



Maryland

Department of the Environment

Maryland's Participation with the United States Climate Alliance (2019-2021)

Prepared for:

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State of Maryland

and the Maryland General Assembly

December 01, 2021

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This report combines information on Maryland's participation with the United States Climate Alliance from years 2019 to 2021.

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Executive Summary

Maryland law (EN §2-1401) states that on or before December 1 of each calendar year, the Governor shall report to the Senate Education, Health, and Environmental Affairs Committee and the House Environment and Transportation Committee on the state's participation in the United States Climate Alliance (USCA). This report includes any collaborations or partnerships among the USCA members or external stakeholders and any policies or programs that the USCA has endorsed, undertaken, or considered.

The USCA

The USCA is a bipartisan coalition of 25 members committed to taking real, impactful, on-the-ground action that urgently addresses the climate challenge. In becoming a USCA member, states commit to achieve the Paris Agreement's goal of keeping temperature increases below 1.5 degrees Celsius by:

1. Reducing collective net greenhouse gas (GHG) emissions at least 26-28% by 2025 and 50-52% by 2030, both below 2005 levels, and collectively achieving overall net-zero GHG emissions as soon as practicable, and no later than 2050;
2. Accelerating new and existing policies to reduce GHG pollution, building resilience to the impacts of climate change, and promoting clean energy deployment at the state and federal level;
3. Centering equity, environmental justice (EJ), and a just economic transition in their efforts to achieve their climate goals and create high-quality jobs; and
4. Tracking and reporting progress to the global community in appropriate settings, including when the world convenes to take stock of the Paris Agreement.

Major USCA Progress

Adopting Strengthened GHG Targets and Advancing Climate Governance

USCA members commit to reducing their GHG emissions to at least 26% below 2005 levels by 2025—consistent with the United States commitment under the Paris Agreement. Several members have recently revised and strengthened their goals in line with and in response to the latest climate science.

Adopting New or Strengthened GHG Targets

Over the past three years, USCA members have pushed back against the deregulation of federal environmental safeguards and adopted innovative climate policies across all sectors. These policies and programs provide a strong foundation to make our communities cleaner and more resilient.

A Robust and Resilient Recovery

USCA members are committed to rebuilding our economies in ways that prioritize addressing climate change, health, equity, and resilience. However, states have had to move forward without federal leadership. We therefore have provided recommendations to congressional leadership to help us with these efforts, including the need for immediate, flexible federal aid for states and territories to enable our governors to preserve core government services.

Recommendations for National Climate Action

Recovery from the economic impacts of COVID-19 presents the United States with a unique opportunity to tackle climate change in a way that catalyzes an equitable, clean, and prosperous economy. Drawing from our experience developing and implementing climate policy, the USCA offers five recommendations that the federal government should integrate when developing future climate and recovery policy:

1. Ensure climate and energy policy goals are aligned with science;
2. Include equity, environmental justice, and family-sustaining jobs at the core of climate and recovery policy;
3. Utilize members' experience and knowledge to collaborate in developing national policy frameworks;
4. Support state and territory-level climate change leadership as they respond to and recover from COVID-19; and
5. Protect members' ambition to go beyond federal standards to formulate and implement policy within their own borders and in coordination with other states and territories.

Leading the Charge

USCA members have worked together to develop consistent climate policy frameworks and issue challenges that aim to spur additional action across a range of sectors. These include:

1. Fulfilling the Short-Lived Climate Pollutant Challenge;
2. Taking on the Natural and Working Lands Challenge; and
3. Working together to deploy cleaner vehicles.

Ensuring a Just and Equitable Transition

Currently, USCA members are deploying exemplary programs to elevate disenfranchised voices, generate new jobs in the low carbon economy, and ensure a just and equitable transition for all our communities.

Maryland is enhancing its Commission on Environmental Justice and Sustainable Communities (CEJSC), a diverse body analyzing the effectiveness of state and local government laws and policies to address issues of EJ. Recognizing that rural and coal communities also continue to be negatively impacted by climate change or transition away from fossil fuel-based economies, several USCA members have included workforce, community development and EJ stipulations into their recent clean energy commitments.

Cleaning and Modernizing Our Electricity Sector

Seventeen USCA members have 100% zero carbon or carbon neutral electricity targets through statute or executive order. Over the past three years, USCA members have continued to decarbonize their electricity sectors. These efforts have received renewed attention due to the important public health co-benefits associated with transitioning away from fossil fuel sources to renewable energy.

In late August 2020, Maryland utility regulators approved a plan to build offshore wind turbines up to 800 feet tall — about 200 feet taller than originally proposed.

Deploying Market-Based Solutions

Eleven USCA members participate in carbon markets. USCA members continue to participate in market-based climate programs, which incentivize cost-effective emissions reductions by setting prices or caps on carbon pollution.

USCA members with a 100% zero carbon or carbon neutral electricity goal include—California, Colorado, Connecticut, Hawaii, Maine, Minnesota, Montana, Nevada, New Mexico, New Jersey, New York, North Carolina, Puerto Rico, Rhode Island, Virginia, Washington, and Wisconsin.

USCA members participating in the Regional Greenhouse Gas Initiative (RGGI) include Connecticut, Delaware, Maine, Maryland, Massachusetts, New Jersey, New York, Rhode Island, and Vermont.

Increasing Building Energy Efficiency

Eleven USCA members have adopted energy and/or water appliance efficiency standards on top of existing federal efficiency standards, with seven of those members putting new standards in place since 2018. Globally, building construction and operation are responsible for 36% of energy use and 39% of energy-related GHG emissions.

Deploying Cleaner and More Efficient Vehicles on Our Roads

Seventeen USCA members have adopted, or are in the process of adopting, low emission vehicle standards for light-duty vehicles. Over the past three years, USCA members have continued to push forward ambitious vehicle emissions standards and accelerate the adoption of clean fuels and vehicles in order to tackle the largest source of GHG emissions.

Addressing Short-Lived Climate Pollutants

Sixteen USCA members have initiated rulemaking processes or passed legislation to phase down or out the use of hydrofluorocarbons (HFCs) consistent with previously enacted national standards. Short-lived climate pollutants (SLCPs)—including methane, HFCs, and black carbon—are harmful air pollutants and potent climate forcers with a much shorter atmospheric lifespan than carbon dioxide (CO₂).

In July 2020, Maryland finalized regulations to reduce fugitive methane emissions from both new and existing facilities, as well as requirements for leak detection, repair, and reporting.

Creating More Resilient Communities

Twenty USCA members have climate adaptation or resilience plans currently in progress for developing a plan. High global temperatures and large-scale natural disasters marked the decade between 2010 and 2019. These disasters have led to USCA members calling for increased support and investments from the federal government and elsewhere to brace for future disasters.

Protecting and Enhancing Our Natural and Working Lands

Seven USCA members have specific Healthy Soils policies or programs in place to increase adoption of conservation practices on agricultural lands, including farms and ranches. Every USCA member is producing a Statewide Forest Resource Assessment and Strategy that identifies strategies and resource needs for maintaining forest resilience in a changing climate.

Maryland has built upon its work on the Natural and Working Lands Challenge and made significant progress on incorporating agricultural soil carbon into the 2023 GHG inventory. Maryland is relying on the best available science to support a full ongoing assessment of our natural carbon sinks. Achieving this task may require additional engagement with expert scientists, like those supporting efforts of the USCA.

Maryland's Role

Maryland continues to encourage all participating USCA members to adopt cleaner air standards and GHG goals as strong and aggressive as Maryland's. In addition, Maryland has found the USCA's coordination helpful and encouraging as we advance actions and partnerships in our own state.

Maryland's 2030 Greenhouse Gas Emissions Reduction Act (GGRA) Plan

Maryland continues to lead the nation through the implementation of the GGRA of 2016, which requires the state to achieve a minimum of a 40% reduction in statewide GHG emissions from 2006 levels by 2030. The goals in the GGRA of 2016 are consistent with the United States' international commitment under the Paris Agreement to reduce emissions by 26-28% by 2025. Through the associated *2030 GGRA Plan*, Maryland shares invaluable insight with other USCA members into how to incorporate climate policies that simultaneously benefit both the environment and the economy.

The Maryland Commission on Climate Change

Maryland has been at the forefront of states taking action to address the consequences of climate change through the bipartisan efforts of the Maryland Commission on Climate Change (MCCC). The MCCC is an independent statutory body established under executive order (01.012007.07) charged with developing an action plan and firm timetable for mitigating and adapting to the impacts of climate change in Maryland. As a result of the work of more than 100 stakeholders and experts, the MCCC produced a climate action plan, which was the catalyst for the GGRA of 2009. The independent Commission serves as an excellent example to the other USCA members on how states can rely upon the latest and most widely accepted science to guide their evaluations and recommendations, while developing action plans and timetables for mitigation and adaptation to the likely consequences and impacts of climate change in their states.

RGGI

RGGI is a collaborative program among 11 Eastern states to reduce CO₂ emissions from power plants through a regional cap-and-invest program. These states adopted market-based CO₂ cap-and-invest programs designed to reduce emissions of CO₂, from fossil fuel-fired electricity generators with a nameplate capacity of 25 megawatts or greater. Thanks to its success, Maryland's participation in RGGI provides a real-world example of the benefits of cap-and-invest programs and both encourages and provides valuable insight to the other USCA members to take the necessary steps to develop and participate in similar programs.

Environmental and Climate Justice

EJ is an ethical mandate that seeks equal protection from environmental and public health hazards for all people regardless of race, income, culture, and social class. Additionally, EJ means that no group of people, including racial, ethnic, or socioeconomic groups should bear a disproportionate share of the negative environmental consequences resulting from industrial, land-use planning and zoning, municipal and commercial operations or the execution of federal, state, local and municipal programs and policies. As Maryland takes an increased focus on EJ, other USCA members have also begun to incorporate the principles of EJ into their climate efforts.

Adaptation and Resiliency

Adaptation refers to action to prepare for and adjust to new conditions, thereby reducing harm or taking advantage of new opportunities. Climate change adaptation is an extremely complex process with no single means of response. Maryland recognizes the need to include robust adaptation and resiliency efforts alongside the aggressive GHG mitigation measures put in place to effectively address and protect the state from climate change impacts. Maryland's efforts have shown the other USCA members that these actions are increasingly dependent on one another, and any program or policy to mitigate the effects of climate change will complement steps to reduce the state's risk to those impacts.

Getting to Net Zero

The GGRA of 2016 requires that the *2030 GGRA Plan* be developed in recognition of the need for developed nations to reduce GHG emissions between 80% and 95% from 1990 levels by 2050. The *2030 GGRA Plan* provides a strong foundation on which to reduce GHG emissions within Maryland far into the future. The analysis in the *2030 GGRA Plan* includes several additional "what if" scenarios to estimate the future impact of various climate policies that extend beyond the 2030 goal of the GGRA of 2016, including a scenario that achieves an 80% reduction in GHG emissions by 2050. That analysis identified several potential measures and technologies that the state could deploy after 2030 to achieve deeper reductions by 2045 and 2050, and serves as a useful example to the other USCA members on how to approach the same goal.

1 - USCA

The USCA is a bipartisan coalition of governors committed to transitioning to a clean energy economy and advancing the goals of the Paris Agreement — “to strengthen the global response to the threat of climate change by keeping a global temperature rise this century well below 2 degrees Celsius above pre-industrial levels and to pursue efforts to limit the temperature increase even further to 1.5 degrees Celsius.” Representing most of the United States population and gross domestic product (GDP), the 25 USCA members (Figure 1-1) are working together to adopt and implement ambitious climate policies that decrease GHG emissions, deploy clean power and fuels, enhance natural carbon sequestration, increase resilience to climate impacts, and improve our communities’ economic and health outcomes.

1.1 - Principles and Commitments

USCA members recognize that climate change presents a serious threat to the environment and our residents, communities, and economy. State-level climate action is benefiting our nation, and USCA members are growing our clean energy economies and creating new jobs, while reducing air pollution, improving public health, and building more resilient communities. Despite the federal government’s decision to withdraw from the Paris Agreement in November 2020, USCA members remained committed to supporting the international agreement, and pursued aggressive climate action to make progress toward its goals.

USCA members hold firm in their commitment to provide the climate leadership the country needs to achieve the goals of the Paris Agreement and keep temperature increases below 1.5 degrees Celsius and support the federal government’s decision to rejoin the Paris Agreement in 2021. Throughout the past years, USCA members have fought the deregulation of federal environmental safeguards and adopted innovative climate policies across all sectors. These policies and programs provide a strong foundation to make their communities cleaner and more resilient.

Each USCA member commits to:

1. Implement policies that advance the goals of the Paris Agreement, aiming to reduce GHG emissions by at least 26-28% below 2005 levels by 2025.
2. Track and report progress to the global community in appropriate settings, including when the world convenes to take stock of the Paris Agreement, and
3. Accelerate new and existing policies to reduce carbon pollution and promote clean energy deployment at state and federal levels.

2 - USCA Progress

Even with an unprecedented level of uncertainty due to COVID-19, USCA members are confident that the policies and programs that have been put into place over the past three years will reduce GHG emissions while growing our economies and providing a strong foundation for a robust and more resilient recovery across our communities.

According to the latest data, USCA members reduced their collective emissions by an estimated 14% between 2005 and 2018, with preliminary estimates showing further declines in 2019 (17% below 2005 levels). We expect deeper emissions cuts in 2020 as the response to COVID-19 resulted in commerce and travel restrictions; forecasts estimate a 12% drop nationally in 2020 alone.

USCA member experience prior to pandemic demonstrates that climate goals can be achieved while growing our economy. Between 2005 and 2018, USCA members achieved far greater emissions reductions than the rest of the country while continuing to grow our collective economy. Additionally, forthcoming analysis suggests that USCA members' clean energy policies promoted the creation of more than 133,000 jobs between 2016 and 2019, the majority of which pay higher-than-average wages for similar job types and create stable pathways to employment for people with varying academic backgrounds.

Over the past several years, USCA member leadership has paved the way for cities and businesses to push forward their own ambitious clean energy and climate actions. For example, Hawaii became the first state to commit to a 100% clean energy future in 2015. Since then, 15 other USCA members, 166 cities and towns, 13 counties, 9 large utilities, and 73 companies have made similar commitments to 100% carbon-free electricity. As a result, nearly one in three Americans now lives in a community that will be served by clean electricity by or before 2050.

The actions we have taken to address climate change and move toward a clean energy economy have also helped create healthier and more prosperous communities—even more critical as we respond to COVID-19. For example, compared to the rest of the country, USCA members have significantly lower levels of harmful air pollutants. This is due in large part to policies we have put in place, such as cleaner and more efficient electricity and transportation systems that avoid harmful air pollutants, like particulate matter and nitrogen oxides. The same can be said for enhanced environmental protections for oil and gas extraction that several USCA members have put into place. At-risk populations exposed to these pollutants are more susceptible to chronic illness and respiratory diseases like asthma and heart disease, and preliminary evidence suggests that long-term exposure to air pollution has led to higher death rates from COVID-19.

Minority communities have historically faced a disproportionate burden of climate impacts and fossil fuel pollution. While transitioning to a low carbon economy with thoughtful policy can help to alleviate some of these injustices, this shift can also impact the economic vitality of communities across the country that are dependent on jobs and tax revenue from fossil fuel industries. Understanding the significant work that is needed to overcome these tensions, the USCA launched the “Just Transition Working Group” (JTWG) in January 2020 to collaborate on effective strategies that advance a clean energy transition while supporting impacted workers and communities.

USCA members recognize that the transition to a clean energy economy carries impacts that can be disruptive, particularly to communities that rely on traditional fossil fuels for jobs and tax revenue. Addressing the challenges brought by this disruption, along with deeper systemic inequalities, will enable the advancement of a resource

transition that allows for environmental protection and economic growth, equitable distribution of costs and benefits, and enhanced community vitality. To achieve this, states must incorporate input from invested and impacted parties, tackle difficult discussions, and confront our own biases.

The JTWG goal is to help shape policies that reform economic systems and labor markets to support prosperous and resilient communities focused on the needs of the people who live there. The JTWG will highlight work that states are doing, share best practices, and provide technical assistance to better integrate principles of just transition. In addition, the group will work to integrate EJ, and racial equity across all USCA workstreams. We also recognize that just transitions go beyond merely fossil fuels, and the USCA seeks to frame its efforts in terms of how broader forces might impact other sectors of the economy, such as agriculture and transportation.

In JTWG's first year we have developed guiding principles that align with our understanding of impacted community needs. Additionally, we have begun to compile tools and best practices that states can tailor to inform their decision-making processes; and identify opportunities for collaboration with other working groups. In 2021 we will embark on comprehensive diversity, equity, and inclusion training for state officials; develop a multi-state framework for cooperation; and work to provide state-specific technical resources to help states better address transition issues and integrate solutions into broader climate and energy policies.

Even with an unprecedented level of uncertainty due to the COVID-19 pandemic, we are confident that the policies and programs that USCA members have put into place over the years will reduce emissions while growing our economies, giving us a strong foundation for a robust and more resilient recovery for all our communities.

The following sections describing the USCA's initiatives and accomplishments borrow heavily from the *USCA 2020 Annual Report: Leading the Charge: Working Together to Build an Equitable, Clean, and Prosperous Future*.

2.1 - Adopting Strengthened GHG Targets and Advancing Climate Governance

USCA members commit to reducing their GHG emissions to at least 26% below 2005 levels by 2025—consistent with the United States commitment under the Paris Agreement. Several members have recently revised and strengthened their goals in response to the latest climate science. Earlier this year, both Oregon and Washington updated their state GHG targets to set more ambitious targets. On Earth Day, Massachusetts established net-zero GHGs by 2050 as the legal emissions limit. Eight USCA members now have carbon-neutrality goals in place.

The USCA members know that there are significant actions needed to reduce GHG emissions. For this reason, the 25 participating governors committed to accelerating climate action in 2019 that was based on collaborative and consistent efforts across the USCA members. Given the urgency of the climate challenge—and the economic and public health benefits states and territories can gain by acting—USCA 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, USCA members have worked together to mobilize their collective market power and push back against federal government rollbacks of climate change and clean energy policies that aim to improve air quality and lower consumer energy bills.

States are continuing to lead on climate change: USCA members recognize that climate change presents a serious threat to the environment and our residents, communities, and economy. State-level climate action is benefiting our economies and strengthening our communities: USCA 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: USCA members are committed to supporting the international agreement, and are pursuing aggressive climate action to make progress toward its goals.

Maryland continues to encourage all participating USCA members to adopt cleaner air standards and GHG goals as strong and aggressive as Maryland’s. In addition, Maryland has found the USCA’s coordination helpful and encouraging as we advance actions and partnerships in our own state.

2.2 – Adopting New or Strengthened GHG Targets

Now more than ever, USCA members hold firm in our commitment to provide the climate leadership our country needs. Over the year, USCA members have pushed back against the deregulation of federal environmental safeguards and adopted innovative climate policies across all sectors. These policies and programs provide a strong foundation to make our communities cleaner and more resilient.

Prior to COVID-19’s impact across all regions and sectors, USCA members have spent years proving that achieving emissions reductions and adapting to a changing climate can be achieved while growing our economies. Between 2005 and 2018, USCA members collectively outpaced the rest of the country in both emissions reductions and economic output, with an estimated 14% decrease in emissions and a 16% increase in per-capita economic output (Figure 2-1), while preliminary estimates show further declines in GHG emissions in 2019. Additionally, it is important to note that these numbers do not consider the cost of inaction in addressing climate change.

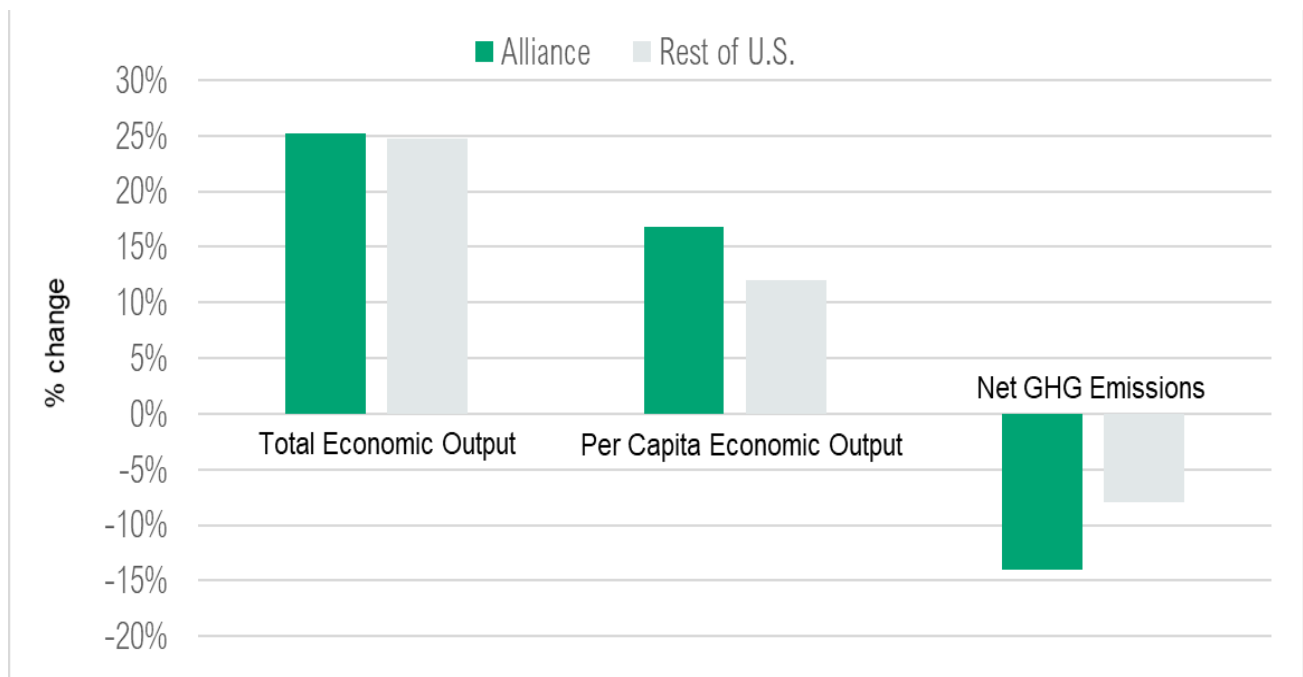


Figure 2-1. Change in Net GHG Emissions and Economic Output, 2005-2018.

SOURCE: Emissions data – Rhodium Group Climate Service; GDP data - U.S. Bureau of Economic Analysis; Population data - U.S. Census Bureau

When looking across the USCA, members are:

1. Increasing ambition: Setting ambitious near-term GHG emissions reduction targets and advancing climate governance within each of our states and territories;
2. Addressing equity and inclusion: Incorporating principles of a just and equitable transition to a clean energy economy into the foundation of our climate actions;
3. Expanding energy efficiency: Increasing building energy efficiency through codes, performance standards, and appliance efficiency standards;
4. Decarbonizing power generation and distribution: Cleaning and modernizing our power grids;
5. Advancing clean transportation: Deploying more efficient and zero-emission vehicles and developing markets for cleaner fuels;
6. Adopting market-based solutions: Joining, developing, and operating carbon markets such as RGGI;
7. Reducing short-lived climate pollutants: Adopting regulations to address potent GHGs like methane and HFCs;
8. Building resilience: Preparing for the effects of climate change and increasing communities' ability to confront these effects, especially vulnerable communities;
9. Enhancing natural and working lands: Protecting and improving our farmlands, forests, wetlands, grasslands, and other land types' ability to sequester carbon and become more resilient to a changing climate; and
10. Fostering innovation: Developing cutting edge policies and programs to combat the climate crisis, including catalyzing private investment to support state climate goals.

Underpinning many of these actions has been the drive to protect community health, promote workforce development, and expand the opportunities for education, job training, and employment for disenfranchised communities.

2.3 – A Robust and Resilient Recovery

USCA members are committed to rebuilding our economies in ways that prioritize addressing climate change, health, equity, and resilience. However, states have had to move forward without federal leadership. We therefore have provided recommendations to Congressional leadership to help us with these efforts, including the need for immediate, flexible federal aid for states and territories to enable our governors to preserve core government services. As we look toward a strong recovery, states also will need resources to strengthen and modernize our infrastructure in ways that build resiliency and reduce GHG emissions. Nature-based solutions should be used where possible and are designed to reduce physical risk from extreme events while maximizing carbon removal and storage potential. Public funds and incentives should be used to mobilize private investment and create public-private partnerships, such as green banks, tax credits, and government bond offerings.

2.4 – Recommendations for National Climate Action

Recovery from COVID-19 presents the United States with a unique opportunity to tackle climate change in a way that catalyzes an equitable, clean, and prosperous economy. Drawing from our experience developing and implementing climate policy, the USCA offers five recommendations that the federal government should integrate when developing future climate and recovery policy:

1. Ensure climate and energy policy goals are aligned with science;
2. Include equity, environmental justice, and family-sustaining jobs at the core of climate and recovery policy;

3. Utilize members' experience and knowledge to collaborate in developing national policy frameworks;
4. Support state and territory-level climate change leadership as they respond to and recover from COVID-19; and
5. Protect members' ambition to go beyond federal standards to formulate and implement policy within their own borders and in coordination with other states and territories.

With or without federal support, USCA members will continue to demonstrate bold climate action. Over the past three years we have built our capacity, both within our own states and territories as well as across this bipartisan coalition, to aggressively address the climate crisis despite federal rollbacks. We worked together to develop consistent and nation-leading policy frameworks for our members, while increasing our engagement with Congress and international leaders.

USCA members are committed to leveraging our experiences, working with our communities, and partnering with the federal government to help our states and territories rebound in a stronger, more resilient, and more equitable way—all while tackling the ever-growing climate crisis. According to the latest data, USCA members reduced our collective GHG emissions by an estimated 14% between 2005 and 2018, with preliminary estimates showing further declines in 2019 (17% below 2005 levels). We expect deeper GHG emissions cuts in 2020 as the response to COVID-19; forecasts estimate a 12% drop nationally between 2019 and 2020 alone. Our experience prior to this current crisis demonstrates that we can achieve climate goals while growing our economy. Between 2005 and 2018, we achieved far greater GHG emissions reductions than the rest of the country while continuing to grow our collective economy. For essentially equal total economic output, USCA members achieved double the GHG emissions reductions. Additionally, forthcoming analysis suggests that USCA members' clean energy policies promoted the creation of more than 133,000 jobs between 2016 and 2019, many of which pay higher-than-average wages for similar job types and create stable pathways to employment for people with varying academic backgrounds.

Over the past several years, USCA member states have paved the way for cities and businesses to push forward their own ambitious clean energy and climate actions. For example, in 2015 Hawaii became the first state to commit to a 100% clean energy future. As of early September 2020, 15 other USCA members, 166 cities and towns, 13 counties, nine large utilities and 73 companies have made similar commitments to 100% carbon-free electricity. As a result, nearly one in three Americans now lives in a community that will be served by clean electricity by or before 2050, and this number continues to grow. The actions USCA has taken to address climate change and move toward a clean energy economy has also helped create healthier and more prosperous communities—even more critical as we respond to COVID-19. For example, compared to the rest of the country, USCA members have significantly lower levels of harmful air pollutants (Figure 2-2). This is due in large part to policies we have put in place, such as cleaner and more efficient electricity and transportation systems that avoid harmful air pollutants such as particulate matter and nitrogen oxides. The same can be said for enhanced health, safety, and environmental protections for oil and gas extraction that several USCA members have put into place. At-risk populations exposed to air pollutants are more susceptible to chronic illness and respiratory diseases like asthma and heart disease, and preliminary evidence suggests that long-term exposure to air pollution has led to higher death rates from COVID-19.

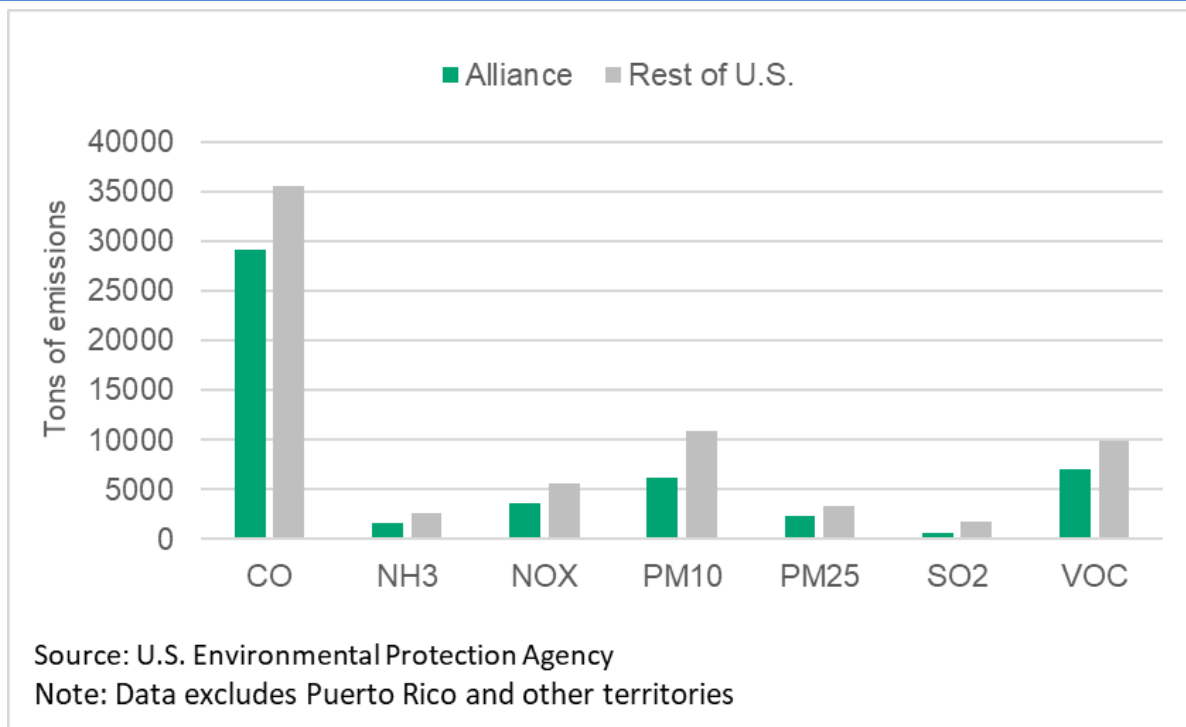


Figure 2-2. USCA members have lower levels of criteria air pollutants than the rest of the country (2018).

2.5 – Leading the Charge

States have been at the forefront, addressing climate change and developing innovative policies and programs that promote clean energy, lowering emissions in our transportation, buildings, and industrial sectors, and making our communities more resilient. In the absence of federal leadership, USCA members have stepped up over the past three years in service of our national GHG emissions reduction goal. To achieve this goal, USCA members have worked together to develop consistent climate policy frameworks and issue challenges that aim to spur additional action across a range of sectors. These include:

1. **Fulfilling the Short-Lived Climate Pollutant Challenge:** The USCA issued the #SLCPChallenge in June 2018 ahead of the Global Climate Action Summit.¹ Since then, more than half of USCA members have adopted regulations and/or enacted legislation that comprehensively addresses SLCP emissions; and states have implemented innovative technologies that quickly identify “super emitters.”
2. **Taking on the Natural and Working Lands (NWL) Challenge:** In August 2018, the USCA issued the #NWLChallenge, which seeks to identify and address obstacles to integrating NWL into state GHG mitigation plans. USCA members have made significant progress over the past two years, particularly with regards to overcoming data, modeling, and other barriers to GHG mitigation planning and policy integration, and identifying best practices to reduce GHG emissions and increase resilient carbon sequestration.²
3. **Working together to deploy cleaner vehicles:** In July 2019, 24 USCA governors issued the Nation’s Clean Car Promise, which reemphasizes these states’ commitment to calling for one strong, national clean car

¹ U.S. Climate Alliance, “SLCP Challenge,” <https://www.usclimatealliance.org/slcpcchallenge>

² U.S. Climate Alliance, “NWL Challenge,” <https://www.usclimatealliance.org/nwlchallenge>

standard and preserving state authority to protect residents from vehicle pollution.³ In July 2020, 15 states and the District of Columbia announced a joint Memorandum of Understanding (MOU) committing to work collaboratively to advance and accelerate the market for electric medium- and heavy-duty vehicles.⁴

Through our Energy Efficiency Working Group, USCA members have been working together to develop and adopt consistent standards to ensure that our residents and businesses have access to the most efficient appliances and equipment available. We are now issuing the Appliance Efficiency Challenge to accelerate this effort.

At the same time, we have increasingly engaged with international leaders at key climate events like the Global Climate Action Summit in 2018, the United Nations Climate Action Summit in 2019, and several Conference of the Parties — the United Nations’ annual climate change conference. At these events, we have shared our experiences and explored opportunities to enhance ambition globally. We have also joined forces with Canada and Mexico through the North American Climate Leadership Dialogue to accelerate climate policy efforts across North America.⁵

Furthermore, we are increasing our engagement with Congress to build on our state leadership and rebuild a cleaner and stronger U.S. economy. In addition to our recommendations to Congressional leadership for achieving a resilient and equitable recovery,⁶ we have shared best practices and lessons learned from our experiences enacting bipartisan climate solutions in early 2020.⁷

We continue to welcome the opportunity to partner with the federal administration to build a strong national framework to address the climate crisis. Our communities, businesses, and especially our future generations deserve to have access to clean and affordable energy, family-sustaining jobs, and a healthy planet. This is why we will continue to urge the federal government to take bold, science-based climate action, and against any effort to roll back existing protections.

We will also work collaboratively, as an USCA, to continue to pursue new and innovative climate and clean energy actions. We encourage more states to join us as we look to make investments that strengthen our power grid, reduce and decarbonize the energy used in our buildings, transition to low carbon transportation, and expand nature-based solutions designed to reduce physical risk from extreme events while maximizing the potential for carbon removal and storage. At the same time, we will work to increase access to quality jobs, government services, education, and training to help transition communities to a low-carbon future.

USCA members have proven that climate leadership and economic growth go hand-in-hand. We know a just transition to a clean and sustainable economy is desperately needed and that this transition will strengthen our communities. We will continue to lead the charge by implementing bold and meaningful climate change policies

³ U.S. Climate Alliance, “U.S. Climate Alliance Governors Issue the ‘Nation’s Clean Car Promise,’” July 9, 2019, <http://www.usclimatealliance.org/publications/cleancarsstatement#:~:text=Strong%20vehicle%20standards%20protect%20our,%E2%80%9CNation's%20Clean%20Car%20Promise.%E2%80%9D>

⁴ Northeast States for Coordinated Air Use Management, “15 States and the District of Columbia Join Forces to Accelerate Bus and Truck Electrification,” July 14, 2020, <https://www.nescaum.org/documents/multistate-truck-zev-mou-media-release-20200714.pdf/>.

⁵ U.S. Climate Alliance, “International Cooperation,” <https://www.usclimatealliance.org/international-cooperation>.

⁶ U.S. Climate Alliance, “U.S. Climate Alliance Stimulus Recommendations,” July 21, 2020, <https://static1.squarespace.com/static/5a4cfbfe18b27d4da21c9361/t/5f1746b40b48fc33c12a0953/1595360950196/USCA+Stimulus+Letter.pdf>

⁷ U.S. Climate Alliance, “U.S. Climate Alliance Response to the House Select Committee on the Climate Crisis Request for Information,” February 2020, https://static1.squarespace.com/static/5a4cfbfe18b27d4da21c9361/t/5e5031f81e73460ae842c071/1582313977088/USCA+Reponse_SCCC_FINAL.pdf

that will help build an equitable, clean, and prosperous future – laying a climate leadership roadmap for our federal government to mobilize the entire country.

2.6 - Ensuring a Just and Equitable Transition

USCA members already are deploying exemplary programs to elevate disenfranchised voices, generate new jobs in the low carbon economy, and ensure a just and equitable transition for all our communities.

Maryland is enhancing its CEJSC, a diverse body analyzing the effectiveness of state and local government laws and policies to address issues of EJ and sustainable communities. Maryland also recognizes the negative impact of climate change and the sometimes-difficult transition from fossil fuel-based economies on rural communities. Several USCA members have included workforce and community development and EJ stipulations into their recent clean energy commitments.

2.7 - Cleaning and Modernizing Our Power Grids

Seventeen USCA members now have 100% zero carbon or carbon neutral electricity targets through statute or Executive order.⁸ Over the past year, USCA members have continued to decarbonize our electricity sector. These efforts have received renewed attention due to the important public health co-benefits associated with transitioning away from fossil fuel sources to renewable energy.

Strong policy mandates are leading to increased deployment of renewable energy sources for USCA members including solar, wind, and battery energy storage.

In late August 2020, Maryland utility regulators approved a plan to build offshore wind turbines up to 800 feet tall — about 200 feet taller than originally proposed.

2.8 - Deploying Market-Based Solutions

Currently, eleven USCA members participate in carbon markets. USCA members continue to participate in market-based climate programs, which incentivize cost-effective emissions reductions by setting prices or caps on carbon pollution. In January 2020, New Jersey officially re-joined RGGI, a cap-and-trade program that is reducing power sector GHG emissions across ten northeastern and mid-Atlantic states.⁹ Since then, New Jersey released a strategic funding plan for its RGGI auction proceeds, directing approximately \$80 million per year toward clean transportation projects, coastal ecosystem enhancement, forest restoration, and the creation of a New Jersey Green Bank. Both the transportation projects and Green Bank will heavily focus on improving outcomes for EJ communities.

USCA members with a 100% zero carbon or carbon neutral electricity goal include—California, Colorado, Connecticut, Hawaii, Maine, Minnesota, Montana, Nevada, New Mexico, New Jersey, New York, North Carolina, Puerto Rico, Rhode Island, Virginia, Washington, and Wisconsin.

USCA members participating in RGGI: Connecticut, Delaware, Maine, Maryland, Massachusetts, New Jersey, New York, Rhode Island, and Vermont.

⁸ Alliance states with a 100 percent zero carbon or carbon neutral electricity goal include—California, Colorado, Connecticut, Hawaii, Maine, Minnesota, Montana, Nevada, New Mexico, New Jersey, New York, North Carolina, Puerto Rico, Rhode Island, Virginia, Washington, and Wisconsin.

⁹ Alliance states participating in RGGI: Connecticut, Delaware, Maine, Maryland, Massachusetts, New Jersey, New York, Rhode Island, and Vermont.

RGGI will welcome its eleventh member, Virginia, in 2021. The first southern state to join the initiative, Virginia plans to direct its auction proceeds toward flood preparedness, coastal resilience, and energy efficiency programs, with more than 50% of proceeds dedicated to energy efficiency projects in low-income communities.¹⁰ Pennsylvania, currently in the midst of its rulemaking process, is working toward joining RGGI,¹¹ an action which, according to a preliminary analysis, would lead to a net increase in jobs, state GDP, and positive health outcomes due to reduced air pollution.¹² In fact, a recent study has found that by transitioning to cleaner electricity production, RGGI has greatly improved the health of children across the entire region, avoiding 500 asthma cases and 100 preterm births, accruing to avoided costs in the range of \$191 and \$350 million.¹³

On the other coast, California's cap-and-trade program covers 85% of California's economy wide GHG emissions and plays a pivotal role in helping the state reach its climate goals. Revenues from quarterly cap-and-trade auctions are deposited into the Greenhouse Gas Reduction Fund - which is appropriated to state agencies to operate programs that accelerate emissions reductions, particularly in disadvantaged and low-income communities. The program has generated \$12 billion in revenue over the past decade. Notably, about 60% of funds have directly benefited disadvantaged communities across the state.

2.9 - Increasing Building Energy Efficiency

Eleven USCA members have adopted energy and/or water appliance efficiency standards on top of existing federal efficiency standards, with seven of those members putting new standards in place since 2018. Globally, building construction and operation are responsible for 36% of energy use and 39% of energy-related GHG emissions.¹⁴ Reducing the amount of energy needed to power our buildings – and decarbonizing the source of that energy – are critically important steps to help us realize our shared climate goals and decrease consumer energy bills.

USCA members have continued to lead the way with ambitious energy efficiency and decarbonization policies and programs during the past year. To date, 11 USCA members¹⁵ have adopted energy and/or water appliance efficiency standards on top of existing federal efficiency standards.¹⁶ Collaborating to adopt substantially similar regulations across states and territories ensures consistency and supports industry standardization. USCA members are now coordinating on implementing those standards, to engage the market, raise awareness, and enforce compliance using similar methods and tools, thereby reducing resource needs on individual members and standardizing processes for industry.

Some USCA members also have begun efforts to promote load flexibility in buildings. In November 2019, California released its roadmap for an energy-efficient and low-carbon future for buildings, highlighting that buildings, which are both highly efficient and grid-interactive will facilitate better with the integration of distributed energy

¹⁰ State of Virginia: Governor Ralph S. Northam, "Virginia Becomes First Southern State to Join Regional Greenhouse Gas Initiative," July 8, 2020, <https://www.governor.virginia.gov/newsroom/all-releases/2020/july/headline-859128-en.html>.

¹¹ State of Pennsylvania: Governor Tom Wolf, "Governor Wolf Reaffirms Commitment to Combat Climate Change, Provides Update on RGGI Process," June 22, 2020, <https://www.governor.pa.gov/newsroom/governor-wolf-reaffirms-commitment-to-combat-climate-change-provides-update-on-rggi-process/>.

¹² Pennsylvania Department of Environmental Protection, "Capping Carbon Pollution Would Save Hundreds of Lives and Billions of Dollars," July 8, 2020, <https://www.ahs.dep.pa.gov/NewsRoomPublic/articleviewer.aspx?id=21833&typeid=1>.

¹³ Frederica Perera, David Cooley, Alique Berberian, David Mills, and Patrick Kinney, July 2020, "Co-Benefits to Children's Health of the U.S. Regional Greenhouse Gas Initiative," Environmental Health Perspectives, Vol. 128: No. 7, <https://ehp.niehs.nih.gov/doi/10.1289/EHP6706>.

¹⁴ UN Environment, "Global Status Report for Buildings and Construction Sector," December 11, 2019, <https://www.unenvironment.org/resources/publication/2019-global-status-report-buildings-and-construction-sector>.

¹⁵ States that have adopted energy and/or water appliance efficiency standards include—California, Colorado, Connecticut, Hawaii, Maryland, Nevada, New York, Oregon, Rhode Island, and Vermont

¹⁶ Appliance Standards Awareness Project, "State Adoption of Energy Efficiency Standards." <https://appliance-standards.org/states>.

resources and demand-side services, as well as enable energy usage management that minimizes the grid's cost drivers and carbon content.¹⁷ California currently is updating its Load Management Standards to promote a flexible demand electricity market and scoping new statutory authority to create appliance regulations that standardize demand response capabilities.¹⁸

USCA members also have adopted ambitious standards and codes within their states and territories. In April 2020, Virginia's first energy efficiency resource standards (EERS) went into effect, which includes the creation of a new program designed with input from affected stakeholders and intended to reduce the energy burden for low-income customers.

In June 2020, the New Jersey Board of Public Utilities adopted one of the most stringent EERS in the country for both electric and gas utilities.¹⁹ Building off input received from stakeholders, the Board also included requirements to increase access and language services, vocational training and local workforce development, and supplier diversity considerations. That same month Delaware updated its building energy codes to become one of the first states to adopt the 2018 IECC and the ASHRAE 90. Energy Standard for Buildings Except Low Rise Residential Buildings, without amendment. The state's leadership in their building energy code will enhance energy efficiency requirements for air sealing, insulation, HVAC, windows, and lighting.²⁰ In August 2020, New Mexico updated its residential and commercial building codes to IECC 2018 standards, a significant improvement over the IECC 2009 codes previously in place. Several USCA members also participated in the 2021 IECC model energy code development process, which resulted in historic energy efficiency improvements more than 10% relative to the previous IECC.²¹

Focusing efforts on energy efficiency and decarbonization in the built environment have myriad economic and health benefits. Investing in energy efficiency creates nearly three times more jobs per dollar than investing in the fossil fuel sector.²² These policies also save consumers money as appliance standards alone save households an estimated \$500 per year on their utility bills, which if adopted nationwide would add up to \$1.9 trillion in total savings by 2035.²³ This is particularly important for low-income households, which face an energy burden (the portion of income spent on utility bills) that is three times higher than others. The U.S. Department of Energy estimates that cost-effective energy efficiency measures could save low-income households between 13 and 31% of their energy bills.²⁴ Eliminating indoor gas combustion by electrifying homes can significantly improve indoor air quality and reduce asthma triggers, particularly relevant considerations during the current global pandemic.

¹⁷ Michael Kenney, Heather Bird, and Heriberto Rosales, "California Energy Efficiency Action Plan," California Energy Commission. Publication Number: CEC400-2019-010-SF, [https://www2.energy.ca.gov/business_meetings/2019_packets/2019-12-11/Item_06_2019%20California%20Energy%20Efficiency%20Action%20Plan%20\(19-IEPR-06\).pdf](https://www2.energy.ca.gov/business_meetings/2019_packets/2019-12-11/Item_06_2019%20California%20Energy%20Efficiency%20Action%20Plan%20(19-IEPR-06).pdf).

¹⁸ California Energy Commission, "2020 Load Management Rulemaking," Docket #19-OIR-01, <https://www.energy.ca.gov/proceedings/energy-commission-proceedings/2020-load-management-rulemaking>.

¹⁹ State of New Jersey Board of Public Utilities, "NJBPB Approves Comprehensive Energy Efficiency Program," June 10, 2020, <https://www.nj.gov/bpu/newsroom/2020/approved/20200610.html>.

²⁰ State of Delaware, Department of Natural Resources and Environmental Control, "Delaware Building Energy Codes Receive Update," June 11, 2020, <https://news.delaware.gov/2020/06/11/building-energy-codes-receive-update/>.

²¹ Lauren Urbanek, "The 2021 Energy Code Is Final—and More Efficient than Ever," Natural Resources Defense Council, April 9, 2020, <https://www.nrdc.org/experts/lauren-urbanek/2021-energy-code-final-and-more-efficient-ever>.

²² Heidi Garret-Peltier, "Green versus brown: Comparing the employment impacts of energy efficiency, renewable energy, and fossil fuels using an input-output model," Economic Modelling, Volume 61, February 2017, 439-447, <https://www.sciencedirect.com/science/article/abs/pii/S026499931630709X#!>.

²³ Appliance Standards Awareness Project, "Appliance Standards Rank as #2 Energy-Saving Tool in US," 2020, <https://appliance-standards.org/image/appliance-standards-rank-2-energy-saving-tool-us>.

²⁴ US Department of Energy, Office of Energy Efficiency and Renewable Energy "Low-Income Household Energy Burden Varies Among States — Efficiency Can Help In All of Them," December 2018,

2.10 - Deploying Cleaner and More Efficient Vehicles on Our Roads

Seventeen USCA members have adopted, or are in the process of adopting, low emission vehicle standards for light-duty vehicles. Over the past year, USCA members have continued to push forward ambitious vehicle emissions standards and accelerate the adoption of clean fuels and vehicles in order to tackle the largest source of GHG emissions. In March 2020, Oregon said it more than doubled the goal of its clean fuels program. As a result, the state expects climate pollution from cars and trucks to be reduced 20% by 2030 and 25% by 2035, making it the most ambitious clean fuels standard in the country.²⁵

In June 2020, Nevada became the latest USCA state to launch a rulemaking process to adopt low-emission vehicle (LEV) and zero-emission vehicle (ZEV) standards for light-duty vehicles.²⁶ In March 2020, Washington became the twelfth ZEV state. Altogether, these 12 USCA members comprise approximately 66% of national electric vehicle (EV) sales since 2010²⁷ and nearly 32% of national automobile sales.²⁸ Seventeen USCA members have now adopted, or are in the process of adopting, California's LEV standards and 14 states have now adopted, or are in the process of adopting, ZEV regulations.²⁹ Additionally, California and 22 USCA members are challenging the federal administration's revocation of California's waiver to set stiffer vehicle tailpipe emissions rules.³⁰

Looking beyond passenger vehicles, California announced its Advanced Clean Trucks regulation, the world's first zero-emission truck standard to address diesel pollution.³¹ According to the California Air Resources Board, the rule could prevent 17.9 million metric tons of CO₂ and 58,000 tons of nitrogen oxides from entering the atmosphere through 2040 and result in \$5.9 billion in savings and the net creation of roughly 7,500 jobs.³² In July, 15 USCA members and the District of Columbia announced a joint MOU to collaborate on the creation of a self-sustaining zero emission medium and heavy-duty vehicle (MHDV) market.³³ This includes developing a multi-state action plan, striving to make 30% of all sales of MHDVs zero emission by 2030 and 100% by 2050, and accelerating deployment of MHDV ZEVs in disadvantaged communities. Electrifying MHDVs is important not only for reducing GHG emissions (as trucks and buses account for a quarter of sector's emissions), but also for improving air quality and health outcomes.

USCA members also are addressing diesel pollution with state and federal grants. Delaware, Maryland, North Carolina, Michigan, New York, New Jersey, New Mexico, Rhode Island, and Washington awarded millions of dollars

²⁵ State of Oregon Governor's Office, "Governor Kate Brown Takes Climate Action," March 10, 2020, <https://www.oregon.gov/newsroom/Pages/NewsDetail.aspx?newsid=36121>.

²⁶ Nevada Department of Conservation & Natural Resources, "Governor Sisolak announces "Clean Cars Nevada" initiative," Jun 22, 2020, <http://dcnr.nv.gov/news/governor-sisolak-announces-clean-cars-nevada-initiative-1>.

²⁷ Atlas EV Hub, "State EV Sales & Model Availability," <https://www.atlasevhub.com/materials/state-ev-sales-and-model-availability/>.

²⁸ U.S. Department of Transportation, Office of Highway Policy Information, "Highway Statistics 2018," December 2019, <https://www.fhwa.dot.gov/policyinformation/statistics/2018/>.

²⁹ States that adopted or are in the process of adopting California's ZEV standards include—Colorado, Connecticut, Maine, Maryland, Massachusetts, Minnesota, Nevada, New Jersey, New Mexico, New York, Oregon, Rhode Island, Vermont, and Washington. These same states, plus Delaware and Pennsylvania, have adopted, or are in the process of adopting, California's LEV standards.

³⁰ State of California Department of Justice, "Attorney General Becerra Files Lawsuit Challenging Trump Administration's Reckless Rollback of America's Clean Car Standards," May 27, 2020, <https://oag.ca.gov/news/press-releases/attorney-general-becerra-files-lawsuit-challenging-trump-administration%E2%80%99s-2>

³¹ California Air Resources Board, "California takes bold step to reduce truck pollution," June 25, 2020, <https://ww2.arb.ca.gov/news/california-takes-bold-step-reduce-truck-pollution>.

³² California Air Resources Board, "Proposed Advanced Clean Truck Regulation," June 25, 2020, <https://ww3.arb.ca.gov/board/books/2020/062520/20-6-3->

³³ States that joined the zero emissions MHDV MOU include—California, Colorado Connecticut, Hawaii, Maine, Maryland, Massachusetts, New Jersey, New York, North Carolina, Oregon, Pennsylvania, Rhode Island, Vermont, and Washington.

in Volkswagen settlement funds toward projects that will electrify school and transit buses, heavy freight equipment, and refueling infrastructure.

USCA members continue to provide state incentives to drive consumer adoption of ZEVs and expand charging infrastructure. In January 2020, New Jersey established a goal of putting 330,000 EVs on the road by 2025. To support these targets, the legislation created a \$300 million EV rebate program (providing up to \$5,000 per EV) and authorized utilities to provide customer incentives for in-home charger installation.³⁴ In July, New York approved the \$701 million “EV Make-Ready” Initiative, incentivizing utilities to invest in charging infrastructure through 2025. Nearly 30% of this funding is earmarked for EJ efforts and is now one of the largest state vehicle electrification efforts in the nation.³⁵ California’s Public Utilities Commission approved a \$437 million proposal by Southern California Edison to add 38,000 chargers to its 50,000 square-mile service area. The plan has an equity focus, with half of investments destined for disadvantaged communities and 30% in multi-family housing and is the largest utility buildout of charging infrastructure to date.³⁶ In addition, the Commission approved an electric rate for Pacific Gas & Electric’s electric vehicle commercial customers.³⁷

2.11 - Addressing Short-Lived Climate Pollutants

Sixteen USCA members have initiated rulemaking processes or passed legislation to phase down or out the use of HFCs consistent with previously enacted national standards. SLCPs, including methane, HFCs, and black carbon, are harmful air pollutants and potent climate forcers with a much shorter atmospheric lifespan than CO₂. For example, just one pound of HFC-134a warms the planet as much as 1,400 pounds of CO₂. Due to their potency and being short-lived, action against these pollutants can achieve significant climate benefits in the near-term. 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. However, many of these rules have been rescinded or delayed, leading to significant regulatory uncertainty affecting businesses and emissions in the United States. In response, the USCA released its SLCP Challenge to Action Roadmap in 2018, which outlines several actions states can take to reduce SLCPs to meet the goals of the Paris Agreement.³⁸

Prior to September 2018, California was the only state that regulated HFCs. Since then, 15 USCA members have initiated rulemaking processes, passed legislation, or are in the process of passing laws modeled after California’s rules and consistent with U.S. EPA’s 2015/2016 Significant New Alternatives Policy rules.³⁹ California is currently proceeding with stationary refrigeration and air conditioning rulemaking to advance the state’s mandatory HFC

³⁴ State of New Jersey Governor Phil Murphy, “Governor Murphy Signs Legislation Establishing Statewide Goals and Incentives for Increased Use of Electric Vehicles and Charging Infrastructure,” January 17, 2020, <https://www.nj.gov/governor/news/news/562020/20200117b.shtml>.

³⁵ New York Governor’s Office, “Governor Cuomo Announces Nation-Leading Initiatives to Expand Electric Vehicle Use to Combat Climate Change,” July 16, 2020, <https://www.governor.ny.gov/news/governor-cuomo-announces-nation-leading-initiatives-expand-electric-vehicle-use-combat-climate>.

³⁶ California Public Utilities Commission, “Decision Authorizing Southern California Edison Company’s Charge Ready 2 Infrastructure and Market Education Programs,” Proposed Decision, August 27, 2020,

³⁷ California Public Utilities Commission, “Decision Authorizing Southern California Edison Company’s Charge Ready 2 Infrastructure and Market Education Programs,” Proposed Decision, August 27, 2020, <https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M345/K702/345702701.PDF>.

³⁸ U.S. Climate Alliance, “From SLCP Challenge to Action: A Roadmap for Reducing Short-Lived Climate Pollutants to Meet the Goals of the Paris Agreement,” September 2018, <https://www.usclimatealliance.org/slcp-challenge-to-action>.

³⁹ States that have adopted or are in the process of adopting rules consistent EPA’s SNAP program include—California, New Jersey, Vermont, Virginia, and Washington (legislation); Colorado, Connecticut, Delaware, Maryland, Massachusetts, New York, Pennsylvania, and Rhode Island (regulations); Hawaii, Maine, and Oregon were in the process of adopting these rules when their legislature was suspended due to COVID-19.

reductions.⁴⁰ Proposed changes include new definitions for end-uses, prohibitions on high-Global Warming Potential (GWP) refrigerants for new stationary air conditioners and large stationary refrigeration systems, additional requirements for existing retail food facilities, and a variance provision. To help meet its statewide HFC goals, Delaware launched its “Cool Switch” program, which provides grants to small businesses that retrofit or purchase new low-GWP refrigerant systems.⁴¹

As more USCA members move to phase out HFCs, these regulations will apply to a larger share of the U.S. market and create opportunities for industry members to sell high-standard products throughout the country. Additionally, Congress currently is considering federal legislation to limit the use of HFCs nationwide. The USCA has submitted written testimony supporting a strong federal framework for an HFC phase down that complements and upholds state efforts while providing regulatory certainty for industry nationwide.⁴²

In July 2020, Maryland finalized regulations to reduce fugitive methane emissions from both new and existing facilities, as well as requirements for leak detection, repair, and reporting.

Members also are taking innovative approaches to better detect where methane leaks are occurring and prioritize investments to reduce emissions. In 2019, California used NASA technology via remote sensing and aerial flyovers to conduct an initial survey of large methane emitters. They found that 10% of the point sources emitted 60% of the methane detected.⁴³ The state is planning another round of airborne flight measurement in fall 2020 to further test the data platform prototype. This testing is expected to demonstrate the ability to translate data into methane emissions reduction as California moves toward the 2022 launch of a satellite platform that will provide persistent observations to identify methane point sources, with results being available within 24-48 hours; this is a key feature that allows for mitigation. Colorado also will participate in flyovers and will be coupling the aerial leak detection with on the ground outreach to operators.⁴⁴ New Mexico pledged \$5 million in Local Economic Development Act funding to Sceye Inc., to build a fleet of airships that can support New Mexico’s ozone attainment and climate change efforts by monitoring ozone levels and methane emissions.⁴⁵ New Mexico also has developed a methane tracking dashboard map and mobile application platform to display information on venting, flaring, and other emissions.⁴⁶ The USCA hopes to expand efforts to other members to detect and repair large methane leaks and achieve significant emissions reduction.

Beyond the oil and gas sector, states are examining new emissions reduction strategies from other methane sources like landfills, wastewater, manure management, and enteric fermentation. For example, as part of its 2018

⁴⁰ Proposed Regulation Order Prohibitions on Use of Certain Hydrofluorocarbons in Stationary Refrigeration, Stationary Air-conditioning, Other End Uses. California Code of Regulations, Title 17, Division 3, Chapter 1, Subchapter 10 Climate Change, Article 4 <https://ww2.arb.ca.gov/sites/default/files/2020-07/DRAFT%20CA%20SNAP%20Amendments-Reg%20Text.pdf>.

⁴¹ Delaware Department of Environmental Resources and Environmental Control, “DNREC to launch refrigerant incentive program,” February 24, 2020, <https://news.delaware.gov/2020/02/24/dnrec-to-launch-refrigerant-incentive-program/>.

⁴² U.S. Climate Alliance, “RE: Written testimony on S. 2754, American Innovation and Manufacturing Act of 2019,” April 8, 2020, https://www.epw.senate.gov/public/_cache/files/0/0/00881ca3-c8b1-4732-8896-5b138168af55/6C438F8C8B0BA1E4686DCAB48D8C4ED9.04.08.2020-us-climate-alliance.pdf

⁴³ California Air Resources Board, “Aerial methane survey finds a fraction of point sources responsible for more than a third of California’s methane emissions,” November 6, 2019, <https://ww2.arb.ca.gov/news/aerial-methane-survey-finds-fraction-point-sources-responsible-more-third-californias-methane>.

⁴⁴ Colorado Department of Natural Resources, “Colorado Oil & Gas Conservation Commission Approves \$18.25 Million Penalty for Firestone Tragedy,” April 13, 2020, https://cogcc.state.co.us/documents/media/Press_Release_COGCC_Firestone_AOC_20200413.pdf

⁴⁵ New Mexico Economic Development Department, “Sceye Picks New Mexico For U.S. Production Center,” August 18, 2020, <https://gonm.biz/uploads/documents/pressReleases/sceye.pdf>

⁴⁶ New Mexico Environment Department, “Open EnviroMap,” <https://gis.web.env.nm.gov/oem/?map=methane>

Universal Recycling Law, which went into effect in July 2020, Vermont banned food scraps from its landfills.⁴⁷ In May 2020, Oregon advanced a Landfill Methane and Food Waste Work Plan as part of its response to meeting the state's new GHG reduction targets.⁴⁸

2.12 - Creating More Resilient Communities

Twenty USCA members have climate adaptation or resilience plans or are in progress for developing a plan. Unprecedented high global temperatures and large-scale natural disasters marked the decade between 2010 and 2019. In 2019 alone, 14 separate billion-dollar disasters occurred, including three major inland floods, eight severe storms, two tropical cyclones, and one wildfire event ravaged communities.⁴⁹ These disasters have led to USCA members calling for increased support and investments from the federal government and elsewhere to brace for future disasters.

Over this past year, USCA members have worked to align the latest climate science with these financing gaps. Several USCA members released robust state roadmaps and policy recommendations to guide the implementation of recent laws and executive orders to increase our preparedness and resilience to natural disasters and climate stressors. States and territories also made significant investments to help their communities brace for climate impacts.

To further the collective understanding of building resilience to climate change, the European Union and the USCA launched a collaboration in 2019 to strengthen dialogue and exchange ideas between climate leaders from both sides of the Atlantic. This collaboration will facilitate technical cooperation on climate risk and resilience strategies paving the way for USCA members to incorporate resilience into everyday planning; make the economic and fiscal case for resilience; increase community adaptation preparedness training, funding, and implementation; and mobilize investments in resilience.

2.13 - Protecting and Enhancing Our Natural and Working Lands

Seven USCA members have specific Healthy Soils policies or programs in place to increase adoption of conservation practices on farms and ranches. Every USCA member state is producing a Statewide Forest Resource Assessment and Strategy that identifies strategies and resource needs for maintaining forest resilience in a changing climate.

Increasing carbon sequestration in and reducing GHG emissions through NWL are critical components of state and national deep decarbonization strategies. The NWL sector, which includes farmlands, forests, wetlands, grasslands, and other land types, has the unique ability to both store carbon in plants and soils, providing resilient carbon sinks, enhancing communities, economies, and ecosystems that depend on them. NWL currently offset approximately 12% of U.S. GHG emissions,⁵⁰ with the potential to sequester approximately 20% to 50% by 2050.⁵¹

⁴⁷ Vermont Department of Environmental Conservation, "Universal Recycling Law Timeline," July 2019, https://dec.vermont.gov/sites/dec/files/wmp/SolidWaste/Documents/Universal-Recycling/Timeline-factsheet_CURRENT.pdf.

⁴⁸ Oregon Department of Environmental Quality, "Oregon DEQ submits emission reduction plans to Governor Brown," <https://www.oregon.gov/newsroom/pages/NewsDetail.aspx?newsid=36647>

⁴⁹ Adam B. Smith, "2010-2019: A landmark decade of U.S. billion-dollar weather and climate disasters," NOAA Climate, January 8, 2020, <https://www.climate.gov/news-features/blogs/beyond-data/2010-2019-landmark-decade-us-billion-dollar-weather-and-climate>.

⁵⁰ See Land Use, Land-Use Change, and Forestry (LULUCF) in U.S. Environmental Protection Agency (2020). Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2018.

⁵¹ U.S. Mid-Century Strategy for Deep Decarbonization (2016); Fargione, J. et al. (2018) Natural climate solutions for the United States. Science Advances. 4 (11): EAAT1869; National Academy of Sciences, Engineering, and Medicine. Negative Emissions Technologies and Reliable Sequestration: A Research Agenda (2020).

In 2018, the USCA launched the NWL Challenge, recognizing the need to include natural and working lands in ambitious climate change goals and policies. In two years, USCA members have significantly scaled up on-the-ground implementation of best practices for land management, restoration, and conservation, contributing to GHG mitigation and resiliency goals.

Maryland has built upon its work on the NWL Challenge and made significant progress on incorporating agricultural soil carbon into the 2023 GHG inventory. Maryland is relying on the best available science to support a full ongoing assessment of our natural carbon sinks. Achieving this task may require additional engagement with expert scientists, like those supporting efforts of the USCA.

3 - Maryland's Role

In January 2018, Governor Larry Hogan proudly committed Maryland to participation in the USCA. When a former president announced the intention of the United States to withdraw from the Paris Agreement, Governor Hogan disagreed with the decision and maintained the importance of aggressive but balanced action in states, communities, and businesses, and the need for multi-state collaboration and international leadership as climate change grows stronger every day.

Over the course of 2019-2021, Maryland has worked with the USCA members to share insights, experiences, and strategies in order to meet and excel beyond the requirements of the Paris Agreement. Maryland has encouraged all USCA members to adopt clean air standards and GHG goals as strong and aggressive as Maryland's. Through collaborative efforts, the USCA members are demonstrating leadership in addressing climate change and inspiring climate action throughout the country.

During the past year, Maryland has been a leader and active participant in the USCA, contributing our experience, knowledge, and cutting-edge research. Many USCA members have looked to Maryland as a model and to learn from our collaborative and ground-breaking work on the Healthy Soils Initiative, the MCCC, RGGI, and the *2030 GGRA Plan*. The USCA has played an integral role in helping Maryland launch a regulatory initiative to phase out HFCs and work to strengthen our forest and agricultural carbon sequestration programs.

3.1 - Maryland's 2030 Greenhouse Gas Emissions Reduction Act Plan

On April 4, 2016, the GGRA of 2016 was signed into law by Governor Hogan. Expanding on the requirements of the original GGRA law of 2009, the GGRA of 2016 requires the state to achieve a minimum of a 40% reduction in statewide GHG emissions from 2006 levels by 2030, which is substantially more ambitious than the United States' international commitment under the Paris Agreement to reduce emissions by 26-28% by 2025. To achieve this goal, the GGRA of 2016 requires the Maryland Department of the Environment (MDE) to develop a statewide GHG reduction plan (*2030 GGRA Plan*). The GGRA of 2016 also required MDE to solicit public comment on the proposed draft plan from interested stakeholders and the public, while demonstrating that the new reduction goal can be achieved in a way that has a net positive impact on Maryland's economy, protects existing manufacturing jobs and creates significant new "green" jobs in Maryland.

MDE's emissions analysis shows that the *2030 GGRA Plan* will come close to achieving a 50% reduction by 2030 without accounting for some anticipated new federal government policies to reduce emissions. If the federal administration takes action to improve vehicle efficiency, reduce the cost of electric vehicles (EVs), deploy more clean and renewable electricity, and invest in energy efficiency and electrification, Maryland will be able to achieve a 50% reduction in GHG emissions by 2030. Future iterations of the GGRA Plan will continue to identify additional measures to reduce emissions as new technologies become available.

The *2030 GGRA Plan* is a comprehensive, multi-sector, multi-agency plan developed with assistance and input from more than a dozen state agencies and nongovernmental organizations. The programs outlined in the *2030 GGRA Plan* provide a blueprint, when fully implemented, will achieve reductions greater than the 40% GHG reduction required by the GGRA of 2016, with significant positive job growth and economic benefits.

3.2 - The Maryland Commission on Climate Change

Maryland has been at the forefront of states taking action to address the consequences of climate change with the development of the Sea Level Rise Response Strategy. The state went on to pass the Healthy Air and Clean Cars Acts, join RGGI, and pass the GGRA.

Governor Hogan signed the Commission on Climate Change Act of 2015 to codify the MCCC. The MCCC is an independent, statutory body established under executive order charged with developing an action plan and firm timetable for mitigating and adapting to the impacts of climate change in Maryland. As a result of the work of more than 100 stakeholders and experts, the MCCC produced a climate action plan, which was the catalyst for the Greenhouse Gas Emissions reduction Act.

The MCCC is required to report to the Governor and the legislature annually “on the status of the State’s efforts to mitigate the causes of, prepare for, and adapt to the consequences of climate change, including future plans and recommendations for legislation, if any, to be considered by the General Assembly.” Under the act, the MCCC is charged with several actions, including:

- Strengthen the Climate Action Plan;
- Develop broad private and public partnerships with local, state, and federal government;
- Communicate and educate citizens about the urgency of acting to reduce the impact of climate change;
- Conduct an inventory of GHG emission sources;
- Address the impacts of climate change on low income and vulnerable communities;
- Assess impacts that climate change may have on the Maryland’s economy, as well as specific sectors such as agriculture; and
- Develop strategies for adaptation and mitigation.
- The MCCC consists of 26 members including representatives of state government, the legislature, business and labor, non-profit organizations, local government, and academia. The Secretary of the Environment serves as the Chair of the MCCC.

The MCCC has four working groups: Adaptation and Resiliency Working Group (ARWG); Education, Communication, and Outreach Working Group (ECO); Greenhouse Gas Mitigation Working Group (MWG); and Scientific and Technical Working Group (STWG). Each working group meets throughout the year to address the MCCC's responsibilities through a series of presentations and discussions to develop the recommendations made in the annual report.

It is the ongoing endeavor of the MCCC and its working groups to ensure that Maryland is utilizing the best science available to progress on limiting climate change (or mitigating) and adapting to the changes that do occur, keeping open lines of communication in both directions with the residents of Maryland.

USCA member states have looked to Maryland as a prominent example of bipartisan leadership on climate action. Maryland routinely shares advice with the USCA on both the logistical structuring of bipartisan bodies and planning actions for climate mitigation and adaptation.

3.3 - RGGI

The Maryland Healthy Air Act required Maryland to join RGGI by July 2007. MDE subsequently adopted COMAR 26.09.01 to .03, implementing the “Maryland CO₂ Budget Trading Program,” which became effective on July 17, 2008. COMAR 26.09.04 (“Auctions”) became effective as a permanent regulation on August 25, 2008.

RGGI is a collaborative program among 11 Eastern states to reduce CO₂ emissions from power plants through a regional cap-and-invest program. These states adopted market-based CO₂ cap-and-invest programs designed to reduce emissions of CO₂, from fossil fuel-fired electricity generators with a nameplate capacity of 25 megawatts or greater. Due to its success, RGGI has grown substantially in recent years, with New Jersey renewing its participation in the program in 2020, Virginia joining in 2021, and Pennsylvania proposing regulations to begin participation in 2022. RGGI is currently composed of Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Rhode Island, Vermont, and Virginia. Participating RGGI states each require electricity generators to have acquired, through regional auction or secondary market transactions, one CO₂ allowance for every ton of CO₂ emitted over a three-year compliance period. Maryland has participated in RGGI since its inception 12 years ago. Through RGGI, the participating states have cut power plant emissions in half while enjoying billions of dollars of economic benefit and creating thousands of jobs.⁵²

RGGI sets a binding cap on CO₂ emissions from power plants in the region that reduces every year. To achieve the 100% clean electricity by 2040 goal, the *2030 GGRA Plan* proposes to reduce the RGGI cap to zero by 2040, with cost controls. Maryland will bring that goal into the upcoming Program Review, where the RGGI participating states convene to establish the program’s future goals. Combined with the RPS and proposed CARES program, that would eliminate CO₂ from Maryland power plants and substantially reduce emissions from the power plants in nearby states that supply electricity into Maryland.

The RGGI program has several unique features unlike other cap-and-invest programs in the U.S. The allowances are controlled by the states and can be allocated or sold to sources. Currently states have opted to auction most of the allowances to sources through quarterly auctions. Proceeds from the auctions are used to fund energy efficiency programs to reduce demand for electricity and provide a means to lower CO₂ emissions. Further, auction proceeds fund renewable energy projects that reduce the amount of CO₂ emissions generated by fossil fuel-fired electricity generators. Under RGGI, more than half of all funds collected by Maryland are invested in energy assistance for low-income households, and energy efficiency in low- and moderate-income communities. The states conducted the first quarterly regional auction in September 2008, and the program officially began in January 2009.

RGGI originally set a cap of 188,076,976 tons of CO₂ emissions for the region, based on average 2000 to 2002 CO₂ emissions from eligible electricity generators subject to the program Maryland received 37,503,983 CO₂ allowances each year through 2013. After the 2012 Comprehensive RGGI Program Review, changes to the cap resulted in Maryland receiving 20,360,944 CO₂ allowances in 2014. Between 2015 and 2020, Maryland’s allowance budget was reduced by 2.5% per year along with the other participating states. Maryland originally set aside 7,388,491 allowances in four different set aside accounts to account for special needs or programs, but this number and the number of set aside accounts was reduced through the 2016 Program Review.

⁵² <https://www.rggiprojectseries.org/>

In the 2016 Program Review, the RGGI states established a cap for the 2020s that declines by 30% from 2020 to 2030. Each individual state's allowance budget, including Maryland's, will decrease each year accordingly. That cap decline may need to accelerate in the 2020s to work toward the longer term 100% clean electricity by 2040 goal.

As of the date of this report, Maryland has successfully participated in all 53 regional auctions of CO₂ allowances with RGGI. Auction proceeds go to the Strategic Energy Investment Fund, which is administered by the Maryland Energy Administration. Maryland has received \$815,083,632.48 in cumulative proceeds.⁵³

3.4 - Climate Change and the Cost of Inaction

With 3,100 miles of shoreline, Maryland is one of the most vulnerable parts of the U.S. to the effects of sea level rise associated with climate change. Rising sea levels and increased storm intensity could have devastating and far-reaching impacts on the Atlantic coast and the Chesapeake Bay ecosystem that affect the environmental, recreational and economic benefits enjoyed by Marylanders and its visitors. Although Maryland's coastal areas may be considered particularly vulnerable, all areas of the state are at risk. In general, climate change alters the severity, frequency or distribution of existing issues that are impacted either directly or indirectly by temperature and precipitation. This includes, but is not limited to:

- Impacts on coastal, bay, and inland water quality parameters that may change the viable uses of surface water, such as for irrigation, recreation, or human consumption;
- More frequent disruptions to urban and coastal infrastructure in Maryland caused by extreme weather events and sea level rise that may indirectly impact the economy of the region by restricting the flow of goods and affecting days worked;
- Common stressors experienced among ecosystems, agriculture, fisheries, and forestry such as those caused by general changes in temperature and precipitation regimes; increased extreme weather events; and increased pressures from weeds, diseases, and pests;
- Human health issues, including those affected by impacts on food and water supply, air quality and extreme weather events; and
- A higher probability of negative outcomes for disadvantaged communities and individuals inherently more sensitive or with a reduced adaptive capacity for responding to the impacts of climate change.

3.5 - Environmental and Climate Justice

EJ is an ethical mandate that seeks equal protection from environmental and public health hazards for all people regardless of race, income, culture, and social class. Additionally, EJ means that no group of people, including racial, ethnic or socioeconomic groups should bear a disproportionate share of the negative environmental consequences resulting from industrial, land-use planning and zoning, municipal and commercial operations or the execution of federal, state, local and municipal programs and policies. EJ requires the development, implementation, and enforcement of environmental laws, regulations, and policies that ensure that no single community will bear a disproportionate share of the negative environmental conditions or pollution. This may include industrial operations, land-use planning and zoning, or municipal and commercial operations, such as through Title V permits issued by environmental regulatory agencies.

⁵³ <https://www.rggi.org/auctions/auction-results>

Climate change poses a significant threat to vulnerable communities with little adaptive capacity. Furthermore, disadvantaged communities are disproportionately impacted by pollution, often stemming from previous policy and planning decisions. The state must ensure that equity and EJ are key principles of climate policies. Maryland also must ensure that residents and businesses across all communities have ample opportunity to shape and comment on climate policy, direct resources from climate programs like RGGI to help disadvantaged communities address climate change and benefit from the transition to clean energy, and to repair damage to communities from previous policies.

“Climate justice” (CJ) is a term that acknowledges climate change can have differing social, economic, public health, and other adverse impacts on disadvantaged populations. Climate justice begins with recognizing that key groups bear disproportionate climate change impacts. Climate impacts can exacerbate inequitable social conditions. Achieving environmental and climate justice will require multidisciplinary collaboration among various stakeholders, including communities, businesses, public health and education experts, air quality scientists, meteorologists, engineers and community planners, and federal, state and, local regulatory agencies. Climate justice principles may include:

- Supporting the right to economic development and employment opportunities;
- Sharing benefits and burdens equitably;
- Ensuring leaders’ decisions are participatory, transparent, and accountable;
- Supporting education for climate stewardship; and
- Using effective partnerships.

In 2020, MCCC chair Ben Grumbles, MDE Secretary, appointed a third co-chair to the MCCC who is empowered to ensure that CJ is considered and included in all MCCC and working group deliberations and products. This co-chair is leading a team of MCCC and its working group liaisons with equity knowledge. The EJ team will provide a progress report in the MCCC’s 2021 Annual Report.

Necessary steps and opportunities to achieve Environmental and Climate Justice are included throughout the *2030 GGRA Plan*, and considerations of how each measure can advance those objectives is considered in the program-by-program discussions in Chapter 3 of the plan. Some ways in which programs in the *2030 GGRA Plan* address environmental and climate justice include:

- Community solar expands the benefits of access to renewable energy to individuals who do not own land or rooftop space, allowing them to enjoy the benefits of solar power generation, while the Community Solar Low to Moderate Income Power Purchase Agreement grant provides funding to offer community solar subscriptions with deep discounts below the utility’s standard offer service rates for low-to-moderate income (LMI) households.
- The Maryland Department of Housing and Community Development provides financing from the EmPOWER Maryland Program for projects that reduce energy costs and address critical health and safety issues for residents and limited income families.
- Under RGGI, more than half of all funds collected by Maryland are invested in energy assistance for low-income households, and energy efficiency in LMI homes and communities.

- The Maryland Department of Natural Resources (DNR) has helped to fund tree planting in urban areas, which has been shown to remove air pollutants, reduce the risk of certain health problems, keep urban areas cooler, as well as sequestering CO₂ from the atmosphere.
- The Maryland Department of Planning is taking measures to mitigate the impact of saltwater intrusion on agricultural communities on the Eastern Shore, and DNR's Park Equity Tool identifies underserved communities that may benefit from preservation of open space, shoreline enhancement, and other nature-based approaches to risk reduction.
- Transportation technologies play a critical role in reducing emissions from the transportation sector which disproportionately impacts low-income communities and communities of color. The state has several programs that deploy electric buses and trucks, reducing pollutants that can contribute to health problems in communities while also reducing CO₂ emissions.

The *2030 GGRA Plan* aims to achieve Maryland's GHG reduction goals in a way that benefits Maryland's economy, creates jobs, and shares those benefits broadly. Economic impact analysis by Towson University estimates that the *2030 GGRA Plan* will primarily create middle-class jobs.

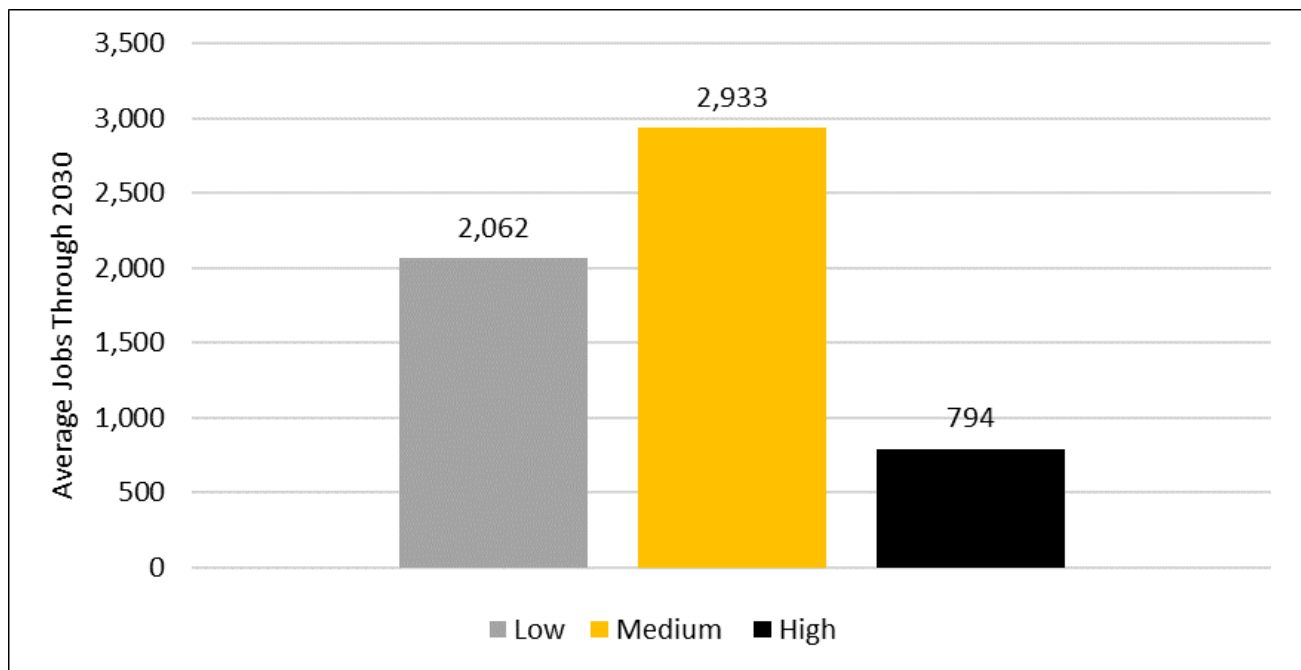


Figure 3-1. Employment impacts from the 2030 GGRA Emissions Reduction Plan through 2030 in the lower, middle, and upper thirds of the income distribution.

The economic impact analysis also finds that the jobs created by the *2030 GGRA Plan* are expected to be broadly spread across Maryland's geography and across racial and ethnic groups.

3.6 - Emissions Reductions and Modeling

Maryland has made significant strides in the reduction of GHG emissions. As illustrated in Figure 3-2, analysis of Maryland's 2017 GHG emissions⁵⁴ show that activities in Maryland accounted for approximately 80.14 million

⁵⁴ Maryland performs comprehensive greenhouse gas inventories on a 3-year cycle to coincide with the National Emissions Inventory. The most recent inventory year is 2017; MDE will complete the next inventory for 2020 in late 2021 once federal datasets on 2020 energy use are published.

metric tons of gross CO₂ equivalent emissions (MMtCO₂e) in 2017, an amount equal to about a 25.8% reduction of the state's total gross GHG emissions in 2006 (108.06 MMtCO₂e).

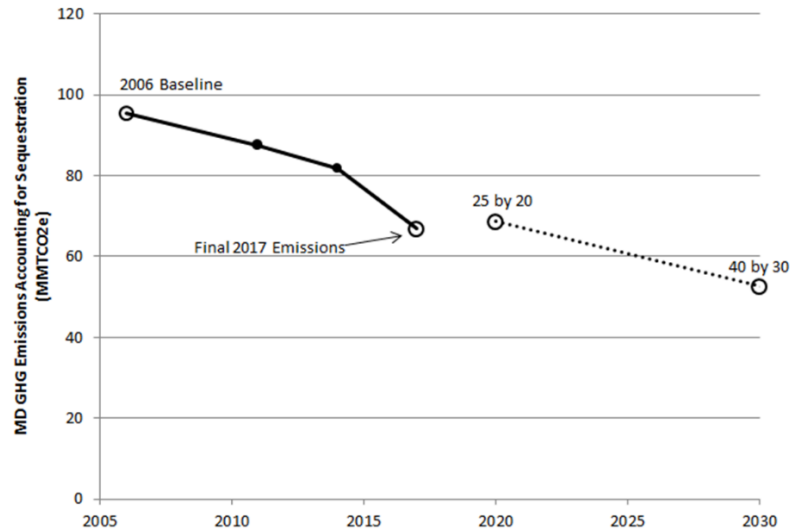


Figure 3-2. Historic decrease in Maryland's GHG emissions compared to GGRA goals.

That 25.8% reduction in emissions in 2017 is greater than Maryland's reduction goal for 2020. However, MDE cautions against concluding that the state met its 2020 goal, because emissions from electricity generation and residential and commercial buildings tend to vary year-to-year with the weather as energy demand is substantially higher during cold winters and hot summers than during mild seasons. Maryland enjoyed particularly mild winter weather and a relatively mild summer, so we saw an especially steep drop in emissions in 2017.

Estimates of carbon sinks within Maryland's forests, including urban forests and land use changes, have also been analyzed. The current estimates indicate that about 11.79 MMtCO₂e was stored in Maryland forest biomass and agricultural soils in 2017. This leads to net emissions from all sectors of 68.35 MMtCO₂e in 2017.

The principal sources of GHG emissions in Maryland are electricity consumption; transportation; and residential, commercial, and industrial (RCI) fossil fuel use. For Maryland's gross GHG emissions in 2017, electricity consumption accounted for 30%, transportation 40%, and buildings 18%.

The 2030 GGRA Plan yields greater emissions reductions than the 2019 GGRA Draft Plan that MDE published in October 2019, due to additional reductions in electricity generation, RCI fuel use, transportation, and methane (CH₄) leakage from the natural gas supply chain.

MDE tasked the Regional Economic Studies Institute at Towson University (RESI) to develop GHG emissions projections, and macroeconomic assessments of Maryland's GHG reduction policies. RESI engaged Energy and Environmental Economics, Inc. (E3) to develop a Maryland-specific emissions model using E3's PATHWAYS model. The 2030 GGRA Plan provides documentation for the assumptions, methods, and results for the project.

After developing a long-term projection of Maryland's GHG emissions based on existing policies that are in place to reduce emissions, as well as forecasted future economic activity and population in the state (the Reference Case), MDE worked with other state agencies and its modeling partners to evaluate the impact of additional and

enhanced GHG reduction policies on Maryland’s overall emissions to establish a set of programs included in the *2030 GGRA Plan* that will reduce the state’s emissions below its 2030 goal.

The *2030 GGRA Plan* programs achieve emissions reductions from across multiple sectors (Figure 3-3). Since most of Maryland’s emissions come from electricity generation and transportation, those are the source of most of the reductions achieved in the plan, but additional reductions come from building energy use, forestry, and healthy soils management.

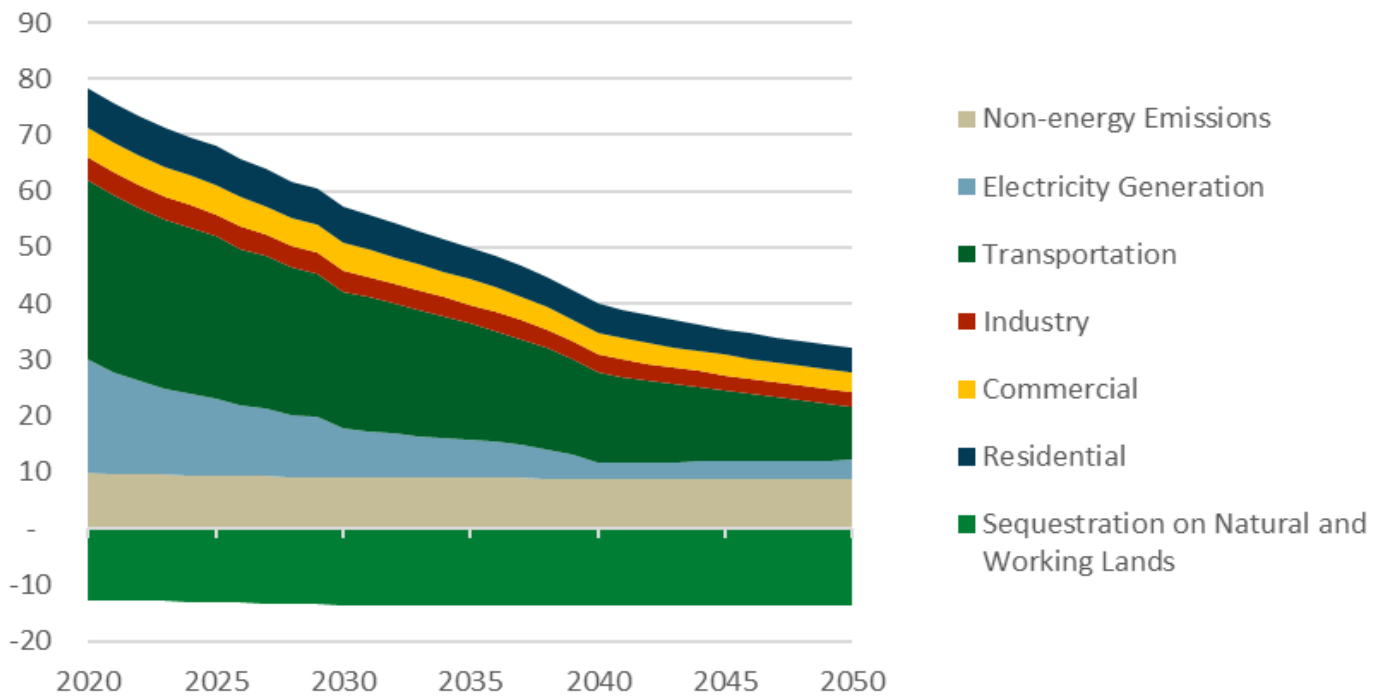


Figure 3-3. Maryland GHG emissions projections by sector under the *2030 GGRA Plan*.
 *Non-Energy includes Agriculture, Waste Management, Industrial Processes and Fossil Fuel Industry

MDE, RESI, and E3 will supplement these estimates with sensitivity analyses, where assumptions about federal government programs, consumer behavior, and nuclear energy generation will be varied to reflect more or less difficult environments for achieving the 2030 goal.

Since one of the primary focuses of that supplemental analysis is the impact of changing federal programs, MDE will produce the analysis once a clearer picture emerges of how the federal administration will craft near-term climate policies.

3.7 - Economic Benefits

MDE and RESI analyzed the economic impacts of the *2030 GGRA Plan* using a dynamic macroeconomic model called REMI PI+, which is a high-end dynamic modeling tool used by various federal and state government agencies in economic policy analysis. To model economic impacts, the team synthesized data from a few sources, including Pathways output and estimates of program costs from state agencies. Additionally, the team conducted public health modeling to estimate the economic impact associated with improved air quality.

Although consumers and businesses are spending more on capital costs (e.g., energy-efficient appliances or new EVs) in the *2030 GGRA Plan* fuel savings are greater than this amount every year.

Through 2030, these employment impacts are driven by transportation infrastructure projects. After 2030, employment impacts remain positive relative to the reference case. On average through 2030, transportation infrastructure measures support 4,374 more jobs compared to the scenario without this spending. This is illustrated above as the difference between the two lines. Regardless of the status of the transportation spending, employment impacts are steadily positive for the *2030 GGRA Plan*.

After 2030, the positive impacts through 2050 are being driven by two primary factors. First, while capital costs are generally higher than the *2019 GGRA Draft Plan*, fuel savings are substantially higher in the *2030 GGRA Plan*. This leads to an acceleration in job growth. Second, after 2030 there is significant build-out in the in-state solar industry. This build-out is associated with an increase in jobs in the later years as Maryland invests in locally produced electricity generation.

3.8 - Adaptation and Resiliency

The Chesapeake Bay region's geography and geology make the state one of the three most vulnerable areas of the country to changes resulting from sea level rise – only Louisiana and southern Florida are more susceptible. Historic tide records show sea level has increased approximately one foot in the Chesapeake Bay over the last 100 years.⁵⁵ Over the past 10 years (2010-2020), Maryland has experienced 10 weather-related events warranting Presidential Disaster declarations, including five coastal flood events.⁵⁶ In Maryland, climate change risks include increased frequency, duration and intensity of events such as drought, storms, flooding, and forest fires; more heat-related stress; the spread of existing or new vector-borne diseases; changes to public health challenges as a result of climate-driven stressors; and increased erosion and inundation of low-lying areas along the state's shoreline and coast. These impacts will influence the interactions and management of our resources now and into the future.

Maryland has been implementing climate adaptation efforts for more than a decade. In 2008, the MCCC ARWG published "Phase I: Comprehensive Strategy to Reduce Maryland's Vulnerability to Climate Change,"⁵⁷ which focused on sea level rise and coastal storms. In 2011 the second phase strategy was published, focusing on societal, economic and ecological resilience.⁵⁸ These strategies together laid out recommendations on adaptation efforts that address changes in precipitation patterns and increased temperature as well as the likely impacts to human health, agriculture, forest and terrestrial ecosystems, bay and aquatic environments, water resources, and population growth and infrastructure.

Climate adaptation is also a key component of Maryland's Chesapeake Bay restoration efforts. Maryland has participated in the Chesapeake Bay Agreement since its inception, and has remained an engaged leader and member, working together with neighboring states and the District of Columbia to address all issues impacting the Bay. Maryland has signed and agreed to all subsequent goals and agreements since the initial program, including the 2014 Chesapeake Bay Watershed Agreement,⁵⁹ which included climate resilience as one of its main goals.

⁵⁵ Chesapeake Bay Foundation. What is Climate Change? (2020) <https://www.cbf.org/issues/climate-change/>

⁵⁶ FEMA All Disasters Database. (2020) <https://www.fema.gov/disasters/disaster-declarations>

⁵⁷ Comprehensive Strategy for Reducing Maryland's Vulnerability to Climate Change Phase I: Sea-level rise and coastal storms (2008) https://dnr.maryland.gov/ccs/Publication/Comprehensive_Strategy.pdf

⁵⁸ Comprehensive Strategy for Reducing Maryland's Vulnerability to Climate Change Phase II: Building societal, economic and ecological resilience (2011) https://climatechange.maryland.gov/wp-content/uploads/sites/16/2014/12/ian_report_2991.pdf

⁵⁹ https://www.chesapeakebay.net/documents/FINAL_Ches_Bay_Watershed_Agreement.withsignatures-Hlres.pdf

Adaptation refers to action to prepare for and adjust to new conditions, thereby reducing harm or taking advantage of new opportunities.⁶⁰ Climate change adaptation is an extremely complex process with no single means of response. As stressed in a recent report by the National Academies,⁶¹ climate change adaptation must be a highly integrated process that occurs on a continuum, across all levels of government, involving many internal and external partners and individual actions, and often evolves at different spatial and temporal scales. Maryland recognizes the need to include robust adaptation and resiliency efforts alongside the aggressive GHG mitigation measures put in place to effectively address and protect the state from climate change impacts. These actions are increasingly dependent on one another, and any program or policy to mitigate the effects of climate change will complement steps to reduce the state’s risk to those impacts. Mitigation without adaptation, or vice versa, could render Maryland, its people, and resources vulnerable to harm from impacts of climate change.

Adaptation aims to enhance the resilience of natural and human-based systems across multiple sectors, including bay and aquatic environments, agriculture, human health, water resources, population growth and infrastructure, forest and terrestrial ecosystems and our coastal zone. Maryland does not work in isolation on these efforts and relies on diverse partnerships at the local, state, and federal levels. Since the MCCC’s inception, the ARWG has served as the state’s leader on adaptation and resiliency. The ARWG develops comprehensive strategies to reduce Maryland’s climate change vulnerability, serves as a resource to state and local governments for tools and planning resources and provides a platform for collaboration. In addition to the ARWG, Maryland’s participation in multi-jurisdictional compacts such as the Chesapeake Bay Program (CBP) is essential to the state’s success in the adaptation arena. The CBP’s Climate Resiliency Work Group (CRWG) leads and monitors work being done in accordance with the climate resilience goal of the 2014 Chesapeake Bay Watershed Agreement. The ARWG, CBP, and CRWG memberships include representatives across state government agencies, institutes of higher education, and non-governmental organizations. Working across and between compacts ensures Maryland relies upon a large, diverse, and committed group of organizations and individuals implementing climate adaptation efforts across the state, protecting Maryland’s societal, economic, and ecological resources for years to come.

3.9 - Getting to Net Zero

The GGRA of 2016 requires that the *2030 GGRA Plan* be developed in recognition of the need for developed nations to reduce GHG emissions between 80% and 95% from 1990 levels by 2050. The *2030 GGRA Plan* provides a strong foundation on which to reduce GHG emissions within Maryland far into the future. The analysis in the *2030 GGRA Plan* includes several additional “what if” scenarios to estimate the future impact of various climate policies that extend beyond the 2030 goal of the GGRA of 2016, including a scenario that achieves an 80% reduction in GHG emissions by 2050. That analysis identified several potential measures and technologies that the state could deploy after 2030 to achieve deeper reductions by 2045 and 2050.

With the measures advanced in the *2030 GGRA Plan*, Maryland will substantially reduce emissions from buildings, transportation, and electricity generation, while improving the rate at which its forests and farms are removing CO₂ from the atmosphere (Figure 3-4). Due to the clean electricity programs in the *2030 GGRA Plan*, Maryland will achieve 100% clean electricity by 2040, largely by eliminating emissions from its power plants. The residual

⁶⁰ Bierbaum, R., A. Lee, J. Smith, M. Blair, L. M. Carter, F. S. Chapin, III, P. Fleming, S. Ruffo, S. McNeeley, M. Stults, L. Verduzco, and E. Seyller, 2014: Ch. 28: Adaptation. *Climate Change Impacts in the United States: The Third National Climate Assessment*, J. M. Melillo, Terese (T.C.) Richmond, and G. W. Yohe, Eds., U.S. Global Change Research Program, 670-706. doi:10.7930/J07H1GGT.

⁶¹ National Research Council. 2010. *Adapting to the Impacts of Climate Change*. National Academies Press, Washington, DC

electricity sector emissions are attributable to power plants outside of Maryland that supply electricity consumed in Maryland, and over which the State of Maryland has limited influence. Without further action in the 2030s, by 2045 Maryland will continue to emit approximately 22 MMtCO₂e more than it sequesters. The remaining emissions come from Maryland’s buildings, vehicles, industrial facilities, waste management systems, and fossil fuel infrastructure.

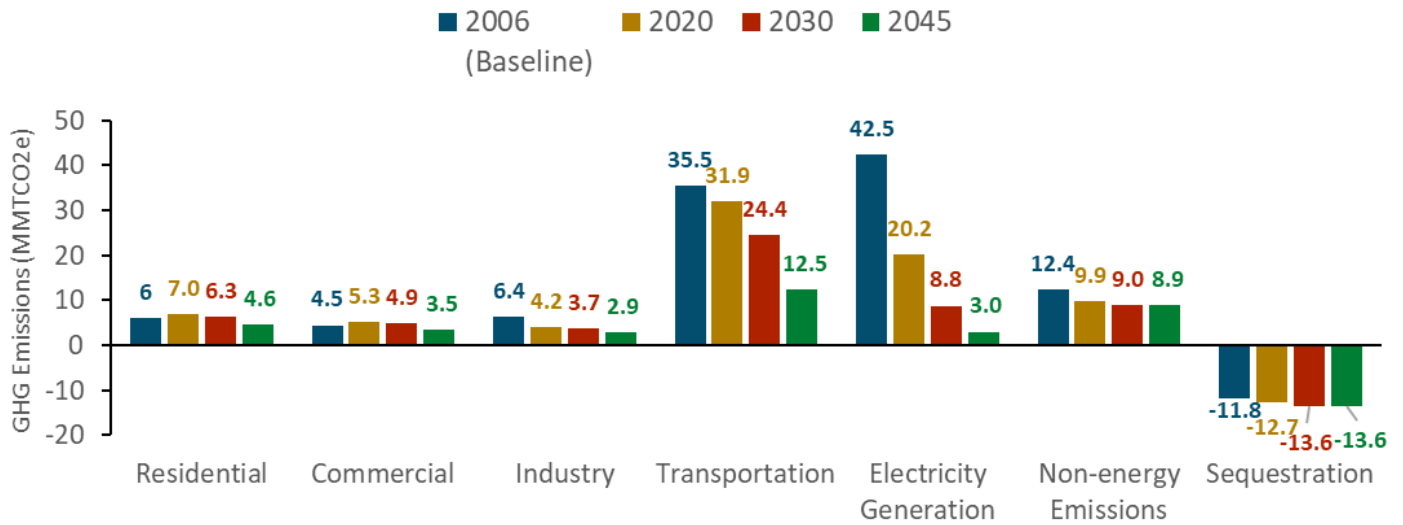


Figure 3-4. Maryland GHG emissions (MMtCO₂e) by sector in 2006, 2020, 2030, and 2045 in the 2030 GGRA Plan.

Securing the additional reductions beyond 2030 necessary to achieve net-zero by 2045 will require deploying new and emerging zero-emissions technologies in buildings and non-road transportation applications, zero-carbon and renewable liquid and gaseous fuels for combustion uses that cannot be electrified, carbon capture and storage systems for industrial processes that emit CO₂ regardless of energy source, and greater long-term efforts to sequester CO₂ using both natural systems and potentially direct air capture systems. Many of those outcomes cannot be achieved without action by the federal government to support research, development, and commercialization of emerging technologies.

The 2030 GGRA Plan proposes a set of measures that are available and economically beneficial today, and that achieve reductions beyond the GGRA of 2016 Act’s 2030 goal while making substantial progress toward more ambitious goals recommended by the MCCC. The 2030 GGRA Plan identifies future measures that should be monitored as technologies mature, and deployed accordingly if they become viable, to ensure that Maryland continues to reduce its GHG emissions beyond 2030.