



# STRENGTH IN NUMBERS

AMERICAN LEADERSHIP ON CLIMATE



| UNITED STATES  
| CLIMATE ALLIANCE

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# Message from the Co-Chairs

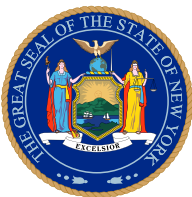
More than two years ago, our three states launched the U.S. Climate Alliance (Alliance) to mobilize a coalition of governors to meet the goals of the Paris Agreement. We are now a bipartisan coalition of twenty-five governors, with eight new members joining in 2019 alone. Collectively, we represent more than half the U.S. population and 60 percent of national GDP—an \$11.7 trillion market that is driving innovation and rebuilding America’s clean energy economy. Despite the weakening of our climate framework at the federal level, we continue to grow our ambition. Alliance members understand first-hand the devastating everyday impacts of this global climate crisis. From floods to hurricanes to wildfires, 2019, once again, brought extreme weather events that affected the lives of millions and devastated many of our communities. In order to mitigate the effects of this new reality, it is critically important to accelerate the pace and scale of climate action on all fronts.

In the past year alone, Alliance members have made extraordinary progress through significant executive, regulatory, and legislative actions. We have adopted ten new, increasingly ambitious greenhouse gas (GHG) emissions reduction targets—including four new carbon neutrality goals. Eight states have now enacted 100 percent zero-carbon or clean energy legislation. We recognize that achieving these goals will require a broad portfolio of actions across all regions and sectors of our state economies. We are employing innovative climate policy, by implementing the country’s first state building

performance standards. We are taking unified action to have a transformative impact on the U.S. economy through coordinated appliance standards. We are pushing back against the federal administration’s deregulatory agenda, in defense of one strong, national clean car standard that protects the rights of states and the health of our citizens. We are working with farmers to improve land practices and standing with American industry to create opportunities for innovation by phasing down hydrofluorocarbons (HFCs). And we are supporting our communities to build resilience to climate impacts.

As the independent analysis contained in this report illustrates, this determined and ambitious state leadership has put us on track to reduce our emissions by at least 20–27 percent below 2005 levels by 2025, all the while demonstrating how climate action and economic growth go hand-in-hand. We have reduced our emissions more rapidly than the rest of the country while growing our per capita GDP three times faster. And we are not close to being done. We will continue to implement new strategies to meet and exceed the goals of the Paris Agreement.

In November, the federal administration wrongly initiated the formal withdrawal from the Paris Agreement—the only country among the 187 parties to do so. While the administration pursues this lonely, errant path, we reaffirm the commitment of the Alliance to continue to lead this global fight and to explore innovative policies across all sectors of our economies to ensure we meet our goals.



**Andrew M. Cuomo**  
Governor, New York



**Gavin Newsom**  
Governor, California



**Jay Inslee**  
Governor, Washington





# U.S. Climate Alliance Principles

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## **States are continuing to lead on climate change:**

Alliance states recognize that climate change presents a serious threat to the environment and our residents, communities, and economy.

## **State-level climate action is benefitting our economies and strengthening our communities:**

Alliance members are growing our clean energy economies and creating new jobs while reducing air pollution, improving public health, and building more resilient communities.

## **States are showing the nation and the world that**

**ambitious climate action is achievable:** Despite the U.S. federal government's decision to withdraw from the Paris Agreement, Alliance members are committed to supporting the international agreement and are pursuing aggressive climate action to make progress toward its goals.

## **Each member state commits to:**

- ▶ **Implement** policies that advance the goals of the Paris Agreement to reduce greenhouse gas emissions by at least 26–28 percent below 2005 levels by 2025;
- ▶ **Track** and report progress to the global community in appropriate settings, including when the world convenes to take stock of the Paris Agreement; and
- ▶ **Accelerate** new and existing policies to reduce carbon pollution and promote clean energy deployment at the state and federal level.



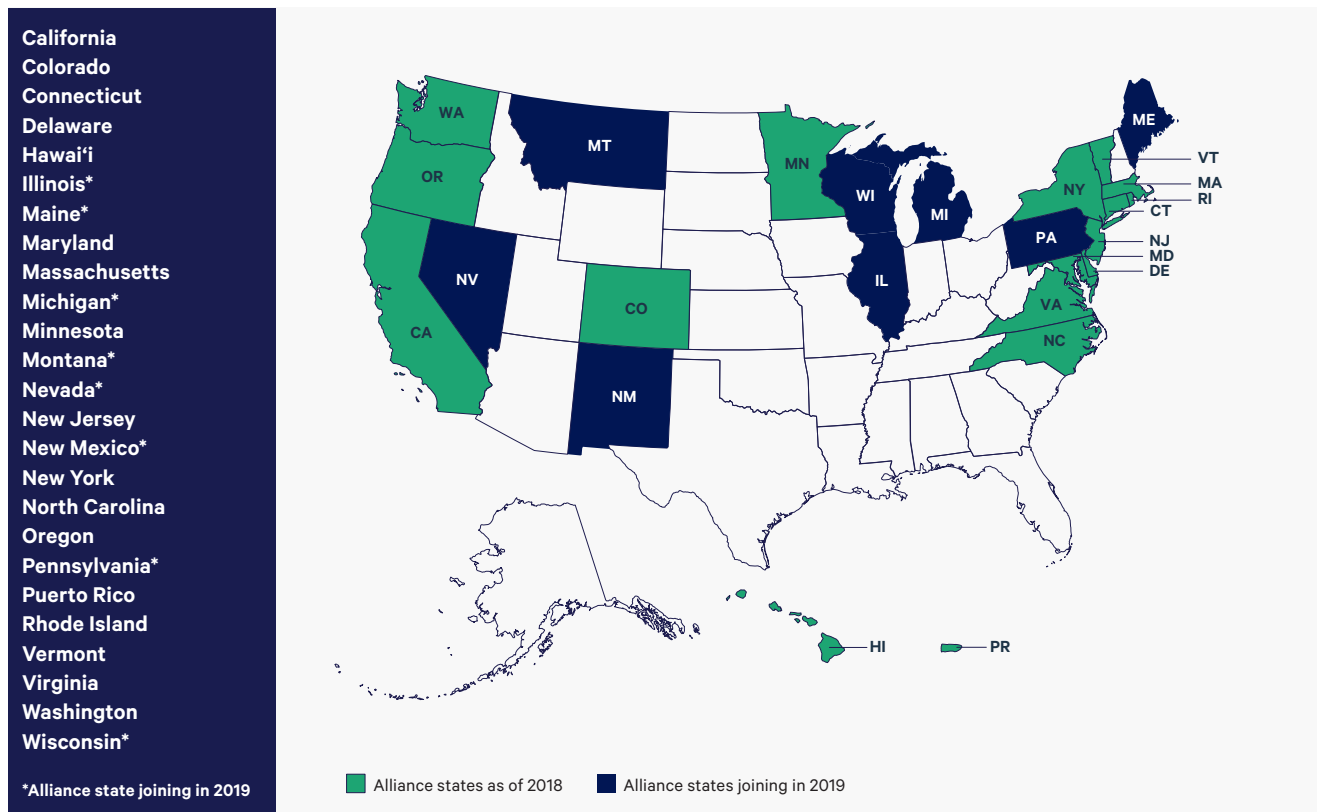
# Executive Summary

*In June 2017, the governors of California, New York, and Washington created the U.S. Climate Alliance (Alliance) as a coalition of governors committed to transitioning to a clean economy and meeting the goals of the Paris Agreement on climate change. In roughly two years, this coalition has grown to twenty-five governors—both Democrats and Republicans—representing 55 percent of the U.S. population and 60 percent of U.S. GDP.*

These twenty-five states and territories are as diverse as the nation itself, representing major urban areas and small towns, coastal communities and farmers in America’s heartland. Through thoughtful, coordinated state action, these governors are filling the federal leadership void, aiming to reduce their collective greenhouse gas (GHG) emissions by at least 26 to 28

percent below 2005 levels by 2025, with many adopting substantially more ambitious emission reduction targets. Generating 40 percent of U.S. GHG emissions, this coalition is equivalent to the world’s sixth largest emitter. Today the Alliance has become an entity of global importance, capable of making a genuine impact on global emissions through its leadership and action.

ES-MAP 1 U.S. Climate Alliance States



### OUR PROGRESS TO DATE

Between 2005 and 2017, Alliance member states reduced their collective GHG emissions by 16 percent, compared to 7 percent for the rest of the country—more than twice the rate. In that period, the combined per-capita economic output generated by these states and territories grew by 12 percent compared to 4 percent for the rest of the country, demonstrating that climate leadership and economic growth go hand-in-hand. As a result of Alliance leadership, communities across these states have benefited from lower levels of harmful air pollutants; increased access to cheaper, cleaner energy; more efficient vehicles; and high-quality clean energy jobs.

As the federal government continues to roll back critical protections, Alliance governors have strengthened existing measures and implemented new policies over the past year, including:

- **Adopting new or strengthened GHG emissions reduction targets**, including four new carbon neutrality goals;
- **Investing in communities** using funds generated by market-based programs, such as the Regional Greenhouse Gas Initiative (RGGI);
- **Ramping up zero-carbon power generation**, with eight states enacting legislation for 100 percent carbon-free or clean electricity by 2040 or later, and eleven more pursuing the same ambitious goal;
- **Modernizing building codes** and reducing appliance energy costs through energy efficiency standards;
- **Driving down our largest source of emissions** by supporting one strong national clean car standard and providing the incentives and infrastructure to accelerate the transition to zero-emissions vehicles (ZEVs) and mobility;
- **Cutting fugitive methane emissions** from oil and gas systems, and phasing down powerful hydrofluorocarbons (HFCs)—short-lived climate pollutants that,

**FIGURE ES-1 Alliance States and Territories Lead the Country in GHG Emissions Reductions and Economic Growth**  
Change in net GHG emissions and economic output, 2005–2017



**SOURCE:** Emissions data - Independent analysis of U.S. Climate Alliance GHG emissions conducted by Resources for the Future (RFF); GDP data - U.S. Bureau of Economic Analysis; Population data - U.S. Census Bureau

if addressed quickly, can slow the pace of climate change in the near-term;

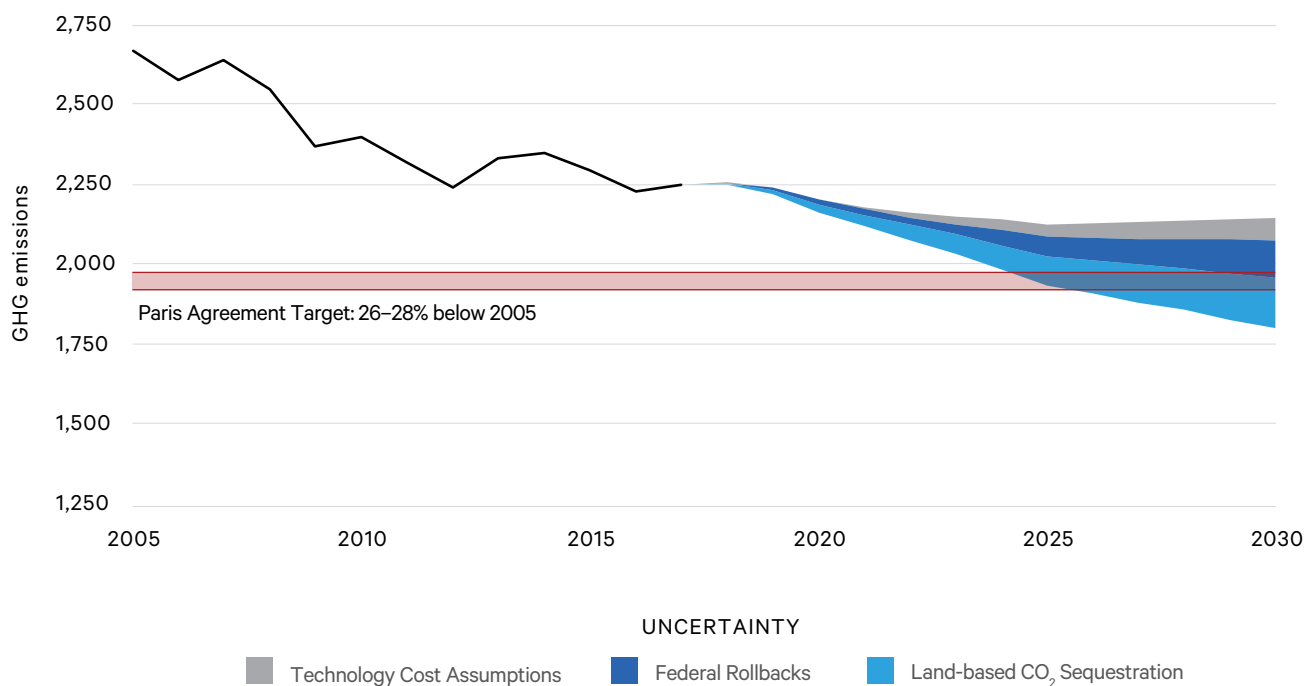
- **Mobilizing capital from a range of sources** to help fill financing gaps in the clean energy and resilient infrastructure sectors;
- **Improving land management practices** to enhance carbon sequestration, mitigate emissions, and build more resilient communities and ecosystems through natural and working lands; and
- **Strengthening community resilience**, including through training programs, grants, and tools.

Alliance governors continue to share nation-wide bipartisan solutions that work to address climate change while delivering co-benefits for residents and businesses, and are engaging with international leaders to share experiences and explore opportunities to enhance ambition globally.

### LOOKING AHEAD

According to independent analysis, the Alliance is on track to continue reducing GHG emissions through 2025 (see Figure ES-2), within reach of our GHG emissions reduction target. Considering policies currently in place, our collective GHG emissions are projected to fall by at least 20–27 percent below 2005 levels by 2025. Compared to last year, Alliance states are now collectively reducing emissions across a larger share of the U.S. economy, making a bigger dent in our national emissions. We have substantially accelerated the pace and scale of climate policies adopted over the past year. We expect this leadership to further drive down emissions beyond 2025, putting us on a path to reducing GHG emissions up to 32 percent below 2005 levels by 2030. But extensive work remains to ensure this goal becomes a reality and to preserve the opportunity for the United States to re-enter the community of nations working together to avoid catastrophic climate change.

**FIGURE ES-2 With Current Policies, Alliance States Forge a Path for Achieving our Paris Target**  
 Net GHG emissions from Alliance states, million metric tons carbon dioxide equivalent (MMT<sub>CO<sub>2</sub>e</sub>)



SOURCE: Independent analysis of U.S. Climate Alliance GHG emissions conducted by RFF. For more information, please see the Appendix.



## WHAT'S NEXT

Over the next year, Alliance states and territories will continue to advance the most ambitious state climate agenda in U.S. history, building on proven bipartisan solutions and multi-state strategies while at the same time growing our economies and high quality jobs. We will act on the Short-Lived Climate Pollutant Challenge (#SLCPChallenge) and address potent HFC and methane emissions, adopt appliance standards and improve building efficiency, and support the transition to zero-carbon electricity generation. We will work together to implement the Nation's Clean Car Promise while continuing to pursue additional actions that protect families and businesses from unnecessary air pollution and fuel costs. We will follow through on the Natural and Working Lands Challenge (#NWLChallenge) to protect and enhance

our most important carbon sinks such as forests, farms, rangeland, and wetlands, while also building greater community resilience that prepares families for severe weather hazards, especially in those communities that are most vulnerable. We will continue improving the methods used to estimate our GHG emissions so we can more effectively plan for both near- and long-term mitigation actions and track our progress. And we will continue cooperating with leading nations to help inspire ambitious action and accelerate the global transition to a low-carbon economy.



Alliance Governors sharing their leadership at the U.S. Climate Alliance event *America's Governors: Delivering Our Commitment to Paris* on September 24th, 2019; (from L-R) Justin Worland, TIME (moderator); Governor Janet Mills, Maine; Governor Ralph Northam, Virginia; Governor Jay Inslee, Washington; Governor Michelle Lujan Grisham, New Mexico; Governor Phil Murphy, New Jersey; Governor Gavin Newsom, California. SOURCE: Jack Mayer, Office of the Governor, Commonwealth of Virginia.

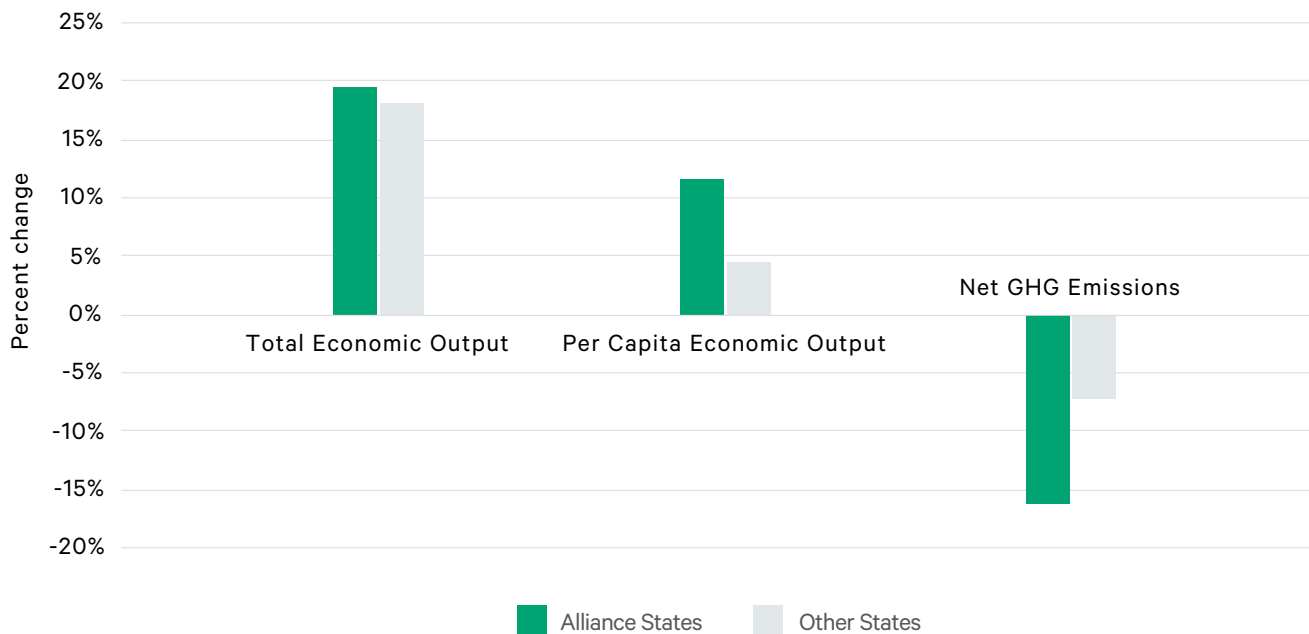
# Our Progress to Date

It's been just over two years since the bipartisan U.S. Climate Alliance (Alliance) formed in response to the Trump administration's intent to withdraw the United States from the Paris Agreement. Since then, the Alliance has grown from three to twenty-five governors, with our membership representing the diversity of the United States—from coastal communities to farmers in America's heartland, from the streets of the biggest cities to the peaks of the Rockies. Alliance states have unique challenges and solutions, but all agree that—if we are to avoid the most severe impacts of climate change—the United States must again lead on climate action and seize the opportunity to transform our economy. This bipartisan coalition now represents 55 percent of the U.S. population and an \$11.7 trillion economy—over 60 percent of U.S. GDP and the third largest economy among the world's nations. Generating 40 percent of U.S. greenhouse gas (GHG)

emissions, Alliance states are also collectively the world's sixth-largest emitter. Our leadership is, and will continue to be, essential to addressing the global climate challenge.

By joining the Alliance, each state and territory has committed to implementing policies that advance the goals of the Paris Agreement, aiming to reduce GHG emissions by at least 26–28 percent below 2005 levels by 2025. As a result of the clean energy and climate policies we have implemented, Alliance states have collectively reduced GHG emissions 16 percent between 2005 and 2017, compared to 7 percent for non-Alliance states (see Figure 1). Not only has the Alliance reduced our collective emissions more than twice as fast as the rest of the country, but our economies have grown faster as well. Per capita, the combined economic output generated by Alliance states and territories grew by

**FIGURE 1 Alliance States and Territories Lead the Country in GHG Emissions Reductions and Economic Growth**  
Change in net GHG emissions and economic output, 2005–2017



**SOURCE:** Emissions data - Independent analysis of U.S. Climate Alliance GHG emissions conducted by Resources for the Future (RFF); GDP data - U.S. Bureau of Economic Analysis; Population data - U.S. Census Bureau



*Alliance states have lower levels of harmful air pollutants such as volatile organic compounds, particulate matter, and nitrogen oxide—all which harm local communities—and have created more renewable energy and energy efficiency jobs.*

12 percent compared to 4 percent for the rest of the country over the same time period.<sup>1</sup> Alliance states have lower levels of harmful air pollutants such as volatile organic compounds, particulate matter, and nitrogen oxide<sup>2</sup>—all which harm local communities—and have created more renewable energy and energy efficiency jobs.<sup>3</sup>

At the same time, residents and businesses within Alliance states are facing the increasingly devastating impacts of climate hazards, such as sea level rise, wildfires, drought, and flooding. Science indicates that more action is needed to avoid the worst impacts of a changing climate. According to the IPCC's December 2018 *Special Report on Global Warming of 1.5°C*, the global community is already seeing the impacts of 1°C of warming and needs a rapid transition across the global economy to avoid increasingly severe and irreversible changes.<sup>4</sup> The U.S. federal government's own *Fourth National Climate Assessment* warns that unabated climate change will continue to intensify the impacts of natural hazards felt by all Americans while exacerbating existing challenges across the United States such as crumbling infrastructure and economic inequality.<sup>5</sup>

## ACTIONS WE'VE TAKEN SINCE LAST YEAR

Given the urgency of the climate challenge—and the economic and public health benefits states can gain

by taking action—Alliance governors have stepped up over the past year to push forward new policies, legislation, and funding opportunities that will reduce emissions and increase community resilience in the face of increased climate risk. At the same time, Alliance states have worked together to mobilize their collective market power and push back against federal government rollbacks of commonsense climate change and clean energy policies that aim to improve air quality and lower consumer energy bills.

The following sections highlight the substantial progress Alliance states have made in the last year alone:

1. Adopting New or Strengthened GHG Targets
2. Deploying Market-based Solutions
3. Expanding Financing Opportunities
4. Ramping up Zero-Carbon Power Generation
5. Increasing Building Energy Efficiency
6. Driving Towards a Clean Transportation System
7. Ramping up Efforts to Address Short-Lived Climate Pollutants
8. Enhancing Carbon Sequestration across Natural and Working Lands
9. Continuing to Make Our States More Resilient
10. Sharing Bipartisan Solutions
11. Engaging with International Leaders



## 1. Adopting New or Strengthened GHG Targets

Nearly all Alliance states have set GHG reduction goals at least as ambitious as the U.S. emissions reduction pledge under the Paris Agreement; since September 2018, many states further increased their ambition to cut future GHG emissions.

Some states used executive action to set their first economy-wide GHG emission reduction targets, including North Carolina<sup>6</sup> (40 percent below 2005 levels by 2025) and Pennsylvania<sup>7</sup> (26 percent below 2005 levels by 2025 and 80 percent by 2050). In her first month in office, Governor Lujan Grisham updated New Mexico's statewide goal, which now aims to reduce GHG emissions by at least 45 percent below 2005 levels by 2030.<sup>8</sup> Before leaving office, Governor Jerry Brown issued an order for California to achieve carbon neutrality by 2045.<sup>9</sup> In July 2019, Governor Steve Bullock issued an executive order that creates the Montana Climate Solutions Council, which is charged with developing a state Climate Solutions Plan that includes recommendations toward achieving long-term net GHG neutrality.<sup>10</sup> Governor Mills, speaking before the United Nations, pledged that Maine will be carbon neutral by 2045 and signed an executive order committing to such.<sup>11</sup> In November 2019, Governor Steve Sisolak issued an executive order reinforcing Nevada's commitment to the U.S. Climate Alliance goals and providing direction to key state agencies to help meet Nevada's newly enacted economy-wide GHG reduction targets.<sup>12</sup> The executive order also calls for the creation of a Nevada Climate Change Strategy.

State legislatures also worked to codify new GHG targets into law, with many looking toward long-term deep decarbonization and carbon neutrality by midcentury. This includes Colorado (at least 90 percent below 2005 levels by 2050),<sup>13</sup> Maine (80 percent below 1990 levels by 2050),<sup>14</sup> Nevada (net zero by 2050),<sup>15</sup> and New York (85 percent below 1990 by 2050 toward carbon neutrality).<sup>16</sup>

## 2. Deploying Market-based Solutions

Alliance states have been leaders in adopting market-based mechanisms that aim to cost-effectively limit carbon pollution. This past year saw expanded participation in

existing markets and record levels of re-investments back into communities. New Jersey re-joined the Regional Greenhouse Gas Initiative (RGGI), a cooperative effort among states in the Northeast and Mid-Atlantic that sets carbon pollution caps for regional power plants and reinvests proceeds generated through the program in complementary strategies. In October 2019, Pennsylvania Governor Tom Wolf issued an executive order instructing the Pennsylvania Department of Environmental Protection to draft a regulation to join RGGI.<sup>17</sup> States participating in this initiative have seen their power sector emissions fall to more than 50 percent below 2005 levels, and have enjoyed \$4 billion in net economic benefits and a multitude of health benefits for their residents.<sup>18</sup> Additionally, Virginia adopted a regulation requiring a 30 percent reduction in carbon emissions from large fossil-fueled power plants by 2030 and Governor Northam has committed to ultimately linking with RGGI.

Through the work of the Transportation and Climate Initiative (TCI), Northeast and Mid-Atlantic jurisdictions are now turning to address emissions from the transportation sector. In December 2018, nine Alliance states and Washington, D.C. announced their intent to "design a new regional low-carbon transportation policy proposal that would cap and reduce carbon emissions from the combustion of transportation fuels, and invest proceeds from the program into low-carbon and more resilient transportation infrastructure."<sup>19</sup>

In the past year alone, California invested \$1.4 billion of its economy-wide cap and trade proceeds, almost doubling 2017 levels of investment. To date, California's investments have helped to install efficiency measures in 110,000 homes, issue more than 207,000 rebates for zero-emissions and plug-in hybrid vehicles, preserve over 500,000 acres of land, add or expand transit options through more than 460 transit agency projects, and plant more than 50,000 trees in urban areas, all while focusing almost 60 percent of funds to benefit the state's most vulnerable populations.<sup>20</sup> California's carbon market is linked with Quebec's, making it the only international multi-jurisdictional carbon market in the world, and a model for future international markets.

### 3. Expanding Financing Opportunities

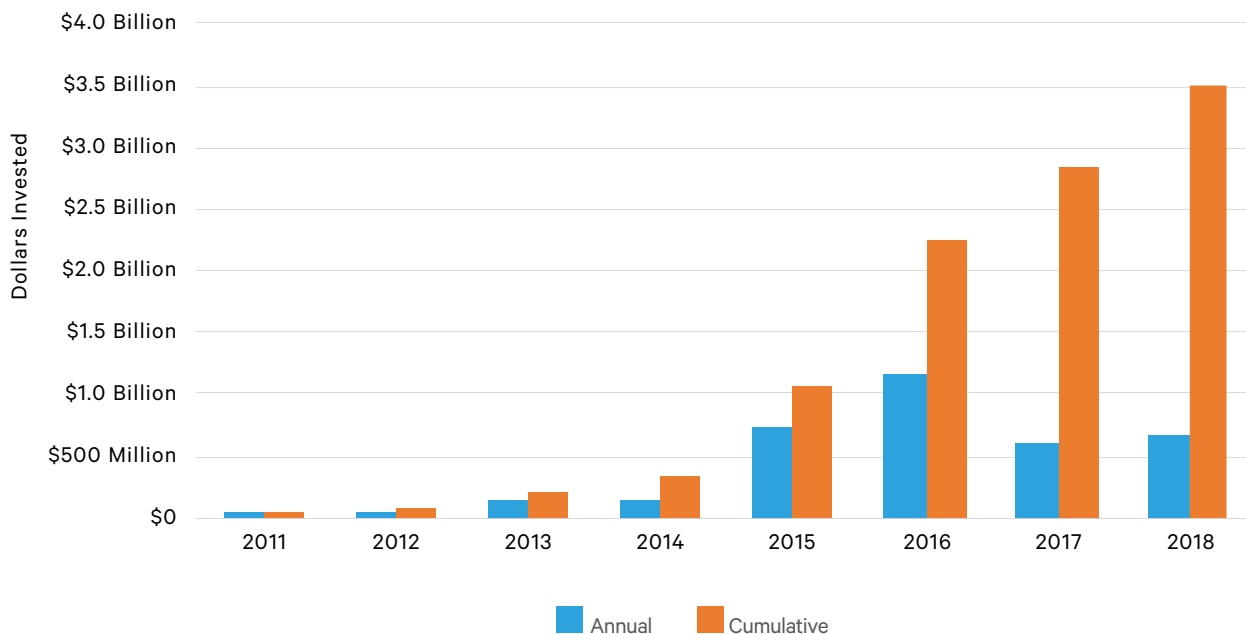
Green banks leverage capital from a variety of sources, including public, private, and philanthropic funds, to help fill financing gaps in the energy and infrastructure sectors. Between 2011 and 2018, six green banks in Alliance states (Connecticut, New York, California, Rhode Island, Hawai'i, and Michigan) spurred more than \$3.5 billion in investments to support clean energy, energy efficiency, and resilient infrastructure projects (see Figure 2).<sup>21</sup> In December 2018, Colorado became the seventh Alliance member to establish a green bank when then-Governor John Hickenlooper announced the formation of the nonprofit Colorado Clean Energy Fund, which will work with market participants to help mobilize capital and accelerate clean energy project development across the state.<sup>22</sup> The nonprofit Nevada Clean Energy Fund is being organized to help finance clean energy projects for both commercial and residential properties in Nevada.<sup>23</sup>

### 4. Ramping up Zero-Carbon Power Generation

Alliance states have made great strides in helping to decarbonize the U.S. power system, in part by dramatically increasing non-hydro renewable energy capacity more than five-fold between 2005 and 2018 (see Figure 3). Alliance states are now home to more than 70 percent of the nation's solar capacity (see Figure 4).<sup>24</sup> In 2018, zero-carbon sources generated nearly half (48 percent) of our electricity, with 10 percent coming from non-hydro renewable sources.<sup>25</sup>

Investment and innovation in battery storage will be key to decarbonizing our energy sector. That's why Alliance states are leading the United States in deploying technology to store the energy generated by these clean energy sources. Alliance states host thirteen of the eighteen operating battery energy storage sites in the United States with an installed power capacity of roughly 20 MW or greater.<sup>26</sup> In total, Alliance states account for 65 percent of operating energy storage capacity across the country (see Figure 5).<sup>27</sup>

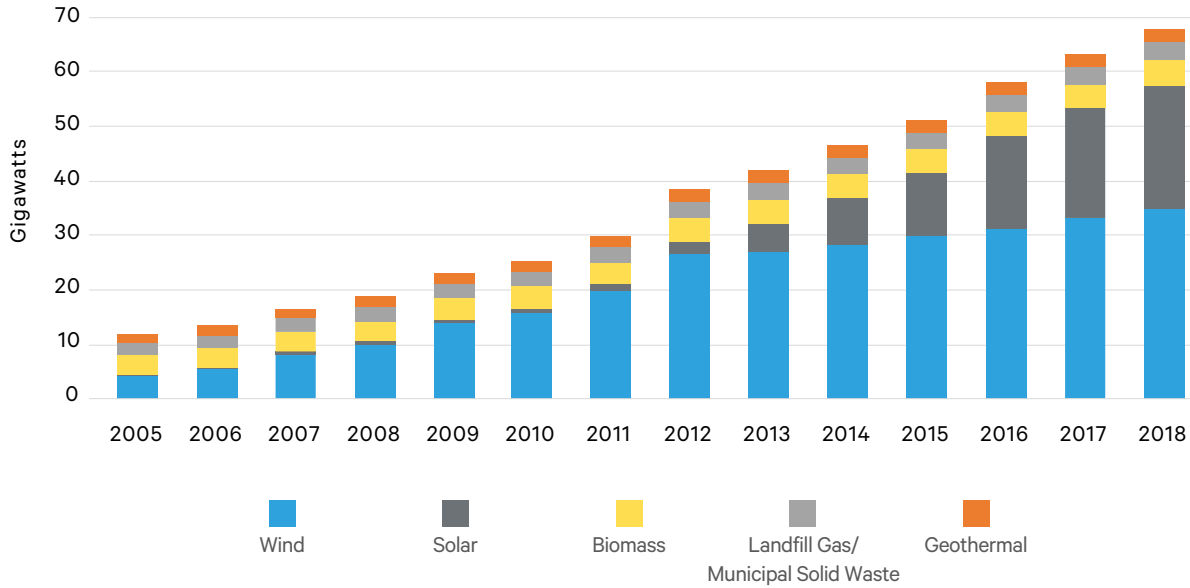
**FIGURE 2** Investment Mobilized by U.S. Climate Alliance State Green Banks



SOURCE: Coalition for Green Capital and the American Green Bank Consortium, May 2019

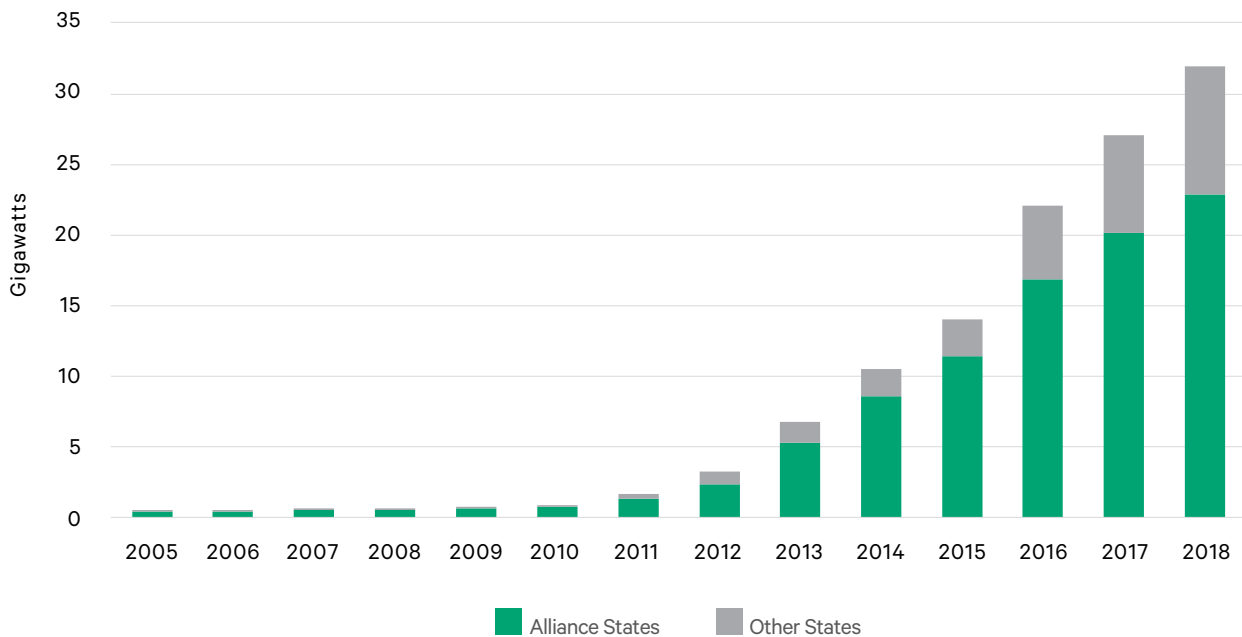


**FIGURE 3 Growth of Renewable Energy Capacity**  
 Cumulative gigawatts of non-hydro renewable electricity generation capacity in Alliance states



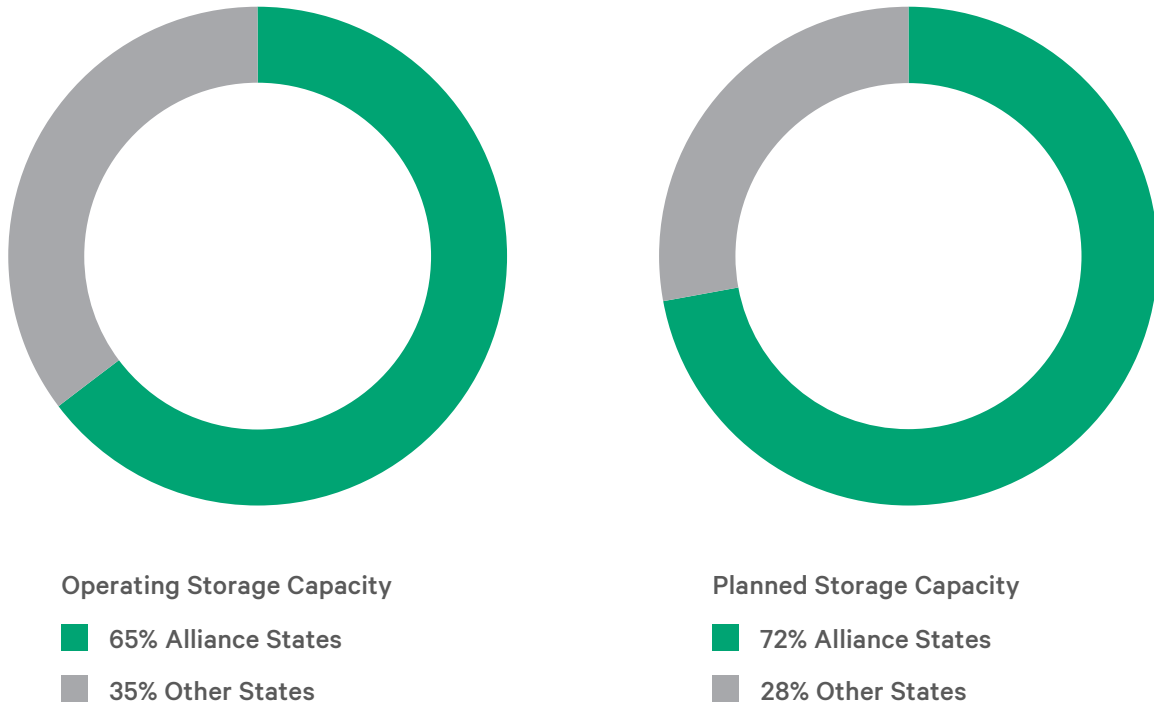
SOURCE: U.S. Energy Information Administration, Form 860 Full Release

**FIGURE 4 Alliance States Lead in Expanding Solar Energy Capacity**  
 Cumulative gigawatts of solar generation capacity



SOURCE: U.S. Energy Information Administration, Form 860 Full Release

**FIGURE 5 Alliance States Continue to Play an Outsized Role in Spurring Energy Storage Capacity**  
Share of total U.S. storage capacity (megawatts) by type, 2018



SOURCE: U.S. Energy Information Administration, Form 860 Full Release

Alliance states are accelerating toward a future of clean power, making substantial progress toward 100 percent carbon-free power. Governors in Hawai'i, California, Maine, Puerto Rico, New Mexico, Nevada, Washington, and New York have signed legislation committing states to 100 percent carbon-free electricity by no later than 2050.

New York aims to achieve this target by 2040, with an interim goal of 70 percent renewable generation by 2030.<sup>28</sup> Maryland Governor Larry Hogan will introduce legislation to establish a Clean and Renewable Energy Standard achieving 100 percent clean electricity by 2040 by the beginning of Maryland's 2020 legislative session in January. Hawai'i has not only committed to carbon-free electricity, but 100 percent of it must come from renewable sources by 2045.<sup>29</sup> In August 2019, Wisconsin Governor Tony Evers issued an executive

order that creates the Office of Sustainability and Clean Energy that, in partnership with other state agencies and state utilities, will aim to achieve a goal of ensuring all electricity consumed within the state of Wisconsin is 100 percent carbon-free by 2050.<sup>30</sup> Virginia Governor Ralph Northam issued Executive Order 43, which includes the goal that by 2050, 100 percent of Virginia's electricity will be produced from carbon-free sources.<sup>31</sup> Connecticut Governor Ned Lamont issued Executive Order 3 directing the Department of Energy and Environmental Protection to analyze pathways and recommend strategies for achieving a 100 percent zero-carbon target for the electricity sector by 2040.<sup>32</sup> Colorado Governor Jared Polis signed into law legislation that requires accounting for the social cost of carbon in utility planning and establishes a path for the state's largest utility to reduce emissions by 80 percent below 2005 levels by 2030.<sup>33</sup> North Carolina

Governor Roy Cooper established the N.C. Climate Change Interagency Council, which set the goals of achieving a 70 percent reduction in power sector emissions from 2005 levels by 2030 and achieving carbon-neutrality by 2050. And many utilities<sup>34</sup> as well as many of the world's major companies<sup>35</sup> are joining these states in striving for 100 percent carbon-free electricity generation and use.

States have stepped up their Renewable Portfolio Standard (RPS) commitments over the past year, mandating that utilities incorporate increasing amounts of electricity generated from renewable sources in their portfolios:

- In Nevada, Governor Steve Sisolak committed to raising the state's RPS to 50 percent by 2030;<sup>36</sup>
- In New Mexico, Governor Michelle Lujan Grisham signed into law the *Energy Transition Act*, increasing the state's RPS to 80 percent by 2040;<sup>37</sup>
- In Maryland, the *Clean Energy Jobs Act* sets a RPS of 50 percent by 2030<sup>38</sup> and Governor Hogan has committed to submit legislation next year (2020) to put the state on a path of 100 percent clean power by 2040;<sup>39</sup> and
- In Maine, Governor Janet Mills signed legislation increasing Maine's RPS to achieve 80 percent renewable energy by 2030, with an ultimate goal of achieving 100 percent by 2050.<sup>40</sup>

Alliance states are setting procurement targets to help spur renewable energy development within our own state borders, including several Northeast states that made substantial commitments to offshore wind electricity generation. In New York, Governor Andrew Cuomo announced the selection of two offshore wind projects totaling nearly 1,700 megawatts, the largest offshore wind procurement to date and advancing New York's mandate of 9,000 megawatts of offshore wind by 2035.<sup>41</sup> Massachusetts recently conducted auctions for its second 800 megawatt procurement and this summer doubled its cumulative target from 1,600 to 3,200 megawatts. On November 19, 2019, New Jersey Governor Phil Murphy signed Executive Order 92 to raise

the offshore wind target from 3,500 megawatts by 2030 to 7,500 megawatts by 2035.<sup>42</sup> New Jersey's Board of Public Utilities also approved a plan to develop a 1,100 megawatt offshore wind farm.<sup>43</sup> And in Connecticut, Governor Ned Lamont signed legislation authorizing the state to buy up to 2,000 megawatts of offshore wind power over the next eleven years.<sup>44</sup> Solar procurements have also been on the rise, including in Virginia, where the Department of Environmental Quality issued permits for new solar projects expected to generate more than 200 megawatts,<sup>45</sup> and in North Carolina, where the utility committed to 602 megawatts stemming from the state's Competitive Procurement of Renewable Energy program.<sup>46</sup> These investments are helping to reduce GHG emissions while also saving money for taxpayers as renewable sources are increasingly the cheaper option compared to coal and natural gas.<sup>47</sup>

States are taking the lead by setting renewable energy targets for state government operations. New Mexico's State Buildings Green Energy project includes the installation of solar power at state buildings and the state government's first battery storage project for solar power.<sup>48</sup> Governor Tom Wolf of Pennsylvania issued an executive order this year setting performance goals for state agencies, including a directive for agencies to offset electricity use with renewable energy procurements.<sup>49</sup> As his first executive order, Connecticut Governor Ned Lamont directed executive agencies to recommit and expand the state's Lead by Example program, requiring agencies to set and achieve energy, water, waste, and GHG reduction targets.<sup>50</sup> States are also providing new incentives for landowners to promote renewable energy while preserving their land; Michigan's Governor Gretchen Whitmer announced this year that land currently enrolled in the state's Farmland and Open Space Preservation Program can be used for commercial solar projects as long as sites are designed to be pollinator friendly.<sup>51</sup>

Alliance states recognize the importance of grid modernization in the transition to a low carbon, resilient energy future and are providing funding to advance this goal. Governor Cuomo announced up to \$30 million in support of projects to improve the resilience, flexibility, and integration of renewable energy resources

onto New York’s electric grid.<sup>52</sup> In Washington, the State Department of Commerce is distributing over \$10 million in grants to electric grid modernization projects from the Washington Clean Energy Fund.<sup>53</sup>

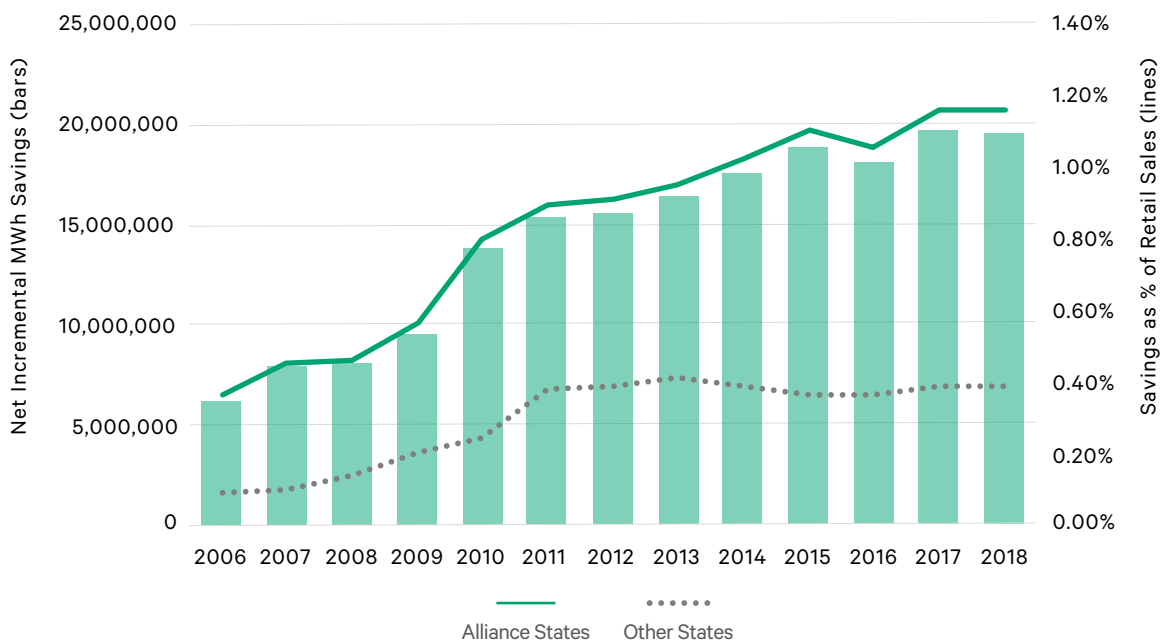
Establishing a just transition to a low-carbon future for communities and workers historically dependent on the fossil fuel economy has become a priority for many Alliance states. States are incorporating community support with RPS policies, such as New Mexico’s *Energy Transition Act*, which establishes funding to provide worker training and support for local economies dependent on fossil fuel generation.<sup>54</sup> And in Colorado, Governor Jared Polis signed the *Just Transition From Coal-based Electrical Energy Economy Act*, creating the Just Transition Office to provide benefits to coal transition workers including access to education and training for high-quality jobs.<sup>55</sup> In New York, Governor Cuomo’s *Climate Leadership and Protection Act* underscores New York’s commitment to a just transition

by establishing a working group to evaluate opportunities afforded by a low-carbon economy, consider the skills of and training for individuals working in conventional energy industries, and minimize economic and carbon leakage.

**5. Increasing Building Energy Efficiency**

Alliance states lead the country in instituting aggressive energy efficiency programs and policies, making up seventeen of the top twenty ranked states for energy efficiency policy by the American Council for an Energy-Efficient Economy (ACEEE).<sup>56</sup> Twenty-one member states have energy efficiency resource standards (EERS) or goals in place, which has helped drive in-state investment and cost savings for our residents and businesses.<sup>57,58</sup> Five Alliance states’ EERS standards are among the most ambitious in the nation, with approximate annual electric savings targets of two percent or greater.<sup>59</sup>

**FIGURE 6 Net Incremental Electricity Savings**  
 Net megawatt-hour savings (left) and savings as a percent of retail sales (right)



SOURCE: American Council for an Energy-Efficient Economy (ACEEE) 2019 Scorecard



*Green buildings not only save residents in Alliance states energy and water but also create healthier environments in which to work and live.*

The Alliance represented nearly 70 percent of the country's new investment in utility-driven energy efficiency improvements in 2018, generating over \$4.3 billion in investment compared to roughly \$1.3 billion in non-Alliance states.<sup>60</sup> These new investments reduced the amount of electricity that households and businesses in Alliance states had to buy in 2018 by about 20 million megawatt-hours (see Figure 6).<sup>61</sup> This is equivalent to the electricity used by more than 1.7 million homes for one year,<sup>62</sup> and more than twice the amount of energy savings in non-member states.<sup>63</sup> Efficiency programs among Alliance states have put more than 1.4 million people to work, representing 60 percent of all jobs in the U.S. energy efficiency sector in 2018.<sup>64</sup>

Alliance states are implementing stringent appliance efficiency standards to increase energy savings from products and appliances. More than ten Alliance states have appliance standards in place, and some—including Colorado, Nevada, Hawai'i, and Washington—have introduced ambitious new standards within the past year for products not yet preempted by existing national standards, or as a backstop to possible repeals of federal standards.<sup>65,66</sup>

Nine Alliance states rank among the top ten states in the United States for LEED-certified green buildings, in

terms of gross square footage (GSF), GSF per capita, and number of certified projects.<sup>67</sup> Green buildings not only save residents in Alliance states energy and water but also create healthier environments in which to work and live. Washington offers one example of state leadership around innovative green building policy. Washington's 2019 *Clean Buildings Act* establishes the first state-level energy performance standard for large commercial buildings—the largest will be required to meet these standards beginning in 2026; most other large commercial buildings will come into the program by 2028.<sup>68</sup> New Mexico is in the process of adopting significantly more efficient codes as well.

Many Alliance states have established lead-by-example energy efficiency targets for state agency operations and government office buildings. For example, in 2019, New Mexico announced \$32 million for upgrades to executive office buildings in Santa Fe.<sup>69</sup> By promoting energy efficient practices in their own operations, Alliance state governments not only reduce energy consumption and related emissions, but also save money on state energy bills and support local economic growth.

## **6. Driving Towards a Clean Transportation System**

Transportation is the largest source of GHG emissions in the United States, and one of the most difficult to



tackle nationally and globally. Alliance states continue to implement policies that encourage low- and zero-emissions vehicle deployment, despite the Trump administration's ongoing efforts to rollback clean car standards and attack states' rights to protect their residents from vehicle pollution and increased costs at the pump. On September 27, the Administration moved forward with its efforts by issuing a final rule attempting to revoke the waiver that allows states to set more stringent vehicle emissions standards,<sup>70</sup> despite federal findings just a few years old that establish that the industry can meet, and even potentially exceed, the existing program.<sup>71</sup> Although there is significant uncertainty about the future of emissions and fuel economy standards under the pending final rule from the U.S. Environmental Protection Agency (EPA) and the National Highway Traffic Safety Administration (NHTSA) and related litigation, Alliance states will continue to oppose efforts to weaken the nation's clean car standards and are moving forward with clean car programs in their states.

In July 2019, twenty-four Alliance governors issued the Nation's Clean Car Promise, which reemphasizes these states' commitment to calling for one strong, national clean car standard and preserving state authority to protect residents from vehicle pollution.<sup>72</sup> Following this, California announced an agreement with four auto manufacturers for a voluntary framework that supports continued annual reductions of vehicle GHG emissions through the 2026 model year, while also encouraging innovation and providing market certainty for industry.<sup>73</sup> In addition, the majority of Alliance states have joined with twenty total jurisdictions—representing more than 43 percent of the U.S. automobile market and 44 percent of the U.S. population—to mount legal challenges against federal efforts to weaken the nation's vehicle GHG emissions and fuel economy standard.

Thirteen states, all of which are Alliance states, have adopted California's emission standards under Section 177 of the Clean Air Act.<sup>74</sup> Collectively, these fourteen states make up 36 percent of the light-duty vehicle market.<sup>75</sup>

*Alliance states will continue to oppose efforts to weaken the nation's clean car standards and are moving forward with clean car programs in their states.*

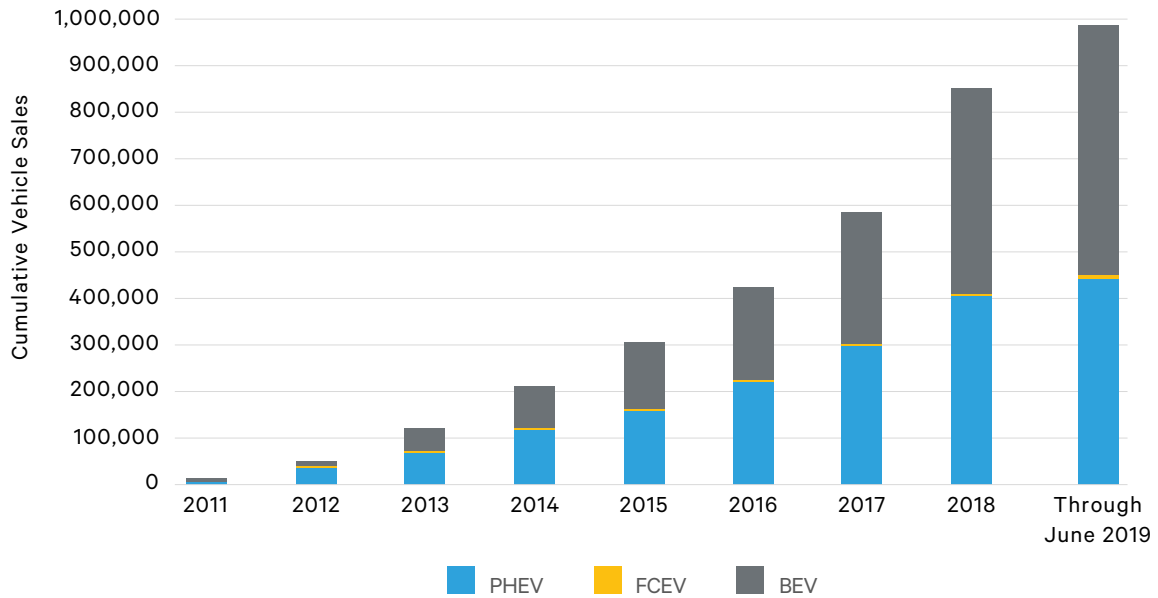
Additionally, Minnesota Governor Tim Walz directed his administration to begin rulemaking towards adopting both the low-emission vehicle (LEV) and zero-emission vehicle (ZEV) standard and New Mexico Governor Michelle Lujan Grisham announced that the state will be proposing, adopting and implementing clean car standards by the end of 2020.<sup>76,77</sup> At the same time, Alliance states are taking bold action to promote ZEV adoption. In August 2019, Colorado became the first new state in a decade to adopt the ZEV mandate, requiring more than 6 percent of the total new vehicle market to be zero-emission passenger vehicles by 2025.<sup>78</sup> Nine Alliance states, including California, are also members of a multi-state ZEV Task Force committed to supporting electric vehicle (EV) adoption.<sup>79</sup> Collectively, these states aim to put more

than 3.6 million ZEVs on the road by 2025. In 2018, California expanded its target to have 5 million ZEVs on the state's roads by 2030. In response to North Carolina Governor Roy Cooper's Executive Order 80, the state finalized its first-ever *N.C. Zero-Emission Plan* in September 2019 and has

begun transitioning state vehicles to electric. Altogether, Alliance states have more than 850,000 ZEVs on the road, accounting for just over 80 percent of all battery electric (BEVs), plug-in hybrid (PHEVs), and fuel cell vehicles (FCEVs) sold nationwide in 2018 (see Figure 7).<sup>80</sup>

Alliance states' market share of the cleanest cars on the road today is also due, in part, to the ten Alliance states that offer consumers financial incentives that make it easier to purchase BEVs, PHEVs, and FCEVs.<sup>81,82</sup> In the past year, states such as Oregon have introduced new incentive programs for ZEVs. Across Alliance states, PHEVs, BEVs, and FCEVs constitute just under three percent of the total market share of new vehicle sales, compared to less than one percent in non-Alliance states as of 2018. Although Alliance states are making progress, the fact that clean vehicle sales account for such a small proportion of total sales highlights the magnitude of the transportation emissions challenge.

**FIGURE 7 Alliance States’ Growing Zero-Emissions Vehicle Fleet**  
 Cumulative sales of BEV, FCEV, and PHEV vehicles in U.S. Climate Alliance states



SOURCE: Automotive Alliance; Note: Figure does not include data for Puerto Rico due to data availability

Addressing infrastructure to support these vehicles is also critical and states are making significant investments to expand charging infrastructure. As of 2018, 13 Alliance states have installed more than 15 percent of the public Level 2 charging infrastructure necessary to support the number of plug-in electric vehicles required by 2025 to meet Paris Agreement targets.<sup>83,84</sup> Nine of these states have similarly exceeded 15 percent of necessary deployment of public DC fast charging infrastructure.<sup>85,86</sup>

Alliance states also are allocating millions of dollars in Volkswagen settlement funds toward vehicle electrification and transportation infrastructure improvements. For example, New Jersey plans to use \$16 million of its VW settlement funding to electrify heavy-duty vehicles, including garbage trucks and school buses,<sup>87</sup> while Virginia has dedicated \$20 million to a new electric school bus initiative<sup>88</sup> and Colorado has allocated \$14 million to transit agencies to deploy electric buses.<sup>89</sup> New Mexico is committing \$2.7 million in Volkswagen settlement funds

towards light-duty zero-emissions vehicle infrastructure, and is focusing efforts on a complete statewide electric vehicle charging network. Governors also are demonstrating leadership by issuing grants to fund transportation improvements throughout their states. One such example is Pennsylvania’s May 2019 announcement of grant funding to install public charging stations and establish 500 additional highway miles as Alternative Fuel Corridors.<sup>90</sup> Other states, such as Minnesota, Colorado, and North Carolina, are leading by example through ZEV procurement in their state government vehicle fleets. For example, Minnesota is targeting 20 percent EVs in its state fleet by 2027<sup>91</sup>, and North Carolina agencies are converting to electric vehicles whenever technically feasible.

Alliance states continue to pursue innovative methods of combatting transportation emissions. For example, California is working to adopt requirements for transportation network companies (i.e., ride-hailing services) to reduce emissions per passenger mile driven and deploy

ZEVs by 2021, with targets being implemented starting in 2023 (SB 1014).<sup>92</sup> Oregon's OReGO pilot program charges drivers by their vehicle miles traveled (VMT) rather than instituting a fuel tax to fund transportation infrastructure improvements.<sup>93</sup> This policy can help incentivize drivers to reduce their VMT, thus reducing transportation-related emissions. Nevada's Senate Bill 299, signed by Governor Sisolak in May 2019, enables schools to apply for utility NV Energy's Electric Vehicle Infrastructure Development incentives to fund up to 75 percent of the cost of charging infrastructure on school property or for the purchase of electric school buses.<sup>94</sup>

## 7. Ramping up Efforts to Address Short-Lived Climate Pollutants

Short-lived climate pollutants (SLCPs)—including methane, hydrofluorocarbons (HFCs), and black carbon—are harmful air pollutants and potent climate forcers with a much shorter lifespan in the atmosphere than carbon dioxide. For example, just one pound of HFC-134a warms the planet as much as 1,400 pounds of carbon dioxide. Because they are potent and short-lived, action taken today to reduce these pollutants can achieve significant climate benefits within a couple of decades. Furthermore, effectively designed measures to reduce SLCP emissions will make U.S. businesses and states more competitive globally. Until recently, an effective federal regulatory framework was in place to begin reducing SLCP emissions nationally. Many of these rules have been rescinded or delayed, leading to significant regulatory uncertainty affecting businesses and emissions in the United States.

Because of these factors, Alliance states are stepping up with state-level rules and programs to backstop against federal efforts to unwind reasonable regulations that reduce methane from oil and gas systems and landfills, and phase-down HFCs.<sup>95</sup> In September 2018, the Alliance released *From SLCP Challenge to Action: A Roadmap for Reducing Short-Lived Climate Pollutants to Meet the Goals of the Paris Agreement*.<sup>96</sup> This roadmap outlines a menu of options states will consider as they pursue an ambitious set of policies that have the potential to reduce collective SLCP emissions by 40–50 percent below current levels by 2030.

Individual states are moving quickly, largely with industry support, to address this sector. For example, California's SLCP Reduction Strategy outlines actions that will reduce emissions of potent SLCPs by as much as 40 percent below 2015 levels by 2030, including the adoption of rules that prohibit the use of high-warming HFCs, consistent with the EPA's 2015 and 2016 Significant New Alternatives Policy (SNAP) rules. In September 2018, Connecticut, Maryland, and New York announced their intention to propose HFC regulations substantially consistent across these states and with California's regulations.<sup>97</sup> Since then, Governor John Carney directed the Delaware Department of Natural Resources and Environmental Control to propose similar regulations by March 2020<sup>98</sup> and both Vermont and Washington passed legislation to phase down the use of HFCs.<sup>99</sup> The Massachusetts Department of Environmental Protection (MassDEP) has begun a stakeholder process to consider potential greenhouse gas regulations regarding 1) high global warming potential HFCs in certain end-uses and 2) creating a refrigerant management program.

Leading states including Colorado, Pennsylvania, and Massachusetts have already put regulations in place to cut methane from oil and gas production and natural gas pipelines. In September 2018, Virginia announced that it is beginning a process to limit methane pollution from natural gas infrastructure and landfills.<sup>100</sup> Maryland is taking proposed regulations aimed at reducing leaking methane emissions from the natural gas sector to the Air Quality Control Advisory Council in December 2019. This starts the formal regulation adoption process. In January 2019, New Mexico Governor Michelle Lujan Grisham signed an executive order that requires state agencies to develop regulations that will reduce methane emissions and prevent waste from new and existing oil and gas sources (among other climate-related actions).<sup>101</sup> New Mexico state agencies have already convened a technical Methane Advisory Panel comprising state, industry, and environmental experts to prepare a technical background document that will inform these regulations. With the passage of SB19-181 in April 2019, Colorado is now undertaking a rulemaking to further reduce emissions from oil and gas production and ensure the protection of public health, safety, welfare, the environment and



*Alliance states are leading the way in protecting and improving our natural and working lands: our country's forests, farmlands, ranchlands, grasslands, wetlands, and urban greenspace.*

wildlife resources.<sup>102</sup> As part of New York's comprehensive methane policies, the State passed the *Food Donation and Food Scraps Recycling Law* that will effectively redirect wasted food and food scraps from the State's largest generators to donation and organics recyclers, as well as developing a new oil and natural gas regulation to address leaks and emissions from operations at oil and natural gas wells, processing activities, transmission, and storage sites.

### **8. Enhancing Carbon Sequestration across Natural and Working Lands**


Alliance states are leading the way in protecting and improving our natural and working lands: our country's forests, farmlands, ranchlands, grasslands, wetlands, and urban greenspace. These lands not only clean our air and water and support our communities and economies, but also hold enormous potential to sequester carbon. In fact, the United States has the potential to sequester 770 million tons of carbon dioxide equivalent per year from employing land use and management strategies, including reforestation, avoided forest conversion, and the use of cover crops.<sup>103</sup> The land use and forestry sector accounted for over 700 million metric tons of carbon dioxide equivalent sequestered in the United States in 2017 (11 percent of total U.S. GHG emissions).<sup>104</sup>

Despite the importance of natural and working lands in addressing climate change, there is limited data

available to help states fully understand both current and future sequestration contributions from this sector. Working with experts and key stakeholders, our Natural and Working Lands working group is developing the data necessary to incorporate lands into statewide inventories and GHG mitigation plans.

Over the past year, Alliance states have also started taking concrete actions that will help enhance and protect this sector. In January 2019, California released its *Draft 2030 Natural and Working Lands Climate Change Implementation Plan*, which establishes a pathway for state-led conservation, restoration, and management activities.<sup>105</sup> Alliance states have also developed tools to assist in conservation decision-making. For example, Virginia launched its *ConserveVirginia* tool this year, with a "smart map" to identify high priority lands for conservation across the state.<sup>106</sup> And our states have increased funding to natural and working lands initiatives, including Rhode Island, which aims to increase its urban forests statewide by designating more than \$650,000 in grant funding to urban forestry projects.<sup>107</sup> New York State will open a new cost-share practice program for private forest landowners in January 2020 aimed at overcoming severe obstacles to establishing natural regeneration in stands of maturing forests located on most of New York's 15.6 million acres of privately-owned forests.





*Just in the past year, states across the West have faced wildfires that threaten communities, homes, and livelihoods, while Midwestern states are experiencing record-breaking drought and flooding leading to crop failures and economic losses. Alliance states are prioritizing resilience measures to respond to climate impacts.*

Hawai'i is pursuing forest carbon sequestration, designating lands as forest carbon projects where reforestation efforts and other responsible land management techniques will be applied. The state will issue a carbon credit for every metric ton of carbon dioxide stored at a designated forest carbon project, which can then be sold as a carbon offset. The Department of Land and Natural Resources estimates that reforestation at the inaugural Kahikinui/Nakula Forest Carbon Project will withdraw 94,000 metric tons of carbon dioxide from the atmosphere.<sup>108</sup>

### **9. Continuing to Make Our States More Resilient**

Extreme weather and climate change-driven impacts continue to harm communities and businesses across the United States, costing the country \$91 billion in 2018 alone.<sup>109</sup> Last year, the entire country witnessed the devastating impact of increasingly intense and frequent wildfires on communities and ecosystems. The 2018 Camp Fire in California burned 153,336 acres and resulted in 85 deaths. The Mendocino Complex Fire was the largest ever wildfire recorded in California, burning more than 450,000 acres. And fifteen out of the top twenty largest California wildfires have occurred since 2000.<sup>110</sup>

California is not alone; just in the past year, states across the West have faced wildfires that threaten communities, homes, and livelihoods, while Midwestern states are experiencing record-breaking drought and flooding leading

to crop failures and economic losses. Alliance states are prioritizing resilience measures to respond to climate impacts. Agricultural communities will need to adapt to more frequent crop failures and declining agricultural productivity, which promise severe economic damages as evidenced by the \$14.5 billion in losses paid by the federal crop insurance program after a major drought in 2012.<sup>111</sup> Along U.S. coasts, sea level has risen about 9 inches since the beginning of the 20<sup>th</sup> century, threatening communities, public infrastructure, and \$1 trillion in national wealth held in coastal real estate.<sup>112</sup>

Looking ahead, the economic toll of climate change will only grow. The federal government's 2018 *Fourth National Climate Assessment* predicts that future climate impacts could cost the U.S. economy \$141 billion from heat-related deaths, \$118 billion from sea level rise, and \$32 billion from infrastructure damage by the end of the century.<sup>113</sup> This is why Alliance states are prioritizing investments that will make communities more resilient to extreme weather and climate impacts. This past year saw a suite of new laws and executive orders aimed at increasing community and local government preparedness to natural disasters and sea level rise. Most recently, this includes Maine's *Act to Help Municipalities Prepare for Sea Level Rise*<sup>114</sup> and Governor Ralph Northam's Executive Order 24, *Increasing Virginia's Resilience to Sea Level Rise and Natural Hazards*.<sup>115</sup>

Alliance states have also implemented resilience programs and developed tools to help communities address climate



hazards, often directing funding to local resilience efforts. The Massachusetts Municipal Vulnerability Preparedness (MVP) program awards funding to communities that complete vulnerability assessments and develop resilience plans.<sup>116</sup> In March 2019, the Baker-Polito Administration announced \$10 million for the MVP program, bringing the total funds committed to the program to \$17 million.<sup>117</sup> The Rhode Island Infrastructure Bank is funding the state's Municipal Resilience Program, committing \$2 million to implement local climate resilience projects.<sup>118</sup> In June 2019, Governor JB Pritzker signed *Rebuild Illinois* into law, which includes \$1 billion for environment and conservation projects, including green infrastructure grants, ecosystem restoration, and flood mitigation, among other projects.<sup>119</sup> North Carolina has taken a number of actions to support climate resilience across the state, from establishing a new Office of Recovery and Resilience to aid in recovery and rebuilding from past and future disasters to developing a N.C. Climate Risk Assessment and Resiliency Plan and publishing a new Coastal Adaptation and Resiliency website to help the state's coastal communities manage resilience-related challenges.<sup>120</sup> In Connecticut, Governor Ned Lamont issued Executive Order 3 expanding the scope of the Governor's Council on Climate Change to include developing a climate adaptation strategy that assesses and prepares the state for the impacts of climate change in areas such as infrastructure, agriculture, natural resources, and public health. And in New Jersey, Governor Phil Murphy issued Executive Order 89 to establish a statewide climate change resilience strategy, a Climate and Flood Resilience Program, and an Interagency Council on Climate Resilience.<sup>121</sup>

## 10. Sharing Bipartisan Solutions

Since the Alliance's inception, our governors have worked across party lines to find common solutions that support a low-carbon, resilient, and equitable economy. This past year, Alliance governors continued to use their platforms to share with the entire nation the bipartisan solutions that Alliance states are developing to address climate change and co-benefits for residents and businesses:

- Massachusetts Governor Charlie Baker and North Carolina Governor Roy Cooper testified before

the U.S. House Natural Resources Committee in Washington, D.C. at the first congressional hearing on climate change in more than eight years to discuss what their states are doing to address climate change and the importance of federal action.<sup>122</sup>

- Colorado Governor Jared Polis testified before the U.S. House Select Committee on the Climate Crisis at its first field hearing in Boulder, Colorado, which focused on state and local actions to address climate change.<sup>123</sup> Governor Polis shared examples of Colorado's climate leadership, including the significant progress made during Colorado's 2019 Legislative Session.<sup>124</sup>
- New Mexico Governor Michelle Lujan Grisham testified before the U.S. House Subcommittee on Energy & Mineral Resources in Santa Fe during an oversight hearing titled *Oil and Gas Development: Impacts on Air Pollution and Sacred Sites*,<sup>125</sup> in which she noted the availability of proven, cost-effective, and innovative technologies, along with better work practices, that can help remediate as much as half of existing methane leaks.
- Maryland Governor Larry Hogan and Virginia Governor Ralph Northam published an op-ed in *The Washington Post*, *States can lead the way on climate change. Let's get to work*, in which they called for putting aside partisan interest, acknowledging the risk climate change poses, and addressing it by working together.<sup>126</sup>

## 11. Engaging with International Leaders

Given the absence of federal leadership on addressing climate change, Alliance states have increasingly engaged with international leaders to share experiences and explore opportunities to enhance ambition globally. The Administration's decision on November 4, 2019, to formally initiate the withdrawal process from the Paris Agreement emphasized the importance of state leadership and engagement with the international community.

- In September 2018, Alliance governors attended the Global Climate Action Summit (GCAS) where they reiterated our commitment to meeting our



Maine Gov. Janet Mills addresses the Climate Action Summit in the United Nations General Assembly at U.N. headquarters, Monday, Sept. 23, 2019. SOURCE: AP Photo/Jason DeCrow

*At the September 2019 United Nations Global Climate Action Summit, Governor Janet Mills of Maine represented state climate leadership on stage among and before world leaders.*

share of the Paris Agreement's emissions reduction goals and announced a suite of new actions to further address climate change through a Joint Statement on Climate Leadership (Box 1).<sup>127</sup> During the summit, Alliance governors met with nearly twenty global climate leaders to share their visions and specific priorities for achieving the goals of the Paris Agreement and explored opportunities for collaboration that could help drive global ambition by accelerating and scaling up climate action.

- At the United Nations' COP-24 in Katowice, Poland, Alliance states shared their leadership with the international community, including through two Alliance-hosted events focused on SLCPs and natural and working lands.<sup>128</sup>
- Through the North American Climate Leadership Dialogue with Canada and Mexico, Alliance governors agreed to work together to achieve an ambitious climate agenda,<sup>129</sup> and since then, have worked toward achieving these goals through information exchanges and increased collaboration. Independent analysis shows that the joint commitment to generate 50 percent of the region's power from zero-carbon sources by 2025 is on track to be achieved. California and Canada signed a memorandum of understanding to improve GHG emissions performance of vehicles. Canada and Mexico joined Alliance commitments to reduce SLCPs and

to protect the region's natural and working lands. Canada and the Alliance also jointly held a workshop to move towards a more accurate social cost of carbon that ensures the true cost of climate change is taken into account when developing policy.

- At the September 2019 United Nations Global Climate Action Summit, Governor Janet Mills of Maine represented state climate leadership on stage among and before world leaders. The only elected U.S. official on stage, Mills committed to put Maine on a path to carbon neutrality by 2045, joining the growing ranks of leaders aligning their jurisdictions with a 1.5°C goal.
- An unprecedented number of U.S. governors—Governor Newsom of California, Governor Mills of Maine, Governor Murphy of New Jersey, Governor Lujan Grisham of New Mexico, Governor Northam of Virginia, and Governor Inslee of Washington—represented U.S. climate leaders at Climate Week 2019, held on the margins of the United Nations General Assembly. In meetings with foreign dignitaries and speaking at public events across New York City, Alliance governors shared their leadership and reaffirmed their commitment to the Paris Agreement.
- Experts across Alliance states and the European Union convened a joint workshop in November 2019 to share strategies for implementing and financing community resilience programs.



## BOX 1

## Delivering on Our Joint Commitments

At the September 2018 Global Climate Action Summit, Alliance states made commitments representing “one of the broadest set of actions yet taken to keep carbon emissions falling in the face of the Trump administration’s rollbacks.”<sup>130</sup> Since then, Alliance states have delivered on the following:

**21 STATES** on track to make natural and workinglands a key component of our climate mitigation strategies

**18 STATES** adopted policies that can help to reduce solar soft costs

**6 STATES** regulating HFCs and 2 states regulating methane with many more considering action in 2020

**4 STATES** adopted appliance efficiency standards

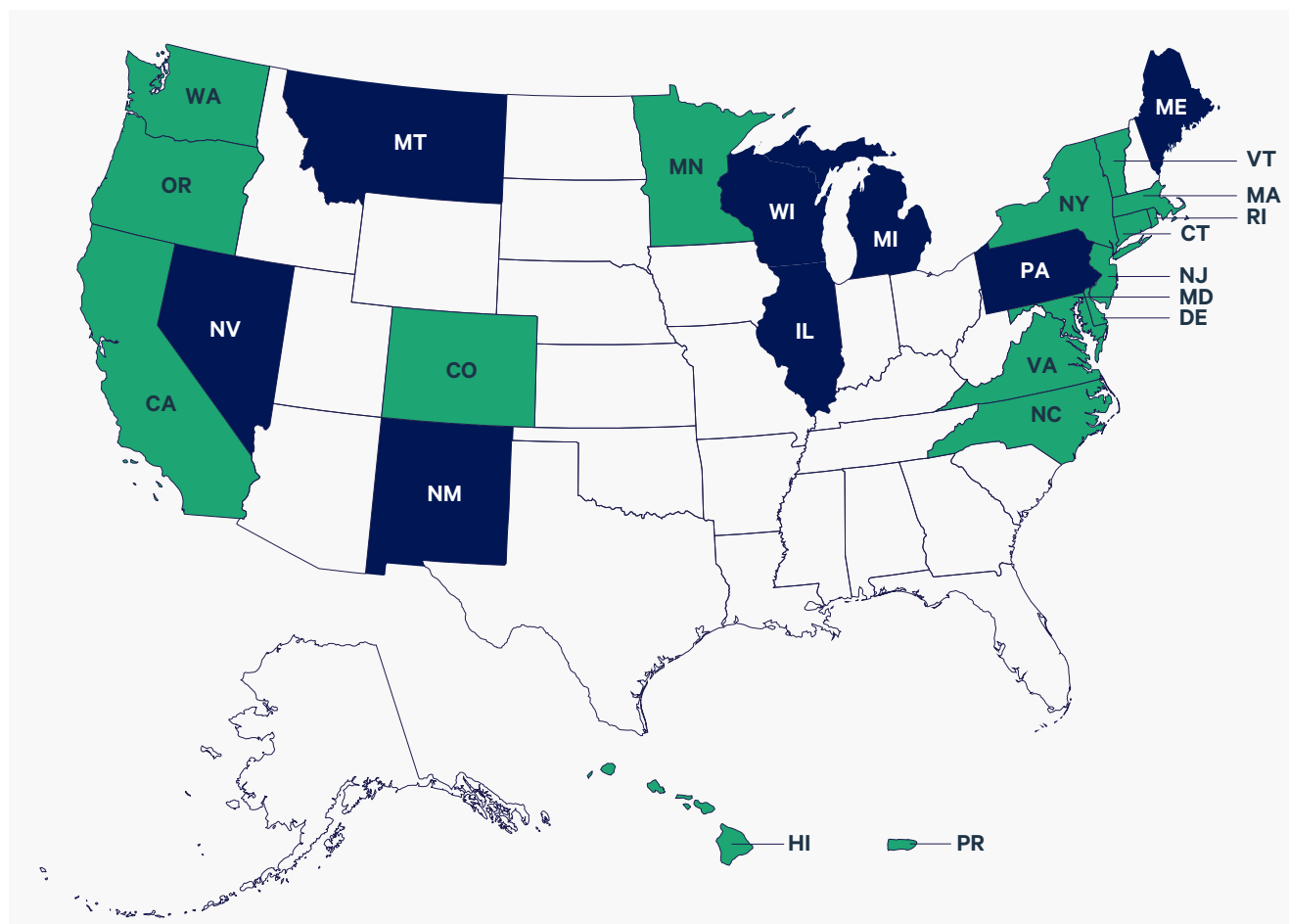
**\$146M OF VOLKSWAGEN SETTLEMENT FUNDS** deployed for low- and zero-carbon transportation with all Alliance states releasing concrete plans to deploy millions more over the coming years<sup>131</sup>

In the coming years, we look forward to continuing to deliver on these commitments, in addition to our other priorities to address climate change.

# Climate Leadership across the Alliance

*Individual leadership by each Alliance governor is the foundation of our collective ambition. U.S. Climate Alliance states are taking bold climate action across every sector of the economy.*

MAP 1 U.S. Climate Alliance States



■ Alliance states as of 2018    
 ■ Alliance states joining in 2019

<b>CALIFORNIA</b>	<b>ILLINOIS*</b>	<b>MINNESOTA</b>	<b>NEW YORK</b>	<b>RHODE ISLAND</b>
<b>COLORADO</b>	<b>MAINE*</b>	<b>MONTANA*</b>	<b>NORTH CAROLINA</b>	<b>VERMONT</b>
<b>CONNECTICUT</b>	<b>MARYLAND</b>	<b>NEVADA*</b>	<b>OREGON</b>	<b>VIRGINIA</b>
<b>DELAWARE</b>	<b>MASSACHUSETTS</b>	<b>NEW JERSEY</b>	<b>PENNSYLVANIA*</b>	<b>WASHINGTON</b>
<b>HAWAI'I</b>	<b>MICHIGAN*</b>	<b>NEW MEXICO*</b>	<b>PUERTO RICO</b>	<b>WISCONSIN*</b>

\*Alliance state joining in 2019

The U.S. Climate Alliance is now 25 governors strong, working together to increase the coalition’s collective ambition. At the same time, each state and territory is taking bold climate action within and across its own borders that serves as the foundation for this coalition’s ambition. The following section provides a snapshot of each Alliance state’s individual climate leadership, with more comprehensive summaries available in this report’s “Climate Leadership Across the Alliance” addendum.<sup>132</sup>

### CALIFORNIA



California established its climate leadership with the *California Global Warming Solutions Act of 2006*, becoming the first state in the nation to adopt an economy-wide cap-and-trade program. Emissions in California are now below 1990 levels and set to drop further with the *100 Percent Clean Energy Act of 2018* and its other suite of policies. Since 2014, California Climate Investments preserved or restored more than 500,000 acres of land, contracted for over 3,200 units of affordable housing, sprouted 50,000 urban trees, and installed 110,000 efficiency measures in homes statewide.

### COLORADO



Colorado advanced a number of transformative legislative efforts, including establishment of economy-wide GHG reduction targets of 26 percent below 2005 levels by 2025, 50 percent by 2030, and 90 percent by 2050. Governor Polis also unveiled his administration’s *Roadmap to 100% Renewable Energy by 2040 and Bold Climate Action*, outlining steps the state will take towards a clean energy future.

### CONNECTICUT



Connecticut’s Governor’s Council on Climate Change recommendations report, *Building a Low Carbon Future for Connecticut: Achieving a 45% GHG reduction by 2030*, provides the state with comprehensive and meaningful GHG reduction strategies across all sectors of the economy, ensuring the state maintains a downward trajectory to meet its climate targets. The recommendations in this report build upon the successful policies and measures the State has implemented to date, propose strengthening existing programs, and put forth new strategies to help Connecticut reach its mid- and long-term GHG reduction targets.

### DELAWARE



Delaware is currently developing a statewide climate plan to identify strategies and actions needed to meet the 2025 GHG reduction target, and to develop the basis for a mid- to long-term target. The plan is due to be completed by December 2020.



**HAWAI'I**



After setting its decarbonization goal, Hawai'i accelerated its renewable energy transition by creating a new Energy Office with a mandate to lead on clean transportation and decarbonization, implementing new electric vehicle programs, and adopting California's appliance efficiency standards. Hawai'i is on track to meet its goal of reducing emissions to 1990 levels by 2020. The Climate Commission has started three working groups on equity, transportation, and legislation.

**ILLINOIS\***



Governor Pritzker is committed to putting Illinois on a path toward 100 percent clean and renewable energy. This year, he signed legislation repealing the state's Kyoto Protocol Act which prevented the state from taking action to address GHG emissions, supporting wind energy development, and establishing an Offshore Wind Task Force. Governor Pritzker's capital plan also includes \$140 million for renewable energy projects.

**MAINE\***



Governor Janet Mills signed into law in June 2019 bipartisan legislation to create the Maine Climate Council. The Climate Council is charged with leading Maine's efforts to reduce the state's GHG emissions by 45 percent below 1990 levels by 2030 and at least 80 percent by 2050. Governor Mills also signed major legislation into law in June 2019 to increase the state's RPS to 80 percent by 2030 and set a goal of 100 percent renewable electricity by 2050.

**MARYLAND**



The State published a draft plan to achieve a 40 percent GHG emissions by 2030 with billions of dollars of increased in-state economic output and more than 11,000 additional jobs through 2030. The plan includes a proposed legislative initiative from Governor Hogan to achieve 100 percent clean electricity by 2040 through a new Clean and Renewable Energy Standard (CARES). Maryland is also a member of the Transportation and Climate Initiative, is developing HFC and natural gas sector regulations, and has continued to support clean car standards.

**MASSACHUSETTS**



Under the Baker-Polito Administration, the Commonwealth continues to lead the nation in addressing climate change with over \$769 million invested statewide to build resiliency and reduce carbon emissions. In addition to nation-leading procurements of offshore wind, work is underway to pioneer innovative programs to protect Massachusetts' residents, infrastructure and natural resources through an integrated statewide hazard mitigation and climate adaptation plan, and initiatives like the Municipal Vulnerability Preparedness program to help cities and towns develop practical, cost-effective climate-resiliency solutions.

**MICHIGAN\***

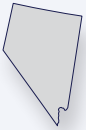
Governor Whitmer has been deliberate in addressing climate change and is working to ensure that state government is leading by example. She signed Executive Directive 2019-12, which pledged Michigan to join the U.S. Climate Alliance. Additionally, Executive Order 2019-06 created the Office of Climate and Energy to coordinate the activities of state departments and agencies on climate response.

**MINNESOTA**

In the 2019 Legislative Session, Governor Walz championed the “One Minnesota Path to Clean Energy,” a set of policy proposals that will lead the state’s electricity sector to 100 percent clean energy by 2050, which aims to drastically cut air pollution while creating jobs and opportunity for people across Minnesota, keeping energy costs low for Minnesota families and maintaining reliability of our electricity grid.

**MONTANA\***

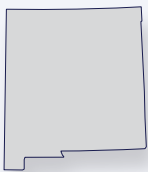
On July 1, 2019, Governor Bullock issued an executive order creating the Montana Climate Solutions Council. The Council is tasked with an interim goal of net GHG neutrality for average annual electric loads no later than 2035 and economy-wide net GHG neutrality at a date determined by the Council.

**NEVADA\***

Nevada’s legislature unanimously strengthened its RPS to 50 percent by 2030, with a goal of 100 percent carbon-free by 2050. Nevada also adopted in statute GHG reduction targets of 28 percent below 2005 levels by 2025, 45 percent by 2030, and net-zero or near-zero emissions by 2050.

**NEW JERSEY**

Governor Murphy has reestablished New Jersey’s leadership on climate change, putting the state on a path to 100 percent clean energy by 2050. His ambitious climate agenda includes leading New Jersey’s re-entry into RGGI, advancing the development of offshore wind, restructuring the state’s solar market, promoting green job growth and ensuring equitable access to clean energy for people across the state.

**NEW MEXICO\***

The 2019 *Energy Transition Act* sets bold statewide renewable energy standards and establishes a low-carbon energy transition away from coal while providing workforce training and community transition assistance. Governor Lujan Grisham’s climate executive order set a statewide GHG reduction target of at least 45 percent below 2005 levels by 2030. This executive order also created the Interagency Climate Change Task Force charged with incorporating climate change mitigation and adaptation strategies into agency operations and developing and implementing climate-related policies.

**NEW YORK**



New York’s *Climate Leadership and Community Protection Act* requires the state to achieve a carbon-free electricity system by 2040 and reduce GHG emissions 40 percent below 1990 levels by 2030 and 85 percent by 2050 on a path toward carbon neutrality, setting a new standard for states and the nation to expedite the transition to a carbon-neutral economy. This legislation underscores New York’s commitment to climate justice by ensuring that a minimum of 35 percent of clean energy and energy efficiency investments benefit disadvantaged communities. It also establishes nation-leading targets of 9,000 megawatts offshore wind power by 2035 and 3,000 megawatts of energy storage by 2030.

**NORTH CAROLINA**



Governor Cooper’s 2018 Executive Order 80 calls for a 40 percent reduction in statewide greenhouse gas emissions, 40 percent improvement in state building energy efficiency, and 80,000 ZEVs by 2025. In 2019, state agencies developed plans to support these goals—including the *N.C. Clean Energy Plan*, *N.C. Zero-Emission Vehicle Plan*, *N.C. Clean Energy & Clean Transportation in NC: A Workforce Assessment*, and *N.C. Motor Fleet Zero-Emissions Vehicles Plan*—and published a state GHG inventory. North Carolina remains second nationally in installed solar capacity, and a 2017 energy law will roughly double the state’s solar capacity in four years.

**OREGON**



Governor Brown is taking bold action to tackle climate change while bolstering a strong, inclusive economy. Oregon’s electricity sector is rapidly decarbonizing after SB 1547’s timeline to remove coal and double renewable energy targets. SB 98 created the nation’s first portfolio goals for renewable natural gas. Oregon is halfway to its goal of 50,000 electric vehicles on Oregon roads by 2020, while the low-carbon fuel standard reduced emissions by more than 1 million tons last year.

**PENNSYLVANIA\***



As a major energy-producing state, Pennsylvania takes seriously its responsibility to reduce emissions that are contributing to climate change. Earlier this year Governor Wolf signed an executive order committing Pennsylvania to GHG reductions in line with the Paris Agreement and the state is now making good on that commitment through lead by example efforts within state government, the release of a major *Climate Action Plan*, and active engagement with the legislature around far-reaching emissions reduction strategies.

**PUERTO RICO**



Puerto Rico signed the *Climate Change Mitigation, Adaption and Resiliency Law of Puerto Rico*, which establishes clear goals, metrics, and deadlines to address the devastating effects of climate change. The state also adopted the *Public Energy Policy Law of Puerto Rico*, which aims to power the island solely by renewable energy by 2050. Also, the Puerto Rico Department of Education, in association with Department of Natural and Environmental Resources, is currently developing a climate change curriculum to be implemented in the first semester of 2020.

**RHODE ISLAND**



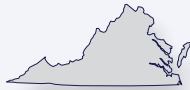
In July 2019, Governor Gina Raimondo signed Executive Order 19-06, charging the Rhode Island Department of Public Utilities and Carriers (DPUC) and the Office of Energy Resources (OER) to work together to develop a strategy to advance clean, affordable, and reliable heating. This executive order makes Rhode Island the first state to actively reshape the heating sector, which produces 35 percent of the state’s emissions.

**VERMONT**



Vermont has been a leader in deploying renewable energy, transitioning to more efficient vehicles, and helping Vermonters save money by burning less fossil fuel in their homes. With the other states in the U.S. Climate Alliance, Vermont will continue to build a clean energy economy and fight climate change.

**VIRGINIA**



Governor Ralph Northam’s Administration is pursuing a comprehensive sector-based approach to climate change that will involve working across state government to reduce pollution, grow the clean energy economy, prepare for climate impacts, and increase the resilience of Virginia communities.

**WASHINGTON**



Washington passed a landmark clean energy package in 2019, ensuring clean electricity by 2030, phasing down HFCs, implementing a first-of-its-kind energy standard for commercial buildings, and incentivizing EVs.

**WISCONSIN\***



Governor Evers is leading Wisconsin in a new direction that embraces sciences, grapples with the very real implications of climate change, and invests in renewable energy. That’s why in August 2019 he signed Executive Order 38, which sets a state goal of 100 percent carbon-free energy by 2050 and establishes a state Office of Sustainability and Clean Energy to promote the development and use of clean energy across the state and advance innovative sustainability solutions that improve the state’s economy and environment. Through executive order, Governor Evers has also created a Task Force on Climate Change which will be chaired by Lieutenant Governor Mandela Barnes. The Task Force is charged with developing a strategy to mitigate and adapt to the effects of climate change for the benefit of all Wisconsin communities.

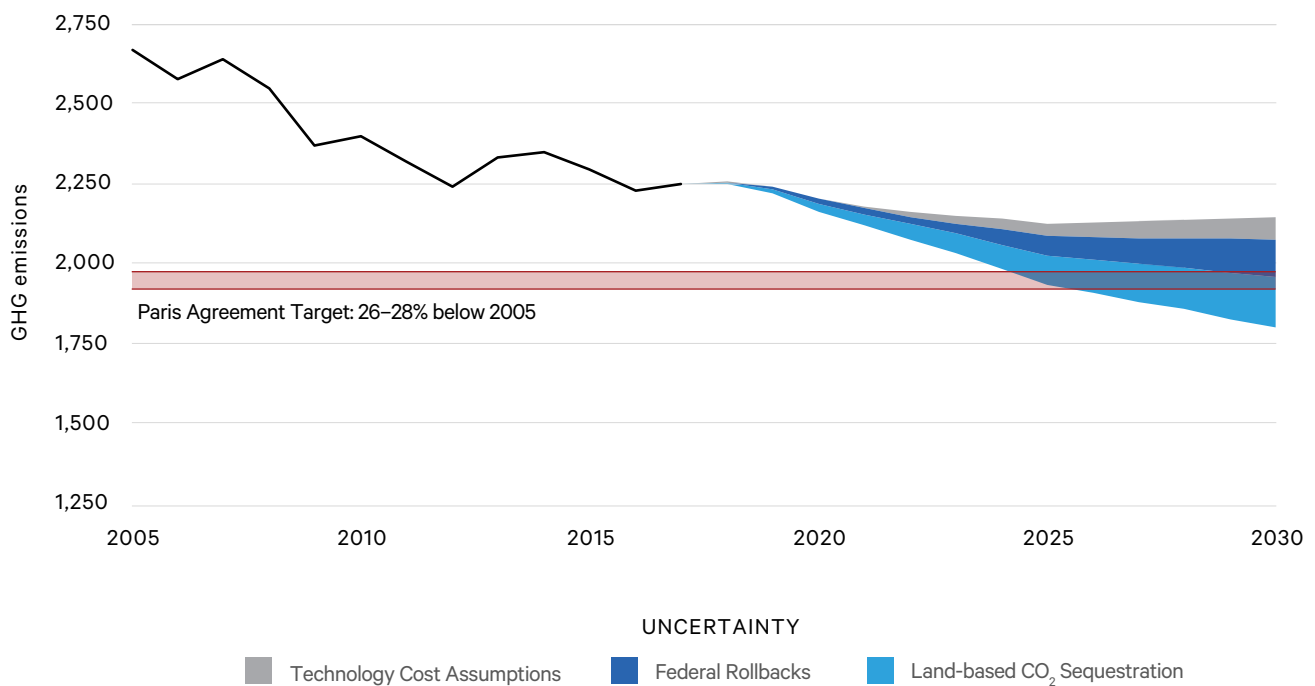
# Upholding Our Commitment

Alliance governors recognize that we must substantially drive down GHG emissions to prevent the worst impacts of climate change and ensure a sustainable future for generations to come. That is why we have committed to collectively reduce our emissions by at least 26–28 percent below 2005 levels by 2025 and to track and publicly report our progress. According to independent analysis by Resources for the Future (RFF), based on already-adopted policies, we are on track to reduce our emissions by at least 20–27 percent below 2005 levels by 2025, within reach of our goal (see Figure 8). The range in the emission reduction projections, represented by the colored bands below, is due to uncertainties in the future cost of technologies, additional federal rollbacks and related litigation, and difficult-to-measure carbon sequestration through land-based solutions. What is clear, however, is that even in the face of federal rollbacks, progressive action by

Alliance governors is moving us closer to our Alliance-wide GHG reduction goal in support of the Paris Agreement.

With the addition of the eight new states in 2019 and continued leadership, Alliance states are not only cutting GHG emissions faster, we are also reducing a larger share of national emissions. By 2025, the Alliance’s twenty-five members are projected to reduce substantially more tons of GHG emissions in comparison to our then-seventeen members (122–302 million metric tons compared to 70–163 million metric tons of GHG emissions). As the coalition has accelerated the pace and scale of climate action, RFF’s analysis shows that we are driving deeper reductions this year compared to last, when Alliance states were projected to reduce 18–25 percent of their GHG emissions in 2025. If the Alliance is to bend the U.S. emissions curve, the importance of strengthening our numbers, both by

**FIGURE 8** With Current Policies, Alliance States Forge a Path for Achieving Our Paris Target  
 Net GHG emissions from Alliance States, million metric tons carbon dioxide equivalent (MMTCO<sub>2</sub>e)



SOURCE: Independent analysis of U.S. Climate Alliance emissions conducted by RFF. For more information, please see the Appendix.



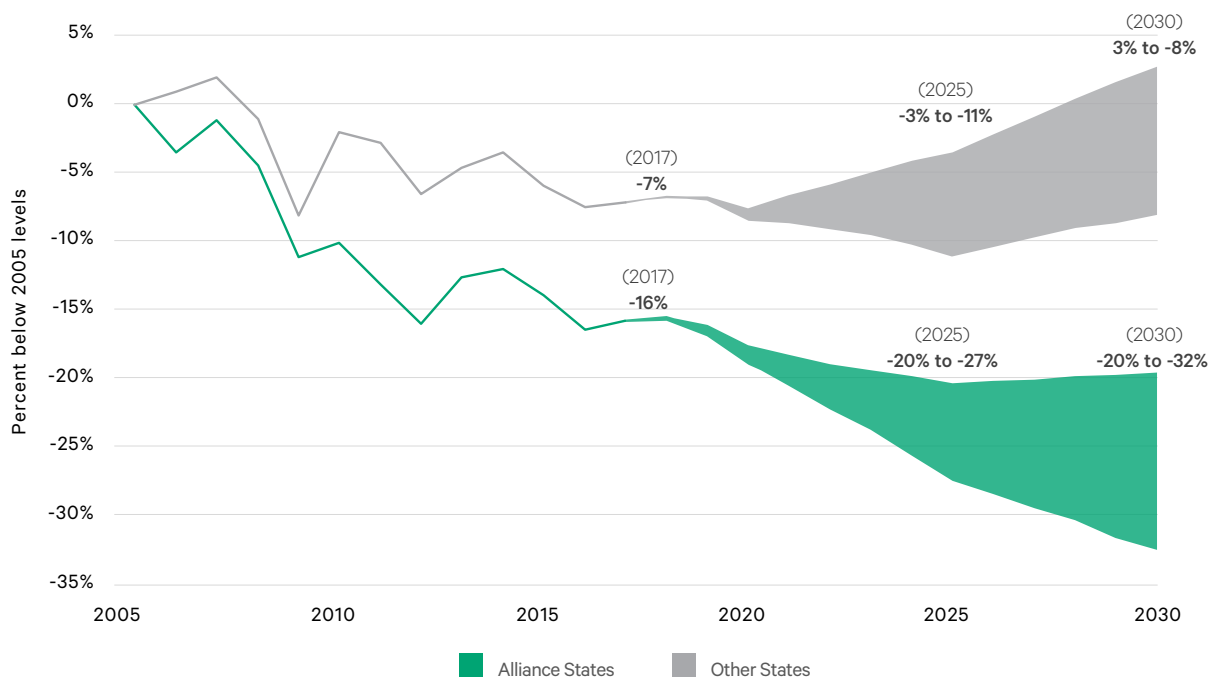
expanding the map of climate leaders and working together to achieve larger reductions sooner, is reinforced by this analysis.

Given the scale of the global climate challenge, leadership at all levels of government is critical. In the absence of action at the federal level, state leadership becomes increasingly important, as is apparent in the stark contrast between projected emissions reductions from Alliance states compared to the rest of the country. RFF’s analysis shows that by 2025, GHG emissions reductions for non-Alliance states are projected to be in the range of 3–11 percent, compared to 20–27 percent for Alliance states. By 2030, that differential markedly grows. Alliance states are projected to reduce their emissions by 20–32 percent below 2005 levels, while the projections for non-Alliance states range from an 8 percent reduction to a 3 percent increase (see Figure 9).

### IMPACT OF FEDERAL ROLLBACKS

This year’s projections capture the increased uncertainty around potential federal rollbacks of commonsense climate regulations. Since last year, the federal government released its proposed rollback of the nation’s clean car standards to freeze fuel economy standards at 2020 levels and revoke California’s waiver to set more ambitious standards. The two transportation scenarios modelled were a low-rollback scenario of fuel economy standards being frozen at 2020 levels for all states except those adopting the standard and a high-rollback scenario of waiver revocation, not considered in last year’s analysis. Additional rollback efforts accounted for in this analysis include the potential HFC rollbacks of the federal Significant New Alternatives Policy (SNAP) and Refrigerant Management Program, the Kigali Amendment to the Montreal Protocol, and federal rules on methane standards for oil and gas activities: the New Source Performance

**FIGURE 9 Alliance States are Changing the Future for their Citizens**  
Percent reduction in net GHG emissions vs. 2005 levels from Alliance States compared to non-Alliance states



SOURCE: Independent analysis of U.S. Climate Alliance and U.S. emissions conducted by RFF

Standards from EPA and the Methane and Waste Prevention rule from BLM.<sup>a</sup> States will continue to drive more ambition but the dramatic unraveling of our nation's climate framework means that for every step forward our states take, they do so against the headwinds of the federal deregulatory agenda. In order for the Alliance and the United States to meet the goals of the Paris Agreement, the federal government must re-engage on climate.

## SECTORAL INSIGHTS

We have made tremendous progress in reducing emissions from some of our largest sources. Between 2005 and 2017, Alliance states reduced their electricity sector emissions by 30 percent and are projected to deepen this reduction to 40–45 percent by 2025, demonstrating the transformative impact Alliance states are already having towards decarbonizing our power sector emissions. When we look more closely at other sectoral emissions, there are clear opportunities for deeper reductions, especially in those more challenging sectors. Through 2030, the buildings sector is projected to remain at 14 percent of Alliance-wide gross emissions. The transportation sector, a priority across Alliance states, is projected to remain at 34 percent of Alliance-wide gross emissions, with many states planning to take additional action to deepen their reductions in this sector. These are among the many sectors where Alliance states will continue to ratchet up their ambition and set bold new policies to accelerate towards the low-carbon economy of the future.

**As a demonstration of our commitment to address these challenging sectors, the Alliance is launching an initiative focused on reducing emissions from buildings, working in partnership with cities and experts.**

## RATCHETING UP AMBITION

We recognize there is more work to be done, and we are not finished yet. That's why in the past year, Alliance states have proposed this bold suite of new actions and will work with their regulatory agencies and state legislatures to implement their proposals and newly adopted policies.

Some of our most recent policy announcements include:

- Pennsylvania's intent to join RGGI, which will significantly drive down emissions from the state with the third-highest emissions.
- New Mexico and Minnesota's announcements on pursuing adoption of clean car standards and the ZEV mandate—one of the most significant policy tools for reducing vehicle emissions.
- The development of a regional cap-and-invest program for transportation emissions that nine Alliance states and Washington, D.C. are collaborating on through the Transportation and Climate Initiative.
- Lead by example targets for executive branch state office buildings or agencies that aim to make buildings and vehicle fleets more energy efficient, increase use of renewable energy, and reduce waste to save money.
- Washington's first-of-its-kind standard that will improve the energy performance of thousands of large commercial buildings in the state.<sup>133</sup>
- Commitments or goals to move to 100 percent zero carbon electricity, such as those for Connecticut, Colorado, Illinois, Minnesota, New Jersey, Virginia, and Wisconsin.
- Intent to regulate methane and HFC emissions, such as the actions announced by Connecticut, Maryland, New Mexico, New York, and Virginia.<sup>132</sup>

These actions will help Alliance states meet their individual state GHG emissions reduction targets. If all Alliance states are on track to achieve their existing state GHG emissions reduction targets, the Alliance is projected to achieve Alliance-wide emissions reductions of 28 percent below 2005 levels by 2025 and 38 percent by 2030.

Through state leadership, we can decrease the gap between current federal policy and what the science tells us is needed so that when the federal government rejoins the Paris Agreement, it can build on the efforts of Alliance states.

<sup>a</sup> The Alliance believes in making continuous improvements to our emissions estimates and improving the transparency of our reporting. Additional detail on the methodology and policy assumptions is provided in the Appendix.

# What's Next

As illustrated throughout this report, U.S. Climate Alliance governors are advancing the most ambitious state climate agenda in U.S. history, despite federal deregulatory efforts. By doing so, the Alliance is rebuilding the nation's climate framework and pushing ahead to create the low-carbon economy of the future. Even with the success the Alliance has achieved in continuing to reduce our collective GHG emissions, there is more work to be done in the years ahead to protect the health of our communities, especially the most vulnerable, economies, and planet.

Over the next year, Alliance states and territories will continue to lead the nation by implementing bipartisan climate solutions, working together to backstop additional federal rollbacks. Members will continue to pursue multi-state strategies, advancing our national climate leadership. And we will continue to engage the international community in order to share climate success stories, learn from international experiences, and work toward a shared vision of increased climate ambition. Together, the Alliance will build on current momentum, taking a range of concrete actions to continue reducing GHG emissions while growing our economies and planning for a just transition for all our constituents in a low-carbon future. Specifically, Alliance states will continue to:

- **Act on the #SLPCChallenge** by pushing forward regulations, incentives, and other actions that help phase-down HFCs and reduce methane emissions from oil and gas infrastructure, landfills, and agriculture;
- **Adopt appliance standards and improve building efficiency**, aiming to transform the U.S. market so all Americans can save money on their energy bills by having access to the most advanced products, and exploring innovative measures that will address energy consumption in buildings;
- **Support the transition to zero-carbon electricity generation** by identifying and implementing measures that will help modernize our power grids, lower technology costs, and support carbon-free power generation;
- **Evaluate and implement the most promising climate finance solutions** by exploring opportunities to leverage member skills and resources to advance best practices and experiences in climate finance across the nation;
- **Implement the Nation's Clean Car Promise**, working together to defend and expand jurisdictions with a strong, science-based national GHG emissions standard while also continuing to pursue additional concrete actions that protect families and businesses from unnecessary air pollution and fuel costs;
- **Follow through on the #NWLChallenge** by integrating actions that protect and sequester carbon across the Alliance's natural and working lands into state GHG mitigation plans;
- **Build greater resilience** so that communities in Alliance states are better prepared in the face of climate impacts and natural hazards, especially the most vulnerable communities that have the least ability to handle climate change impacts;
- **Improve the methods used to estimate GHG emissions and support analysis that identifies robust pathways toward deep decarbonization** so that states can better plan future mitigation actions while being transparent about the progress being made; and
- **Cooperate with leading nations** to accelerate the global transition to a low-carbon economy, and inspire ambitious action in support of the Paris Agreement's goals.

As we consider the work left to be done in the year ahead, 2020 will have significant implications for our ability to effectively address the climate crisis. Alliance states are clearly committed to following through on the promise each has made to act on climate change with the urgency that it requires. Through strong state leadership, the U.S. Climate Alliance is demonstrating to the global community that the United States continues to rise to the climate challenge, meeting it head-on with innovation, determination, and an ambitious vision for a livable, sustainable future for all.

# Appendix

Resources for the Future (RFF), an independent nonprofit research institution, provided the historical data and projected results cited in this report. RFF utilized a detailed, state-level, energy-economic modeling framework that captures all sectors of the economy and all greenhouse gases. They modeled a range of potential emissions outcomes with and without federal policies currently in jeopardy, varying technology cost assumptions, and accounting for uncertainty in the capacity of our collective land sector to continue to remove carbon from the atmosphere.

Historical data includes annual GHG emissions inventories across all sectors and greenhouse gases at the state level to allow for comparison between Alliance (except for Puerto Rico) and non-Alliance states.

This GHG emissions inventory is current through 2017 and relies on data from the U.S. Environmental Protection Agency (EPA), U.S. Energy Information Administration (EIA), U.S. Department of Agriculture (USDA), and other sources.

For this analysis, future GHG emissions were projected from 2018 to 2030 for two policy scenarios under a range of technology, energy price, and other assumptions using the following suite of modeling tools:

- **Electricity:** The Engineering, Economic, and Environmental Electricity Simulation Tool (E4ST) was run for the years 2020, 2025, and 2030, and linear interpolation was used to calculate results for intermediate years. More information on E4ST is available at [e4st.com](http://e4st.com).
- **Light-duty Vehicle Transportation:** The RFF Light-Duty Vehicle Model was used to conduct the primary analysis for future GHG transportation emissions. This model includes components for both the new vehicle market and utilization decisions for all on-road light-duty vehicles.
- **Emissions from fossil fuels consumed by activities other than light-duty transportation and electricity generation (including energy used by all other modes of transportation, industry and buildings):** RFF utilized a simplified projection tool which combines state data from the EIA State Energy Data System (SEDS) with regional data from the EIA 2019 *Annual Energy Outlook* (AEO).
- **Waste, Industrial, Agricultural Emissions, and Fugitive Emissions from Oil and Gas Operations:** Linear extrapolation was used, based on the emissions trends visible in the historical data. For agriculture and the fugitive methane and flared CO<sub>2</sub> emissions from oil and gas operations, historical data was sourced from EPA's State Inventory Tool (SIT).
- **HFCs:** The California Air Resources Board (CARB) F-Gas Emissions Inventory Model was used to create HFC emissions estimates for each state.
- **Land Use, Land-use Change, and Forestry (LULUCF):** Projections were based on high- and low-emissions cases from the 2016 Second Biennial Report of the United States of America (for the UN Framework Convention on Climate Change), as well as downscaled projected carbon fluxes according to estimated state-level trends. For the high-emissions case, the projected flux was based on predicted population growth and associated housing starts and land-use change. For the low-emissions case, the projected flux was based on a model of U.S. forests and forest product markets.

Two emissions uncertainty scenarios were modeled with different assumptions for potential federal policy rollbacks (see Table 1), energy technology costs, energy prices, and net carbon sequestration estimates from natural and working lands. Additional key assumptions include:

- **Power Plant Retirements:** All announced power plant retirements through 2030 per S&P Global Market



Intelligence’s electric generating unit database (as of August 2019); in addition, the E4ST model predicted what additional power plant retirements would occur by 2025 and by 2030, based on profitability.

- **Announced Power Plant Additions:** All announced power plant additions through 2024 per S&P Global Market Intelligence’s electric generating unit database that were considered “under construction” or in “advanced development” (as of August 2019); in addition, the E4ST model predicted what additional power plant additions would occur by 2025 and by 2030, based on profitability.
- **Oil Prices:** In the electricity sector, EIA’s 2019 AEO high oil and gas resource and technology (HOGRT) case was used. For all other sectors, they were derived from EIA’s 2019 AEO reference case.
- **Renewable Energy Technology Costs:** Technology costs and characteristics for new renewable energy generating resources were derived from National Renewable Energy Laboratory (NREL)’s 2018 Annual Technology Baseline. The low-emissions case assumes “low” cost projections for wind and solar technologies and the high-emissions case assumes the average of the “mid” and “constant” projections. For all other technologies in both scenarios, the mid projections were assumed.
- **Utility-scale Energy Storage Costs:** Existing storage in service as of 2017 were modeled in the electricity sector analysis. New investments in battery storage technologies were not considered.
- **Electric Vehicle (EV) Battery Costs:** For the low-emissions scenario, EV battery cost projections through 2030 came from Bloomberg New Energy Finance. Future EV production costs decline in proportion to the projected battery cost and the size of the vehicle’s battery. For the high-emissions scenario, battery costs decline at half the rate projected by Bloomberg.
- **Natural Gas Resource and Prices:** For the electricity sector, regional delivered gas prices from the AEO 2019 HOGRT case were used, averaging \$3.29/MMBtu in 2018 dollars nationwide for the period 2020–2030. Prices from the AEO 2019 reference case were used for all remaining sectors.
- **Vehicle Miles Travelled (VMT):** Each state’s 2017 VMT was estimated from the 2017 National Household Travel Survey (NHTS). The AEO 2019 reference case includes projections of national VMT for light-duty vehicles. For consistency with the CARB analysis, annual VMT for California was assumed to grow by 40 percent less than national VMT in the AEO reference case. All other states have the same national VMT growth rate.
- **Automated Vehicle Development:** VMT projections for light-duty vehicles include AEO’s implicit assumptions about the effect of future vehicle automation on VMT (as embedded in the AEO 2019 reference case VMT estimates).

Two state policy scenarios were modeled across both emissions uncertainty outcomes (see Table 2):

1. **Current Policies:** regulations and policies that have been finalized as of July 1, 2019, including increased renewable portfolio standards and new carbon caps on power sector emissions
2. **GHG Targets:** the latest state GHG reduction targets

## UPDATES FROM LAST YEAR’S REPORT

We remain committed to transparently reporting on our progress going forward and continuing to improve our emissions estimates so we can understand where to prioritize our emission reduction efforts (see Table 3). There are several differences between our 2018 and 2019 Annual Report analyses. Four notable differences include (1) Methodological improvements; (2) Different modeling systems; (3) Changes in federal policy rollback assumptions; and (4) New state membership.

**TABLE 1** Federal Policy Assumptions, by Scenario

	<b>Low emissions</b> (high policy ambition)	<b>High emissions</b> (low policy ambition)
<b>Passenger Vehicles</b>	<ul style="list-style-type: none"> <li>• CAFE Standards frozen at 2020 levels for all but Sec. 177 states.</li> <li>• The California Clean Air Act waiver (per Sec. 177) is NOT revoked and as a result, California and the thirteen states that have adopted California’s GHG standards impose their own standards that increase through 2025 and then remain constant through 2030 (these standards are the same as the standards the U.S. EPA finalized in 2012). Additionally, California and nine other states implement the Zero-Emission Vehicle (ZEV) program, which specifies market shares of plug-in hybrids and electric vehicles that increase through 2025 and then remain constant through 2030.</li> </ul>	<ul style="list-style-type: none"> <li>• CAFE standards frozen and the California Clean Air Act waiver (per Sec. 177) is revoked (all USCA states subject to rolled-back federal standards).</li> </ul>
	<ul style="list-style-type: none"> <li>• Federal tax credit for plug-in vehicles is phased out according to current law as manufacturers pass the specified cumulative vehicle sales threshold.</li> </ul>	
<b>Electricity</b>	<ul style="list-style-type: none"> <li>• Federal production tax credit for wind resources commencing construction before 2020, and a 10 percent federal investment tax credit for all new solar resources (effective indefinitely).</li> </ul>	
<b>Methane</b>	<ul style="list-style-type: none"> <li>• All current federal policies continue.</li> </ul>	<ul style="list-style-type: none"> <li>• Rollback of EPA’s New Source Performance Standards for methane emissions from the oil and gas industry.</li> <li>• Rollback of BLM’s Methane and Waste Prevention rule.</li> </ul>
<b>HFCs</b>	<ul style="list-style-type: none"> <li>• All current federal policies continue.</li> </ul>	<ul style="list-style-type: none"> <li>• Rollback of federal Significant New Alternatives Policy (SNAP) Rule 20.</li> <li>• Rollback of federal Sect. 608 Refrigerant Management Regulations (for HFCs).</li> <li>• Rollback of Kigali Amendment to Montreal Protocol.</li> </ul>
<b>Fossil fuel consumption for the buildings and industry sectors and non-passenger vehicle transportation emissions</b>	<ul style="list-style-type: none"> <li>• For a list of federal policies factoring into the analysis aspects that rely on the regional AEO projection, please see the Summary of Legislation and Regulations included in the Annual Energy Outlook 2019.</li> </ul>	

**TABLE 2** Existing State Policies, by Scenario

	Low emissions (high policy ambition)	High emissions (low policy ambition)
<b>Electricity</b>	<ul style="list-style-type: none"> <li>• The Regional Greenhouse Gas Initiative (RGGI)</li> <li>• State renewable energy and clean energy standards. States with clean energy standards were assumed to preserve nuclear plants operating in those states through 2030 (excluding plants that have already announced retirement).</li> <li>• State renewable capacity procurements and mandates.</li> <li>• State nuclear zero-emissions incentives (NY, IL, CT, NJ, and OH); these programs were assumed to preserve nuclear plants operating in these states through 2025 (excluding plants that have already announced retirement).</li> <li>• State electric energy efficiency resource standards (as of May 2019).</li> </ul>	
<b>Transportation</b>	<ul style="list-style-type: none"> <li>• State subsidies for plug-in vehicles continue until their current expiration date.</li> <li>• Low Carbon/Clean Fuel Standards in Oregon and California.</li> </ul>	
<b>Economy-wide</b>	<ul style="list-style-type: none"> <li>• California Cap &amp; Trade Program</li> </ul>	
<b>HFCs</b>	<ul style="list-style-type: none"> <li>• The SLCP Strategy developed by CARB is implemented as well as signed legislation from Vermont and Washington backstopping EPA’s SNAP HFC regulations.</li> </ul>	<ul style="list-style-type: none"> <li>• The SLCP Strategy is not implemented, but other state legislation from Vermont and Washington is still implemented.</li> </ul>

**Methodological Improvements**

Several improvements were made to the underlying data sources of this year’s analysis, including:

- **Vehicle Miles Traveled (VMT):** For light duty vehicles, the U.S. Energy Information Administration (EIA) revised their vehicle VMT projections upwards (projecting about 5 percent higher emissions annually, compared to 2018 AEO estimates). Along with vehicle efficiency, VMT is a major driver of GHG emissions from the transportation sector when the majority of vehicles on the road consume fossil fuels.
- **Vehicle Scrapage Assumptions:** The most recent vehicle scrapage rates, or the likelihood that a vehicle of a particular age will be retired, suggests that Americans are keeping their vehicles longer than in the past. So policies focused on new

vehicles, including the ZEV mandate, purchase incentives, and fuel economy standards, will take more time to transition the Alliance vehicle fleet.

- **Carbon Sequestration:** The National Land Cover Dataset (NLCD) was used to measure state-level trends in land use change. These were used, with estimates of state-level carbon stocks from the USDA’s 2013 US Agriculture and Forestry Greenhouse Gas Inventory to downscale national EPA estimates of carbon flux from land use, land-use change, and forestry (LULUCF). EPA revised their methods for estimating net carbon sequestration from LULUCF. This change reduced expected U.S. Climate Alliance sequestration estimates compared to last year’s projections, (which leads to higher net emissions estimates for USCA and non-USCA states alike).

### **New Modeling System**

While much of the underlying data and assumptions used in this year's analysis are consistent with last year's, RFF utilized a different modeling system that is built on different parameters than the modeling approach used last year. This is especially relevant for the modeling of the power and transportation sectors. Additionally, for the purposes of this collective analysis, RFF utilized one consistent set of tools and assumptions. However, the results of this analysis may be different than what has been undertaken by individual states due to varying inventory methodologies, data sources, and modeling approaches.

### **Federal Rollbacks**

This year's projections capture the increased uncertainty around potential federal rollbacks of commonsense climate regulations. Since last year, the federal government released its proposed rollback of the nation's clean car standards—freezing fuel economy standards at 2020 levels and revoking California's waiver to set more ambitious standards. Two transportation policy scenarios were modelled: 1) a low-rollback scenario of fuel economy standards being frozen at 2020 levels for all states except those adopting the standard and 2) a high-rollback scenario of waiver revocation, not considered in last year's analysis. Additional rollback efforts accounted for in this analysis include the potential HFC rollbacks of the federal Significant New Alternatives Policy (SNAP) and Refrigerant Management Program, the Kigali Amendment to the Montreal Protocol, and federal rules on methane standards for oil and gas activities: the New Source Performance Standards from EPA and the Methane and Waste Prevention rule from BLM.

### **New Membership**

We welcomed eight new states this year, meaning that we are now collectively reducing emissions across a larger share of the U.S. economy and making a bigger dent in our national emissions. Our net emissions projection (in million metric tons CO<sub>2</sub>e) for 2025 is now about 70 percent greater than it would have been when compared to last year's 17 members. However, the 2025 percentage reduction below 2005 levels estimated in this year's study is higher

than that estimated last year (20–27 percent compared to 18–25 percent, or about two percentage points).

Several of these states have economies with large shares of fossil fuel production or have new governors who are making climate change a priority for their states for the first time. These states have continued to announce additional policies since the modelling was finalized, including Pennsylvania's intent to draft regulation to join RGGI and New Mexico's announcement on clean car standards, that displays the ambition of the Alliance's newest members. These leaders have already started to implement actions that will help move their states towards a cleaner economy and their constituents will see the benefits of these actions in the years ahead.



**TABLE 3** Aggregate GHG Emissions from Alliance States, million metric tons carbon dioxide equivalent (MMTCO<sub>2</sub>e)

Sector	2005	2017	2020	2025	2030
Transportation	1,028	929	908	863 to 871	815 to 842
Electricity	854	596	574	463 to 513	408 to 495
Residential	258	215	215	202	191
Commercial	147	147	151	146	143
Industrial	369	324	345	344	337
HFCs	43	98	97 to 110	77 to 120	49 to 125
Agriculture	183	205	210	216	222
Fugitive and Process Emissions from Oil & Gas Operations and Coal Mining	49	58	57 to 58	55 to 60	58 to 64
Other Industrial Processes and Product Use	64	42	40	35	33
Waste	64	51	46	40	35
Total Gross GHG Emissions	3,059	2,665	2,644 to 2,657	2,441 to 2,542	2,291 to 2,478
LULUCF Sequestration	-381	-409	-472 to -450	-497 to -408	-483 to -323
<b>Total Net GHG Emissions</b>	<b>2,678</b>	<b>2,257</b>	<b>2,172 to 2,207</b>	<b>1,944 to 2,134</b>	<b>1,808 to 2,155</b>
<b>Change from 2005</b>	<b>—</b>	<b>-16%</b>	<b>-18% to -19%</b>	<b>-20% to -27%</b>	<b>-20% to -32%</b>

# Endnotes

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