# Don't Believe the Carbon Market Hype

Why states should not pursue carbon markets and what they can do instead



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Don't Believe the Carbon Market Hype: Why states should not pursue carbon markets and what they can do instead

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## INTRODUCTION

The effects of climate change are increasingly apparent—2016 was recorded as the hottest year ever, and droughts, floods, wildfires and other extreme weather events are rising globally. The implications of these changes are tremendous; yet, the United States does not currently have a national plan to reduce greenhouse gas emissions.

In 2015, the Obama Administration presented the Clean Power Plan as the first nationwide policy to address climate change. The plan aimed to reduce electricity sector emissions to 32 percent below 2005 levels by 2030 by reducing emissions from existing coal fired power plants.<sup>1</sup> Each state was given an emissions reduction target and great flexibility in choosing how to meet that target. While the Clean Power Plan was significant in that it was the first federal climate change policy, it only covered coal-fired power plant emissions and left out other high emitting sectors of the economy, including transportation, infrastructure and housing. Furthermore, it encouraged states to create and join in regional carbon markets, which have proven ineffective at reducing greenhouse gas emissions for reasons this paper will address.

After a series of legal challenges and President Trump's Executive Order to dismantle the rule, the Clean Power Plan will no longer go into effect. It is highly unlikely that the federal government will pursue action on climate change anytime soon. The Trump administration's cabinet is filled with varying levels of climate deniers, including former Exxon/Mobil CEO and now Secretary of State Rex Tillerson, who has stated that climate science was "inconclusive;" head of the Environmental Protection Agency Scott Pruitt, who has denied the scientific consensus on human contributions to climate

#### State Climate Action Plans



Source: "Climate Action Plans," *Center for Climate and Energy Solutions* February 2016, <a href="https://www.c2es.org/us-states-regions/bolicv-maps/climate-action-blans">https://www.c2es.org/us-states-regions/bolicv-maps/climate-action-blans</a>> (lune 13. 2017).

change; and Secretary of Agriculture Sonny Perdue, who wrote that those calling for climate action are "so obviously disconnected from reality." In addition, President Trump's proposed budget for fiscal year 2018 recommends slashing the Environmental Protection Agency's budget by over 30 percent and closing the Environmental Protection Agency's Office of Environmental Justice, which is instrumental in ensuring equitable environmental policy. Perhaps most notably, President Trump announced that he is pulling the U.S. out of the Paris Agreement, sending a signal to the world that the U.S. federal government will not act on climate change.

As the federal government moves backwards on climate action, there are new opportunities for states to take the lead. The end of the Clean Power Plan creates an opportunity to reset thinking on climate policy, learn from past mistakes and expand progress on what has been working. Currently, 34 states plus Washington D.C. have some form of climate action plan,<sup>2</sup> but there's significant room for them to be strengthened and for more to be created.

Since the 2016 presidential election, several states have already announced their own climate change initiatives. New York Governor Andrew Cuomo announced an initiative in May 2017 to curb the state's methane emissions—one of the first such initiatives in the country. Virginia Governor Terry McAuliffe issued an Executive Order in the same month directing the state to begin creating a carbon market. This is unsurprising given that carbon markets are the default for many at the state level when thinking about climate policy, but enthusiasm for carbon markets is surprising given this approach's poor track record. They rarely lead to real, sustainable greenhouse gas emissions reductions and can harm the health and economic security of communities in the process. Historically, rural communities, low-income communities and communities of color have been disproportionately harmed by polluters operating within carbon markets, making them an inequitable choice for climate action.

Instead of using the lack of federal climate change policy as a catalyst to create more carbon markets, states should consider policies that combine effective, predictable regulation with investment in climate friendly energy and infrastructure. Rural, low-income and minority communities can benefit greatly from investments in renewable energy and energy efficiency, from increased jobs in the clean energy sector and from local ownership that retains wealth in the community. Such policies best arise from deep community engagement and inclusive processes that strive to address local concerns so that communities can remain resilient as they adapt to climate change. This paper will outline why carbon markets will not work to address the climate crisis and provide recommendations for states to consider as they create their own climate change plans.

# PROBLEMS WITH CARBON MARKETS

A carbon market is initially established by setting a cap on allowable greenhouse gas emissions, with that cap declining as the years go on to gradually meet greenhouse gas emissions reduction goals. The government creates emissions allowances (also called emissions credits), measured in units of greenhouse gases per year, and issues enough of these credits to add up to the cap on allowable emissions. Carbon markets operate under the assumption that by gradually limiting the amount of emissions credits available, the market will lower greenhouse gas emissions overall. Covered entities (e.g. power plants, companies, or other polluting entities, depending on the specific market and its confines) can buy and sell emissions credits as necessary, creating a financial incentive for them to pollute less and a financial burden for them if they pollute more. Some carbon markets can also function as revenue generators for the governments that run them from the buying and selling of emissions credits. This revenue can be invested in projects that support climate change adaptation and mitigation.

Carbon markets became attractive following the Kyoto Protocol, an annex to the United Nations Framework Convention on Climate Change (UNFCCC). Finalized in 1997, the Kyoto Protocol was signed by 192 countries to reduce greenhouse gas emissions globally. Notably, the U.S. did not sign the treaty. The Kyoto Protocol developed mechanisms for countries to reach their greenhouse gas emissions reductions goals through markets that traded emissions credits.<sup>3</sup> However, the Protocol did not go nearly far enough to effectively address climate change. Despite underwhelming results, carbon markets have been a popular policy option at the national and sub-national levels since Kyoto, including in the European Union (EU Emissions Trading System), in the northeastern U.S. (Regional Greenhouse Gas Initiative), in California (Assembly Bill 32), in China through a series of carbon trading pilot programs, in Ontario and Quebec in Canada and more.

Despite the theoretical potential for carbon markets to work, carbon markets worldwide and in the U.S. have largely failed to reduce greenhouse gas emissions,<sup>4,5</sup> and, in some cases, have also failed to bring in revenue,<sup>6</sup> among other problems. These failures can happen for many reasons, some of which are discussed in this section.

# Determining the amount, price, and distribution of credits on the market

Governments determine how many emissions credits are made available in a carbon market, and setting this number is critical. If there are too many emissions credits available, covered entities have less incentive to reduce emissions because the credits are so easy to attain. Alternatively, if there are too few emissions credits available, covered entities are forced to adapt their operations and technologies to be less emissions intensive more rapidly, which can be expensive and can sharply increase prices for consumers.

The price of emissions credits follows the principle of supply and demand: the more credits, the lower the price; the fewer credits, the higher the price. Most governments have erred on the side of having too many credits available on the market to effectively reduce emissions, and they have often given these credits to polluters for free. Consequently, emissions credits are easy to come by and demand too low a price to drive greenhouse gas emissions reductions. In Europe's case, prices dropped as low as .1 euros per ton in 2007,<sup>7</sup> rose for several years, and then dropped back down to under four euros per ton in both 2013 and 2016. Such low prices render a carbon market essentially useless at incentivizing emissions reductions.

Problems can also arise during the process of distributing emissions credits at the outset of the market. Some markets have used auctions, where covered entities purchase their initial share of credits. Ongoing auctions allow for covered entities to buy and sell additional credits. However, in most cases, the carbon market's governing body has determined a fair share of credits for each entity and given them away at no cost at the market's outset. This method of distribution removes the incentive to reduce emissions since the credits to pollute are free.<sup>8</sup>

#### Leakage and offsets

Carbon markets are geographically bound, covering the emissions from certain states or countries. However, climate change is a global problem and greenhouse gas emissions anywhere cause climate change everywhere. "Leakage" is the term for an increase in greenhouse gas emissions outside the area covered by a carbon market. This can happen because of covered entities moving their production to other states or countries with less ambitious climate measures or increased imports from entities outside the carbon market area. Not accounting for leakage can make a market look falsely successful—greenhouse gas emissions in the market boundaries may decrease, even though emissions may have gone up globally.

Many carbon markets have allowed offsetting, another practice that may not lead to real emissions reductions. An offset is a reduction in greenhouse gas emissions made to compensate for emissions elsewhere. Offset projects can include installing manure digesters to capture methane from mega-dairies and factory farms, planting forests to sequester carbon, or other projects that the market defines as acceptable.

#### Credit prices in California, RGGI and the EU ETS compared with estimates of what price is needed



# Prices taken from the most recent auction data in each market

Source: "Report of the High-Level Commission on Carbon Prices," *Carbon Pricing Leadership Coalition* May 29, 2017, <https://static1.squarespace.com/static/54ff9c5ce4b0a53 decccfb4c/t/59244eed17bffc0ac256cf16/1495551740633/ CarbonPricing\_Final\_May29.pdf> Accessed: June 18, 2017. One problem is that offsets may not be additional, meaning they might have happened regardless of the buying and selling of any emissions offset credit. This issue is especially apparent when emissions offset credit prices are extremely low. In some markets, emissions offset credits can originate from agricultural activities in developing countries, and the power dynamics of holding developing countries responsible for cleaning up the mess made by the developed world are highly inequitable. Put simply, offsets allow polluters to continue business as usual while holding others—generally others less well off—accountable for emissions reductions.

Soil carbon offsets are a type of offset that allow carbon sequestered in the soil through tree planting or agricultural land management to count as mitigation for emissions elsewhere. The problem with this type of offset is that soil carbon storage is extremely impermanent; any carbon sequestered in the soil can be released with a change in land management practices. Even contracts that bind land managers to use certain practices for 10 or 20 years do not ensure permanence, since all the carbon stored can be released back into the atmosphere as soon as the contract is up if the land manager returns to less climate-friendly practices. In addition, the science and measurement tools are not advanced enough yet to precisely quantify the amount of greenhouse gas emissions sequestered over time.<sup>9</sup>

Farmers are often responsible for implementing the land management practices to create soil carbon offsets, which adds a social dimension to the problem. Farming is already a risky profession, reliant on good weather conditions and stable market prices. However, tying agricultural land to a carbon market could leave farmers even more vulnerable to volatile prices than they are already. Furthermore, soil carbon offsets must be additional to be effective. This means that the price for the offset must be high enough to incentivize farmers to change their land management practices, which can require expensive new equipment, inputs and knowledge. However, carbon credit prices have historically been far too low to fairly incentivize such large-scale land management changes.10 These dynamics expand the already disproportionate impacts of carbon markets on rural communities by making farming-a staple of many rural economies-more economically unstable.

We do need programs to incentivize climate-friendly agricultural and land management practices, but not for the exclusive purpose of sequestering carbon. Agriculture provides food, fuel and fiber for the nation and needs to remain resilient for many reasons beyond serving exclusively as a carbon sink. Though carbon sequestration is an added benefit of good agricultural management, it should not act as an offset for polluting entities in carbon markets.

#### Environmental justice implications

The environmental justice community advocates for strong action on climate change because climate change will disproportionately impact low income, minority and other disadvantaged communities. Residents in low-income communities spend a larger percentage of their income on energy costs, which will be exacerbated as climate change leads to more extreme temperatures throughout the year, requiring more heating and cooling. Communities that are economically dependent on agriculture, forestry, fisheries or other natural resource-based industries-most of which are rural and have higher poverty rates on average-will face challenges as these industries become increasingly volatile and risky due to extreme weather. In addition, race is the number one indicator for the placement of toxic and greenhouse gas emitting facilities in this country, meaning the public health impacts of climate change are overwhelmingly clustered in communities of color.<sup>11</sup>

Carbon markets allow covered entities to trade emissions credits, meaning that pollution rates can end up highly uneven. For instance, one power plant could buy up a large portion of the market's available emissions credits, which would then allow that power plant to pollute at a much higher rate than others. Power plants do not only emit greenhouse gases; they also release co-pollutants, such as sulphur dioxide (SO2), nitrogen oxides (NOx), mercury (Hg), and fine particulate matter (PM2.5). These co-pollutants have enormous public health impacts ranging from cardiovascular and respiratory problems to premature death.<sup>12</sup> Because most power plants and polluting entities are situated in or near low-income communities and communities of color, the increased pollution in certain locations will harm those communities disproportionately.<sup>13</sup>

It's clear that addressing climate change is not only an environmental issue; it is an equity issue. As such, carbon markets are not the way to do it. The Oregon Department of Environmental Quality recently performed a study assessing whether the state should develop a cap-and-trade program. It refers to pricing carbon as "inherently regressive,"<sup>14</sup> meaning that it will have a disproportionately large impact on low income communities and residents. Even so, the state put forth a recommendation to pursue cap-and-trade.

One environmental justice advocate wrote of the Clean Power Plan that it "places the [environmental justice] advocacy community in an awkward position because [environmental justice] advocates want to aggressively fight climate change but overwhelmingly do not support carbon trading, a policy mechanism the Clean Power Plan at least facilitates if not promotes."<sup>15</sup> Carbon markets as a climate solution ignore the stance of the communities that will be most impacted by climate change and the inequities carbon markets create. The end of the Clean Power Plan provides a new opportunity to enact more equitable policy approaches on climate change.

## EXAMPLES WE CAN LEARN FROM

#### **Regional Greenhouse Gas Initiative**

The Regional Greenhouse Gas Initiative (RGGI) is the first mandatory cap-and-trade program for greenhouse gas emissions in the United States, and currently involves nine states— Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New York, Rhode Island and Vermont. Although RGGI functions well in certain ways, it has experienced many bumps along the road and, to this day, does little to reduce greenhouse gas emissions.

The nine RGGI states account for approximately seven percent of the U.S.'s carbon dioxide emissions; however, the program only applies to electric power plants with capacities to generate 25 megawatts or more. RGGI does not cover greenhouse gas emissions from transportation, agriculture or any other sectors.<sup>16</sup> Of the emissions that are covered by RGGI, studies show that greenhouse gas reductions since the program's inception occurred independently of RGGI stipulations. Instead, falling natural gas prices made it a cheaper (and cleaner burning) alternative to coal and oil; milder winters reduced demand for heating; and nuclear, wind, and hydropower capacity increased in the northeast.<sup>17</sup>

RGGI took effect in 2009 and underwent a major overhaul following a 2012 program review that revealed "a significant excess supply of allowances relative to actual emission levels in the region."<sup>18</sup> In other words, there were more emissions credits on the market than necessary to incentivize a shift from a business as usual scenario, so covered entities could maintain or even increase their greenhouse gas emissions and still comply with the program. The program review reduced the 2014 emissions cap by 44 percent, with a further annual reduction of the cap by 2.5 percent until 2020. The new cap and ratcheting down the level of emissions credits improved the program, but these changes still are not enough to outpace the greenhouse gas reductions that would occur without RGGI because of fuel switching, the falling price of renewables and increased energy efficiency.

RGGI also does not address leakage. A 2016 RGGI monitoring report compared the 2012 to 2014 time period with a pre-RGGI baseline of 2006 to 2008. The report found that "the annual average electric generation from all sources in the nine-state RGGI region from 2012 to 2014 decreased by 30.1 million megawatt hours, or 9.1 percent, compared to the average for 2006 to 2008." This sounds like good news, but the report went on: "Annual average net [energy] imports into the nine-state RGGI region from 2012 to 2014 increased by 19.1 million MWh, or 34.0 percent, compared to the average for 2006 to 2008."<sup>19</sup> Much of this electric generation was less emissions intensive due to increased hydropower and renewable sources within the region and imported from Quebec,<sup>20</sup> but without a robust process to control leakage, there's no way to ensure that energy imports are less emissions intensive in the future.

The potential for leakage increases with the price of carbon, and yetleakage concerns should not deter an adequate price on carbon. Research has suggested leakage rates could increase from 28 percent with \$3/metric ton prices to 90 percent with \$7/metric ton prices.<sup>21</sup> Credits at the March 2017 auction sold for \$2.72/metric ton.<sup>22</sup> Though this low price theoretically minimizes leakage, it could also mean that the price is too low to incentivize covered entities to reduce emissions. Yet, if the number of emissions credits on the market were lowered to incentivize significant emissions reductions, leakage could become even more of a problem. The most obvious solution to prevent leakage is establishing a border tariff or tax, neither of which RGGI currently has.

What RGGI does well is generate revenue. Though this is not the main goal of a carbon market (the main goal should always be to reduce emissions), the revenue from RGGI has been reinvested well. Of the nearly \$2.7 billion dollars that RGGI has raised to date,<sup>23</sup> 80 percent has supported energy efficiency, renewable energy and other climate-related projects. Supporting energy efficiency can lead to emissions reductions, lower electricity bills and job creation.

RGGI has not established a cap beyond 2020, so there is potential for another overhaul such as the one in 2012. Ways to increase RGGI's effectiveness include expanding its reach beyond just the power sector or growing the program to include more states. Both options would be exceedingly difficult administratively and politically. Instead of overhauling the carbon market, the northeastern states should consider other options, such as those highlighted at the end of this paper, to reduce greenhouse gas emissions more meaningfully.

#### California carbon market

California's Global Warming Solutions Act (AB 32) was signed into law in 2006. It includes a cap-and-trade program with the goal of reducing the state's greenhouse gas emissions to 1990 levels by 2020. Most of the emissions credits are given away to covered entities for free and the remainder are auctioned off quarterly. Each year, the emissions credits and the number of free credits each covered entity gets are ratcheted down. Ratcheting is intended to increase the value of emissions credits, but this strategy has not worked; credits have continued to sell at or near the market's price floor of around \$12.

Although California's greenhouse gas emissions are falling the latest statewide emission inventory notes a 9.4 percent overall decrease in emissions in 2014 compared to peak levels in 2004<sup>24</sup>—it's unclear whether this drop is due to cap-andtrade. California has a host of other programs that contributed to the decrease, most notably the Renewable Portfolio Standard, which "requires retail sellers and publicly owned utilities to procure 50 percent of their electricity from eligible renewable energy resources by 2030."<sup>25</sup> Without this law, California's emissions would be an estimated 22 to 30 million tons higher per year in 2020. The Renewable Portfolio Standard, coupled with the falling prices of renewable energy and the slump in energy use after the 2008 recession, could account for nearly all the emissions reductions in California to date.

The California cap-and-trade program has raised nearly \$4.5 billion dollars, which is significant, but is well below state estimates. Cap-and-trade revenue is used for projects that reduce greenhouse gases and environmental burdens, specifically in disadvantaged communities. This is critical, because many power plants, coal mines and fracking sites are in communities already burdened by high poverty rates. These communities also pay the price of the pollution through worsened public health and deteriorated natural resource bases. Therefore, it's critical that these programs receive reliable and sufficient funding. Yet, at the May 2016 auction, just over ten percent of the emissions credits up for auction sold, leaving California \$600 million short of projected revenues.<sup>26</sup> Because the auction revenue fell short, anticipated investments in California climate programs were much lower than expected. More recently, at the February 2017 auction, only 18 percent of the emissions credits up for auction sold, indicating that this could be a long-term problem.<sup>27</sup> The instability of revenue displays the inherent risks of a cap-and-trade approach as the primary source of funding for critical climate change programs.

Furthermore, the California cap-and-trade program allows offsets to count for eight percent of total compliance obligation. Offsets can currently come from forestry projects, dairy digesters and ozone depleting substances projects. Including dairy digesters as an accepted offset in the California market adds an extra challenge. On many large-scale dairies, manure is stored in pits or lagoons, which emit large

amounts of methane (a greenhouse gas roughly 30 times more potent than carbon dioxide). Dairy digesters capture the methane released from the manure lagoons and turn it into energy. This technology has been touted as an easy way to turn factory farm waste into renewable energy, but this is a partial truth. In fact, incentivizing digesters by funding them with cap-and-trade revenues further entrenches the system of factory farming by investing in the cleanup of massive amounts of animal waste rather than avoiding it in the first place through sustainable agriculture practices. Instead of allowing dairy digesters as an offset in the California market, the state should use that money to invest in sustainable agriculture practices—such as pasture-raised livestock-that build healthier soils, mitigate climate change and help farmers adapt to the increasing extreme weather events that climate change will bring.

The California cap-and-trade program also presents a host of environmental justice issues. A group of California universities released a research brief in 2016, which found that California residents of color and residents living in poverty are disproportionately impacted by cap-and-trade. Facilities emitting the highest levels of greenhouse gases (which also emit particulate matter and other harmful air pollutants) were more likely to be in environmental justice communities. The report found that "on average, neighborhoods with a facility that emitted localized GHGs within 2.5 miles have a 22 percent higher proportion of residents of color and 21 percent higher proportion of residents living in poverty than neighborhoods that are not within 2.5 miles of such a facility."<sup>28</sup> Until these impacts can be rectified, the cap-and-trade program is perpetuating inequity in the state of California.

California's cap-and-trade program as it currently functions goes until 2020, and its future beyond that is unclear. Due to increasing recognition of the market's problems to-date, legislators are bringing proposals to the table to amend the program. One of these proposals is California Senate Bill 775, which would alter the cap-and-trade program to eliminate offsets, stop giving away free emissions credits, and assert more control over the carbon price by establishing a price ceiling and floor. These changes and more are necessary to establish a well-functioning carbon market in California.

#### **European Emissions Trading System**

The European Union Emissions Trading System (EU ETS) is the world's first and largest cap-and-trade system for greenhouse gas emissions. Launched in 2005, it was intended to help Europe meet its commitments under the Kyoto Protocol. However, the EU ETS has struggled with an over-allocation of credits, fraud and excessive market speculation, resulting in the program doing more harm than good.

The EU ETS is organized into trading periods. The first period lasted from 2005-2007 and the second from 2008-2012, and during both periods an extreme oversupply of emissions credits led to low credit prices. Today, the EUETS is in its third trading period, which lasts until 2020. So far, this period has been spent fixing the problems of the first two periods. The EU ETS introduced ratcheting, so the emissions cap will decline by 1.74 percent per year for an ultimate emissions reduction of 21 percent in 2020 compared to 2005 levels. This level of ratcheting is not enough; to meet the EU's 2050 climate objectives, the annual ratcheting level should be at least 2.6 percent.<sup>29</sup> In addition, over half of all emissions credits are still given away for free. These changes move the system in the right direction, but the carbon price has remained low and the EU ETS has barely reduced greenhouse gas emissions. In addition, studies have found that the market has not spurred clean energy innovation.30

Perhaps the number one mistake of the EUETS is that it allows emissions credits to be assets for derivatives trading. This has changed the nature of credit trading significantly, with most credit trading now happening for speculation rather than compliance. According to the World Bank, futures trades accounted for 73 percent of EUETS trades in 2009.<sup>31</sup> This trend allows traders to bet that credit prices will fall to a certain level, exacerbating the market's pre-existing excess supply problem and uncoupling the carbon market from its primary objective of incentivizing greenhouse gas emissions reductions.

Fraud has also posed a massive problem in the EUETS; starting in 2008, an unprecedented increase in trading volumes began due to a loophole that allowed tax fraud. The European Police Office (Europol) released a press release in December 2009 stating that the fraud had "resulted in losses of approximately 5 billion Euros for several national tax revenues. It is estimated that in some countries, up to 90 percent of the whole market volume was caused by fraudulent activities."<sup>32</sup> This ordeal led several EU member states to change their tax rules on emissions credit transactions; however, not all the EUETS member states have put the correct tax mechanisms in place to prevent this fraud from happening again in the future.<sup>33</sup> As the EU ETS approaches its fourth trading period from 2021 to 2030, officials have an opportunity to change the market for the better. However, a vote in February 2017 decided in favor of more free credits for covered entities and against deeper emission cuts, which means the EU ETS will fall short of commitments made in the Paris Agreement.<sup>34</sup> Also, the potential for fraud still exists. This early vote indicates that market overhaul is improbable, and the EU ETS will continue down the same path of offering too many credits at too cheap a price, and with too much potential for market volatility.

# BUILDING BLOCKS FOR A NEW SYSTEM

Climate change is one of the biggest challenges the world currently faces, and the U.S. must be part of the solution. In lieu of federal action, states can continue to design meaningful climate policy that reduces greenhouse gas emissions and addresses equity issues. Successful state-level policy already exists that targets emissions from energy, transportation, infrastructure and more. These policies have proven to be effective and equitable ways to reduce greenhouse gas emissions without relying on market-based mechanisms.

Renewable Portfolio Standards exist in 29 states to specify the amount of renewable electricity utilities must sell.<sup>35</sup> Electricity accounts for 30 percent of greenhouse gas emissions in the U.S., so these standards cover a large swath of the country's emissions.<sup>36</sup> The rapidly declining price of renewables makes Renewable Portfolio Standards increasingly easy to meet; solar prices are at an all-time low, and are now costcompetitive with fossil fuels.<sup>37</sup> In addition, 60 percent of new renewable generation in the U.S. since 2000 has been driven by Renewable Portfolio Standards, proving the effectiveness of these policies at driving energy innovation.<sup>38</sup> Increasing renewable energy also creates jobs; according to the U.S. Department of Energy, over 3.3 million Americans were directly employed by the clean energy industry in the first quarter of 2016. By comparison, just over 2.9 million Americans were directly employed by the fossil fuel industry in the same quarter, and this number is falling.<sup>39</sup> Add to this the reduced air pollution and improved public health from burning fewer fossil fuels, and Renewable Portfolio Standards become an even more appealing option for state climate policy.

Residential and commercial building energy codes are another widespread state policy that reduces greenhouse gas emissions. Currently, 42 states have a minimum level of energy efficiency for commercial buildings, residential buildings, or both. These codes vary in their stringency from state to state, but the U.S. Department of Energy estimates that building



Source: "State Renewable Portfolio Standards and Goals," *National Conference of State Legislators* April 26, 2017, <a href="https://www.ncsl.org/research/energy/renewable-portfolio-standards.aspx">https://www.ncsl.org/research/energy/renewable-portfolio-standards.aspx</a> (June 14, 2017).

energy codes will avoid 841 million metric tons of carbon dioxide emissions through 2040 and will save home and business owners \$126 billion by lowering energy needs.<sup>40</sup> These codes would especially help rural residents, who have lower housing quality with lower energy efficiency on average. States can consider creating or strengthening building energy codes to address infrastructure-related emissions.

Several states require accounting for climate change in environmental impact assessments. This means that the health and environmental costs of climate change are factored into economic decision making. This type of policy accounts for the true cost of climate change and encourages companies and individuals to invest in energy efficiency, renewables and other means of avoiding or mitigating greenhouse gas emissions. The federal government struck down the use of the social cost of carbon in a March 2017 Executive Order,<sup>41</sup> making such state-level policies more critical than ever.

Carbon taxes have been proposed in several states as an alternative to carbon markets. Legislators in Massachusetts, Rhode Island, Connecticut, Vermont and Washington state have all introduced proposals to impose a carbon tax or fee.<sup>42</sup> Whereas carbon markets set the emissions reductions and let the market determine the price, carbon taxes set the price on carbon and allow the market to determine the emissions reductions. This results in greater price stability, but means that emissions reductions are uncertain. By allowing greenhouse gas emissions to continue, the carbon tax perpetuates many of the inequities that are embedded in current carbon

markets. Carbon taxes can have more bipartisan support since they can be revenue-neutral by returning revenue generated to taxpayers through tax credits and rebates. However, depending on how they are designed, they can also function as a regressive tax, hurting low-income and rural residents disproportionately. British Columbia enacted a carbon tax in 2008, but it's difficult to isolate the effects of the carbon tax from the effects of British Columbia's other climate policies and the impacts of the recession.<sup>43</sup> Carbon taxes also face the same issues as carbon markets when it comes to leakage. States should exercise caution in considering carbon taxes, and lean towards more proven approaches for reducing emissions.

Fighting climate change in the U.S. has never been solely dependent on the federal government. Congress has not passed any bills directly targeting climate change in the past decade, and yet greenhouse gas emissions have begun falling from their peak levels in the U.S. regardless.<sup>44</sup> States, cities and counties must continue to lead this charge with localized policies that focus on equity and resilience. These new approaches can and should include rural and minority voices throughout the policymaking process. Past global and domestic experience with carbon markets shows that they have not worked from a greenhouse gas reduction or equity perspective, and states should keep this in mind as they design climate policy that works for all people and communities.

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