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April 10, 2017

Clerk of the Board
California Air Resources Board
1001 I Street
Sacramento, CA 95814

RE: The 2017 Climate Change Scoping Plan Update: The Proposed Strategy for Achieving California's 2030 Greenhouse Gas Target

On behalf of Food & Water Watch and our over 186,000 supporters in California, we respectfully submit these comments on "The 2017 Climate Change Scoping Plan Update: The Proposed Strategy for Achieving California's 2030 Greenhouse Gas Target."

The California government, and in particular the Air Resources Board (ARB), has a duty to serve and protect the people of California, not polluting industries. Unfortunately, not only do the Proposed Scenario and Alternatives 2, 3 and 4 — which propose extending cap-and-trade beyond 2020, a carbon tax, all cap-and-trade and cap-and-tax, respectively — fail to put forward effective and achievable paths towards rapid, significant and permanent emission reductions, but also fail to protect Californians, their health and the health of our shared environment.

For reasons explained below, "Alternative 1: No Cap-and-trade" is the only option that provides the certainty needed for rapid, significant and permanent emission reductions to avoid the worst effects of climate chaos. It is also the only scenario that truly prioritizes direct emission reductions to protect the state's most impacted and disadvantaged communities as currently required under the laws enacted by the legislature in 2016.

In order to meet the current legal mandate and properly protect the health, safety and welfare of Californians, the environment and, ultimately, the planet, ARB must do the following:

1. Adopt "Alternative 1: No Cap-and-trade" to require direct emission reductions, and reject all market-based solutions including cap-and-trade, a carbon tax and cap-and-tax
2. Reject "renewable" natural gas and reject carbon sequestration in natural environments and working lands

The immediate threat of climate change means we do not have time for a failing cap-and-trade approach or a carbon tax — or any market-based "solution" — that will leave us decades from now in the same dire circulstances we now face. It is irresponsible and immoral to place the burden of unproven market schemes like cap-and-trade and carbon taxes on those most at-risk from climate change, including low-income communities and communities of color — policies to reduce emissions should protect these communities and our environment first and always, not sacrifice them in favor of polluter interests. Rapid, significant and permanent reductions in greenhouse gas emissions by way of direct emission reductions on a source-by-source basis is the only proven way out of our climate crisis.

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1. Adopt "Alternative 1: No Cap-and-trade" to require direct emission reductions, and reject all market-based solutions including cap-and-trade, a carbon tax and cap-and-tax

a. "Alternative 1: No Cap-and-trade" Provides the Most Certainty of Permanent Emission Reductions

The proposed emission reduction scenarios all have degrees of uncertainty regarding how likely each is to achieve reduction goals. Out of all of the scenarios, "Alternative 1: No Cap-and-trade" provides the most certainty of reaching the 2030 reduction target, and of possibly even surpassing it. In the "ideal" Alternative 1 scenario it is estimated that the approach could actually *exceed* the needed reductions by about 73 million metric tons of carbon dioxide equivalent (MMT CO_2e), meeting approximately 110 percent of the 2030 reduction goal.[1] The "uncertainty" version of Alternative 1 could fall short of the 2030 goal by about 138 MMT CO_2e, but this is still better than the possible shortfall of even the "ideal" Proposed Scenario of cap & trade alone. (See below).

Not only are the direct source reductions contemplated under Alternative 1 the best approach to ensure that the state meets its legislative goals, but it is the only approach provided for post-2020 under current law. Under AB 197 California is mandated to protect the state's most impacted and disadvantaged communities by prioritizing "Emission reduction rules and regulations that result in direct emission reductions at large stationary sources of greenhouse gas emissions sources…" — Alternative 1 is the only scenario that prioritizes such direct emission reductions to protect the most impacted and disadvantaged communities. Any potential shortfall of Alternative 1 could also be covered by the state committing to 100 percent renewable energy and zero emissions by 2035[2] and incrementally increasing state RPS standards to help achieve this.

b. Cap-and-Trade Is Not an Effective Approach to GHG Emissions Reductions

Both the Proposed Scenerio and Alternative 3 embrace a cap-and-trade program to attain the state's current climate mandate. However, even ARB concedes that these market approaches, even under "ideal" circumstances, involve a fairly high degree of uncertainty. ARB's "ideal" Proposed Scenario of implementing cap-and-trad alone has substantial uncertainty — leaving an estimated gap of 191 MMT CO_2e, or nearly 30 percent of all emission reductions needed between 2021 and 2030. While this represents the "ideal" outcome, the estimated "uncertainty" version of the Proposed Scenario, shows that cap-and-trade alone could be expected to reduce emissions by as much as 342 MMT CO_2e, or only about 50 percent of all greenhouse gas emission reductions needed between 2021 and 2030 — this places extraordinary reliance on a risky and otherwise unproven method.

We do not have time to waste on policies that cannot reliably deliver rapid, significant and permanent emission reductions. There is no evidence that cap-and-trade will be able to deliver the substantial, direct emission reductions that California and our planet so badly need, and we cannot afford to "wait and see" if it works ten to fifteen years from now. Regulated, source-by-source, direct emission reductions are the only approach that has delivered legitimate reductions — this is the only path forward.

In California there is not yet any evidence that the current cap-and-trade program has decreased greenhouse gas emissions. In fact, rather than require emissions be cut at the source of pollution, the

program undermines permanent emission reductions within the state by allowing polluters to purchase and sell emission allowances, as well as a limited number of offset credits that allegedly reduce emissions elsewhere. The most significant drop in emissions since AB 32 passed in 2006 coincided with the 2007-2009 Great Recession, and those reductions predate the implementation of cap-and-trade. Warmer winters in recent years and subsequent decreases in energy for home heating have also led to emissions decreases — not cap-and-trade.[3]

What makes ARB's continuing insistence on a cap-and-trade approach to GHG reduction particularly egregious is a recent study that documents the impact of the practice on environmental justice communities in the state. A 2016 report found that industrial facilities are more often located in low-income communities and communities of color, and that many of these industrial polluters (that are covered by the cap-and-trade market) have had increases in localized greenhouse gas emissions during the current cap-and-trade program, not decreases.[4] Despite this, ARB continues to dismiss and downplay the concerns of environmental justice groups and the communities they represent — the 2030 scoping plan disregards much of the recommendations made by the Environmental Justice Advisory Committee (EJAC). Cap-and-trade is failing these communities and must be replaced with direct emission reductions that do not sacrifice the health of the most impacted and disadvantaged communities in favor of polluter interests.

Other state market approaches to pollution control have also failed. The Los Angeles' Regional Clean Air Incentives Market (RECLAIM) — an anti-smog cap-and-trade program run by the South Coast Air Quality Management District (SCAQMD) since 1993 — has failed to adequately reduce ozone levels and air pollution from particulate matter. Prior to RECLAIM, regulatory approaches showed dramatic reductions in many smog-related pollutants, which stopped after RECLAIM was implemented.[5] The SCAQMD voted in March to phase-out the failed RECLAIM program and replace it with mandatory cuts in pollution.[6]

While California's current GHG cap-and-trade program is a fairly recent approach, we do know that the largest existing carbon market in the world – the European Union's – has, like California's other forays into market pollution control approaches, been an abject failure in many ways. With a total value of $4 billion as of 2014, the biggest pollution marketplace experiment is the ongoing European Union Emissions Trading System (EU ETS). It was included as one of the mechanisms for meeting national emissions targets under the Kyoto Protocol to reduce climate-altering greenhouse gas emissions from industries around the globe

Thirty one countries are part of this regional cap-and-trade system. The EU ETS only covers certain sectors, such as power generation and steel manufacturing, but not others, such as transport and agriculture. The EU ETS aims to reduce CO_2 emissions in these sectors 20 percent by 2020. Trading started in 2005. It has been fraught with significant problems and, at times, seems to be teetering on the edge of complete collapse. As was recently the case in the California allowance market, the price for carbon in the EU ETS has been incredibly volatile. It reached €30 in 2008, languished below €10 for most of 2012, hitting a low of €5.99 in April of that year. This kind of volatility undermines economic planning, while allowing some companies to reap a windfall with over-allocation.

As one recent EU ETS commentator states: "The price of carbon is less than per permit, way below 7€ an impactful threshold. Only around 45 are currently covered by the ETS, of emissions in the EU %

with a number of exceptions, and up to half of all thepermits are being given away for free. The result is plain and simple — it is cheaper to pollute. Not only that, but the low carbon price makes it hard, if not impossible, for certain new technologies to emerge."[7]

The EU ETS has also attracted hackers and outright fraud, culminating in shutting down the spot market in 2011 after a group of Eastern European hackers cost EU governments up to €5 billion in an attack. From stolen and fraudulent credits to stockpiling, plunging demands and miscalculated caps, the carbon cap-and-trade program has more problems associated with it than any traditional regulatory program could.

Even where cap-and-trade systems have, arguably, resulted in decreased emissions, they have proven to be less effective than source-by-source, command and control approaches. Title IV of the 1990 Clean Air Act Amendments, known as the Acid Rain Program, or ARP, has become the poster child for pollution trading proponents. It was enacted to address the main causes of acid rain — the emission of sulfur dioxide (SO_2) and nitrogen oxides (NO_x) from coal-fired power plants — through a system of buying and selling emission allowances. The goal of ARP was to reduce annual SO_2 emissions to about 9 million tons by 2010, down from the 15.7 million tons emitted in 1990.

While recent modeling indicates that this reduction target was reached by 2007, it remains far from clear whether the reductions were due to pollution trading or in spite of trading. For example, we know that the U.S. Environmental Protection Agency (EPA) now attributes at least 1 million tons of SO_2 reductions during ARP to factors unrelated to trading, namely the increased availability and switch to low-sulfur coal sources from the Powder River Basin in the early 1990s.

Prior to the enactment of Title IV, an assessment projection indicated that reductions in SO_2 as great as those achieved under a market-based ARP could be attained if older coal-fired power plants simply complied with the Clean Air Act's New Source Review (NSR) technology retrofitting requirements. But with the introduction of trading, those technological modifications fell by the wayside. As one 2005 report indicates, "Experience since 1990 has shown that most of these facilities have managed operations to avoid triggering NSR, resulting in facility life being extended longer and adoption of new control technologies being slower than many analysts predicted in 1990."

While we may never know the real impact of substituting trading mechanisms for technological upgrades on U.S. SO_2 emissions, results from Europe's contemporaneous acid rain approach indicate that we would have done much better sticking with regulatory approaches. A 2004 comparative study of the U.S. trading approach to SO_2 with the European Union's and Japan's regulatory "command and control" systems show a much greater reduction without trading. While the United States attained a 39 percent reduction in SO_2 during Phase I of the ARP program, the EU achieved a 78 percent reduction. Japan's emissions fell by 82 percent.

The ARP could only be considered a successful trading program if you ignore the reductions we would have achieved had we continued to force these industries to comply with the law and upgrade their reduction technology, without allowing trading.

Perhaps one of the most troubling aspects of the current state market-based system is the use of emission reduction unit offsets in lieu of at-source reductions. Regardless of whether the proposed offsets occur

within or outside of California, any kind of offset is a legitimate threat to achieving real, additional or permanent emissions reductions. Offsets allow polluters to avoid the urgent need to stop polluting at the source and instead allow them to pay to continue their harmful activities with impunity, while claiming that emissions have been reduced elsewhere. Moreover, the agenda behind offsets, as is clear here, too often places priority on cost containment, market efficiency and making it easier for polluters to comply, disregarding the true climate change priority of reducing GHG emissions.

The issue of permanence presents one of the most egregious problems with offsets. The dictionary defines permanence as "the state or quality of lasting or remaining unchanged indefinitely." However, offsets obtained from a variety of sources — manure digesters, forestlands, etc. — are never truly permanent. For example, trees can be harvested, burnt down in wildfires or killed by disease and drought. In addition, the use of third party verifiers, many of whom profit from the generation and sale of offset credits, adds a high degree if unreliability to any offset verification system. This is especially exacerbated when out-of-state offset sources are used, where regulatory authorities will have virtually no method to independently verify offset reductions.

Many pollution trading systems, from the EU ETS to the U.S. Renewable Fuels Standard RIN program, have been riddled with documented instances of fraud because of the reliance on third party verification systems and government agencies' inability to oversee credit generation processes. With its offset approach, the cap-and-trade scoping approaches are inviting similar issues with regard to GHG emission reductions and the generation of offset credits. The lack of clear GHG reduction measurements and methodology for many offset sources — for example, the exact amounts of carbon dioxide (CO_2) stored in forests — also leaves the program open to fraud and manipulation. With these highly variable reduction estimates, offsets are then sold for exact amounts of avoided emissions. A modeled estimate does not equal an exact amount of emissions. It doesn't add up.

California's regulations hold that, "A registry offset credit must represent a GHG emission reduction or GHG removal enhancement that is real, additional, quantifiable, permanent, verifiable, and enforceable" (Health and Safety Code §38562(d)(1) and (2)). Yet time and again, approved offsets do not meet these requirements.

In 2011, Brubaker Farm in Pennsylvania built a manure digester using taxpayer funding to provide electricity for the farming operation. The owner of the farm is on record as saying he originally built the digester not for credits, but for electricity. Yet, in 2015 California's ARB retroactively certified the Brubaker digester as a GHG emissions offset generator, and California industries can now take advantage of this facility to continue their own emissions even though the digester was already in place, and operating.

Likewise, ARB approved the 704-acre Pungo River Forest Conservation Project in North Carolina as a source of GHG emission offsets even though this stand of forest was put into permanent conservation easement in 2003. Seeking out already existing projects across the country to generate GHG emission reductions and subsequent offset credits for use in the state of California means that no additional GHG reductions are happening.

The lack of accountability in offset approaches is not restricted to California. A recent study of a European Union offset program found that 80% of credits were unverifiable. This means that polluters

were able to buy offset credits to pollute more from sources that may or may not have actually reduced emissions.

There is nothing in proposed scoping plan that gives FWW any comfort that similar non-real, non-verified and non-additional offset reductions will not also regularly occur as they have in all other GHG emissions offset systems. In fact, given the complexity of the cap-and-trade and offset approach and the inability of ARB to adequately oversee such a convoluted method of emissions reduction, it is virtually inevitable that the approach will not achieve the reductions projected, much less the ones needed to protect our planet and communities. Offsets cater to profit-driven third party verifiers and self-interested industries that are highly motivated to game the system for their own benefit.

The offsetting approach is not the only problem. Cap-and-trade is a regulatory framework that seeks to eliminate one of the most important tenets of the Clean Air Act, which is that companies do not have an inherent right to pollute. Under cap-and-trade policies, polluters are being given a right to threaten public health and the environment, as long as they pay for it. These schemes essentially create loopholes that allow polluters to continue dumping and discharging rather than holding them accountable for their pollution.

Trading creates a mechanism where profits determine who is able to pollute and can actually lead to an overall increase in pollution along with regional pollution hot spots, as larger and well-financed polluters will often opt to purchase credits rather than install pollution control equipment. As described above, this happened with the Los Angeles air pollution trading programs under the Rule 1610 and RECLAIM programs in which communities of color near the city's refinery district suffered from increased air pollution when these facilities purchased emissions credits instead of installing reduction technologies.

While proponents of cap-and-trade and offsets tout the regulatory flexibility benefits of these policies, in reality these policies allow polluting industries to put profit above the interests of public health and the environment. We need to strengthen protections under the Clean Air Act that have worked for decades to help hold polluters accountable, rather than rolling back some of the most important public health laws for decades.

c. A Carbon Tax or Cap and Tax Is Not an Effective Approach to GHG Emissions Reductions

Carbon taxes have not been proven an effective means to reduce emissions, either, and pose a threat to Californians, especially low-income households and individuals. In October, 2016, Food & Water Watch released a report on British Columbia's carbon tax, which has been in place since mid-2008.[8] Our analyses of the province's emissions data found that total emissions actually increased by about 2.2 percent from 2009 (the first full year the tax was in place) to 2014 (the most recent year for which data is available). Taxed emissions rose even more, increasing by 4.3 percent from 2009 to 2014.[9] We hereby incorporate this report into these comments.

In addition, despite the British Columbia carbon tax being structured as revenue neutral — wherein all revenue generated is returned to businesses and citizens — over the years the main recipients of the revenue have changed significantly. In the beginning, low-income households received a majority of the tax revenue, but in more recent years corporations now receive the lion's share of the revenue. Even

though the tax is technically revenue neutral, it has still had regressive effects and places an adverse burden on low-income households and individuals.

No matter how a carbon tax is structured, the added costs will be passed down to consumers typically in the form of increased gasoline and home fuel heating charges. One of the reasons why ExxonMobil and other fossil fuel companies support a carbon tax is because they know that it will have no real impact on their production and profits; consumers will pay the tax and still be forced to consume their products for the foreseeable future. Consumers who rely on their cars to get to work, shops and the doctors' offices are not going to stop driving because gas increases $1 or even $2 and more per gallon at the pump. Nor are they going to stop heating their homes with fossil fuels when no viable alternatives exist. What they do is cut back on other expenses and other needs so they can fill their car up and heat their home.

We are also convinced that the adoption of false, industry-friendly market approaches, like carbon taxes and carbon cap-and-trade programs, will foreclose real climate solutions like mandatory, source-by-source emission reductions as we sit back for decades to see how these pay-to-pollute programs play out. We are now witnessing how California's cap-and-trade program is still being pursued, despite evidence that it has resulted in added emissions of pollution in underserved communities, because the state has become increasingly reliant on revenue raised from the sale of carbon allowances. Raising revenue from pollution is not a method to reduce emissions, but a way in which state governments balance general budget needs while industries simply pass on costs to struggling consumers.

We ask that you stand strong for real climate solutions and reject any attempt to implement an ineffective and regressive carbon tax as a GHG reduction approach.

2. Reject "renewable" natural gas and reject carbon sequestration in natural environments and working lands — in both Alternative 1 and in all present and future scenarios

a. Reject "Renewable" Natural Gas

In California, about 55 percent of in-state methane emissions — a greenhouse gas that traps 87 times more heat over a 20-year time period than carbon dioxide[10] — come from livestock operations, 25 percent of which is from dairy manure alone and the remaining 30 percent is from enteric livestock emissions. In partial response to this problem, ARB has proposed generating "renewable natural gas," or RNG, from dairy manure. However, the volume of manure produced from industrial dairy operations in California is an environmental crisis, and unsustainable factory farming should not be perpetuated through false solutions like "renewable natural gas."

As of the 2012 agricultural census, California had approximately 1.7 million dairy cows on factory farms, which produced ten times more waste than what the entire human population of California produces in one year.[11] It is equivalent to the amount of human sewage generated by about 380 million people in one year — greater than the entire U.S. population.[12] RNG sourced from factory farm dairy manure is dirty energy — and subsequently is not suitable for use in any RPS.

ARB proposes using anaerobic digesters to convert dairy manure into RNG, but this would be very expensive, not to mention that digesters have been plagued by performance problems and require tax

subsidies to be economically feasible, as discussed in the attached Food & Water Watch fact sheet on the problems with manure digesters. In order to comply with the SB 1383 mandate to reduce methane emissions 40 percent below 2013 levels by 2030, some estimate that at least 200 new digesters must be built.[13] However, the cost for 200 digesters is about $750 million — and this would only address methane emissions from manure.[14] Given the high failure rate of digesters in California, the state shouldn't be investing in, or incentivizing, ineffective digester technologies.

RNG would also perpetuate significant risks to the health of Californians and to our environment. First, it is not a clean source of energy — RNG still releases carbon dioxide emissions into the air when combusted or flared, and methane from any source is neither emissions neutral nor clean. In addition, methane digesters do little to mitigate the water pollution caused by animal waste from industrial dairies. Nitrates contained in manure stored in lagoons have contaminated groundwater by seeping through the liner of the lagoon floor.[15] In other instances, excessive manure spread on fields has contaminated groundwater, causing nitrate levels to rise above what is safe for human consumption.[16] Rainstorms have also washed animal waste into surrounding streams and rivers, which has resulted in a number of algal blooms that destroy aquatic ecosystems.[17] Finally, practices common on factory farms can lead to public health impacts, such as foodborne illness, including *E. coli* and *Salmonella* contamination and the risk of mad cow disease. The large number of animals raised in cramped conditions creates a perfect breeding ground for the formation of new diseases, and the routine use of antibiotics in factory farms can lead to the creation of deadly antibiotic-resistant bacteria.[18] These harms outweigh any alleged benefit of increased RNG production. Instead, ARB should be regulating existing factory farms while incentizing conversion to pasture-based production, which will lead to climate benefits and require no investment in expensive, polluting technology.

b. Reject Carbon Sequestration in Natural Environments and Working Lands

California's "Natural Environment and Working Lands" are not a receptacle to sequester polluter's continued carbon dioxide emissions, instead of reducing emissions at the source. The state already experiences serious wildfires that damage the natural environment and working lands, and as climate change continues — increasing temperatures and potential drought conditions — this increases the likelihood of forest fires. Recent research shows that the aftermath of these fires is significantly hampering the regenerating ability of trees, which affects the ability of trees to sequester carbon dioxide emissions from the air.[19]

Similarly, the idea that soils can be relied on as a carbon sink is also ill-conceived and not a substitute for direct emission reductions. A recent study found that continued rising temperatures will "stimulate the net loss of soil carbon to the atmosphere, driving a positive land carbon-climate feedback that could accelerate climate change."[20] This means that cutting existing emissions may not be enough, because the earth itself could become a significant source of emissions in the twenty-first century.

ARB also suggests that carbon dioxide emissions can be stored in the oceans. However, our oceans are already over-burdened with carbon dioxide that is causing ocean acidification, because of exceedingly high atmospheric levels of CO_2 — adding additional CO_2 emissions to the ocean instead of requiring that polluters reduce emissions at the source would only precipitate the dying of our oceans. Ocean acidification is already affecting waters off the coast of California and up the western seaboard into Canada and Alaska,[21] and California is particularly susceptible to the effects of ocean acidification

because of inherently low pH levels from the California Current.[22] Studies have found evidence of pteropod shell dissolution off the coast of California[23], and more recent studies indicate that Dungeness crab, rock fish, dover sole and other west coast sea life are at risk of significant declines because of ocean acidification.[24] We are well beyond the time of short-cuts and "kicking the can down the road" — the only reliable option left is direct emission reductions without exception.

Conclusion

The best way for California, and the planet, to avoid the worst effects of climate chaos is to require direct emission reductions from polluters and to adopt a goal of 100 percent clean, renewable energy and zero emissions by 2035, which would simultaneously require an increasingly higher RPS in order to achieve this target. California is in a unique position to truly be a leader in fighting climate change. We at Food & Water Watch urge ARB not to waste this opportunity on false solutions like cap-and-trade and carbon taxes, which would only jeopardize meaningful emission reductions and the critical need to transition to 100 percent clean, renewable energy. Put the people of California, and our shared environment, first before profits and polluter interests.

Sincerely,
Adam Scow
California Director
Food & Water Watch

Endnotes

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[10] Myhre, Gunnar et, al. "Anthropogenic and Natural Radiative Forcing." In Stocker, T.F. et. al. (2013). *Climate Change 2013: The Physical Science Basis. Contribution of Working Group 1 to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change.* Cambridge and New York: Cambridge University Press at 714.
[11] U.S. Environmental Protection Agency (EPA). "Risk Assessment Evaluation for Concentrated Animal Feeding Operations." EPA/600/R-04/042. May 2004 at 9; Food & Water Watch calculation comparing human and livestock waste production based on EPA (2004) at 9. The average human produces 183 pounds of manure annually compared to 30,000 pounds for 1,000 of live weight dairy cow (which is one dairy cow animal unit). Every dairy cow animal unit produces 163.9 times more manure than an average person. Food & Water Watch multiplied the number of dairy cow animal units on operations of over 500 cows in each county by 163.9 to come up with a human sewage equivalent. U.S. EPA reports that "A

dairy CAFO with 1,000 animal units is equivalent to a city with 164,000 people," which means that one dairy animal unit is equivalent to 164 people, which matches Food & Water Watch's calculations. The human sewage equivalent was compared to the U.S. Census Bureau figures for metropolitan area population estimates. U.S. Census Bureau. "Annual Estimates of the Population of Metropolitan and Micropolitan Statistical Areas: April 1, 2000 to July 1, 2012." (CBSA-EST2012-01).

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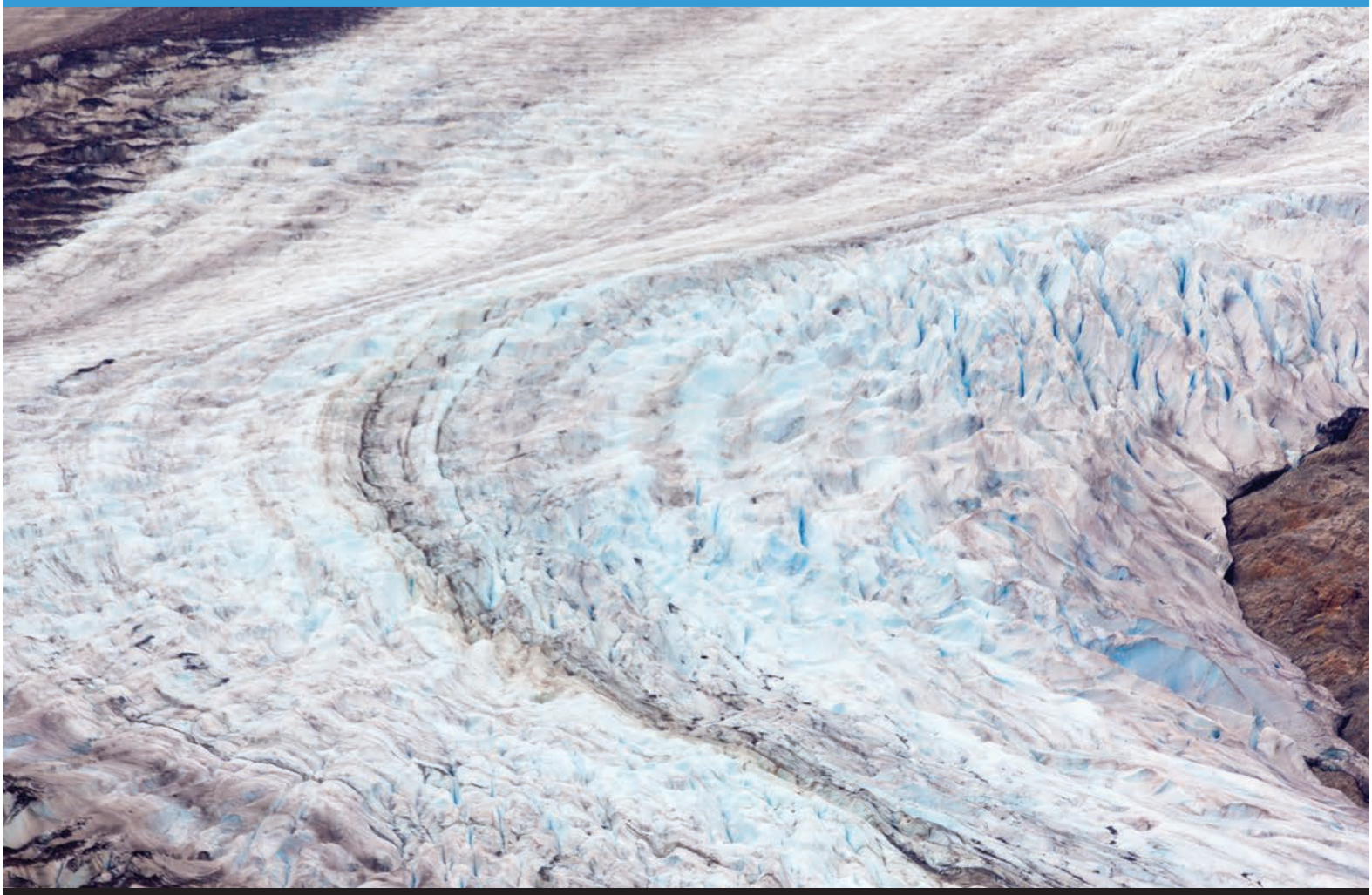
[24] Marshall, Kristin N. et al. 2017.



The British Columbia Carbon Tax

A Failed Experiment in Market-Based Solutions to Climate Change

food&waterwatch

About Food & Water Watch

Food & Water Watch champions healthy food and clean water for all. We stand up to corporations that put profits before people, and advocate for a democracy that improves people's lives and protects our environment. We envision a healthy future for our families and for generations to come, a world where all people have the wholesome food, clean water and sustainable energy they need to thrive. We believe this will happen when people become involved in making democracy work and when people, not corporations, control the decisions that affect their lives and communities.

Food & Water Watch has state and regional offices across the country to help engage concerned citizens on the issues they care about. For the most up-to-date contact information for our field offices, visit *foodandwaterwatch.org*.

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The British Columbia Carbon Tax

A Failed Experiment in Market-Based Solutions to Climate Change

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Executive Summary

Our planet's climate crisis is intensifying, but many in industry, government and even the advocacy community have turned to market mechanisms to alleviate climate change instead of regulating the pollutants that cause it. These free-market approaches rely on putting a "price" on climate change-inducing emissions — such as imposing taxes on carbon — as an indirect method to reduce these pollutants.

The Canadian province of British Columbia implemented a carbon tax on certain fossil fuels in July of 2008. Some experts and pricing proponents are using the British Columbia carbon tax example to promote carbon taxes and other market mechanisms as a way to purportedly reduce greenhouse gas emissions and address our climate problem.[1] Unfortunately for these free-market proponents, the real-world record fails to demonstrate that British Columbia's carbon tax reduced carbon emissions, fossil fuel consumption or vehicle travel. Most of the modest and short-term reductions in emissions seem to be related primarily to the 2008 global recession, not to the carbon tax. More recently, British Columbia's emissions have resumed their rise.

This report examines the British Columbia program and finds that this type of pricing approach is not going to save the planet or safeguard our communities. A more straightforward approach of regulating emissions would be significantly more effective at curbing climate change.

Introduction

We are in the midst of a global pollution problem that threatens our environment, public health and future generations. Emissions of greenhouse gases, especially carbon dioxide (CO_2) and methane (CH_4), into the atmosphere are driving serious climatic changes that will threaten coastal communities, water resources and agricultural productivity, and have many other significant ecological impacts.

Human activity, primarily in the form of the burning of fossil fuels, is propelling the release of CO_2 emissions into the atmosphere at a rate that is 10 times faster than at any time in the last 66 million years.[2] Preventing the worst effects of climate change and avoiding a 1.5 degree Celsius temperature rise — which means not emitting more than 400 gigatonnes of CO_2 starting in 2011 — requires driving greenhouse gas emissions essentially to zero.[3] The most prudent way to do this is to transition to a 100 percent clean energy system and zero emissions by 2035.[4]

Many policies, from strict regulatory controls to market-based approaches (including carbon credit trading schemes, carbon taxes and other carbon pricing mechanisms) have been proposed to counter this impending crisis.[5] In the 1970s, the United States successfully stopped and reduced many forms of air pollution with the Clean Air Act by establishing limits on industrial pollutants, and effectively regulating polluting industries.[6] The sensible approach to climate change should be based on this empirically demonstrated model.

Unfortunately, governments, including the United States, currently lack the political will to take the concrete steps necessary to successfully address and curtail greenhouse gas emissions. Rather than setting mandatory emissions limits and requiring polluters to meet these in order to achieve greenhouse gas emission reductions, experts — and their recommendations to policy makers — are shying away from effective regulations on industry.[7] Instead, there has been a major shift, driven by industry and economists, to rely on the marketplace to control pollution.[8]

Many frequently hold out British Columbia as an example of a successful carbon tax program that significantly reduced CO_2 emissions.[9] The data do not support these claims. British Columbia achieved only minimal and short-term province-wide greenhouse gas emission reductions immediately after the tax was implemented, and it is highly questionable whether the carbon tax even caused these declines.

The carbon tax only went into effect in the second half of 2008, and while there was a decline in emissions from 2008 to 2009, it is impossible to attribute that one-year drop to a tax that was in place for only half of 2008 — especially since taxed greenhouse gas emissions rose by a total of 4.3 percent between 2009 (the first full year that the tax was in place) and 2014. British Columbia's carbon tax failed to reach the reduction targets necessary to ensure a sustainable climate, demonstrating that carbon taxes are not a viable policy solution to climate change.

The Theory Behind British Columbia's Carbon Tax

Economists are not going to solve our pollution problems. Much of our industrial activity has substantial social or environmental costs that often are not factored into business costs. It may make perfect economic sense to operate a coal-fired power plant based on what it costs to buy coal and what can be charged for electricity, but only if you do not consider the costs of pollution on communities or the environment. Economists call these costs "externalities."

The proponents of market mechanisms believe that if these externality costs — costs to society — could be included in the price of the activity that generates carbon emissions, it would deter and reduce that pollution. Companies and individuals would be encouraged to reduce emissions to cut their costs through the marketplace, without the heavy hand of regulation.[10] A carbon tax raises the price on human activities that generate carbon emissions, internalizing the cost and discouraging behavior that causes climate change.[11]

On July 1, 2008, the Canadian province of British Columbia implemented a carbon tax, imposing a surcharge on each tonne of greenhouse gas emissions from the combustion of fossil fuels in an attempt to "elicit a powerful market response across the entire economy resulting in reduced emissions."[12] Despite the explicit desire for an economy-wide effect, the tax covers only fossil fuels used for transportation, heating and industrial processes, which amounts to about 70 percent of British Columbia's total greenhouse gas emissions.[13] The tax started at C$10 per tonne of CO_2-equivalent emissions (CO_2e) and increased by C$5 per tonne each year until reaching the current tax rate of C$30 per tonne of CO_2e in 2012.[14]

The carbon tax was designed to be revenue-neutral, meaning that all revenue generated would be returned to taxpayers through tax credits and rebates.[15] Additional protections, such as low-income tax credits, were built into the tax to try and ensure that it did not unfairly burden lower-income individuals and families.[16] The carbon tax revenue was directed to both individual and business tax cuts.[17]

It should be noted that a carbon tax is theoretically designed to raise the cost of greenhouse gas emissions, but if those costs are refunded it almost defeats the purpose. The price of climate change is only included at the point of emissions, but since it ultimately is returned to the companies and individuals, over time it may create little disincentive to pollute.[18]

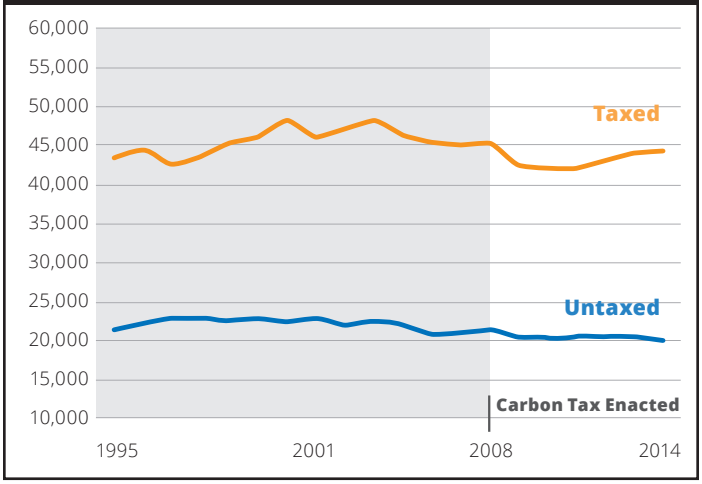
Carbon tax fails to have long-term impact on greenhouse gas emissions

Carbon tax proponents have significantly overstated the purported beneficial effects of the British Columbia carbon tax. Although greenhouse gas emissions have continued to decline since the 2004 peak through the first full year the carbon tax was in place, the initial decline under the tax from 2008 to 2009 was more likely recession-related, as the tax does not appear to have had a long-term impact. Greenhouse gas emissions have been rising rapidly in recent years even as the tax rate and total tax revenues have increased. Moreover, the short-term declines in taxed greenhouse gas emissions were more modest and were reversed more quickly than the changes to the *untaxed* greenhouse gas emissions — exactly the opposite of what would happen if carbon taxes had a causal impact on changing emissions.

Carbon tax advocates have been able to promote the British Columbia model as a success only by looking at a very narrow time window of the few years after the carbon tax went into effect, including 2008 when the tax was in effect for only six months. The 2009 reductions appear to be part of a longer-term cyclical decline from the peak in 2004. Earlier short-term examinations of the carbon tax claim that the policy has reduced greenhouse gas emissions by a total of between 5 and 15 percent.[19] But this assessment overstates the short-term decline and ignores the reversal in more-recent years.*

A longer time frame tells a different story. (See Figure 1.) During the years that the tax was in place for the entire

Fig. 1 • British Columbia Greenhouse Gas Emissions by Carbon Tax Status, 1995-2014
(*KILOTONNES CO_2e*)



SOURCE: F&WW analysis of Government of British Columbia Summary of GHG Emissions, 1990-2014.

* It largely depends when the change is measured: The taxed emissions decline was more than 10 percent from the 2004 peak to 2012, but that includes many falling years before the carbon tax was enacted; the decline was 2.2 percent from 2008 to 2014, but the tax was in effect only for the second half of 2008.

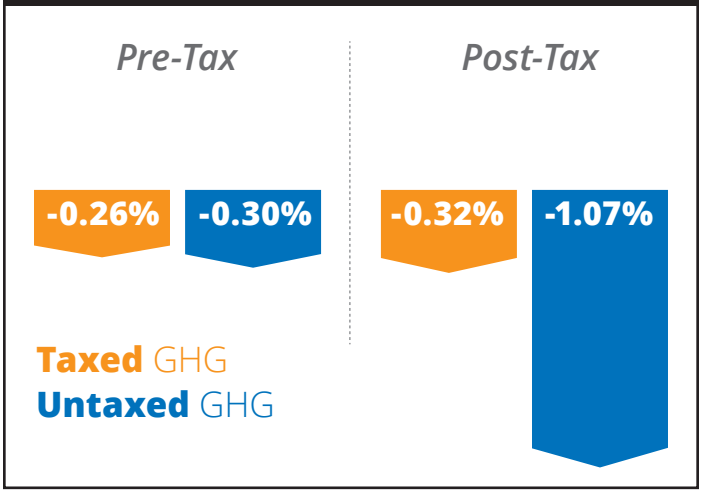
year, from 2009 to 2014, greenhouse gas emissions from taxed sources rose by a total of 4.3 percent.[20] During this same time period, emissions from non-taxed sources fell by a total of 2.1 percent.

The one-time drop in emissions from 2008 to 2009 does not appear to be driven by the carbon tax. The average annual year-to-year change in taxed greenhouse gas emissions barely changed after the carbon tax went into effect. (See Figure 2a.) Before the carbon tax was in effect, the categories of greenhouse gas emissions that would be subject to the tax fell by 0.26 percent annually from 2002 to 2008, but after the tax went into effect, from 2008 to 2014, the taxed greenhouse gas emissions declined by 0.32 percent annually — a modest difference that likely reflects a longer-term downward trend.

The average annual change in untaxed greenhouse gas emissions trended downward before the tax went into effect and continued downward after 2008, even though these emissions were not subject to the carbon tax. In the four most recent years, from 2011 to 2014, the total taxed greenhouse gas emissions rose by 5.3 percent while total untaxed emissions decreased by 2.5 percent, and the annual average growth for taxed emissions rose by 1.7 percent annually and exceeded untaxed emissions.† (See Figure 2b.)

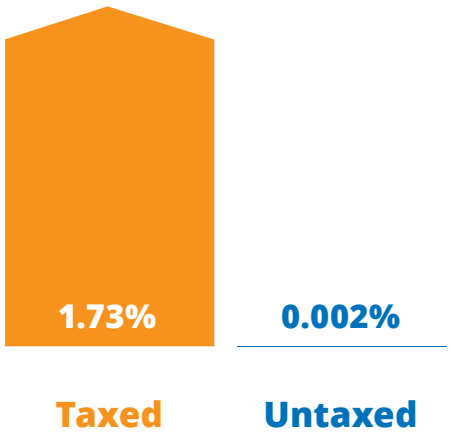
Some carbon tax advocates claim that pricing mechanisms like the British Columbia carbon tax are only effective as long as the tax rate continues to rise each year. In British Columbia, the tax reached its peak of C$30 per tonne in 2012 with no subsequent increases in the following years. But even looking at these active tax years — from 2009 to 2012 when the tax was in place for the entire year *and* a tax increase was implemented that year — the British Columbia carbon tax failed to reduce emissions. (See Figure 3.) From 2009 to 2012 taxed emissions increased by a total of 1.51 percent, but untaxed emissions increased by a total of only 0.01 percent.

Fig. 2a • Average Year-to-Year Change in Greenhouse Gas Emissions, 2002-2014



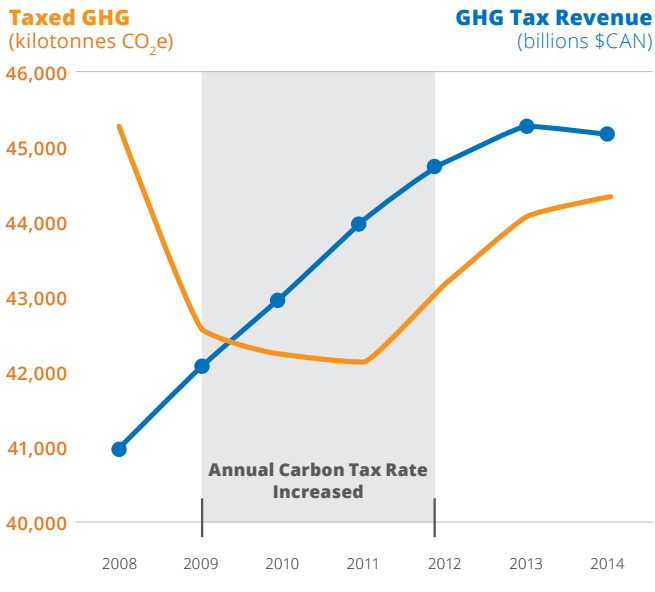
SOURCE: F&WW analysis of British Columbia government data; pre-tax from 2002/2003 to 2007/2008, post-tax from 2008/2009 to 2013/2014.

Fig. 2b • Average Year-to-Year Change in Greenhouse Gas Emissions, 2011-2014



SOURCE: F&WW analysis of British Columbia government data.

Fig. 3 • British Columbia Taxed Greenhouse Gas Emissions and Carbon Tax Revenues, 2008-2014



SOURCE: F&WW analysis of British Columbia Budget and Fiscal Plan data and Government of British Columbia Summary of GHG Emissions, 1990-2014.

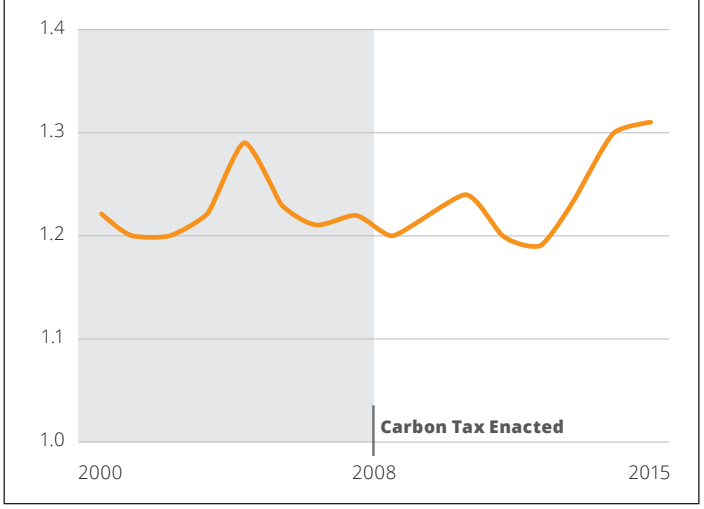
† British Columbia released the 2014 data on greenhouse gas emissions in August 2016.

The taxed greenhouse gas emissions also appear to have risen as the carbon tax rate and carbon tax revenue rose. (See Figure 3 on page 4.) As the carbon tax rate and revenue rose after 2011, so did the taxed emissions. This challenges the theory that "pricing" the carbon emissions into the product through taxes would reduce emissions. By 2012 the tax rate reached its peak of C$30 per tonne (US$30.02 per tonne), but the taxed greenhouse gas emissions continued to rise.[21]

Ultimately, it appears that the British Columbia carbon tax has had no beneficial long-term impact on greenhouse gas emissions. British Columbia's *total* greenhouse gas emissions (as well as those covered by the carbon tax) have risen over the first six full years the carbon tax has been in effect. From 2009 to 2014, total greenhouse gas emissions rose by 2.2 percent. The volume of total emissions decreased for untaxed emissions (430 kilotonnes of CO_2e), and taxed emissions rose (1,808 kilotonnes of CO_2e). As the economy continues to improve, it seems likely that British Columbia greenhouse gas emissions will continue to rise.

Already, British Columbia projects that total greenhouse gas emissions will increase over coming years even with the tax in place.[22] Canada's 2016 biennial report on climate change estimates that the province's greenhouse gas emissions will increase by 7,000 kilotonnes of CO_2e (about 12.5 percent) between 2005 and 2020, and by 18,000 kilotonnes of CO_2e (about 29.7 percent) between 2005 and 2030 — preventing British Columbia from meeting its goal of reducing greenhouse gas emissions 33 percent below 2007 levels by 2020 by a wide margin.[23] In 2016, British Columbia actually abandoned any mention of the 2020 target and is now looking toward a more distant target of reducing emissions 80 percent below 2007 levels by 2050.[24]

Fig. 4 • Total British Columbia Vehicle Gasoline Sales, 2000-2015 (billions of gallons)



SOURCE: F&WW analysis of Statistics Canada. Table 134-0004 Supply and disposition of refined petroleum products, monthly (cubic meters).

Motor fuel sales rise steadily despite carbon tax

Motor fuel sales have trended upward since the carbon tax took effect, casting significant doubt on whether the tax has been an effective tool at curbing greenhouse gas emissions. Transportation fuel accounted for more than half of the taxed greenhouse gas emissions, and gasoline and diesel motor vehicle fuel represented more than two-fifths of the taxed emissions, making it a good proxy for the impact of the carbon tax on emissions.[25]

Total motor vehicle fuel sales in British Columbia have generally risen since the carbon tax went into effect — sales exceeded those in 2008 for every year except 2012. (See Figure 4.) In recent years, motor vehicle fuel sales have exceeded the 2004 peak, even though the carbon tax reached its highest rate. In the seven years since the carbon tax took effect, from 2009 to 2015, total motor vehicle fuel sales rose 7.4 percent.[26]

Most studies by carbon tax proponents do not use total fuel sales data and instead use data contortions such as creating a metric for gasoline consumption per capita (using a per capita gasoline consumption metric minimizes the rising fuel sales with a rising population).‡ Although some of these same studies concede that it is not possible to conclude that the tax has caused reduced gasoline sales, the authors nonetheless proclaim that the carbon tax has been effective.[27] However, the increase in total vehicle fuel sales — including all gasoline and diesel consumption — is the best, most straightforward proxy for vehicle miles traveled§ and demonstrates that the carbon tax failed to curb one of the biggest sources of greenhouse gas emissions.

It is not surprising that the carbon tax had a negligible effect on gasoline consumption. People are dependent on their vehicles to travel to work and to attend to their family responsibilities. According to the Laval University in Quebec and the U.S. Energy Information Administration, gasoline prices have a minimal effect on car travel.[28] For example, despite significant volatility in U.S. gasoline prices in recent years, the total number of vehicle miles traveled and household car travel demand changed very little in response to price fluctuations.[29] Without sufficient alternative transportation options, people will continue to drive their cars regardless of significant changes in gasoline prices. The

Laval University researchers state that fuel consumption is not responsive to price and that a carbon tax in Canada should not have major effects on vehicle emissions.[30]

Drivers in the United States have faced considerably larger gasoline price increases than the British Columbia carbon tax without reducing gasoline consumption or travel miles.[31] Even significant changes in gasoline prices have not had any real impact on vehicle miles traveled and subsequent CO_2 emissions.[32] Between 2006 and 2015, the national U.S. average price for gasoline fluctuated from a 10-year low of US$2.40 per gallon in 2009 and a 10-year high of US$3.68 per gallon in 2012 — more than 50 percent higher than only four years earlier.[33] However, total vehicle miles traveled in 2012 were actually above mileage in 2009 (2,938.5 billion miles and 2,934.4 billion miles, respectively), despite gasoline costing US$1.28 more per gallon.[34]

Debunking the pricing proponents' misleading claims

The straightforward data assessment demonstrates that the British Columbia carbon tax has not had a long-term impact on greenhouse gas emissions or gasoline consumption trends, since both have resumed their rise after a brief decline. Carbon tax proponents have overstated the results of the policy (primarily by focusing on a narrow time frame) and have over-attributed the causal impact of the carbon tax even on the short-term declines in greenhouse gas emissions and vehicle fuel sales.

Although greenhouse gas emissions and vehicle fuel sales declined as the carbon tax went into effect, most of these declines are more the result of the economic recession than of the carbon tax. Some of the 2008 to 2009 decline in greenhouse gas emissions was likely attributable to the decline in economic output[35] — companies going out of business, rising unemployment and falling disposable income, all of which led to less energy use.[36]

British Columbia's environment minister at the time estimated that two-thirds of claimed emissions reductions between 2007 and 2010 were likely due to the economic recession.[37] In 2009, the first full year the carbon tax was in place, the entire country of Canada experienced a significant drop in greenhouse gas emissions, even though the majority of the country had not implemented

‡ Some studies by carbon tax advocates have found that gasoline sales have declined, but to reach a conclusion that contradicts the aggregate sales data, the researchers have employed data contortions, such as creating a metric for gasoline consumption per capita, which can suppress apparent fuel sales by diluting consumption by non-driving populations (including children and older senior citizens).

§ Canada stopped collecting vehicle miles traveled in 2010, and its new Canadian Vehicle Use Study does not currently provide provincial-level data.

a comparable carbon tax.[38] As the economy improves, greenhouse gas emissions are likely to rise even with the carbon tax in place. Indeed, from 2011 to 2014, the British Columbia economy grew 4.8 percent and taxed greenhouse gas emissions rose 5.3 percent.[39]

Moreover, the carbon tax was only one small part of British Columbia's policy suite targeting greenhouse gas emissions.[40] The other policies implemented include Acts for Greenhouse Gas Reduction Targets, Cap and Trade, Emissions Standards, Renewable and Low Carbon Fuel Requirements, Vehicle Emissions Standards, the Local Government (Green Communities) Statutes Amendment, the Utilities Commission Amendment, Clean Energy, Energy Efficiency and Zero Net Deforestation.[41] The pro-carbon tax studies attribute all of the short-term emission reductions to the carbon tax alone. It is far more likely that the carbon tax may have contributed only some part — perhaps a minimal part — of the already modest, overall emission reductions.[42]

Not only do the pro-carbon tax studies fail to establish a causal link between the application of the carbon tax and the short-term declines in emissions and vehicle fuel sales, but also many of the studies have methodological flaws that further overstate the purported benefits of the carbon tax. Even recent studies tend to focus on a narrow time frame of emissions instead of on the full data available on greenhouse gas emissions between 2008 and 2013, and now 2014 with the recent release of new data.[43] The studies that highlight the decline in greenhouse gas emissions from 2008 to 2011 or 2012 ignore the reversal of the emissions trend since 2011. (See Figure 1 on page 3.)[44] Other studies ignore the aggregate province-wide emissions or vehicle fuel sales and calculate these values on a per capita basis, which depresses the rebounding greenhouse gas emissions and rising gasoline sales because of British Columbia's growing population.[45]

Some studies contended that the British Columbia carbon tax helped reduce greenhouse gas emissions in the province more dramatically than in the rest of Canada.[46] But from 2005 to 2013 Ontario's electricity sector greenhouse gas emissions fell by 23,600 kilotonnes of CO_2e (a 68 percent drop), due largely to the closures of coal-fired electricity generation plants.[47] Total emissions in Ontario decreased by 19 percent from 2005 to 2014, compared with only a 5.8 percent decrease in total emissions for British Columbia over the same period.[48]

Unlike British Columbia, Ontario did not have a carbon tax or price on carbon (via cap-and-trade) in effect at this

time — Ontario's regulation for its cap-and-trade market went into effect on July 1, 2016, and the first compliance period begins on January 1, 2017.[49] This basic comparison demonstrates that the mandatory replacement of fossil fuel energy plants with renewable, carbon-free forms of energy can rapidly and permanently reverse emissions trends. The British Columbia carbon tax instead made at most modest and short-term impacts on the province's emissions trend.

British Columbia carbon tax rebates favor businesses over lower-income households

Lower-income households bear the disproportionate brunt of carbon taxes that are levied on transportation fuel, electricity generation and residential heating. These energy costs represent a larger share of expenses for lower-income households, making the tax especially regressive.[50] British Columbia aimed to reduce the regressive tendencies of the carbon tax and to make the policy more politically palatable by refunding these costs back to consumers (and businesses).[51] People would pay the tax at the gas pump, for example, but every three months they would receive a tax rebate.[52]

British Columbia's rebates fail to remedy the regressive nature of carbon taxes. The majority of the benefits of the rebate program have been shifted to businesses, not to individuals. But even if the rebates worked to rebalance the unfairness of the carbon tax, the very idea of rebates tends to contradict the theoretical justification for carbon taxes.

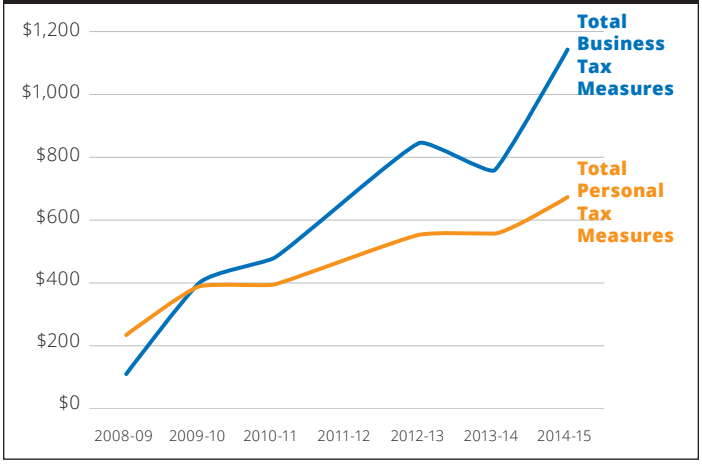
The taxes are supposed to send a price signal to discourage economic behavior that generates greenhouse gas emissions. If the added cost deterrent of the carbon tax is ultimately returned in the form of rebates, it weakens the price signal. At the outset, businesses and individuals

might reduce greenhouse gas emitting activity because of the tax, but the likely point-of-purchase effect will decline over time as people anticipate future tax rebates.

All of the revenue generated from British Columbia's carbon tax is returned back to its citizens through tax cuts and credits — a process known as "revenue recycling." (See Figure 5.)[53] The carbon tax revenue is returned in separate categories to businesses and individuals (called "personal tax measures" and "business tax measures").[54] The carbon tax also includes safeguards to protect lower-income individuals and families, such as low-income tax credits, a reduction in personal income taxes and rural homeowner benefits, among others.[55] The British Columbia government estimates how the rebates get divided between businesses and individuals (which includes the lower-income targeted tax provisions) annually, but there is no established formula to ensure that individuals receive a consistent and sufficient portion of rebates, and the actual revenue recycled can vary from the estimates.[56]

A large portion of the British Columbia carbon tax revenue has been paid directly by individuals: The greenhouse gas emissions from transportation, public electricity utilities and residential emissions that are paid primarily by individuals made up nearly half of the emissions covered by the tax. Furthermore, a portion of the costs of the other covered emissions — domestic airline fuel, commercial and institutional emissions, manufacturing and petroleum refining — were likely passed on to individuals in the form of higher consumer prices. Individuals ultimately shoulder the majority of the costs of the British Columbia carbon tax, and lower-income individuals would bear a disproportionate burden.

Fig. 5 • British Columbia Carbon Tax Revenue Distributions ($US millions)



SOURCE: Government of British Columbia Budget and Fiscal Plans 2008/09 - 2018/19. Public Account Numbers. In U.S. dollars.

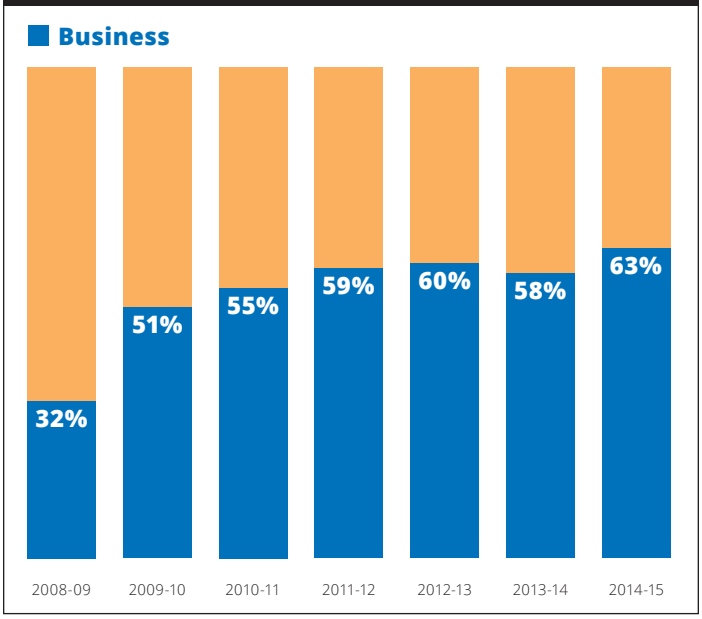
During the 2008/09 fiscal year when the carbon tax went into effect, individuals received the majority of the tax rebates (68 percent), but the British Columbia government rapidly shifted the rebates toward businesses in subsequent years.[57] Within a few years, British Columbia awarded three-fifths of the carbon tax rebates to businesses. (See Figure 6.)[58]

By the 2014/15 fiscal year, British Columbia awarded 70 percent more carbon tax rebates to businesses (US$1.14 billion) than to individuals (US$673 million).[59] Even a paper favorable to British Columbia's carbon tax recognizes that the rebates have diverged from the province's goal of remedying the regressive impact of carbon taxes on lower-income households and has instead "evolved into a system with some 'industrial policy' objectives of promoting certain sectors."[60] As the carbon tax rate and revenue increased, British Columbia has failed to ensure that the tax rebates remain focused on individuals, especially the lower-income families that spend a greater share of their income on energy.[61] As a result, this made the tax more regressive over time despite the tax rebates.[62]

ExxonMobil carbon tax endorsement should give environmentalists pause

While the greenhouse gas-emitting fossil fuel industry continues to vehemently oppose any stringent regulation of greenhouse gas emissions, some of these companies have recently supported the principle of a carbon tax

Fig. 6 • Share of British Columbia Carbon Tax Rebates to Business



SOURCE: Government of British Columbia. Budget and Fiscal Plans 2008/09 - 2018/19. Public Accounts Numbers.

approach.[63] In its statement on the 2015 United Nations climate talks in Paris, ExxonMobil endorsed a carbon tax as "the best option" to address climate change and to achieve, among other policy goals, "let[ting] market prices drive the selection of solutions."[64]

Those genuinely concerned about implementing effective policies to address climate change should be skeptical of a carbon tax approach endorsed by ExxonMobil. For more than a quarter century, ExxonMobil concealed its own scientific knowledge of fossil fuel-induced climate change and funded scientists, think tanks and lawmakers denying the human impacts of climate change.[65] ExxonMobil now publicly acknowledges the real threat of climate change, but what is driving ExxonMobil's support of a carbon tax? The short answer is that market-based pricing schemes such as the British Columbia tax have no impact on ExxonMobil's production and profits.

ExxonMobil believes, with good reason, that there is no political will among governments to implement a cap on emissions that would achieve a low-carbon scenario that prevents the acceleration of atmospheric CO_2 levels.[66] In 2016, ExxonMobil stated that, "world climate policies are 'highly unlikely' to stop it from producing and selling fossil fuels in the near future."[67]

ExxonMobil also understands the practical economic roadblocks to effective carbon pricing policies, notably that meaningful carbon taxes would be astoundingly high. In a comment to the *Houston Chronicle,* ExxonMobil's manager of environmental policy and planning said that, "Trimming carbon emissions to the point that average temperatures would rise roughly 1.6 degrees Celsius — enabling the planet to avoid dangerous symptoms of carbon pollution — would bring costs up to $2,000 a ton of CO_2. That translates to a $20 a gallon boost to pump prices by the end of this century…."[68] These price increases would represent an extraordinary and unmanageable burden for average Americans. By 2090, carbon taxes would add about US$23,177 (in 2016 dollars) to household energy costs.[69]

ExxonMobil is in no hurry to help solve our climate crisis, stating that "all economic energy sources will be necessary to meet growing global demand, and the evolution of the energy system toward lower atmospheric emissions will take many decades due to the energy system's enormous scale, capital intensity, and complexity."[70] It seems likely that the corporate supporters of carbon taxes are betting that they can continue business as usual under the carbon tax with little impact on their operations.

Unfortunately, we do not have several decades to confront climate change. A 2016 study found that without a transition to renewable or zero emissions from 2017 onward, global warming will irreversibly exceed a 2-degree Celsius global temperature rise starting in 2018.[71]

Summary

British Columbia's carbon tax has failed to change the province's long-term greenhouse gas emissions trends or to reduce gasoline sales. The short-term decline in emissions was not likely related to the tax and was rapidly reversed; taxed emissions have risen by a total of 5.3 percent in the four most recent years — faster than untaxed emissions, which actually decreased by a total of 2.5 percent. The billions of dollars in carbon tax revenue have been diverted increasingly toward corporations and businesses.

At best, the British Columbia carbon tax coincided with modest short-term reductions, but the decline was more likely related to the economic recession after the tax went into effect in 2008 than to the carbon tax itself. It is no wonder that multinational fossil fuel corporations, like ExxonMobil, favor carbon taxes as a "solution" to climate change.[72] For these industries, carbon taxes have no impact on their day-to-day operations nor on their profits.

Ironically, it is just this feature that leads many economists to favor carbon pricing as a means of addressing greenhouse gas emissions. Economists claim that carbon pricing is the most efficient policy because it will limit the costs of reducing greenhouse gas emissions. Unfortunately, economic efficiency is not the rubric by which future generations will judge the success or failure of greenhouse gas emissions policies. Instead these policies will be judged on whether or not they generated decisive action to produce real, drastic reductions in greenhouse gas emissions fast enough to stave off the worst effects of climate chaos. If there is anything to be learned from British Columbia's experience, and that of other early carbon taxes, it is that carbon taxes cannot avoid those effects that loom just beyond 1.5℃ of global warming.

It is increasingly evident that carbon taxes are really a form of "desperate environmentalism" — an apt phrase coined by Joshua Galperin, a Yale School of Forestry and Environmental Studies professor — which is "…characterized not by awe, enthusiasm and enjoyment of nature but by appeasement."[73] Galperin continues, "From market-friendly cap-and-trade to profit-driven corporate social

responsibility, desperate environmentalists angle for the least-bad of the worst options rather than the robust and enforceable safeguards that once defined the [environmental] movement."[74]

Strong and enforceable pollution standards work. Carbon taxes put the cost and responsibility of addressing climate change on individuals instead of holding polluters accountable for destroying our planet. And they are largely ineffectual, having little or no impact on greenhouse gas pollutants. Carbon taxes further endanger meaningful action to reduce harmful greenhouse gas emissions. The political capital and institutional engagement wasted in pursuing carbon taxes are a distraction from what is really needed: mandatory pollution reductions.

Recommendations and Conclusion

The solution to addressing climate change, in earnest, is not complicated: the amount of carbon dioxide entering the atmosphere and water must decrease significantly and rapidly. Incremental, gentle, polluter-friendly approaches, such as carbon taxes, will never bring about a stable and sustainable future. Instead, the public must demand that state and federal governments:

Transition to 100 percent clean, renewable energy by 2035. Electric power generation must be transitioned off of all fossil fuels, which should be kept in the ground. Investments in and build-out of solar, wind and truly clean sources must be prioritized.

Aggressively invest in energy efficiency programs to reduce overall energy needs and to create good-paying jobs. According to the Center for American Progress, retrofitting 40 percent of existing U.S. residential and commercial buildings "would mobilize a massive amount of domestic labor, over half a million (625,000) sustained full time jobs over a decade."[75]

Implement and enforce mandatory pollution control measures, not weak pricing mechanisms. Landmark legislation like the Clean Air Act and Clean Water Act in the United States led to unprecedented improvements in air and water quality, and despite industry efforts to undermine these protections, they remain some of the strongest and most effective to date. Weak pricing measures cannot compete with mandatory pollution control measures.

The effects of climate change are real, they are serious, and they are already happening. Without significant concerted action, the costs and risks of climate chaos will surge and magnify. Carbon taxes cannot achieve meaningful changes to climate-destroying emissions. Investing time, energy and resources on such "desperate environmentalism" is neither an option nor a solution.

Data and Methodology

Food & Water Watch used publicly available data to report on British Columbia's carbon tax program. The primary data came from the Government of British Columbia Greenhouse Gas Inventory, Statistics Canada data on the Supply and Disposition of Refined Petroleum Products (Table 134-0004) and Government of British Columbia Budget and Fiscal Plans.[76] Taxed and untaxed carbon emissions are drawn from these tables and from the statutory definitions, and are determined based on the specifications of what is and is not covered under the tax.[77] Finally, all tax revenues and tax rates are converted to U.S. dollars using the annual exchange rate provided by the U.S. Federal Reserve Board.[78]

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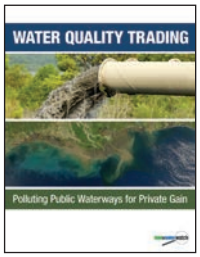
More Food & Water Watch Climate and Environment Research



Water Quality Trading: Polluting Public Waterways for Private Gain

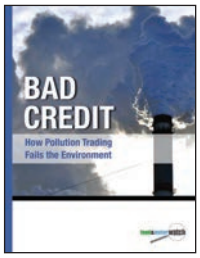
After over forty years of effective Clean Water Act control of many of our biggest sources of pollution, industries have finally found a way to evade meaningful and enforceable limits on their discharges. Water pollution trading — or water quality trading, as proponents call it — is allowing polluters to opt out of installing pollution reduction technologies and, instead, purchase pollution "credits" from other sources who may or may not be controlling their own discharges. This pay-to-pollute scheme is not only endangering our rivers, streams and lakes, but threatening the very underpinnings of our successful water quality laws.

The Truth About Offsets

Under cap-and-trade, polluters are offered the opportunity to "pay to pollute," turning decades of environmental efforts on their head and undermining improvements in environmental health. The linchpin of these cap-and-trade schemes is offsets, or credits from outside the regulated industry that polluters can buy in order to keep on polluting. But offsets are only a further loophole and avoidance of achieving real, additional and permanent reductions.

Dividend and Conquer: Cap-and-Dividend and Environmental Betrayal

Although cap-and-dividend avoids the pitfalls of trading credits and offsets, it still relies on a market solution for pollution that upends our commitment to stop pollution and protect our families and our environment. As with cap-and-trade, cap-and-dividend sets up a pay-to-pollute scheme whereby industry can simply purchase the right to degrade your land, air and waterways.



Bad Credit: How Pollution Trading Fails the Environment

For the past 25 years, emissions trading, known more recently as "cap-and-trade," has been promoted as the best strategy for solving pollution problems. But while existing pollution laws like the Clean Water Act call for the elimination of pollutants from our air and water, cap-and-trade begins by accepting the right of people to pollute and then paying them not to. Cap-and-trade substitutes economic abstractions that may or may not work for actual regulation and collective action to reduce environmental harm.

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COVER PHOTO (SEPTEMBER 2015): Melt caused by climate change is visible in the curving, receding view of Salmon Glacier ice and its exposed rocky ground. Salmon Glacier is the fifth largest glacier in North America, located north of Hyder, Alaska and Stewart, British Columbia on the Canadian side.

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HARD TO DIGEST:
GREENWASHING MANURE INTO RENEWABLE ENERGY

ISSUE BRIEF • NOVEMBER 2016

Most food animals in the United States are grown on highly concentrated factory farms, and the vast amounts of waste those animals produce poses a huge environmental and public health problem. Historically, farmers used animal manure as fertilizer, but factory farms produce far more manure than can be used responsibly on local fields. The over-application of manure leads to runoff from agricultural fields into waterways. The runoff dramatically alters the ecosystem, contributing to algae blooms and "dead zones" as well as impacting fishing and recreation economies and public health.[1]

Manure digesters have been offered up by agribusiness and policy makers as a way to turn factory farm manure into "renewable" energy. When animal waste is stored in pits and lagoons on factory farms, it releases methane, a potent greenhouse gas, and other air pollutants.[2] Manure digesters capture the methane released by decomposing waste and burn it for energy. Promoted as a "'win-win' for farmers, communities and the nation," these taxpayer-funded operations purport not only to reduce greenhouse gases but also to reduce environmental impacts associated with excess manure.[3]

In reality, these technologies have negligible impacts on the deep environmental problems caused by factory farms, and, if anything, serve to further entrench this disastrous method of food production. Indeed, the biggest and most obvious potential of taxpayer-subsidized manure digesters is to help sustain factory farms with new revenue streams from energy production. Policy makers, instead of using taxpayer dollars to prop up factory farms, should be implementing and enforcing environmental and public health regulations for factory farms.

Digesting Waste

Factory farm production of cows, pigs and poultry generated 13 times more waste than the entire human population in the United States in 2012. The problem is often intensified in certain regions of the country where specific types of factory farms have proliferated, such as dairy operations in California. For example, in 2012, the factory-farmed dairy cows in Tulare County alone produced five times as much waste as the human population of metropolitan New York City.[4]

Many factory farms store their vast quantities of manure in pits or lagoons, where microorganisms digest the waste

More Than Just Manure: Other Feedstocks for Digesters

Digesters can produce energy from a variety of biomass material, and animal manure is one of the least productive source materials — largely because farm animals have extracted much of the available energy from the feedstock. Cow manure yields just over one-tenth as much biogas as food scraps, for example.10 One private consultant for biogas projects noted that the "manure-only" digesters will not attract investors because of inefficiencies.[11]

Promoters of digesters, like the USDA, are considering ways to mix manure with better source material to improve fuel production, including building "community" digesters that accept a variety of biomass materials from multiple sources.[12] The food waste from Disney World, for example, is fed with a mix of other biomass materials into a $30 million facility in Orlando, Florida.[13]

Trucking all of these materials to and from the digesters incurs significant fossil fuel use and presents risks of spills and accidents. And given the marginal energy potential of manure in digesters, it is not clear that this will be financially feasible — unless taxpayers subsidize the process. Creating a large, centralized facility that depends on a steady supply of animal manure to operate could also incentivize the construction of new factory farms in the area surrounding the digester, similar to the way a new slaughterhouse can drive the growth of factory farms in a region.

Just like manure lagoons without any methane capture system, digesters may accidentally spill or leak liquid manure and also present environmental risks from explosions associated with methane production. A 1.25 million gallon manure digester in Wisconsin, constructed in part with public funds, spilled 380,000 gallons of manure into nearby waterways in 2013, then another 22,000 gallons in 2014. The digester then experienced a major methane explosion.[14] Faced with the reality of such dangerous accidents at digesters, along with other concerns, some rural residents have opposed the construction of digesters.[15]

through a chemical process called "anaerobic digestion." The digestion produces "biogas," mostly a mixture of methane and carbon dioxide. The methane, the main component of natural gas, can then be burned to generate electricity or heat.

The most common manure-to-energy approach in the United States are manure digesters, designed to capture methane gas from these manure lagoons, which can be burned to produce energy. This approach is promoted as a good fit for many types of factory farms, which are already producing large volumes of manure and emitting methane, a powerful greenhouse gas.[5]

Manure digesters require a great deal of manure to generate energy, compared to other feedstocks, as the animal's own digestion has already broken down the food.[6] That is why, according to an economic analysis by the U.S. Department of Agriculture (USDA), anaerobic digester systems that generate and sell electricity are not economically viable, as opposed to those that use the biogas as a replacement for natural gas for on-farm heating needs.[7]

As of the fall of 2016, there were nearly 250 manure digesters in the United States, almost all of them located on dairy and swine operations.[8] The U.S. Environmental Protection Agency (EPA) has noted that there are enough factory farms to potentially support the operation of more than 8,000 digesters.[9] Such ambitious forecasting ignores the environmental and economic realities associated with this failed technology — and the inherent unsustainability of the factory farm model.

Manure Remains

Even factory farms that safely manage manure during methane capture still have to manage the huge volume of waste that remains following the digestion process.[16] Digesters do not make the nutrient loads (nitrogen and phosphorous) in the manure evaporate or disappear; they merely extract methane gas from the manure. In fact, if digesters add water to manure during the digestion process, the total volume of waste may actually increase.[17]

Factory farms with digesters then resort to the same problematic waste disposal efforts that they have always used — spreading the digested manure as fertilizer, leading to runoff from over-application. In fact, the process of digestion makes certain nutrients, such as nitrogen and phosphorus, more water soluble, meaning that rainwater is more likely to wash those nutrients from fields into nearby streams.[18]

Additionally, trucking tons of digested manure to surrounding farms incurs significant environmental costs associated with fossil fuel use and presents risks associated with spills. There are also economic costs involved in trucking tons of manure and digestate to and from digesters, and because of high transport costs, industry sources note that it is not always financially viable to utilize digested manure as fertilizer.[19]

Desperate to find a way to dispose of these mountains of manure, digester promoters are even exploring disturbing, new

applications, such as using digested manure as a nutrition source for animals.[20] In all, the USDA has committed $10 million for research into manure digesters.[21]

Greenhouse Gases

Animal agriculture is a major contributor to climate change, with some studies estimating that livestock account for nearly 15 percent of human-caused greenhouse gas emissions globally.[22] Much of this is in the form of methane, a greenhouse gas that is 25 times more powerful than carbon dioxide, emitted from factory farms that use anaerobic (oxygen-deprived) manure management approaches such as lagoons and pits.[23] The EPA indicates that manure management on U.S. farms accounts for almost 10 percent of all human-caused methane releases in the United States.[24]

Even more troubling, these emissions grew 65 percent between 1990 and 2013, which the EPA notes is related to larger and more concentrated dairy and swine farms using liquid manure management, such as lagoons.[25] The total number of livestock on the largest factory farms rose by 20 percent between 2002 and 2012. The number of dairy cows on factory farms doubled, and the average-sized dairy factory farm increased by half between 1997 and 2012. The number of hogs on factory farms increased by more than one-third, and the average factory farm size swelled nearly 70 percent from 1997 to 2012.[26]

Anaerobic manure management practices chemically convert organic compounds found in waste into methane. By capturing and burning this methane, digesters purportedly offer a potential environmental benefit over traditional manure lagoons, both by decreasing greenhouse gas emissions and by producing energy that would offset fossil fuel consumption.[27]

However, digesters do not offer clear environmental benefits over sustainable manure management practices, such as lower-density pasture-based animal production where manure decomposes aerobically (in the presence of oxygen) and becomes a natural fertilizer, releasing very little methane in the process.[28] This process involves no expensive machinery and no transportation of manure off the farm.

Given the various manure management practices available, digesters would appear to be the most expensive, most complicated way to reduce greenhouse gases produced from animal agriculture. And it is not clear that digesters actually reduce greenhouse gases.

Manure digesters do not capture all of the methane they produce, and some amount of methane that these facilities generate escapes as emissions. This "fugitive methane," as scientists call it, can offset a portion of the greenhouse gas reductions that digesters offer.[29] And when digesters burn methane, they release greenhouse gases like carbon dioxide and nitrogen oxide, which contributes to smog.[30]

Factory farms using digesters have balked at even modest efforts by regulators to reduce this pollution. After regulators in California started requiring manure digesters to install catalytic converters to reduce emissions of nitrogen oxide as a public health measure, factory farms loudly protested that such upgrades are too costly.[31]

Subsidizing Factory Farms

Manure digesters are an extremely inefficient method of energy production and likely would not exist in the United States were it not for taxpayer subsidies. Start-up, maintenance and operating costs are often in the millions of dollars, and digesters often do not generate enough energy or revenue to be economically feasible.[32]

The USDA is a major proponent of both the factory farm model and manure digesters and has spent tens of millions of dollars helping factory farms purchase and install digesters.[33] Other federal agencies and state government programs fund the construction of digesters as well.[34] Yet, the USDA notes that low energy prices in the United States mean that digesters, in most cases, do not make economic sense as sources of electricity alone.[35]

The USDA and other promoters of digesters often present manure-based biogas alongside wind and solar as a source of green, renewable energy that can help the United States reach its goal of increased energy independence.[36] But this campaign to rebrand factory farms as being part of the green economy ignores the economic failures of this technology.

Digesters require significant energy to collect, pump and truck manure to and from the digester and to heat the manure once it is in the digester. As much as half of the energy produced from digesters may be needed to operate the digester itself.[37] Sometimes factory farms do not even generate energy from all the available gas but simply "flare off" the biogas they produce, to reduce either odors or emissions.[38]

Because the manure is free and construction costs can be subsidized, factory farms have the potential to reap a major economic benefit, and some factory farms no doubt have

Digesters for Odor Reductions?

One widely cited benefit associated with digesters is their ability to reduce the noxious odors associated with factory farms.[48] USDA economists, noting the limited economic potential of digesters as energy producers, have observed that the odor reductions provided by digesters may create the necessary economic justification for constructing these very expensive machines.[49]

However, it is not clear that digesters are effective at reducing odors. One government study from Wisconsin examined a variety of manure management practices and determined that "anaerobic digesters do not predictably reduce odors or ambient [ammonia] concentrations near manure storage lagoons. . . ."[50]

seen revenues increase with digesters. Overall, however, methane digesters have high failure rates.[39]

For example, even though over a third of the funding for a $900,000 digester on a dairy farm in San Diego County, California came from taxpayers, the EPA indicated that it was no longer in operation only a few years later.[40] It is perhaps unsurprising, as an independent analysis of start-up and maintenance costs indicated that, even accounting for grant funding, it would have taken 71 years for the digester to pay for itself.[41] As of spring 2016, the EPA indicated that 13 of 26 digesters that had been constructed in California, the nation's largest dairy state, had been shuttered.[42]

One especially controversial funding mechanism that the USDA uses to subsidize digesters is the Environmental Quality Incentives Program (EQIP). Designed to improve the environmental performance of American agriculture, this program has been used increasingly to subsidize factory farms. An estimated $750 million in EQIP funds was spent on manure management between 1997 and 2010, including helping factory farms construct manure pits and digesters.[43] The USDA also funds manure digesters through the Rural Energy for America Program (REAP), which has spent hundreds of millions of dollars to support biofuel projects.[44]

Finally, promoters of poultry manure-to-energy technologies have distorted state and national energy policy to include this environmentally damaging technology as a source of renewable energy. And the construction of these expensive facilities almost guarantees the expansion of factory farms in the area, to produce the steady supply of waste to feed them.

For example, North Carolina, a leading poultry-producing state, passed an energy bill mandating that utility companies obtain at least 900,000 megawatt-hours of electricity from poultry waste by 2014, creating a major incentive for the construction of manure-to-energy technologies such as digesters or incinerators — and the expansion of factory farms to feed these expensive facilities.[45]

Likewise, the state assembly in Maryland has designated energy produced from poultry litter facilities as a "Tier 1" source of renewable energy, on par with solar and wind. The implications of this decision are great because the state also has a mandate for electricity suppliers to generate 20 percent of electricity retail sales from renewable sources by 2022.[46] As in North Carolina, poultry litter incinerators are being explored in Maryland, along with anaerobic digesters, to fix the problem of excess manure from locating too many animals in one area.[47]

Conclusion

The political support for manure digesters and other manure-to-energy projects makes the excess manure associated with factory farms seem like less of a problem, but manure digesters in fact do not address most of the problems that the manure causes. Seldom in the public policy debate is it acknowledged that if factory farms were not concentrating

Carbon Markets

Manure-to-energy technologies like manure digesters claim to reduce emissions of greenhouse gases such as methane and carbon dioxide. Some policy makers believe that farmers should be financially rewarded for providing this environmental benefit. One such mechanism exists in carbon cap-and-trade programs such as California's.

The program allows factory farms that use manure digesters to generate "carbon offsets," referring to the greenhouse gases that would have been emitted by the factory farm without the digester in place. Other highly polluting facilities, such as power plants, can then purchase the offsets so the facilities can emit more greenhouse gases themselves, rather than cleaning up their own facilities.[51]

These so-called "carbon markets" are rife with fraud, and it is difficult to verify that emissions actually are reduced. Moreover, offsets allow polluters to avoid the urgent need to stop polluting by allowing them instead to pay to continue harmful activities with impunity, while claiming that emissions have been reduced elsewhere.[52]

The Brubaker Farm in Pennsylvania, for example, raises 30,000 pigs a year. Using taxpayer funds, the farmers built a manure digester to provide electricity for the farming operation and to sell back to the grid.[53] In 2015, the California Air Resources Board certified the Brubaker digester as a greenhouse gas offset generator.[54] The approval allowed a California energy company to claim offsets for the greenhouse gas reductions of the manure digester from the prior two years — so the energy company could keep polluting as normal, and the farm gets paid for environmental benefits it made already.[55] The government provides grants for manure digesters in order to provide an environmental benefit, but when those environmental benefits are used as offsets that allow another facility to keep polluting, that purpose is defeated.

huge amounts of waste in one place, we would not need this expensive "solution."

The most common-sense improvement we can make to the environmental problems facing animal agriculture is to stop building new factory farms. We need policies that help smaller, independent and diversified farmers to thrive in a way that does not harm communities, the environment and public health. Until a shift to a more sustainable food system happens:

- The EPA and states should establish a moratorium on the construction of new factory farms and on the expansion of existing facilities. We will never solve the existing excess manure problem — and we will make it worse — if we do not stop the increased consolidation of the factory farm industry.
- States should strip animal manure out of State Renewable Portfolio Standards. Manure is a dirty source of energy that does not address the root of the problem: we need to diversify our highly concentrated milk and meat production system so that it is not producing unsustainable mountains of manure. Instead of allowing states to meet their renewable energy mandates with dirty technologies that rely on the excess production of manure and enable continued concentration of too many factory-farmed animals in the same region, we need to incentivize clean energy production while creating a food economy that is good for everyone.
- Congress should eliminate other financial incentives for manure-to-energy technologies by making sure that the Environmental Quality Incentives Program no longer serves as a subsidy for factory farms by capping the size of payments that can be made to any one operation.
- The EPA and states should establish better and enforce existing air and water pollution laws, and not stand in the way of local government efforts to impose strict health and zoning regulations for factory farms.
- The federal government and states should not replace enforceable regulations to reduce factory farm pollution with market-based efforts that create pay-to-pollute schemes.

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