYSTEMS: SETTING THE FEE/TAX RATE OVER TIME

6) What should the fee schedule be over time?

Recommendation: Set carbon fees in accordance with widely-accepted estimates of the social cost of carbon pollution, starting low and increasing regularly over time. One way is to add on a fixed charge each year, while a second method is to add on a percentage increase, possibly with an inflation adjustment. A third method is to have the price increase depend on whether the state is meeting its GHG reduction targets. Start between $10 to $20 per metric ton of CO_2 equivalent and increase by $10 a year until it hits $50 or higher. Alternatively, after some number of years, increase by the general inflation rate plus some percentage a year.

Explanation: Recent bills in various states begin with prices of $10 to $20 a ton and increase at various rates, ending up at $40 to $100 or more after a number of years. Generally, we recommend that bills start relatively low in order to provide time for society to adjust to and accept the charges, then ramp up until they reach widely-used estimates of the social cost of carbon after a reasonable number of years. One way to do this is to increase by a flat amount a year; a second way is to go up by a percentage a year. A third way is to go up by a higher amount if the state is not meeting, or on the way to achieving, its GHG-reduction targets.

7) Consider a higher fee schedule

Recommendation: The fee schedule is based on political feasibility, not on what is needed to reach long-term emission reduction goals. If the political context allows for higher rates, the latest science on this issue justifies them. Have the state's environmental agency conduct a review every three years and recommend that the legislature increase the rate if the best estimate of the social cost of carbon emissions is higher.

Explanation: Since 2009, the U.S. Interagency Working Group on the Social Cost of Greenhouse Gases (IWG) has developed comprehensive social cost estimates, which are widely used in regulatory assessments including the California Air Resources Board's (CARB) cap-and-trade design.

Figure 1: U.S. Interagency Working Group Social Cost of Carbon[8] (2018 dollars/tCO_2e)

YEAR	3 Percent Discount Rate	2.5 Percent Discount Rate
2015	$43.31	$67.53
2020	$50.65	$74.76
2025	$55.47	$82.00
2030	$60.29	$88.03

[7] "An Act to promote green infrastructure, reduce greenhouse gas emissions, and create jobs," Massachusetts House Bill 1726, Rep. Jennifer Benson, legislative session of 2017-2018, lines 94 through 100.

[8] CARB Staff Report - Initial Statement of Reasons, Sept 2018.

There is considerable expert consensus that this social cost estimate is low.[9] But due to its rigorous methodology and process, it serves as the best estimate of a **minimum** cost of carbon. The Stern-Stiglitz High-Level Commission on Carbon Prices concluded that the carbon price necessary to achieving the Paris temperature target is at least \$40-\$80/tCO_2 by 2020 and \$50-\$100/tCO_2 by 2030. Their estimates assume that complementary policies are in place, such as incentives for energy efficiency, renewable power, and efficient vehicles. As mentioned in this discussion paper, California's 2017 Scoping Plan used a Social Cost of Carbon price of \$57 (in 2015 dollars) in 2030. Some studies have given substantially higher figures.[10]

The Stern-Stiglitz High-Level Commission on Carbon Prices concluded that the carbon price necessary to achieving the Paris temperature target is at least \$40-\$80/tCO_2 by 2020 and \$50-\$100/tCO_2 by 2030.

D. CAP-AND-TRADE SYSTEMS: SETTING THE CAP LEVEL AND ALLOWANCE PRICE OVER TIME

The cap level, and the allowance price determined by the cap, are the foremost design choices of a cap-and-trade system. For policymakers to choose the cap involves a set of modeling runs to determine what future emissions are expected to be, what a cap-and-trade program can feasibly achieve, and what allowance prices it would require. Historically the governments involved have chosen cautiously, to obtain allowance prices that do not lead to large increases in the prices of fossil fuels or electricity. But the modeling involved, and policy choices on factors such as leakage and offsets, can mean that the caps are relatively weak and do not constrain emissions greatly. Below we describe the choices that must be made and how advocates and public officials can influence them.

Putting these issues into legislation or regulations is a complex job. Some of them come up in legislation, but others are decided by teams of state officials in a regulatory process. Typically there is some form of a stakeholder process in which the public may participate, and it is important that environmental and other advocates take an active part in this process.

8) Baseline emissions

In a cap system, the strength of the cap over time must be measured against the baseline emissions when the system starts up. The higher the baseline, the weaker the cap. Often the agreements on the baseline are set a couple of years before the system begins, which leaves room for forecast error when calculating baseline emissions. State governments can also argue that the baseline should be calculated on the basis of the average of some number of past years, or the highest year in the past few.

It is vital that the baseline emissions be set realistically, or the cap will be too high. This is what happened with the Regional Greenhouse Gas Initiative (RGGI), where emissions from the electricity sector (the only sector regulated by RGGI) fell dramatically just after the cap was set.[11] The result was that the cap was not "binding," meaning that it was far above actual emissions from the time that it was set.

9) Business-as-usual forecast of future emissions

Once the baseline emissions are set, modelers must project what emissions will be like in the future, without the cap coming into existence.

[9] Howard & Sylvan, May 2015. "The Economic Climate: Establishing Consensus on the Economics of Climate Change."

[10] Preliminary Concepts Price Containment Points, Price Ceiling, and Allowance Pools, California Air Resources Board, February 2018.

[11] See *Regional Cap and Trade: Lessons from the Regional Greenhouse Gas Initiative and Western Climate Initiative*, Jonah Kurman-Faber and Marc Breslow, Climate XChange, October 2018, page 11, Figure 4. In 2009, when RGGI went into effect, the cap was set at 188 million tons of CO2, while actual emissions were about 122 million.

This is known as the "business as usual" (BAU) scenario. Modelers will estimate the BAU based on economic indicators, technological changes, and complementary policies that will occur regardless of a cap-and-trade program. For example, auto emissions are likely to fall due to the continued implementation of federal fuel efficiency standards, as set by the Obama administration in 2015 and going out through 2025.

The higher the BAU is, the easier it will be to meet any cap set in relation to it. Some state officials and business interests will prefer a cap that is easy to attain. For this reason, it is important that advocates participate in whatever regulatory process is set up to construct the BAU scenario. This includes the choice of outside modelers, and the assumptions state officials give them to work with.

10) Modeling cap-and-trade policy scenarios

With the BAU scenario projected, modelers can then apply various cap-and-trade scenarios to the model and examine the results. Modelers look at what emissions reductions the economy can reasonably make, given known technology and the economics of using that technology. For example, for electric power plants, modelers will look at what the alternatives to existing fossil fuel-fired plants are, including changing from coal to natural gas, from any type of fuel to renewable sources, or engaging in energy efficiency. For the same reason as with the baseline projection, it is vital that advocates participate in the design of these cases. The results of this modeling will be what state officials use to decide the future trajectory of the cap, and so the emissions reductions achieved.

11) "Leakage" of emissions outside the regulated territory

Leakage means that the result of setting a cap within a state, or a region including several states, is to push emissions to surrounding areas, thereby frustrating the intent of the cap. For example, under RGGI, imports of electricity from states outside those regulated (from Maine to Maryland) do not have to hold emissions permits (allowances). This has meant that electricity coming from, for example, Pennsylvania, can substitute for in-region generation, and is not counted in the cap. There has been some debate about the amount of leakage in RGGI, but it may be relatively small because much of the imported power is coming from low-emission sources. In contrast, under the Western Climate Initiative, California does require imported power to purchase allowances. Another example is putting a cap on the use of gasoline. Can many residents of the state being regulated conveniently go across state lines to purchase their gas? This could be either a big problem or a small one, depending on geography.

12) Offsets

Offsets are a mechanism that allows polluting entities to fulfill part of their compliance by funding GHG reduction projects in other sectors or in other geographic areas than those being regulated, rather than submitting allowances. In California, for example, many polluting companies invest in protecting or planting trees. If such protection would not have occurred without the money from outside parties, a condition known as "additionality," this is counted as reducing CO2 and "offsets" a portion of an entity's compliance obligation.

As another example, under the international Kyoto Protocol, offsets are allowed to take place anywhere in the developing world. Known as the Clean Development Mechanism, it means that electricity generators in Europe can continue to pollute, but pay less than the cost of allowances under Kyoto to purchase offsets. This is justified because it transfers money to lower-income countries, and helps them to reduce their own emissions.[12] But there are many instances where

Offsets are a mechanism that allow polluting entities to fulfill part of their compliance by funding GHG reduction projects in other sectors or in other geographic areas than those being regulated.

[12] The Clean Development Mechanism, United Nations.

the additionality or permanence of offsets are open to question.

It is vital that your state's system maintain strict controls over offsets, which can make it appear that the cap is being met, even when emissions from regulated sources exceed the cap. Under RGGI, offsets have been under strict regulation, including that they must be located within one or more of the RGGI states, are limited to a small number of specified types, and must be "real, additional, verifiable, enforceable, and permanent" (terms defined in the RGGI regulations).

13) Banking of emissions allowances

In RGGI, WCI and other cap-and-trade systems, the allowances can be "banked" indefinitely, meaning that current allowances can be bought and held onto until needed in the future. This can occur, for example, because more allowances were issued than were needed in the present – due to the baseline emissions being overstated, or the BAU and policy scenarios overestimating future emissions. Once banked, the allowances can be used by regulated parties, or bought by them from unregulated parties, to meet part of their allowance obligations in the future. This can mean that emissions in future years are higher than the cap specifies. Under the WCI, a large portion of California's allowances have been banked, with one analysis finding that their use could cause the state to miss its 2030 targeted GHG reduction by as much as 30%.13 Under RGGI, states have reduced the cap to account for banked allowances.14

Without careful control over the baseline, BAU, and policy cases to ensure that they do not overstate expected future emissions, or regulators imposing a future reduction of the cap, banking can frustrate the intent of the cap-and-trade policy. Cap-and-trade programs, when being designed, can greatly benefit from setting up periodic program reviews in order to analyze the degree of banking in the system and adjust the cap accordingly.

It is vital that your state's system maintain strict controls over offsets.

14) Minimum allowance prices (price floor)

Those jurisdictions that have had surplus allowances have seen their supply exceed the demand for them. As a result, the price of allowances has dropped to very low levels, particularly in RGGI, but also at one time in the European Trading Scheme (ETS). This is undesirable because it reduces the incentive for polluters to cut their emissions. It also means that the states that were counting on the revenue to fund GHG-reduction programs face difficulties continuing the programs. Finally, it makes it easy for companies to purchase allowances and add them to their "banked" store, which they can sell or submit to meet their emissions requirements later.

This challenge can be addressed with a price floor, or the minimum price at which allowances can be sold at a government auction. In WCI, this price floor is approximately $15.60 per metric ton in 2019.15 RGGI currently has a floor price of $2.05 per ton,16 and plans to institute a higher floor beginning in 2021, starting at $6 per ton and rising 7% per year. It is important that your state or region implement an effective price floor that will maintain prices near to the forecasted value.

15) Price ceiling

Both RGGI and WCI have also instituted maximum prices at which they will release more allowances for sale, intended to prevent prices from going beyond a reasonable range. RGGI's "cost containment reserve" (CCR) trigger price

[13] Ross Brown, December 2017. "Cap-and-Trade Extension: Issues for Legislative Oversight." as cited in *Regional Cap and Trade: Lessons from the Regional Greenhouse Gas Initiative and Western Climate Initiative*, Jonah Kurman-Faber and Marc Breslow, Climate XChange, October 2018, page 30.
[14] Kurman-Faber and Breslow, op cit, page 11.
[15] California Cap-and-Trade Program and Québec Cap-and-Trade System 2019 Annual Auction Reserve Price Notice, December 3, 2018; *2019 WCI Auction: Higher Prices, Similar Market Dynamics*, Near Zero, May 2019.
[16] *The Regional Greenhouse Gas Initiative: A Fact Sheet*, CERES.

We would urge that your state adopt a price ceiling that is sufficiently high that the emissions cap is exceeded only in extreme circumstances.

was set at $10.51 per ton in 2019,17 increasing 2.5% each year thereafter. California's "Allowance Price Containment Reserve" in 2019 begins at $58.34 per allowance, at which a specific quantity of additional allowances will be available at auction.18 We would urge that your state adopt a price ceiling that is "sufficiently high that the emissions cap is exceeded only in extreme circumstances," as is stated in the principles of the Massachusetts carbon pricing coalition.19

E) HOW SHOULD THE REVENUE BE USED?

16) Use of funds in general

Recommendation: Use funds to protect vulnerable households and employers; provide transition benefits to workers and communities who are impacted by shrinkage of the fossil fuel industry; incentivize clean energy and low-emissions transportation; provide a high level of benefits to communities who are overburdened by the local impacts of fossil fuel use and other environmental hazards; and provide funding for resilience building in the face of climate change impacts.

Explanation: Carbon fees will raise a large amount of money that can be used for various important purposes. Deciding how to use the funds is an important design feature of any carbon pricing program. Several recommendations follow that provide detail on how we recommend splitting up the revenues among different purposes.

17) Rebates versus tax cuts

Recommendation: Evidence from other states has shown that rebates provide greater equity outcomes for low- and moderate-income households than would cutting taxes, such as those on personal income, sales, business, or property. We therefore recommend returning money to households via rebates (or tax cuts equivalent to rebates). Our preliminary analysis is that cutting other state taxes would not yield an equitable return to those with low and moderate incomes.

Explanation: Use of energy rises with household income levels, but not proportionally to income. As a result, energy costs constitute a higher share of household income the lower their income is, on average. Consequently, fees on carbon emissions will also have a greater relative impact for lower income families.

In order to cut an existing state tax to adequately compensate such households for their higher costs, the existing tax must be similarly "regressive," with low and moderate income households paying at least the same share of the total state revenues from the tax. In other states we have found that this is not the case for state income or sales taxes. However, it is possible to substitute an equivalent tax cut for a rebate, at least for upper income brackets. For example, the state income tax could be reduced by an amount equal to the rebate, for those households that pay income taxes.

As a sample from one state, Figure 2 shows our estimates of the share of each state tax paid by each fifth of Maryland households, classified by their income level. At the bottom is our estimate of the share of total carbon fees paid by households.

[17] *CO_2 Allowances Sold for $5.20 in 45th RGGI Auction*, 9/6/19.
[18] *2019 Annual Allowance Price Containment Reserve Notice California Cap-and-Trade Program Greenhouse Gas Allowance Price Containment Reserve Sales*, *December* 3, 2018
[19] "Principles for Carbon Pricing/Cap-and-Invest," Massachusetts Campaign for a Clean Energy Future, 2017, https://masscleanenergyfuture.org/the-policy/, item #7.

In California's cap-and-trade system about 45 percent of the value of emissions permits (allowances) is used by state agencies to fund investments that reduce GHGs and create additional co-benefits.

The first two columns in the figure are the two state-level taxes that are likely candidates to cut in order to balance carbon fees on households – sales taxes on individuals and personal income taxes. Compare the figures here to those in the third column, carbon fee impacts in Maryland. The lowest-income 5th of households pay a much smaller share of sales and income taxes than they would pay in carbon fees. As a result, **trading carbon fees for reductions in either of these taxes would leave low-income households worse off,** if the carbon fee impacts on households in your state are similar to those in Maryland (and we have found similar results for Massachusetts, as have other studies for the United States as a whole). This is likely to be the case, and a study could be conducted to determine numerical results, if the necessary data is available.

Depending on the specific tax system in your state and the impact of carbon fees, **we conclude that a rebate system would serve low/moderate income households better than a cut in any state tax.** However, it may be possible to construct a tax cut in such a way that higher benefits are provided to lower income households, and this could be investigated. For example, a flat rebate could be provided to all households via an adjustment to their state income taxes, with rebates given to low-income households who don't pay income taxes. An additional factor to consider is that it may be harder to adjust a tax cut over time than a rebate. While a rebate can be held constant or adjusted to fit the rising revenues from the carbon fee, tax revenues vary greatly from year to year with the state of the economy.

18) Percentage split of funds among different purposes

Recommendation: Determining the optimal split requires research on the impacts of the fees on households at different income levels, in different circumstances, and on industries of different types. Our analysis in several states, suggests a distribution in the range of 60 percent to households, 20 percent to employers, and 20 percent to other purposes including clean energy. But other distributions may also make sense in your state's economic conditions and politics, such as putting a greater fraction of the funds into clean energy and a just transition for workers and communities reliant on fossil fuel-related industries.

Explanation: Protecting low- and moderate-income households should be the first priority when using revenue. For low income households, a large majority should receive more money back than they pay in carbon fees. To increase political

Figure 2: Impact of state and local taxes and carbon fees by income 5ths in Maryland

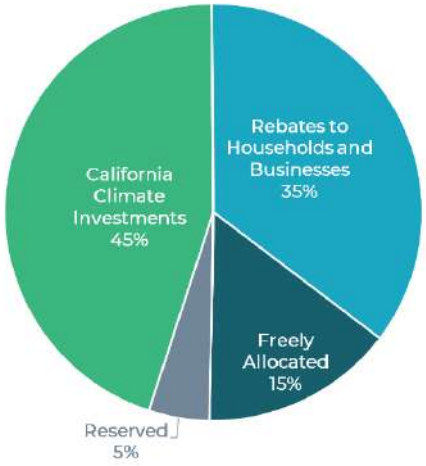
acceptance, to the degree feasible, higher income households could also receive rebates, although their fees are likely to exceed them. Defining low/moderate income as the bottom three-fifths (quintiles) of households by income, our Maryland and Massachusetts studies found that at least 60 percent of the total revenues are needed to achieve this objective, if rebates are also provided to higher-income households. Studies done at the national level have yielded similar results.[20] The appropriate percentage (allowing for a degree of uncertainty), can be estimated through an economic study that looks specifically at available data for your state. The percentage also depends on what fraction of low- and moderate-income households the state wishes to ensure will have a net benefit.[21]

Another important reason for devoting a large share of the revenue to rebates/tax cuts is that it may make it more feasible to raise the fee levels over time. If households, particularly those of low and moderate income, have their energy bills rise in proportion to the fee levels, without getting rebates, this will tend to limit the acceptability of increasing the fees. For example, California rebates about 35 percent of its funds to households and small businesses, and has allowance prices at about $15/ton at present, while RGGI has no rebates and has prices at about $5/ton.[22]

However, proposals by legislators and advocates in some states allocate up to 100 percent of the funds to clean energy investment, transition benefits, and other purposes. Many advocates for disadvantaged and low income communities propose that investing in the transition to clean energy is more valuable than rebates, which only help in the short run.[23] In a particular state these choices may make sense given the political and economic conditions.

For example, in California's cap-and-trade system about 45 percent of the value of emissions permits (allowances) is used by state agencies to fund investments that reduce GHGs and create additional co-benefits.24 Legislation proposed in New York State would devote 30 percent of carbon fee revenues to benefits for lower-income households and use the other 70 percent for clean energy investments, transition assistance, and other purposes.[25] A 2019 bill in Oregon would have the state join the Western Climate Initiative's cap-and-trade system (California and Quebec), and devote close to 100 percent of the funds to investment.[26]

Figure 3: California's Use of its Cap-and-Trade Funds



[20] See for example, *A Short-Run Distributional Analysis of a Carbon Tax in the United States*, Anders Fremstad and Mark Paul, August 2017, Political Economy Research Institute, University of Massachusetts-Amherst.
[21] *An Analysis of Impacts on Households at Different Income Levels from Carbon Pollution Pricing in Maryland*, Marc Breslow and Chynna Pickens, Climate XChange, February 2018, Sections VI and VII. See also Massachusetts Department of Energy Resources study cited above.
[22] There are also other reasons why RGGI's prices have remained low, including falling natural gas prices and their impact on causing generation to shift from coal to natural gas.
[23] *Effective Carbon Pricing Policy: A Primer*, Green For All.
[24] *Regional Cap and Trade: Lessons from the Regional Greenhouse Gas Initiative and Western Climate Initiative*, Jonah Kurman-Faber and Marc Breslow, Climate XChange, October 2018, page 18, Figure 13.
[25] "Cut Pollution Fund Solutions for NY," New York Renews, 2018.
[26] "Frequently Asked Questions & Answers," Renew Oregon.

19) Formula for distribution among households

Recommendation: To the degree that state law allows, rebate to low-income households (or provide equivalent tax reductions) enough funds to cover any increased costs for as high a fraction of such households as possible. For moderate-income households provide sufficient funds so that on average any increased costs are covered. For higher-income households provide rebates to the extent feasible after desired expenditures listed in item (9) above are provided.

Explanation: The lower a household's income, the more vulnerable it is to increases in living costs. Maximum efforts should therefore be made to see that the bottom 5th of households, by income level, get rebates that fully cover their higher costs, and a similar effort should be made for the 2nd and 3rd (middle) quintiles, which we define as moderate income. We have found that policymakers are highly concerned about the impacts on this 60 percent of households, particularly the bottom 20 percent. Most households in the top two 5ths (40 percent) can more easily afford carbon fees. However, for building political support it is also valuable to provide rebates to them. In any case, most will have rebates smaller than their costs, due to much higher levels of energy use than households with lower incomes.

As discussed further below, it is also important both for building public support and reducing emissions, to use a portion of the revenues to finance investment in clean energy and low-carbon transportation. Such investments can also provide long-term cost savings to households. There is a tradeoff between using funds for rebates and for investment.

A simple formula for distributing rebates, such as Citizens Climate Lobby (CCL) has advocated and had studies conducted on, is to provide an equal rebate per adult with a half-rebate per child; or a full rebate for all residents including children. Bills proposed in 2017-2018 in the Massachusetts Senate, along with bills in Rhode Island and Connecticut, used the CCL formula.[27] Research in Massachusetts, Rhode Island, Maryland, and nationally has indicated that formulas of this nature can yield positive net impacts on low/moderate income households on average, with net losses for higher income households.

Maximum efforts should therefore be made to see that the bottom 5th of households, by income level, get rebates that fully cover their higher costs.

However, our research in Massachusetts and Maryland has also shown that while a majority of lower income households will be protected by such a formula, a significant fraction of low income people will come out behind. The main reason being that even among households with similar income levels, energy use varies greatly. Some of this is due to differences in the characteristics of homes and their use of heating and electricity, but most is due to differences in the amount of gasoline use between households.

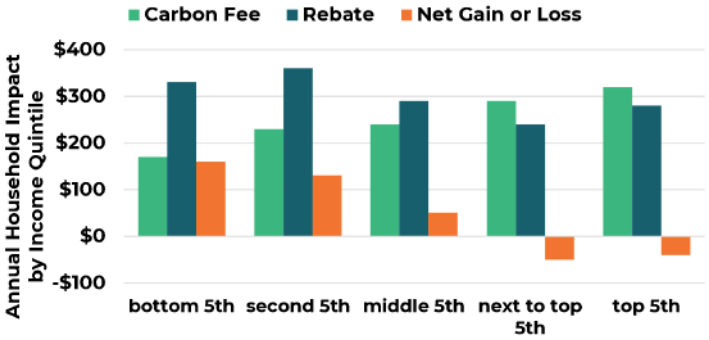
Public officials and advocates have predominantly felt that it is vital to protect as many low-income families as possible, even before steps are taken to improve energy efficiency and convert to clean energy. To accomplish this, additional revenues should be shifted to low income households, using some of those that would otherwise go to employers, higher income people, and other purposes. The latter design choice was taken in both the 2017 Massachusetts House bill[28] and the 2018 Maryland bill.[29]

Through the use of formulas, low- and moderate-income households are given larger rebates per person than high income ones. Our studies for both states have shown that satisfactory results

[27] None of these bills passed the legislatures, although the Massachusetts bill did pass the Senate unanimously.
[28] *An Act to promote green infrastructure, reduce greenhouse gas emissions, and create jobs*, Massachusetts House Bill 1726, Representative Jennifer Benson, January 18, 2017, lines 166 through 227 (which also include distributions for rural residents and home energy assistance).
[29] Maryland House Bill 939, *Regional Carbon Cost Collection Initiative*, Delegates Ben Kramer and David Fraser-Hidalgo, introduced February 5, 2018.

for low- and moderate-income households can be achieved via such formulas. Figure 4 shows the results for one scenario in Maryland.[30,31] A study specific to your state could be done at some point to fine-tune the formula for distributing rebates.

Figure 4: Maryland Scenario 1 ($15/ton, electricity included in regulated sectors, 67.5% of revenue returned to households)[32]



20) Transition benefits for workers and communities

Recommendation: Provide a sufficient share of the funds to allow workers who lose their jobs and communities who lose tax revenue and economic activity to make a smooth transition over time to other activities. For older workers, this could mean partial or full replacement wages until retirement if needed.

Explanation: Since the goal of carbon pollution policy is to have the state transition its consumption from carbon-emitting sources to clean energy, there will inevitably be shrinkage of fossil fuel industries over time. It is important that both workers and particular communities which depend on these industries are provided assistance to make a smooth transition away from them. A quantitative forecast of how much funding might be needed for such programs in your state should be done. Other studies have been done at the national level and for other states that can be used for guidance, and appropriate language can be extracted from legislation introduced in other states.[33]

21) Funds for clean energy and transportation

Recommendation: Carbon pricing has two means of reducing emissions––the price incentive to switch to clean energy, and the use of revenues to directly invest in clean energy and transportation. We recommend that 20 percent or more of total revenues be devoted to the promotion of energy efficiency, renewable energy, and low-carbon forms of transportation. A portion of these funds should be reserved for the benefit of low-income households, such as one-third for the lower-income third of households.

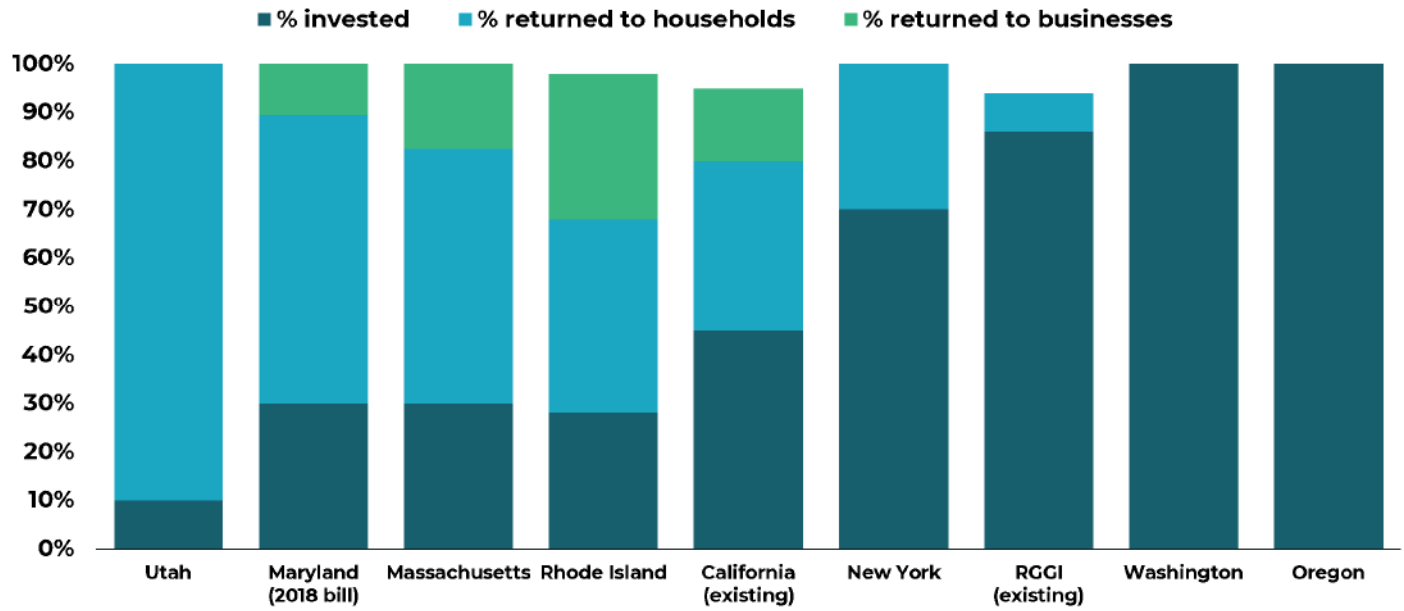
Explanation: In some formulations, all revenue is returned to households, providing the greatest short-term returns. However, while relying on the important price incentive to convert from fossil fuels to cleaner energy forms, it does not provide investment capital that is also critical for the transition, such as electric vehicle charging infrastructure. Evidence from several states shows that there is a high level of public support for using at least part of the revenues for investment in clean energy and transportation.

To date, almost all of the carbon pricing bills introduced in the United States, and the two major cap-and-trade systems in existence (RGGI

Provide a sufficient share of the funds to allow workers who lose their jobs and communities who lose tax revenue and economic activity to make a smooth transition over time to other activities.

[30] Impacts of Carbon Pollution Pricing on Massachusetts Households at Different Income Levels , Marc Breslow, Climate Xchange, 2019.
[31] *An Analysis of Impacts on Households at Different Income Levels from Carbon Pollution Pricing in Maryland*, Marc Breslow and Chynna Pickens, Climate XChange, February 2018, Table 10A, page 24.
[32] *An Analysis of Impacts on Households at Different Income Levels from Carbon Pollution Pricing in Maryland, Marc Breslow and Chynna Pickens, Climate XChange, February 2018, page 25.*
[33] See for example, *The Economics of Just Transition: A Framework for Supporting Fossil Fuel-Dependent Workers and Communities in the United States*, Robert Pollin & Brian Callaci, Political Economy Research Institute, University of Massachusetts-Amherst, October 2016.

Figure 5: Proposed uses of revenue in state fee/tax bills and existing cap-and-trade



and the Western Climate Initiative), use some or all revenue from carbon pricing for investment. The decision on whether to return all funds to households, and possibly employers, or to use a higher or lower percentage for clean energy investment, is one for your state's policymakers and advocates to make based on the particular political and economic conditions in the state.

The 20 percent of total funds is based on what would remain after the percentages that we estimate are needed for household rebates, transition benefits, and assistance for vulnerable employers, based on studies we have conducted for other states. Greater precision on what could reasonably be available depends on conducting economic studies for your state, and on value judgements concerning the relative importance of devoting money to different purposes.

Figure 5 shows the percentages proposed to be spent in three ways under fee/tax bills, and that spent in two existing systems, California's economy-wide cap-and-trade system and the Regional Greenhouse Gas Initiative in the Northeast/Mid-Atlantic states. As can be seen, the amount to be invested ranges from 10% in Utah to 100% in the Washington and Oregon proposals.

A substantial proportion of the investment funds should go to communities that have historically been overburdened by the use of fossil fuels and other environmental hazards.

22) Funds for disadvantaged communities and low-income households

Recommendation: A substantial proportion of the investment funds should go to communities that have historically been overburdened by the use of fossil fuels and other environmental hazards, such as power plants and road traffic; and which have gotten less than their fair share of the benefits of clean energy programs.

Explanation: People of color as well as those with low incomes have historically suffered from disproportionate burdens from the use of fossil fuels and other environmental hazards. These include the location of power plants, particularly those powered by coal; much higher volumes of traffic from cars, trucks, and buses, releasing large amounts of diesel pollutants; and location of toxic hazards. Reducing these problems provides substantial "co-benefits" in better health outcomes, which can be as great as the benefits from reducing GHGs.

Further, the benefits of clean energy policies have tended to go to higher-income people who

can afford to take advantage of clean energy incentives, such as those to buy solar panels for their homes and hybrid and electric vehicles. To ensure that disadvantaged populations get their fair share of such funding requires that programs be set up to specifically direct money to communities and individual households.

California defines disadvantaged communities based on over 20 socioeconomic and environmental factors, and low-income populations as those below 80% of the state median household income. Under California's latest legislation, AB 1550 passed in 2016, 35 percent of overall investments must benefit disadvantaged communities and low-income communities or households.[34] In Massachusetts, carbon pricing bill H.2810 (2019), 40% of the money going into investment must benefit low-income households or communities.[35]

23) Funds for employers

Recommendation: Funds should be provided as needed to protect vulnerable industries, including those that are "energy intensive and trade-exposed" (EITE), such as manufacturing and agriculture; small non-profit organizations; and state and local government agencies. Base rebates, free allowances, or exemptions on either output levels or number of employees.

Explanation: Evidence from other states indicates that many industries will not face large enough impacts to require rebates or tax cuts, because energy use is a small fraction of their total operating expenses, and/or they are not particularly susceptible to interstate competition. This includes most service and information-based industries, such as health care, education, many professional services, and retail trade. Construction is a large industry that is energy-intensive but is not substantially trade exposed, in that neither commercial or residential buildings are likely to be put in a different state due to the addition of carbon fees.

Vulnerable industries include those that are EITE. This means that their energy purchases are a substantial fraction of their total expenses, and that they can easily lose sales to competitors in states or nations that do not have carbon charges. The European Union's Emissions Trading System and California's Western Climate Initiative both provide protections to particular industries based on these considerations. Those included are primarily certain manufacturing sectors, including petroleum refining in California. At present about 15 percent of the allowances in California freely allocated to EITE industries.

In addition, small non-profit organizations and state and local government agencies have relatively inflexible revenue sources that cannot easily be raised to accommodate carbon fees, so we recommend that these employers are considered for economic protections.

Figure 6 is drawn from our study for Maryland, showing 16% of total fees on employers is the maximum that we estimated might be needed for rebates to vulnerable employers (not counting small nonprofits). Since your state's economic structure is likely quite different from Maryland's, a study could be performed if the state wishes to more precisely estimate the numbers.

Figure 6: Maryland employers that could be vulnerable to impacts of carbon pricing[36]

Industry	2015 GDP ($millions)	2015 GDP (% total)	% of total carbon fees on employers
Trade-exposed industries	$21,890	6.0%	5.8%
Agriculture	$861	0.2%	0.7%
Manufacturing	$21,029	5.7%	5.1%
State & local government	$30,741	8.4%	10.6%
Total vulnerable businesses[37]	**$52,631**	**14.3%**	**16.4%**

[34] *Carbon Pricing in a Just Transition: A Policy Framework and Case Study of California Cap-and-Trade*, Jonah Kurman-Faber and Marc Breslow, Climate XChange.
[35] *An Act to promote green infrastructure and reduce carbon emissions* , MA House of Representatives, 2019.
[36] *An Analysis of Impacts on Households at Different Income Levels from Carbon Pollution Pricing in Maryland*, Marc Breslow and Chynna Pickens, Climate XChange, February 2018, Table 6, page 17.
[37] Excluding non-profits

For EITE companies, we recommend considering two possibilities for the size of rebates that go to an industry and the individual companies within it:

a) **Employment**––depending on its degree of energy intensity and trade exposure, the industry as a whole receives back a portion or the entirety of the fees that it is assessed, or receives part or all of its allowances for free. Within the industry, each company is given rebates, or free allowances, based on its number of full-time employees. Over time, the degree of protection is reduced as companies are expected to improve their energy efficiency and to transition away from fossil fuels.

b) **Output**––each company is provided assistance in proportion to its output, in order to ensure that assistance is not given while production is being shifted outside the state. In addition, California's system of setting emissions benchmarks per unit of output could be used, where relatively low-emitting firms get all their emissions covered while high-emitting firms do not. Canada is also considering such a system.[38]

Output-based allocation can be administratively challenging at the state level – it requires extensive collaboration with industry stakeholders, deep understanding of industrial processes, and enough in-state facilities to make benchmarking statistically viable. However, extensive documentation produced by California, the EU ETS, and other organizations can be referenced to help create such a system in your state. Some of these processes can be simplified and/or modified in order to function in your state, although this question needs to be further investigated.

24) Legal issues in the use of the revenue

Recommendation: Explore what restrictions exist in your state on raising fees (taxes) and on using them for particular purposes. Obey such restrictions or modify your policy to avoid them.

Explanation: Some states have constitutional restrictions on raising taxes, and carbon fees may be classified as such. These restrictions, such as a two-thirds vote in the legislature or putting the increase to a popular vote, may make it harder to pass a policy. In such a case, it may make more sense to put forward a cap-and-trade system, which has been ruled by courts in California, and in New York and Delaware (in regard to the RGGI program) to not be a tax. [39]

Some states have restrictions on what revenue from taxes on motor fuels can be used for.

In addition, some states have restrictions on what revenue from taxes on motor fuels can be used for, usually restricting it to transportation-related purposes, or even to road-related purposes. This could be a problem for your state, especially for using funds for rebates or for low-carbon transportation. See the section "Challenging States for Legal Reasons" in *Creating Opportunities for Carbon Taxes at the State Level.*

25) Protection for particular groups (such as rural households, public transit authorities)

Recommendation: Households in rural areas generally need to drive more than those in cities or suburbs. We recommend considering a higher rebate level for such households based on an objective criterion such as (a) whether they live in a community where average miles driven are at least 30% above the statewide average, or (b) the

[38] See Canadian factsheet on output-based emissions allocation: *Explaining Output-Based Allocations (OBAs)*

[39] *California's Landmark Cap-and-Trade Program Upheld by California Supreme Court*; *Appeals Court Dismisses Legal Challenge to New York RGGI Program*, Thomas F. Puchner, Philips Lytle, December 6, 2013; Indeck Corinth, L.P. v. Paterson (New York) ; Superior Court dismisses lawsuit against DNREC challenging Delaware's participation in Regional Greenhouse Gas Initiative.

population is less than 500 per square mile (or whatever number/square mile would be appropriate for your state).

Explanation: Legislators are often politically sensitive to the needs of rural voters. Working with state legislators, we have included such provisions in both the Senate and House bills in Massachusetts, and in the Maryland bill. The wording needs to be carefully crafted to include an appropriate portion of the state's households.

Public transit agencies, or other agencies that provide low-carbon forms of transportation, should either be exempt from the fees or be fully rebated for their higher costs. While such agencies could reduce their emissions, they typically operate under tight budgets, and the benefits of public transportation over autos is the dominant consideration.

The collection of fees should be done in a manner that minimizes administrative costs and ensures that all fuels and electricity consumed in the state is accounted for.

F. ADMINISTRATIVE ISSUES

26. Where to collect carbon fees or charge for allowances

Recommendation: For all fuel or electricity that is to be consumed in the state, the fee or permit (allowance) price should be collected at the first point of sale or transfer within the state, whether it originates in the state or is imported. For natural gas that goes through regulated utilities, the utilities should collect the fees/allowance prices on behalf of the state.

Explanation: The collection of fees should be done in a manner that minimizes administrative costs and ensures that all fuels and electricity consumed in the state is accounted for. Generally, this can be done by charging fees as far "upstream" as possible, whether that is at a drilling site, mine-mouth, refining plant, wholesale distribution point, or regulated utility. Since most or all fuels already have taxes imposed on them, the state already has a collection mechanism that can be extended to carbon fees. Whatever existing tax point is used, it needs to have data on 1) the volume of fuel, 2) the type of fuel (for carbon content), and 3) the end-use of the fuel (both for in-state, out-of-state, and exempt in-state uses). Another option is to set up a mandatory reporting regulation for GHG emissions, which several states have done.

For electricity generated in-state, the utilities that operate the generating plants know and have to report on how much fuel of each type they use. They also know how much power goes to end-users in your state and how much they export. For natural gas utilities, they know how much gas goes through their system and whether it is distributed to end-users in the state or exported, and therefore can pay the appropriate fees to the state.

Electricity imports are more complex. If the electric utilities have firm purchase contracts with particular generating plants, then the fuel mix used by these plants is known, and appropriate carbon fees can be charged by the utilities. If, however, electricity is purchased on "spot markets" the amount coming from specific generating plants may not be known. Your state's energy and/or environmental agency will need to make the best estimate possible of the average emissions from the unknown imports, and charge the utilities for them.

27) How can the policy ensure that all low-income people get rebates?

Recommendation: Instruct all state agencies to cooperate, including sharing their databases, to ensure that as close as possible to 100% of low-income people receive the appropriate rebates. Require that distribution methods be as convenient as possible for low-income households. This could include requiring a state agency, such as the agency which administers SNAP benefits,[40] to add carbon rebates to their electronic benefit transfer (EBT) cards.

Ensure that as close as possible to 100% of low-income people receive the appropriate rebates.

[40] "Looking for Assistance: Supplemental Nutrition Assistance Program (SNAP)," New Mexico Department of Human Services.

Explanation: Your state's revenue department should be able to easily identify and get rebates to all households that pay state income taxes, or file tax returns even if they do not owe money. However, many low income households may not be on the state's tax rolls and would have to be located in other ways. State agencies that provide benefits and services to low income people are in the best position to provide information on them. Due to confidentiality rules, information may not be shareable among agencies unless the legislation specifically instructs agencies to do so. When EBT cards are in use to provide benefits, this provides a method that has low administrative costs and is convenient for rebate recipients, to send benefits on a frequent time schedule.

Include a provision that requires most residents and businesses/institutions to get rebates early in the year and/or throughout the year such that they have the money to pay their bills when needed.

28) How can the policy provide rebates on a time schedule that allows people and businesses to pay their bills?

Recommendation: Include a provision that requires most residents and businesses and institutions to get rebates early in the year and/or throughout the year such that they have the money to pay their bills when needed.

Explanation: A concern that is often raised is that even if rebates or other assistance is provided, if it only comes at the end of year it will not be available when people need to pay their fuel and electricity bills. Particularly for low- and moderate-income households this can be a serious cash-flow problem. The legislation should therefore require that state agencies provide funds on a timely basis.

The strongest form of this is what British Columbia did, and what is in Rhode Island's proposed legislation,[41] to provide rebates at the beginning of the year. British Columbia accomplished this through borrowing funds prior to any of the carbon fees revenues being collected. Absent such a strong method, rebates could be provided periodically throughout the year, either through electronic means or with checks sent by mail. For employees who have state income taxes deducted from their paychecks, the deductions could be reduced on each paycheck based on the rebate. As noted above, EBT cards could also be an inexpensive and reliable way of sending rebates. Massachusetts House Bill 2810 from 2019, lines 303 to 309, say:

(c) The DOR commissioner shall do at least one of the following: (i) Provide rebates to low and moderate income households twice each year in advance of the annual heating season and summer cooling season; (ii) distribute part or all of the annual expected value of household rebates to low and moderate-income households prior to collecting greenhouse gas charges in year one; or (iii) otherwise set schedules and methods for distribution of rebates that ensure low and moderate-income households obtain rebates corresponding to the time schedule in which they can be expected to be paying greenhouse gas pollution charges.

29) To the degree possible, exempt rebates from being considered in eligibility for other public benefits

Recommendation: The state should be able to exempt carbon rebates (or tax reductions) from being considered in eligibility for state programs that provide benefits to low/moderate income people. For federal programs, this should be done to the extent that federal law allows the state to do so.

Explanation: There is significant concern that rebates could cause low-income residents to lose eligibility for certain benefits, or to have their benefits reduced. Your state's legislation could require that rebates not be considered in calculating eligibility for state programs. For federal programs it is probably not possible for state legislation to affect the eligibility rules, but it may be possible in some cases, and the

[41] State of Rhode Island, General Assembly 2018, H 7400, "Energize Rhode Island: Clean Energy Investment and Carbon Pricing Act of 2018," page 9, lines 22 through 26.

legislation should require that the state administration attempt to do so.
Maryland House Bill 939, page 21, lines 1 through 7, says:
(K) Money distributed as a rebate under this section: (1) may not be included in taxable income for purposes of any state or local income tax; and (2) shall, to the extent feasible, be excluded from household income for purposes of determining eligibility for, or the level of, any form of public assistance.

Rebates should be provided in a manner that is most noticeable to residents and employers.

30) Balance needs to publicize benefits and to keep administrative costs low

Recommendation: To build maximum public support for the program, rebates should be provided in a manner that is most noticeable to residents and employers, such as a periodic paper check in the mail. On the other hand, state governments often prefer to minimize administrative costs through the use of electronic payment transfers, and including rebates within other transactions. We recommend that legislative wording should treat the first criterion as primary, but balance that with cost considerations.

Explanation: California has sent rebates on a quarterly basis through the electric and gas utilities using checks and an enclosed information piece which informs recipients that the rebate derives from the state's cap-and trade program for CO_2 emissions. This provides high exposure and public awareness for the program, and is better than a rebate that only comes at the end of the year. However, it may still be too long a time period between checks to meet the cash flow needs of lower-income residents.

31) How to administer funds used for clean energy and transportation?

Recommendation: The state's environmental agency should be in overall charge of distributing these funds, with the authority to devolve administration over portions to agencies with the appropriate expertise, such as the department of transportation for low-carbon transportation investments, and the energy agency for renewable energy and energy efficiency programs for clean energy investments.

Explanation: Since this is a program whose principal purpose is to reduce environmental harm, primary authority should rest with the agency that has the environment as its mandate. However, other agencies may be more capable of actually administering specific portions of the funds, given clear guidelines that come from the legislation and the environmental agency.

One possibility for how to distribute funds is to have a portion provided as grants to municipal and county governments and to public transit agencies. Because local governments and transit agencies tend to be perpetually short of funds, this can be a way of building local support among public officials and the general public for the carbon fees. Such grants can be conditioned on submission of applications that show the local government has a clear plan to make effective use of the funds. On the other hand, state agencies may have more expertise and capability to utilize the money directly in their own programs. Both local governments and state agencies should be required to devote at least a proportional share of the funds to overburdened communities and households that are classified as low-income.

Primary authority should rest with the agency that has the environment as its mandate.

IV. CONCLUSION

The design of a carbon pollution fee/tax or cap-and-trade bill must be specific to the economic and political conditions of the state or region in which it is to be located. These conditions include whether it is a fossil fuel exporting or importing state; what type of other industries dominate the local economy; the relative income of state residents compared to other states; the size of the state's administrative bureaucracy, which will handle the carbon fee system; and the environmental politics of the state.

All of these determine how legislation responds to several factors – what emissions to cover and how, the size of the fee rate over time, how the funds raised are utilized, and critical administrative issues that determine, among other things, how the fees affect low income people. Some of these factors can be determined based on critical reasoning by those who know the state well. But others require quantitative, qualitative, and legal studies to be done. To see examples of relevant studies, go to the Climate XChange website, where you can find studies on household and industry impacts, GHG emissions, on evaluating the RGGI and WCI systems, and on how to provide assistance to disadvantaged communities.

V. APPENDICES

A. FEE/TAX SAMPLE LEGISLATION

This sample legislation, attached at the end of this document or on the Climate XChange website, is composed from a compilation of provisions given in several state bills, designed to be appropriate to most states. In several cases we have provided alternative versions of particular provisions, recognizing that different states have different needs.

B. CAP-AND-TRADE SAMPLE LEGISLATION/REGULATIONS

1. Regional Greenhouse Gas Initiative (RGGI) Model Rule, 2017 revision - this rule was issued by the RGGI states collectively, as the basis for each state to adopt similar laws or regulations. We have also provided Connecticut's RGGI laws as web links, derived from the Model Rule.
2. Connecticut law on control of CO2 emissions
3. Connecticut law on auctioning of RGGI allowances
4. Connecticut law on RGGI offset projects
5. California's Global Warming Solutions Act of 2006 (GWSA) or AB 32 - the law from which California's economy-wide cap-and-trade program was derived. The state's fact sheet on AB 32 is a good overview.

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