

April 17, 2018

VIA EMAIL

Administrator E. Scott Pruitt
Environmental Protection Agency
1200 Pennsylvania Ave. NW
Washington, DC 20460

Re: Docket ID No. EPA-HQ-OAR-2017-0355 – *Repeal of Carbon Pollution Emission Guidelines for Existing Stationary Sources: Electric Utility Generating Units*

Dear Administrator Pruitt:

We represent environmental and energy agencies from a group of 13 states that comprises 114 million people and 44 percent of the U.S. economy.¹ We are submitting comments opposing EPA's proposal to repeal the Carbon Pollution Emission Guidelines for Existing Stationary Sources, the Clean Power Plan (CPP). As leaders of state environmental and energy agencies, we play an important role in protecting our citizens' health and the environment in collaboration with the federal government. The Clean Power Plan will secure significant reductions in carbon dioxide emissions across the country and is a practical and cost-effective strategy to meet EPA's legal obligation to reduce carbon pollution while respecting the balance of authority between federal agencies and states and between environmental and energy regulators. State efforts demonstrate that reductions in carbon emissions can occur in tandem with economic growth, and the Clean Power Plan provides us the flexibility to continue employing proven methods to meet federal emission standards while growing our economies.

The proposed repeal will make our efforts to reduce carbon pollution more difficult, and endanger the health and welfare of our residents. In addition to its greenhouse gas benefits, the CPP would help to reduce transported air pollution from other states, helping jurisdictions comply with federal air quality standards. The Clean Power Plan would drive emissions reductions under a consistent framework across the country, and in doing so accelerate the technical and regulatory innovations that make these reductions cheaper. EPA's analysis of the proposed repeal's impacts raises serious questions about EPA's valuation of the benefits of environmental regulation, which could have long-term implications for the health and safety of

¹ See U.S. Census Bureau, *Annual Estimates of the Resident Population for the United States, Regions, States, and Puerto Rico: April 1, 2010 to July 1, 2017* (July 1, 2017), <https://www.census.gov/data/tables/2017/demo/popest/state-total.html#tables>; U.S. Department of Commerce, Bureau of Economic Analysis, *Current-Dollar and "Real" Gross Domestic Product*, <https://www.bea.gov/national/index.htm#gdp>; "State BEARFACTS," U.S. Department of Commerce, Bureau of Economic Analysis, <https://www.bea.gov/regional/bearfacts/statebf.cfm>.

our residents. Finally, repealing the CPP will create significant regulatory uncertainty for our utilities and businesses.

Our states are already suffering the impacts of climate change. Our residents have lost property, been displaced from their homes, and even lost loved ones due to the increasingly severe extreme weather events exacerbated by climate change. For example, in 2017 California experienced almost twice as many wildfires burning six times as many acres as the average over the last five years,² and these fires were among the deadliest in the state's history, killing a total of 43 people.³ NOAA estimates that Hurricane Sandy caused damages of over \$70 billion, and projected damages from Hurricane Harvey total \$125 billion.⁴ Even small inland states are experiencing historic damages. Vermont incurred an estimated \$250-300 million in damages from Tropical Storm Irene.⁵ Less catastrophic impacts, such as increased frequency of extreme heat events, shorter winters, and rising sea levels are already affecting our infrastructure and economies.⁶ Some of our state economies rely on weather-dependent industries, such as agriculture, fishing, and recreational tourism, which have been affected by drought, shorter winter seasons, and changes in precipitation patterns. These impacts also threaten the health of our residents, as evidenced by recent findings that climate change is already negatively affecting human health across the country.⁷

The Clean Power Plan is a reasonable regulatory response to the risk that these and other climate change impacts pose for our country, and properly fulfills EPA's legal obligation to regulate emissions of carbon dioxide. The CPP maintains the longstanding division of responsibility between EPA and the states in regulation under the Clean Air Act (CAA). As with many prior rules, EPA created a federal framework for regulation and identified the level of emission reduction that states would then develop plans to meet. EPA conducted unprecedented outreach to states and others in the development of the CPP. We worked extensively with the agency during this process and provided many comments at all stages of rule development to ensure the regulation respected the role of states as co-regulators.

The CPP also builds upon the success that we and other states have already achieved in reducing emissions from the power sector. By "decoupling" pollution from economic growth, our states have shown that we can make our air cleaner while creating jobs, spurring

² "Incident Information," California Department of Forestry and Fire Protection, http://cdfdata.fire.ca.gov/incidents/incidents_stats?year=2017.

³ Phillip Reese, "California Wildfires in 2017: A Staggering Toll of Lost Life and Homes," The Sacramento Bee (Dec. 31, 2017), <http://www.sacbee.com/news/state/california/fires/article192402749.html>.

⁴ "Billion-Dollar Weather and Climate Disasters," NOAA, <https://www.ncdc.noaa.gov/billions/events/NY/1980-2017>; "Hurricane Costs," NOAA, <https://coast.noaa.gov/states/fast-facts/hurricane-costs.html>.

⁵ Sacha Pealer, Vermont Agency of Natural Resources, *Lessons from Irene: Building Resiliency as We Rebuild* (January 4, 2012), 1.

⁶ See generally, D.J. Wuebbles et al., U.S. Global Change Research Program, *Executive Summary of the Climate Science Special Report: Fourth National Climate Assessment, Volume I* (2017).

⁷ Lancet Countdown & American Public Health Association, *Lancet Countdown 2017 Report: U.S. Briefing* (October 31, 2017).

innovation, and attracting investment. Low natural gas prices, declining costs of renewable energy technologies, and low demand growth due to energy efficiency investments are all existing power sector trends that have allowed our states to reap positive economic benefits from reducing emissions. The CPP would amplify these trends and make emissions reductions easier and more cost-effective to achieve through increasing the demand for clean energy and creating economies of scale.

We would also like to stress the importance of accurate regulatory impact analyses (RIA) and accounting methodologies, and we are concerned with the approach taken in this proposal's RIA to calculate the benefits of reducing emissions of CO₂ and other pollutants. The additional analyses that EPA used to calculate climate change impacts, the public health benefits of pollution reduction, and EPA's assessment of the rule's impact on vulnerable communities are misleading and in some instances not grounded in the evidence, and would set a dangerous precedent for future rulemakings. We believe that such drastic changes to EPA's analytical procedures, findings, and generalized statements must go through more rigorous scientific analysis and public review process.

We discuss these and other objections we have to the proposed repeal of the Clean Power Plan, and we respond to specific requests for comment made in the proposed repeal. Specifically, we believe that: 1) the structure of the Clean Power Plan aligns with past regulation of emissions from the energy sector and maintains the independent role of states; 2) the projected impacts of the CPP are not radical departures from ongoing trends in the energy sector, and in fact will foster positive growth in the economy; 3) analyses of the impacts of regulations should include the full scope of health and welfare impacts and should adhere to the most scientifically sound methodologies; and 4) repealing the CPP will create harmful regulatory uncertainty for our electric utilities and power producers, discourage fossil fuel-intensive states from addressing this regulated air pollutant, and delay reductions in carbon emissions across the country.

These comments are being provided in the absence of EPA's proposed alternative approach to fulfill the Agency's duty to regulate⁸ greenhouse gas (GHG) emissions from stationary sources under the Clean Air Act. Although EPA issued an Advanced Notice of Proposed Rulemaking (ANPRM) on December 18, 2017, requesting input on the Agency's options for replacing the CPP, that Notice does not present an actual proposal that would allow us to evaluate repeal of the CPP with a specific alternative in mind.⁹ Comments from 12 states on the ANPRM were submitted on February 26, 2018. As explained in that letter, repealing the CPP without providing a replacement consistent with section 111(d) would violate EPA's legal obligation under section 111(d) to establish guidelines for emissions from existing sources.

⁸ Kyle Danish and Avi Zevin, "The Clean Air Act and Climate Change," ch. 14 in *The Clean Air Act Handbook*, 4th ed., ed. Julie R. Domike and Alec C. Zacaroli (Chicago: American Bar Association 2016), 563-614.

⁹ State Guidelines for Greenhouse Gas Emissions from Existing Electric Utility Generating Units, Env'tl Protection Agency No. EPA-HQ-OAR-2017-0545.

1. The scope of the CPP is not in conflict with state authorities to regulate pollution or with the role of energy regulators.

The proposed rule requests comment on whether the CPP “exceeded the EPA’s proper role” in relation to states and to energy regulators.¹⁰ The CPP maintained the balance of responsibilities between EPA and states as envisioned by Congress in the CAA by establishing federal emission levels and leaving implementation and enforcement to state governments. This cooperative federalism model reflected in Section 111(d) was included by Congress in numerous provisions of the Clean Air Act. EPA has long crafted regulations in line with those congressional choices. Moreover, the CPP respects the independent regulatory authority of the Federal Energy Regulatory Commission (FERC) and other energy regulators (e.g., state public utility commissions); the rule does not mandate a particular type of generation, nor does it interfere in electricity markets.

In the proposed rule, EPA argues that the CPP would cause a “policy shift of great significance for the relationship between the federal government and the states.”¹¹ Contrary to this characterization, the CPP preserves the relationship between the federal government and the states as established in statute and codified in numerous EPA regulations addressing the power sector.¹² For example, states have decades of experience using State Implementation Plans (SIP) to meet National Ambient Air Quality Standards (NAAQS). EPA sets targets for six criteria pollutants and the states submit plans that identify the enforceable emissions limits, compliance timetables, monitoring and verification processes, enforcement mechanisms, and contingency plans that the state has enacted to meet the targets.¹³ EPA then assesses whether the plan is complete, and if it is, grants either full, partial, or conditional approval.¹⁴ If a state does not submit a SIP or EPA finds the SIP does not meet CAA requirements, only then is a federal plan used as a backstop for air quality protection. The CPP follows the same cooperative federalism approach, tailored to meet the requirements of Section 111(d): EPA sets emission guidelines, states submit plans to achieve those guidelines, and EPA implements a federal plan if a state chooses not to submit its own.

States do not have authority over electricity generation to the complete exclusion of federal regulation; power generators must comply with federal standards for environmental quality

¹⁰ Proposed Repeal of Carbon Pollution Emission Guidelines for Existing Stationary Sources: Electric Utility Generating Units, 82 Fed. Reg. 48,035, 48,042 (October 16, 2017) [hereinafter Proposed Repeal of Carbon Pollution Emission Guidelines].

¹¹ Proposed Repeal of Carbon Pollution Emission Guidelines, 82 Fed. Reg. at 48,039.

¹² Brief for State & Municipal Intervenors in Support of Respondents by the States of New York et al. at 16, West Virginia, et al. v. EPA, No. 15-1363 (D.C. Cir. argued Sept. 27, 2016) [hereinafter Br. for State & Municipal Intervenors].

¹³ James D. Braddock & Alec C. Zaccaroli, “Meeting Ambient Air Standards,” ch. 3 in *The Clean Air Act Handbook*, 4th ed., ed. Julie R. Domike & Alec C. Zaccaroli (Chicago: American Bar Association 2016), 53-55.

¹⁴ *Id.* at 60-61.

and health and safety, and with federal energy market requirements.¹⁵ EPA, operating under both political parties, has applied the SIP process to address emissions from the power sector multiple times. For example, the 1998 NO_x SIP call, the 2005 Clean Air Interstate Rule, and the 2011 Cross-State Air Pollution Rule all established state emission budgets for the power sector and allowed states to develop plans to meet them.¹⁶ In practice, implementation of the CPP involves a very similar state planning and decision-making process as CAA regulations that target other pollutants from power plants. The structure of the CPP uses the same “cooperative federalism” approach that has been used for nearly 50 years, and does not represent a significant policy shift in the balance of state and federal authorities.

EPA also requests comment on whether the CPP infringes on the jurisdiction of energy regulators. We represent both state environmental and state energy regulatory agencies, and have firsthand knowledge of how these agencies independently regulate within their respective jurisdictions, yet in collaboration. Energy and environmental regulation coexist successfully. Federal regulators also successfully maintain distinct spheres of authority while complementing one another. Under the CPP, state energy regulators would maintain their independent authority to oversee retail electricity prices and to license new electric generating capacity.¹⁷

Any air pollution regulation that applies to emissions from power plants will affect the power sector.¹⁸ Companies that own regulated facilities must decide, based on those regulatory standards, whether to install emission control technology, whether to curtail dispatch or retire plants, and whether to invest in cleaner generation sources. State energy regulators oversee those decisions and work with utilities, generators and independent system operators to ensure that the electricity system delivers adequate, reliable power supply to customers at reasonable cost. Regardless of decisions by state energy regulators, generators must meet federal requirements.¹⁹

This is the case for both criteria pollution regulations that limit emissions from power plants and the CPP. State environmental regulators develop the implementation plans, while energy regulators oversee operating decisions by generators to meet those environmental requirements. For example, the Regional Haze Rule identified scrubbers as the “best available retrofit technology” for coal-fired power plants; yet, in a state regulatory proceeding, the Oklahoma Corporation Commission denied a utility’s request to install scrubbers at a power plant because the company had failed to fully assess whether other options, like switching to

¹⁵ Br. for State & Municipal Intervenor at 9-10.

¹⁶ Final Brief of the Institute for Policy Integrity at the NYU School of Law as Amicus Curiae in Support of Respondents at 9, *West Virginia, et al. v. EPA*, No. 15-1363 (D.C. Cir. argued Sept. 27, 2016).

¹⁷ Respondent EPA’s Final Brief at 56-57, *West Virginia, et al. v. EPA*, No. 15-1363 (D.C. Cir. argued Sept. 27, 2016).

¹⁸ *Id.* at 13.

¹⁹ *See id.* at 11-12, 20.

renewable energy, would be more cost-effective.²⁰ As long as generators meet the emissions guidelines provided by the CPP—requirements EPA is under a legal duty to establish—state energy regulators are free to implement state policies that reflect priorities for their communities, be it low retail prices, investment in clean energy, or other goals.

Another example is the process for setting NAAQS, through which EPA has repeatedly recognized that meeting these standards may cause increased use of cleaner energy sources.²¹ Such effects do not, and should not, make a pollution regulation illegitimate. In fact, the statute directs EPA to consider effects on energy requirements, acknowledging that pollution standards will affect the energy sector.²² Recently, EPA itself argued that an interpretation of the CAA that forbids indirect effects on the energy sector would preclude regulation of any harmful pollutants emitted by power plants.²³ Also, both the Mercury Rule and the Transport Rule considered shifting dispatch to lower-emitting sources in setting emission standards for the power sector,²⁴ but that did not prevent the Federal Energy Regulatory Commission (FERC) and state PUCs from maintaining stable electricity markets and reliable service. Numerous other CAA regulations influence state electricity generation mixes, yet states have successfully regulated pollution from power plants for decades while simultaneously ensuring affordable and reliable electricity service.

2. The CPP would not cause a radical departure from current market trends in the power sector, and would have positive economic impacts. The CPP mirrors the successful strategies employed by states to reduce emissions from the power sector.

In its proposed rule, EPA argues that the CPP's inclusion of generation-shifting and fuel-switching in its design would have "potentially serious economic and political implications."²⁵ However, the experience of our states indicates otherwise. Compliance with the CPP would involve actions of the same nature as changes already occurring in the electricity sector and actions that our states already use to successfully reduce emissions of both carbon dioxide and other pollutants from the power sector.

The electricity sector is already undergoing significant changes. The combination of low-cost, abundant natural gas, more efficient and flexible natural gas combined cycle generation, an aging coal plant fleet, and the declining cost of renewable energy technologies have shifted

²⁰ *Id.* at 23 (citing *In re Ok. Gas & Elec. Co.*, No. PUD 201400229, 2015 Okla. PUC LEXIS 397, at *18-*20 (Ok. Corp. Comm'n, Dec. 2, 2015)).

²¹ Final Brief of the Institute for Policy Integrity at the NYU School of Law as Amicus Curiae in Support of Respondents at 14, *West Virginia, et al. v. EPA*, No. 15-1363 (D.C. Cir. argued Sept. 27, 2016).

²² Clean Air Act §111(a), 42 U.S.C. § 7411(a); Br. for State & Municipal Intervenors at 12-14 (citing *Am. Elec. Power Co. v. Conn.*, 564 U.S. 410, 427 (2011)).

²³ Respondent EPA's Final Brief at 56, *West Virginia, et al. v. EPA*, No. 15-1363 (D.C. Cir. argued Sept. 27, 2016).

²⁴ Final Brief of the Institute for Policy Integrity at the NYU School of Law as Amicus Curiae in Support of Respondents at 14, *West Virginia, et al. v. EPA*, No. 15-1363 (D.C. Cir. argued Sept. 27, 2016).

²⁵ Proposed Repeal of Carbon Pollution Emission Guidelines, 82 Fed. Reg. at 48,042.

power markets toward low- and zero-emission sources. Natural gas continues to be the leading category of new capacity additions, and 2016 was the first year in U.S. history in which natural gas exceeded coal as the leading fuel source for electricity generation.²⁶ Electricity generation from wind and solar increased 1,200 percent between 2005 and 2015, while coal-fired generation decreased by 33 percent,²⁷ and the majority of all new capacity additions over the last three years have been non-hydroelectric renewable sources.²⁸

While the CPP will accelerate shifts to low-carbon sources of electricity generation, it is by no means the only driver of these shifts. As EPA noted, the effect of the above-mentioned “trends on the nation’s generation mix is significantly greater than the impact of the CPP..., which confirms that the CPP is trends following [sic].”²⁹ The abundance of cheap natural gas is the “main driver of these trends,”³⁰ which EPA described as “a permanent recalibration of the market based upon major advances in drilling techniques.”³¹ However, in the absence of regulation, not all states and businesses are moving toward low-carbon generation sources. As a result, federal standards are needed to drive more rapid reductions in carbon emissions across the country.

Advances in renewable energy technology and increasing economies of scale also have made zero-emission sources, such as wind and solar, increasingly competitive. Wind generation project costs declined 25 percent from 2009 to 2015, while the price of solar decreased from \$4.46 per Watt in 2009 to \$1.42 per Watt in 2016.³² The Energy Information Agency’s (EIA) Annual Energy Outlook (AEO) 2016 projected deployment of 49 GW more renewable energy capacity by 2020 than did the AEO 2015, illustrating that the projections of renewable growth have also been increasing.³³ As a result, EIA expects strong renewable energy deployment through 2030, while gas-fired generation is expected to drop below 2015 levels.³⁴

In its updated analysis of the CPP in 2017, EPA concluded that a majority of states have already met—or are on track to meet—the CPP’s 2022 interim target without any additional action, and many are on track to meet their 2030 targets.³⁵ These projections are encouraging, but action is

²⁶ U.S. Energy Information Administration, *Annual Energy Outlook 2017* (January 5, 2017), 70.

²⁷ *Id.* at 23.

²⁸ *Id.* at 27.

²⁹ U.S. Env’tl Protection Agency, Basis of Denial of Petitions to Reconsider and Petitions to Stay the CAA section 111(d) Emission Guidelines for Greenhouse Gas Emissions and Compliance Times for Electric Utility Generating Units, Appendix 2: Power Sector Trends 6 n. 7 (January 2017).

³⁰ *Id.* at 33.

³¹ *Id.* at 35.

³² *Id.* at 36.

³³ *Id.* at 49.

³⁴ *Id.* at 46-47.

³⁵ U.S. Env’tl Protection Agency, Basis of Denial of Petitions to Reconsider and Petitions to Stay the CAA section 111(d) Emission Guidelines for Greenhouse Gas Emissions and Compliance Times for Electric Utility Generating Units, Appendix 1: States’ Progress and Trends 8 (January 2017).

needed nationwide to achieve the level of emission reduction required to avoid the most dangerous consequences of climate change.³⁶ The CPP provides a national regulatory framework to enable this outcome.

Complying with the CPP also will be less costly than even EPA originally expected. EPA updated its estimates of implementation costs in January 2017, and found that the average marginal cost of CO₂ reduction would be \$4 per ton, compared to the original RIA's finding of an average marginal cost of \$11 per ton.³⁷ Generators in 18 states would be able to comply with zero compliance costs.³⁸

Furthermore, the CPP would create much-needed and sustained economic benefits, as states have demonstrated that it is possible to drive economic growth while reducing GHG emissions. The U.S. Bureau of Labor Statistics listed solar panel installers and wind turbine technicians as the projected fastest growing employment category in the country over the next ten years,³⁹ and solar technology businesses already employ more people than natural gas companies and almost twice as many people as coal companies, including employment in fuel production.⁴⁰ A Brookings Institute report found that 33 states decoupled their GHG emissions reductions from economic growth between 2000 and 2014.⁴¹ For example, Maryland cut its emissions 20 percent in that time period, while its GDP grew by 32 percent. Minnesota's GDP grew by 23.1 percent over the same years, while its emissions decreased by 3.6 percent.⁴² North Carolina's Renewable Energy and Energy Efficiency Portfolio Standard has resulted in investments of over \$10 billion in clean energy technologies,⁴³ created 34,000 clean energy jobs,⁴⁴ resulted in the state being the second largest producer of electricity from photovoltaics, and reduced CO₂ emissions by 14.6 percent between 2004 and 2014 with minimal impact to electricity rates and a GDP increase of 26.3 percent. These accomplishments have occurred without great expense to the rate payers of North Carolina, as indicated by the costs being below the cost recovery

³⁶ See United Nations Environment Programme, *The Emissions Gap Report, 2017* (2017), https://wedocs.unep.org/bitstream/handle/20.500.11822/22070/EGR_2017.pdf?sequence=1&isAllowed=y.

³⁷ *Id.* at 58.

³⁸ *Id.*

³⁹ "Employment Projections: Fastest Growing Occupations," U.S. Bureau of Labor Statistics, https://www.bls.gov/emp/ep_table_103.htm.

⁴⁰ See U.S. Dep't of Energy, *U.S. Energy and Employment Report* (January 2017), 29, tbl. 1.

⁴¹ Devashree Saha & Mark Muro, The Brookings Institution, *Growth, Carbon, and Trump: State progress and drift on economic growth and emissions 'decoupling'* (December 8, 2016), Fig. 3.

⁴² *Id.*

⁴³ RTI International, *Economic Impact Analysis of Clean Energy Development in North Carolina – 2017 Update* (Oct. 2017), available at https://energync.org/wp-content/uploads/2017/10/Summary-Findings_Economic-and-Rate-Impact-Analysis-of-Clean-Energy-Development-in-North-Carolina%E2%80%942017-Update-October-Version.pdf

⁴⁴ U.S. Climate Alliance, *2017 Annual Report*, available at https://static1.squarespace.com/static/5936b0bde4fcb5371d7ebe4c/t/59bc4959bebab2c44067922/1505511771219/USCA_Climate_Report-V2A-Online-RGB.PDF

caps set by the legislation.⁴⁵ The CPP will increase the demand for clean energy technologies, create economies of scale, and possibly allow for emissions markets, making emissions reductions less costly and accelerating this decoupling trend.

3. Changes to the methodology of the regulatory impact analysis are not based on scientific evidence, which affects the assessment of the CPP and future environmental rulemakings.

A regulatory impact analysis (RIA) calculates the projected economic costs and benefits of complying with a given regulation. The way that agencies craft and use an RIA in a rulemaking must comply with the underlying statute and must itself be rational and use best available data. In addition, changes in underlying approaches to regulation by an agency must always confront the earlier approach and offer "good reason" for the policy deviation.⁴⁶ EPA posits that the proposed rule simply repeals the CPP.⁴⁷ However, in analyzing its repeal, EPA inappropriately changed several assumptions incorporated in the original CPP RIA. EPA invites comment on the "modeling assumptions, uncertainties, and other relevant matters" related to the RIA,⁴⁸ and we object to several proposed changes to the RIA from the original CPP that seem to unjustifiably diminish the health and economic benefits of reducing carbon emissions. Not only do these changes mischaracterize the benefits of carbon dioxide emissions reductions, they also set a dangerous precedent in undervaluing the benefits from reducing other pollutants. Specifically, we object to a) EPA's approach to calculating the social cost of carbon, b) EPA's assumptions regarding the health benefits of PM_{2.5} reductions, c) EPA's assessment of the environmental justice impacts, and d) EPA's treatment of co-benefits in the regulatory analysis.

a. Calculating the social cost of carbon

The social cost of carbon (SCC) is a measure of the climate change impacts on different sectors of the economy caused by carbon dioxide emissions—e.g., net changes in agricultural productivity, property damage from rising sea levels and increased flood risk, and higher energy costs from increased use of air conditioning. It is used to estimate the benefits of a rule that would reduce carbon emissions and therefore reduce climate impacts and associated costs, and it should reflect the full cost of carbon emissions' contribution to climate change. In the proposed CPP repeal, EPA made several changes to its calculation of the SCC, compared to the 2015 RIA of the CPP, all of which understate the benefits of the CPP.

In the proposed repeal, EPA limited cost estimates to the impacts expected to occur within the United States. EPA's decision to narrowly focus on domestic costs is not consistent with the

⁴⁵ North Carolina Utilities Commission, Annual Report Regarding Renewable Energy and Energy Efficiency Portfolio Standard in North Carolina Required Pursuant to G.S. 62-133.8(J) (October 1, 2017), <http://www.ncuc.commerce.state.nc.us/reports/repreport2017.pdf>.

⁴⁶ See *Encino Motorcars, LLC v. Navarro et al.*, No. 15-415 (U.S. June 20, 2016).

⁴⁷ Proposed Repeal of Carbon Pollution Emission Guidelines, 82 Fed. Reg. at 48,036.

⁴⁸ *Id.* at 48,043.

best available, peer-reviewed scientific literature, the independent conclusions of the nation's preeminent scientific academy, or the federal government's own climate science and impacts assessment reports. The approach of the proposed repeal fails to fully account for the real costs our states will experience and are already experiencing due to global climate change, and does not reflect the physical reality of climate change impacts. Volume 1 of the Fourth National Climate Assessment is the latest of a series of peer-reviewed, authoritative assessments of the science of climate change published by the federal government since 2000 that conclude that the observed climate changes in the United States—including changing temperature, precipitation, extreme weather, and sea level rise—are driven by changes in the global climate system.⁴⁹ The U.S. is not isolated either physically or economically from the rest of the world; droughts and extreme weather events in other countries create social instability that affects our national security and affect the global economy through changes in commodity prices, disrupted supply chains, international migration and tourism patterns, in addition to the physical impacts of individual events. The National Academy of Sciences—created by Congress in 1863 to provide objective, non-partisan scientific advice to the federal government⁵⁰—concluded that “[c]limate damages to the United States cannot be accurately characterized without accounting for consequences outside U.S. borders.”⁵¹

As the world's largest economy with a military presence in numerous countries, the U.S. could experience even stronger effects from international climate impacts than other countries.⁵² The U.S. Department of Defense identified persistent changes in environmental conditions, more frequent and severe extreme weather events, sea level rise, and decreases in Arctic ice cover as significant national security risks.⁵³ The U.S. military is already expending resources responding to these circumstances: after a six-year severe drought, political instability in Syria increased as a result of food shortages, increased migration, and the inability of local institutions to meet changing demands; during a historic flood in Pakistan that killed 2,000 people, DoD provided humanitarian relief; and DoD is actively planning for damages caused by sea level rise to port facilities and other military installations worldwide.⁵⁴ EPA has not provided an adequate explanation for changing its previous approach to ignore such significant factors in estimating the full social cost of carbon.

⁴⁹See “About NCA4 Vol. I,” U.S. Global Change Research Program, <https://www.globalchange.gov/content/cssr>; D.J. Wuebbles et al., eds., U.S. Global Change Research Program, *Climate Science Special Report: Fourth Nat'l Climate Assessment, Vol. I* (2017), available at <https://science2017.globalchange.gov/>.

⁵⁰ “Frequently Asked Questions,” Nat'l Academies of Sciences, Engineering, & Medicine, <http://www.nationalacademies.org/about/faq/index.html>.

⁵¹ Nat'l Academy of Sciences, Engineering, & Medicine, *Valuing Climate Damages: Updating Estimation of the Social Cost of Carbon Dioxide* (2017), 53.

⁵² Ilana Paul, Peter Howard, & Jason A. Schwartz, Institute for Policy Integrity, *The Social Cost of Greenhouse Gases and State Policy* (October 2016), 6.

⁵³ U.S. Department of Defense, *National Security Implications of Climate-Related Risks and a Changing Climate* (July 23, 2015), 4-5.

⁵⁴ *Id.*

Climate change is a global problem, and will require global action and cooperation to address. If states and other countries followed the example set in this proposed rule and only considered the domestic costs and benefits of climate change mitigation, we would collectively fail to reduce emissions with the urgency that is needed to address this global challenge.⁵⁵ New York's Public Service Commission uses the federal estimate of the SCC in its regulatory actions, but it also has expressly recognized that "a narrow view of costs and benefits [limited to inside the jurisdiction]... could lead to inaction not only in New York but in all other jurisdictions."⁵⁶ Other countries, such as Canada and Mexico, already directly use the U.S. estimates of the social cost of carbon in setting their emissions standards.⁵⁷ By choosing to disregard global impacts in its estimation of the value of reducing carbon, EPA not only drastically underestimates the benefits the CPP would have produced, but also discourages other countries from making the commitments needed to address climate change.

Additionally, in the proposed repeal, EPA chose to apply a higher discount rate of seven percent to the estimated benefits from reducing carbon emissions, compared to the three percent discount rate used in the 2015 RIA. The high discount rate dramatically underestimates the real costs our states and citizens—particularly future generations—will suffer. Economic experts have pointed out that applying such a high discount rate to intergenerational effects is not the standard practice, and OMB itself has concluded that a discount rate of seven percent is not appropriate for effects experienced on a long time horizon, such as climate change.⁵⁸ A recent report by the Council of Economic Advisors found that a discount rate of about two percent, which is lower than that used in the 2015 CPP RIA, may be more appropriate for these types of impacts.⁵⁹ By applying a discount rate of seven percent, more than twice the rate recommended by OMB, the proposed rule's RIA minimizes the true value of emission reductions to our states and the people we serve, including today's children and future generations.

b. Valuing the health benefits of PM_{2.5} reductions

The proposed rule's RIA also included additional novel analyses as part of EPA's estimation of health benefits of reductions in emissions of PM_{2.5}, without a scientific basis for this change. Section 111(a) of the CAA requires EPA to consider health impacts in setting emission guidelines.⁶⁰ In considering those impacts, EPA must err on the side of a more inclusive

⁵⁵ Iliana Paul, Peter Howard, & Jason A. Schwartz, Institute for Policy Integrity, *The Social Cost of Greenhouse Gases and State Policy* (October 2016), 6.

⁵⁶ NY State Public Service Commission, Order Adopting a Clean Energy Standard, No. 15-E-302 (August 21, 2016), 71.

⁵⁷ *Id.*

⁵⁸ Interagency Working Group on the Social Cost of Carbon, Response to Comments: Social Cost of Carbon for Regulatory Impact Analysis under Executive Order 12,866 (July 2015), 36.

⁵⁹ Richard G. Newell, Resources for the Future, *Unpacking the Administration's Revised Social Cost of Carbon* (October 10, 2017).

⁶⁰ Clean Air Act § 111(a), 42 U.S.C. § 7411(a).

consideration of regulatory impacts and costs.⁶¹ The changes EPA made in its analysis of the costs and benefits of the repeal of the CPP do not reflect an inclusive consideration of the forgone health benefits of the CPP.

As Administrator Pruitt recently affirmed in his testimony before the Environment Subcommittee of the House Committee on Energy and Commerce,⁶² scientists agree that PM_{2.5}, or fine particulate matter, is a dangerous health hazard and that no safe level of exposure has been identified.⁶³ The 2015 RIA of the CPP followed EPA's well-established practice and the most scientifically sound approach of including the health benefits of reducing PM_{2.5} at any level, including to levels well below NAAQS standards. According to EPA's prior analysis, the scientific evidence shows that there are significant health benefits from all levels of reductions in PM_{2.5}.⁶⁴ Many state regulators have concluded the same; for example, the Minnesota Pollution Control Agency, Department of Health, Department of Commerce, and Public Utilities Commission have all addressed the question of whether potential health impacts from PM_{2.5} exist below the current NAAQS. In all instances, these Minnesota agencies recognized the high potential for health impacts from PM_{2.5} levels below the NAAQS.⁶⁵ The New York Department of Environmental Conservation found that the first 20 years of participating in RGGI would prevent nearly 10,000 premature deaths through reducing levels of ozone and fine particulates by 10 percent.⁶⁶

Instead, in its RIA for the proposed repeal of the CPP, EPA chose to include two additional estimates of the benefits from reductions in PM_{2.5} emissions. The first eliminated the health benefits of PM_{2.5} reductions below the established NAAQS threshold. The second eliminated the health benefits of reductions below the lowest measured level (LML) threshold observed in major studies. EPA argues that these changes better reflected the uncertainties associated with estimating such benefits. However, EPA has consistently evaluated the health risks from individual pollutants, and where no safe level of exposure to a pollutant has been identified,

⁶¹ See *Michigan v. EPA*, 135 S. Ct. 2699 (2015).

⁶² *The Mission of the Environmental Protection Agency: Hearing Before the Subcommittee on Environment, H. Comm. On Energy and Commerce*, 115th Cong. (2017) (statement of Admin. Scott Pruitt).

⁶³ See, e.g., U.S. Env'tl. Protection Agency, *Summary of Expert Opinions On the Existence of a Threshold in the Concentration-Response Function for PM_{2.5}-related Mortality* (June 2010), <https://www3.epa.gov/ttn/ecas/regdata/Benefits/thresholdstds.pdf>; World Health Organization, *Health Effects of Particulate Matter* (2013), 6.

⁶⁴ *Id.*

⁶⁵ Minn. Pollution Control Agency, *Life and Breath* (2015), https://www.pca.state.mn.us/featured/life-and-breath_ Accessed December 19, 2017; Minn. Office of Administrative Hearings, *In the Matter of the Further Investigation into Environmental and Socioeconomic Costs Under Minnesota Statutes Section 216B.2422* at 103. https://mn.gov/oah/assets/2500-31888-environmental-and-socioeconomic-costs-criteria-pollutants-report_tcm19-245843.pdf.

⁶⁶ NY State Dep't of Env'tl. Conservation, *Final Generic Environmental Impact Statement for Promulgation of 6 NYCRR Part 242: CO₂ Budget Trading Program* (2008), 8.

then the health benefits are included for reductions at all levels.⁶⁷ Ignoring those benefits ignores the real lives that would be saved in our states from those reductions, something no regulatory analysis should do. We believe that this is a complex matter that requires rigorous scientific analysis, debate, and public discussion. We request that EPA remove this new approach for estimating health benefits of reductions in emissions of PM_{2.5} that has far reaching impacts to future regulatory impact analysis, and convene a scientific panel and a national dialogue to address the fate of the PM_{2.5} health benefit analysis process.

c. Assessing environmental justice impacts

EPA's conclusion that this proposed rule will not have any significant environmental justice impacts is unsupported by reasoned analysis. The proposed rule acknowledges that previous analyses found that low-income and minority communities located in proximity to EGUs "may have experienced an improvement in air quality as a result of" the CPP, but it argues that this analysis is uncertain and did not account for the "potential distribution of compliance costs."⁶⁸ EPA identifies potential health impacts of unemployment (e.g., substance abuse) resulting from shifts in regional workforces due to the CPP and concludes without justification that repealing the CPP would be unlikely to have disproportionate effects on vulnerable populations. These are speculative and attenuated risks compared to the direct health and environmental impacts of exposure to pollution from power plants that have been studied and documented by scientists and public health practitioners for decades.⁶⁹

d. Accounting for co-benefits

EPA invites comment on the extent to which EPA should only consider the benefits of reducing the *target* pollutant relative to the costs in its regulatory decision-making. EPA noted that it believes this to be an appropriate way to evaluate this *and future* regulatory actions. We interpret this to call for comment on ending the inclusion of co-benefits in calculating a regulation's costs and benefits. When examining the societal impacts of a change in policy, all

⁶⁷ For example, in the RIA for proposed revisions to the NAAQS for lead, EPA notes that, "[t]here is no level of [lead] exposure that can yet be identified, with confidence, as clearly not being associated with some risk of deleterious health effects"; U.S. EPA, Regulatory Impact Analysis of the Proposed Revisions to the National Ambient Air Quality Standards for Lead (2008), <https://www3.epa.gov/ttnecas1/regdata/RIAs/finalpbria.pdf>. Another example: in the RIA for the final revisions to NAAQS for ozone, EPA notes: "Though there are greater uncertainties at lower ozone and PM_{2.5} concentrations, there is no evidence of a threshold in short-term ozone or PM_{2.5}-related health effects in the epidemiology literature." U.S. EPA, Regulatory Impact Analysis of the Final Revisions to the National Ambient Air Quality Standards for Ground-Level Ozone (2015), <https://www.epa.gov/sites/production/files/2016-02/documents/20151001ria.pdf>.

⁶⁸ Proposed Repeal of Carbon Pollution Emission Guidelines, 82 Fed. Reg. at 48,048.

⁶⁹ Daniel Krewski et al., "Extended Follow-Up and Spatial Analysis of the American Cancer Society Study Linking Particulate Air Pollution and Mortality," Research Report 140, Health Effects Institute (2009), <https://www.healtheffects.org/system/files/Krewski140.pdf>; Johanna Lepeule et al., "Chronic Exposure to Fine Particles and Mortality: An Extended Follow-up of the Harvard Six Cities Study from 1974 to 2009," *Environ Health Perspect.* 2012 Jul; 120(7): 965–970, <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3404667/>.

relevant impacts should be considered, including indirect effects that are significantly negative or positive. In its proposed repeal of the CPP, EPA included indirect economic impacts in its calculation of the compliance costs that the proposed repeal would avoid, such as impacts on retail electricity rates and changes in wholesale energy market prices.⁷⁰ EPA should do the same when assessing the forgone health benefits that the CPP would produce.

We strongly encourage EPA to continue its longstanding practice of including the health benefits of known, measurable reductions in non-target pollutants, commonly referred to as co-benefits, in a rule's RIA. We recognize that these co-benefits must be quantified in a manner that avoids double counting between successive or related regulatory actions. As state regulators, we incorporate the reductions of non-target pollutants caused by compliance with one federal CAA rule into our planning and implementation of other pollution reduction standards. Excluding these pollution reductions from the RIA and relying on that assessment to repeal the CPP will set an unwelcome precedent for future EPA regulatory actions and disrupt our current strategies for meeting other federal pollution standards.

4. Repealing the CPP will create harmful regulatory uncertainty for our electric utilities and power producers, and will only further delay necessary reductions in carbon emissions.

The proposed repeal creates regulatory uncertainty. Utilities and generators plan investments decades ahead of time; they have spent years preparing for CPP compliance, and now the regulatory environment is more uncertain. For example, Minnesota law requires the Public Utilities Commission (MPUC) to establish an estimated cost range of future CO₂ regulation on electric generation in the state,⁷¹ which is then to be applied in utility Integrated Resource Plans (IRPs). The MPUC's most recently established cost range and starting date were designed for CPP compliance. Since utilities plan many years in advance, Minnesota utilities have already included this cost estimate in their IRPs. If EPA repeals the CPP, these plans become more, not less, uncertain. EPA argues the CPP would disrupt the electricity sector, but in fact it is the repeal that would force some electricity suppliers and regulators to change course.

Finally, we are deeply concerned with the broader policy implications of repealing the CPP. EPA has a legal duty to regulate carbon emissions, a duty it has had 10 years to fulfill. Repealing the rule without a replacement and with no timeline to develop one will further delay necessary reductions in carbon emissions, while states and residents are already suffering from climate change impacts. The CPP is an appropriate framework for meeting EPA's responsibility, while this repeal would put the agency back at square one. Our states are already seeing the impacts of climate change. There is no time to waste in meeting EPA's legal obligation to address these emissions. Further delaying any limit on carbon pollution ignores the real harm happening

⁷⁰ U.S. Env'tl. Protection Agency, Regulatory Impact Analysis for the Review of the Clean Power Plan: Proposal 58-59 (October 2017).

⁷¹ Minn. Stat. § 216H.06.

today, and shirks EPA's affirmative legal duty. Although this group of states has continued to work to reduce our emissions, carbon emissions do not produce locally isolated impacts – effects are global. As states, we can only do so much on our own; we need a federal framework, like the CPP, to achieve the necessary emission reductions on a nationwide basis. We urge EPA to maintain the CPP and work with states to achieve its goal of reducing carbon pollution.

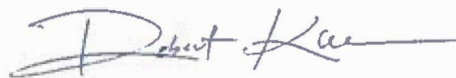
Sincerely,



Mary Nichols
Chair
California Air Resources Board




Dr. Larry Wolk
Director
Colorado Department of Public Health
& Environment



Robert Klee
Commissioner
Connecticut Department of Energy
and Environmental Protection



Shawn M. Garvin
Secretary
Delaware Department of Natural Resources
& Environmental Control



Martin Suuberg
Commissioner
Massachusetts Department
of Environmental Protection



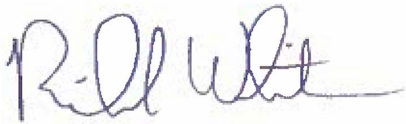
John Linc Stine
Commissioner
Minnesota Pollution Control Agency



Basil Seggos
Commissioner
New York State Department
of Environmental Conservation



Michael S. Regan
Secretary
North Carolina Department
of Environmental Quality



Richard Whitman
Director
Oregon Department of Environmental
Quality



Janine Benner
Director
Oregon Department of Energy



Janet Coit
Director
Rhode Island Department of Environmental
Management



Emily Boedecker
Commissioner
Vermont Department of Environmental
Conservation



David Paylor
Director
Virginia Department of Environmental
Quality



Maia Bellon
Director
Washington Department of Ecology

Appendix: Relevant State Examples

Impacts of Climate Change

- In New England, warming coastal water, ocean acidification and other climate change impacts are threatening marine life and the economic viability of the fishing industry. For instance, Connecticut's lobster landings topped 3.7 million pounds a year, worth \$12 million, in the late 1990s, but by 2014 had diminished to about 127,000 pounds worth a little more than \$600,000. Data collected by the National Oceanic and Atmospheric Administration (NOAA) demonstrate that marine species, such as lobsters, have moved further north and east to colder and/or deeper water. Scientists studying the impacts of climate change coastal water in New England suggest that the effects of climate change will likely be greater than in other parts of the world due to the Gulf Stream moving north, increasing water temperatures, increased storm magnitude and frequency, and increases in precipitation.¹
- According to the Connecticut Department of Insurance, properties along the Connecticut coastline are collectively valued at over \$570 billion and insurance companies paid nearly \$1 billion for 200,000 covered claims as a result of the October 2011 Nor'easter, Tropical Storm Irene in 2011 and Superstorm Sandy in 2012. In addition to this, the local utilities storm recovery costs totaled \$462.3 million, of which \$414 million ratepayers paid over a 6-year period.
- According to new research, unabated greenhouse gas (GHG) emissions could allow sea levels to rise up to ten feet by the end of this century—an outcome that could devastate coastal communities in California and around the world.²
- California's current conditions point to a changing climate. California's recent historic drought incited land subsidence, pest invasions that killed over 100 million trees,³ and water shortages throughout the State. Recent scientific studies show that such extreme drought conditions are more likely to occur under a changing climate.⁴ The total statewide economic cost of the 2013–2014 drought was estimated at \$2.2 billion, with a total loss of 17,100 jobs.⁵

¹ Jan Ellen Spiegel, "Beneath the Waves, Climate Change Puts Marine Life on the Move," *CT Mirror* (New Haven, CT), 29 August 2016. Accessed November 3, 2017. <https://ctmirror.org/2016/08/29/beneath-the-waves-climate-change-puts-marine-life-on-the-move/>.

² California Ocean Protection Council, *Rising Seas in California: An Update On Sea-Level Rise Science* (2017), www.opc.ca.gov/webmaster/ftp/pdf/docs/rising-seas-in-california-an-update-on-sea-level-rise-science.pdf.

³ U.S. Department of Agriculture, *New Aerial Survey Identifies More Than 100 Million Dead Trees in California* (2016), www.usda.gov/wps/portal/usda/usdahome?contentid=2016/11/0246.xml&contentidonly=true.

⁴ N. Dissenbaugh, D. L. Swain, and D. Touma, "Anthropogenic Warming Has Increased Drought Risk in California," *Proceedings of the National Academy of Sciences* 112(13) (2015): 3931–3936; D. Cayan, T. Das, D. W. Pierce, T. P. Barnett, M. Tyree, and A. Gershunov, "Future Dryness in the Southwest US and Hydrology of the Early 21st Century Drought," *Proceedings of the National Academy of Sciences* 107(50) (2010): 21272–21276.

⁵ R. Howitt, J. Medellin-Azuara, D. MacEwan, J. Lund, and D. Summer, *Economic Analysis of 2014 Drought on California Agriculture* (Univ. of California, Davis, 2014), https://watershed.ucdavis.edu/files/biblio/DroughtReport_23July2014_0.pdf.

- One study shows that the increasing co-occurrence of dry years with warm years raises the risk of drought, highlighting the critical role of elevated temperatures in altering water availability and increasing overall drought intensity and impact.⁶ Generally, there is growing risk of unprecedented drought in the western United States driven primarily by rising temperatures, regardless of whether or not there is a clear precipitation trend.⁷
- While more intense dry periods are anticipated under warmer conditions, extremes on the wet end of the spectrum are also expected to increase due to more frequent warm, wet atmospheric river events and a higher proportion of precipitation falling as rain instead of snow. In recent years, atmospheric rivers have also been recognized as the cause of the large majority of major floods in rivers all along the U.S. West Coast and as the source of 30 to 50 percent of all precipitation in the same region.⁸
- According to data compiled by the Georgetown Climate Center and Old Dominion University's Mitigation and Adaptation Research Institute, the Commonwealth of Virginia has already seen a 33 percent increase in heavy rainstorms and snowstorms in the last sixty years, as well as an 11 percent increase in precipitation from the largest storms. The same report found that as many as 400,000 Virginia homes are at risk of damage from increased storm surges.⁹ The researchers projected that rebuilding Virginia's at-risk residential property could cost \$92 billion. In addition, half of Virginia's counties face increased risk of water shortages by 2050 as the result of climate-related shifts in precipitation and weather.¹⁰ Currently, agriculture is Virginia's largest industry, supporting almost 311,000 jobs with an annual economic impact of \$52 billion.¹¹ Other business sectors are similarly feeling the impacts of climate change as warmer temperatures affect worker productivity and the health of the workforce.¹²
- In New York, average annual temperature statewide has increased by about 2.4°F since 1970, with winter warming exceeding 4.4°F. These temperature increases have been seen statewide, with the largest temperature increases occurring around New York City and downstate west of the Hudson River. The state's average temperatures are projected to continue to increase by 5°F to 10°F by the 2080s. Average annual precipitation has also increased across the state, with heavier

⁶ N. Diffenbaugh, D. L. Swain, and D. Touma, "Anthropogenic warming has increased drought risk in California," *Proceedings of the National Academy of Sciences* 112(13) (2015): 3931-3936, www.pnas.org/content/112/13/3931.full.pdf.

⁷ B. I. Cook, T. R. Ault, and J. E. Smerdon, "Unprecedented 21st Century Drought Risk in the American Southwest and Central Plains," *Science Advances* 1(1) (2015).

⁸ M.D. Dettinger, "Atmospheric Rivers as Drought Busters on the U.S. West Coast," *Journal of Hydrometeorology* 14 (2013):1721-1732, journals.ametsoc.org/doi/abs/10.1175/JHM-D-13-02.1.

⁹ Georgetown Climate Center & Old Dominion University Mitigation and Adaptation Research Institute, *Understanding Virginia's Vulnerability to Climate Change* (2017), <http://www.georgetownclimate.org/files/report/understanding-virginias-vulnerability-to-climate-change.pdf>. Accessed May 9, 2017.

¹⁰ See *id.*

¹¹ Virginia Department of Agriculture and Consumer Services, *Virginia Agriculture Facts & Figures*, <http://www.vdacs.virginia.gov/markets-and-finance-agriculture-facts-and-figures.shtml>. Accessed May 9, 2017.

¹² U.S. Global Change Research Program, *Impacts of Climate Change on Human Health in the United States: A Scientific Assessment* (2016), <https://health2016.globalchange.gov/>. Accessed May 9, 2017.

precipitation occurring in winter and less precipitation in late summer and early fall. Since the 1950s, precipitation occurring as downpours has increased by more than 70 percent in the northeastern United States. In New York, areas around the Capital District and New York City saw the largest increases in precipitation. Precipitation is projected to increase by 4 to 15 percent by 2080s, with a lot of regional variability. Extreme weather events, including heat waves, cold events, intense precipitation and flooding, and drought, are expected to increase in both frequency and intensity. The number of heat waves is expected to increase, and will likely be a substantial departure from historically cool conditions in upstate regions of the state.¹³ Sea level has risen by over a foot since 1900 and is projected to continue to rise by a total of 6 feet by 2100.¹⁴ This is very likely to increase coastal flooding.

- The North Carolina Coastal Resource Commission’s Science Panel predicts sea levels will rise by 1.9 to 10.6 inches at different locations along North Carolina’s coast by 2045.¹⁵ The North Carolina Division of Emergency Management (NCEM) predicted that in the next century 9 percent of the land area in the 20 coastal counties would experience inundation.¹⁶ Another study predicted 13 communities will face chronic inundation from sea level rise by 2035.¹⁷ NCEM also predicted sea level rise could cause the regulatory floodplain to expand by 350 square miles, causing the loss of 5000 buildings worth \$923 million, and adding 24,000 buildings to the floodplain.¹⁸ Sea level rise and inundation also would have a major impact on North Carolina’s \$22.9 billion tourism industry, including loss of coastal areas and decrease in demand due to unpredictable weather patterns.¹⁹ In addition, North Carolina’s coastal wetlands and estuaries, which support fisheries, face damage from salt water intrusion and increased storm damage.
- Climate change will impact the agriculture sector in North Carolina, which contributed \$84 billion to the state’s economy in 2016.²⁰ More severe droughts and higher temperatures can lead to crop

¹³ R. Horton, D. Bader, C. Rosenzweig, A. DeGaetano, and W. Solecki, *Climate Change in New York State: Updating the 2011 ClimAID Climate Risk Information* (Albany, New York: New York State Energy Research and Development Authority (NYSERDA), 2014).

¹⁴ N.Y. Comp. Codes R. & Regs. Tit. 6, § 490.

¹⁵ N.C. Coastal Resource Commission Science Panel, *North Carolina Sea-Level Rise Assessment Report: 2015 Update to 2010 Report and 2012 Addendum* (March 31, 2015), <https://files.nc.gov/ncdeq/Coastal%20Management/documents/PDF/Science%20Panel/2015%20NC%20SLR%20Assessment-FINAL%20REPORT%20Jan%2028%202016.pdf>.

¹⁶ North Carolina Department of Public Safety, North Carolina Emergency Management Geospatial and Technology Management, *North Carolina Sea Level Rise Impact Study: Final Study Report* (June 2014).

¹⁷ Union of Concerned Scientists, *When Rising Seas Hit Home: Fact Sheet: North Carolina Faces Chronic Inundation* (July 2017), <https://www.ucsusa.org/sites/default/files/attach/2017/07/when-rising-seas-hit-home-northcarolina-fact-sheet.pdf>.

¹⁸ North Carolina Department of Public Safety, North Carolina Emergency Management Geospatial and Technology Management, *North Carolina Sea Level Rise Impact Study: Final Study Report* (June 2014).

¹⁹ Economic Development Partnership of North Carolina, *North Carolina Tourism Generates Record Employment and Visitor Spending in 2016* (May 8, 2017), <https://edpnc.com/north-carolina-tourism-generates-record-employment-visitor-spending-2016/>.

²⁰ Brian Long, “Today’s Topic: Economic impact of NC agriculture, agribusiness increases to \$84 billion,” *In the Field* (June 7, 2016), <http://info.ncagr.gov/blog/2016/06/07/todays-topic-economic-impact-of-nc-agriculture-agribusiness-increases-to-84-billion/>.

failures and reduced livestock productivity.²¹ Increasingly severe and frequent hurricanes will also damage forestlands. A study of the economic impacts of climate change in North Carolina estimated that forest damages rise by \$500 million for every increase in category level of hurricane.²² In addition, saltwater intrusion from sea level rise will impact agriculture and forestlands in coastal counties.

- North Carolina also sits within a frequent hurricane path. In 2016, flooding from Hurricane Matthew had devastating impacts on eastern North Carolina, killing at least 27 people and causing some \$1.5 billion in damage.²³ Although this particular hurricane may not be studied to be linked to climate change, it provides an indication of the extent of the impact to the community and infrastructure.

State Approaches to RIAs

- New York's Public Service Commission (PSC) utilizes the federal Social Cost of Carbon (SCC) in its regulatory actions. For example, in adopting the Clean Energy Standard (CES), which requires utilities to provide 50 percent renewable energy by 2030, the PSC issued a cost study that found: "The net benefits of the CES to 2023 of \$1.8 billion reflect program costs and the benefits associated with lower carbon emissions. The CES forms a crucial component of efforts to deliver the New York State targets of reducing carbon emissions by 40 percent by 2030, and 80 percent by 2050, both by maintaining emission reductions from existing nuclear and renewable energy facilities, and achieving further carbon reductions through new renewable energy deployment. The Study quantifies these carbon benefits using the 'social cost of carbon' as published by the U.S. Environmental Protection Agency."²⁴ In its decision, the PSC expressly rejected the argument that benefits should be limited to those occurring domestically: "A narrow view of costs and benefits might limit environmental benefits to those experienced solely within New York. In the case of climate change, such an approach could lead to inaction not only in New York but in all other jurisdictions."²⁵ The PSC also uses the SCC in establishing zero emission credits for nuclear power and in pricing distributed energy resources under the Reforming the Energy Vision program.²⁶

²¹ U.S. Environmental Protection Agency, *What Climate Means for North Carolina* (August 2016), <https://19january2017snapshot.epa.gov/sites/production/files/2016-09/documents/climate-change-nc.pdf>.

²² University of Maryland, Center for Integrative Environmental Research, *Economic Impacts of Climate Change on North Carolina* (Sept. 2008), <http://cier.umd.edu/climateadaptation/North%20Carolina%20Economic%20Impacts%20of%20Climate%20Change%20Full%20Report.pdf>

²³ FEMA, Press Release, "Six Months Following Hurricane Matthew, Volunteers Work for North Carolina Progress," (April 6, 2017), <https://www.fema.gov/news-release/2017/04/06/six-months-following-hurricane-matthew-government-partners-volunteers-work>.

²⁴ N.Y.S. Department of Public Service, *Clean Energy Standard White Paper – Cost Study, No. 15-E-302* (April 8, 2016), 6.

²⁵ N.Y.S. Public Service Commission, *Order Adopting a Clean Energy Standard, No. 15-E-302* (August 21, 2016), 71.

²⁶ N.Y.S. Public Service Commission, *Order Establishing the Benefit Cost Analysis Framework, No. 14-M-0101* (January 21, 2016), 18.

- In initially adopting and subsequently revising its regulations implementing the Regional Greenhouse Gas Initiative, New York calculated the benefit from reducing non-CO₂ criteria pollutants. In its 2008 Environmental Impact Statement (EIS), New York Department of Environmental Conservation found: “[T]he burning of fossil fuels contributes to other air quality problems, including increases in local concentrations of nitrogen oxides (NO_x), mercury and sulfur dioxide (SO₂). NO_x and SO₂ are both associated with ozone formation and fine particle pollution. Scientists believe that reducing GHG emissions by the levels anticipated to occur through the Regional Greenhouse Gas Initiative (RGGI) will also reduce ambient levels of ozone and fine particles by 10 percent. They conclude that reductions of this magnitude will prevent nearly 10,000 New York City area premature deaths over a 20 year period.”²⁷ The 2013 EIS regarding revisions to the RGGI cap determined that it would yield “cumulative emission reductions of NO_x, SO₂, and mercury through 2020 within the RGGI region [of] 38,000 tons, 68,000 tons, and 0.134 tons respectively.”²⁸
- Minnesota has used valuation of small particulate matter (PM_{2.5}) impacts in its regulatory policy making for planning purposes and to inform actions to protect public health. The Minnesota Pollution Control Agency (MPCA) has estimated that the total public health burden of PM_{2.5} exposure across the state to value many billions of dollars. The MPCA, the Minnesota Department of Health (MDH), the Minnesota Department of Commerce, and the Minnesota Public Utilities Commission (MPUC) have all addressed the question of whether potential health impacts from PM_{2.5} exist below the current NAAQS. In all instances, these Minnesota agencies decided to follow the research literature and recognize the significant health impacts from PM_{2.5} levels below the National Ambient Air Quality Standards (NAAQS).
- Minnesota’s “Life and Breath” report,²⁹ a 2015 publication jointly authored by MPCA and the MDH, examined the health impacts of air pollution in the Minneapolis-St. Paul metropolitan area. One conclusion of the study was that a 10 percent reduction in concentrations of fine particles (formed, in part, from emissions of SO₂ and NO_x) and ground-level ozone (created by chemical reactions between NO_x and volatile organic compounds) in the metro area could prevent hundreds of deaths, hospitalizations, and emergency department visits due to heart and lung conditions each year. Again, this followed the prevailing scientific consensus of linear concentration-response relationships with no evidence of safe thresholds (i.e., below the NAAQS or below the lowest observed values in the epidemiological studies).
- Specifically in the context of electricity generation, Minnesota has used valuation of PM_{2.5} impacts in its regulatory policy making. Minnesota law requires the Minnesota Public Utilities Commission (MPUC) to determine the environmental costs of emissions (of both criteria pollutants and CO₂), which electricity generators must apply in their integrated resource plans (IRPs).³⁰ Utilities are required to consider these costs in their resource plans to determine which fuel resources should

²⁷ N.Y.S. Department of Environmental Conservation, *Final Generic Environmental Impact Statement for Promulgation of 6 NYCRR Part 242: CO₂ Budget Trading Program* (2008), 8.

²⁸ *Id.* at 70.

²⁹ Minn. Pollution Control Agency, *Life and Breath* (2015), <https://www.pca.state.mn.us/featured/life-and-breath>. Accessed December 19, 2017.

³⁰ Minn. Stat. § 216B.2422.

be selected to meet Minnesota's future electricity demand. In July 2017, the MPUC updated the externality costs of criteria pollutants (PM_{2.5}, SO₂ and NO_x) emissions and CO₂ emissions. For CO₂, the MPUC chose to use the federal government Interagency Working Group's SCC values, with some modifications, as the best available and most appropriate values for the environmental cost of CO₂ emissions from Minnesota power plants. For criteria pollutants, the MPUC chose externality cost values that consider the human health impacts from PM_{2.5} exposure. The selection of these values followed a contested case proceeding, where some parties argued that there should be assumed to be either no impacts of PM_{2.5} exposure below the NAAQS or new impacts below the low end of the range of ambient PM_{2.5} concentrations in the major epidemiological studies that quantified the relationship between PM_{2.5} exposure and premature mortality. The Minnesota Administrative Law Judge, and later the MPUC, rejected these arguments, agreeing with the scientific literature that "...a preponderance of the evidence demonstrates the relationship between chronic exposure to PM_{2.5} and all-cause cardiovascular and lung-cancer mortality is linear without a threshold."³¹

Cooperation and Collaboration between Environmental and Energy Regulations and Regulators

- The Regional Greenhouse Gas Initiative cap-and-invest program is a collaboration of the energy and environmental regulators in each of the nine participating states. For example, Connecticut's Department of Energy and Environmental Protection (DEEP) works hand-in-hand with its Public Utilities Regulatory Authority (PURA) to fully implement the state's participation in RGGI. For instance, PURA's Chair-person has served as the RGGI Executive Board Chair while EGU compliance entities are regulated by DEEP.
- North Carolina's Department of Environmental Quality, State Energy Office, North Carolina Utilities Commission, and the Utilities Commission Public Staff have worked together on energy and electricity related projects for many years. This includes formulating, implementing and reporting compliance activities under the state's landmark air pollution legislation, the Clean Smoke Stacks Act (CSA), which set emission limits for large coal electric generating units in North Carolina from 2002 to the present. The interagency cooperation also includes providing assistance on the development and reporting under the North Carolina's Renewable Energy and Energy Efficiency Portfolio Standard (REPS). The two agencies also worked together extensively on the Clean Power Plan (CPP) comments and developed early strategies for its implementation. Lastly, the two agencies participated in workshops designed to educate their staff on various rules, programs, and opportunities to reduced electricity demand and costs and to find new ways to work together for the citizens of North Carolina.

Success in Reducing Emissions while Growing Economy

- Connecticut's largest reduction since 1990 has occurred in the electric power sector – a reduction of 41 percent. Overall, the carbon intensity of Connecticut's economy has declined dramatically falling from

³¹ Minn. Office of Administrative Hearings, *In the Matter of the Further Investigation into Environmental and Socioeconomic Costs Under Minnesota Statutes Section 216B.2422* p. 103, https://mn.gov/oah/assets/2500-31888-environmental-and-socioeconomic-costs-criteria-pollutants-report_tcm19-245843.pdf.

0.8 pound of CO₂e per dollar of state gross domestic product in 1990 to 0.4 pounds per dollar in 2014. This demonstrates significant long-term decoupling of economic growth and carbon pollution.

- Minnesota has achieved significant GHG emissions reductions since 2005 while growing its economy, and has built a clean energy economy over the past decade that will support continued GHG emissions reductions well into the future. In 2007, the Minnesota legislature unanimously adopted a statewide effort to address GHG emissions. During this period, the electricity generation sector has accomplished the largest emissions reductions (over 15%). The Minnesota Department of Employment and Economic Development's 2014 report, "Minnesota's Clean Energy Economy Profile: How Industry Sectors Are Advancing Economic Growth," notes that more than 15,300 Minnesotans work in the clean energy field, and these workers added more than \$1 billion in direct wages to the Minnesota economy in 2013.³² Average annual wages in clean energy were more than \$71,000 in 2013 – 42 percent higher than the statewide average for all jobs (about \$51,000). These clean energy jobs in Minnesota grew more than 75 percent between 2000 and 2014, while the total Minnesota economy grew 11 percent during the same time period.
- From 2009 to 2014, employment in Colorado's clean energy technology industries grew 29.1 percent—more than 14 percent higher than the national average.³³ In 2016, the clean tech industry in Colorado supported 26, 270 direct jobs and another 86,100 indirect jobs.³⁴ These clean tech jobs provided \$4.6 billion in wages.³⁵
- In New York, RGGI has produced considerable economic and health benefits. New York's GDP has increased by approximately 15 percent since 2005.³⁶ Even more significant, health impacts from power plants in New York were reduced by 87 to 88 percent since 2005.³⁷ Investments in the RGGI portfolio of programs through March 31, 2016 are expected to reduce CO₂ emissions by more than 100 million tons, cut fossil fuel use by 52.5 million Btu, and save 4.2 million megawatt hours (MWh) of electricity over the lifetime of the measures installed with RGGI funding.³⁸ Over the same timeframe, net renewable generation is expected to rise to approximately 5.6 million MWh, saving customers more

³² Minn. Employment & Economic Development, *Minnesota's Clean Energy Economy*, <https://mn.gov/deed/data/research/clean-energy-economy/>. Accessed December 19, 2017.

³³ Colorado Cleantech Industry Assoc., *Clean Tech Workforce: March 4, 2015* (2015), <http://coloradocleantech.com/cleantech-workforce-march-4-2015/>.

³⁴ Colorado Energy Coalition, *Resource Rich Colorado: Colorado's National and Global Position in the Energy Economy* (2016), <http://www.metrodenver.org/media/720054/Resource-Rich-Colorado-8th-Edition.pdf>.

³⁵ *Id.*

³⁶ U.S. Department of Commerce, *Regional Data*, <http://www.bea.gov/iTable/iTable.cfm?reqid=70&step=1&isuri=1&acrdn=1#reqid=70&step=1&isuri=1> [select "Real GDP in chained dollars;" select "All Industries;" click "Next Step;" select "New York;" click "Next Step;" select "All Years;" and click "Next Step"]. Accessed December 8, 2017.

³⁷ Specifically, the 2005-2012 rates of mortality, heart attacks, bronchitis, asthma and hospital visits linked to SO₂, NO_x, and PM_{2.5}. Jonathan Banks & David Marshall, Clean Air Task Force, *Regulation Works: How Science, Advocacy, and Good Regulations Combined to Reduce Power Plant Pollution and Public Health Impacts; With A Focus On States in The Regional Greenhouse Initiative* (2015), 13, <http://www.catf.us/resources/publications/view/216>.

³⁸ N.Y.S. Energy Research & Development Authority, *New York's Regional Greenhouse Gas Initiative-Funded Programs Status Report* (2016), 4, <https://www.nyserda.ny.gov/About/Publications/Program-Planning-Status-and-Evaluation-Reports/RGGI-Reports>.

than \$2.9 billion on their electricity bills.³⁹ New York's suite of clean energy programs has stimulated the clean energy sector, which supported 146,000 jobs as of the end of 2016.⁴⁰

- In Rhode Island, the state's strong commitment to sustainable, cleaner sources of energy is growing jobs, attracting new investment, reducing energy burdens at homes and businesses, and mitigating consumer exposure to energy price volatility, all while reducing carbon footprints and fostering public health benefits. Home to the nation's first off-shore wind farm and well positioned to benefit from that burgeoning new industry to America's shores, the Ocean State has already experienced a 66 percent growth in clean energy employment since 2014, and an impressive 11 percent increase over just the last year.⁴¹ This growth has been driven, in large part, by policies and investments that support the adoption of no-to-low carbon energy resources, such as energy efficiency. In fact, since 2006, Rhode Island has created over \$2.3 billion in economic benefits for consumers, 23,000 job-years of employment, and 1.3 million MWh of electricity savings.⁴²
- In Virginia, Governor McAuliffe has prioritized policies that would drive investment in clean energy resources, including signing into law a bill that declares 500 megawatts (MW) of utility-scale solar to be in the public interest.⁴³ Virginia's solar market has grown from only 17 MW installed in 2014 to more than 2,600 MW currently in service or under development.⁴⁴ In the last year alone, the number of solar jobs in Virginia has increased by 65 percent, from 1,963 to 3,236.⁴⁵ Virginia's solar jobs market is the second fastest growing in the Southeast and ninth fastest growing in the nation.⁴⁶ The Commonwealth is already home to over 75,000 energy efficiency workers.⁴⁷ Energy efficiency business revenue in Virginia has increased from \$300 million in 2014 to \$1.5 billion in 2016, a fivefold increase.⁴⁸ The continued growth of clean energy investment in the Commonwealth has the potential to bring about long-term sustainable economic development while also mitigating the impacts of climate change through reduced carbon dioxide emissions.

³⁹ *Id.* at 4.

⁴⁰ N.Y.S. Energy Research & Development Authority, *2017 New York Clean Energy Industry Report* (2017), 3, <https://www.nysedra.ny.gov/clean-energy-jobs>.

⁴¹ Rhode Island Office of Energy Resources, *Rhode Island 2017 Clean Energy Jobs Report* (2017), <http://www.energy.ri.gov/cleanjobs/>.

⁴² State of Rhode Island Energy Efficiency & Resource Management Council, *Annual Report* (2017), 5, http://rieermc.wpengine.com/wp-content/uploads/2017/08/7_2017-eermc-annual-report.pdf.

⁴³ VA Code Ann. § 56-585.1 (2016).

⁴⁴ Office of the Governor, Press Release, "Governor McAuliffe Announces New Solar Project in King William County," (October 6, 2017), <https://governor.virginia.gov/newsroom/newsarticle?articleId=21448>.

⁴⁵ The Solar Foundation, *National Solar Jobs Census 2016* (2016), <http://www.thesolarfoundation.org/national/>. Accessed May 9, 2017.

⁴⁶ *See id.*

⁴⁷ U.S. Department of Energy, *2017 US Energy and Employment Report State Charts*, <https://energy.gov/downloads/2017-us-energy-and-employment-report>. Accessed May 9, 2017.

⁴⁸ Virginia Energy Efficiency Council, *Why Energy Efficiency is a Smart Investment in Virginia* (2017), <http://vaeec.org/resources/data/>.

- Since the launch of many of the California’s major climate programs, including Cap-and-Trade, economic growth in California has consistently outpaced economic growth in the rest of the country. The state’s average annual growth rate has been double the national average – and ranks second in the country since Cap-and-Trade took effect in 2012. In short, California has succeeded in reducing GHG emissions while also developing a cleaner, resilient economy that uses less energy and generates less pollution.
- California is on track to achieve its 2020 GHG target while also reducing criteria pollutants and toxic air contaminants and supporting economic growth. In 2015, total GHG emissions decreased by 1.5 MMTCO₂e compared to 2014, representing an overall decrease of 10 percent since peak levels in 2004. California emissions per dollar GDP dropped by 39 percent between 1990 and 2013. In 2013, California was the 4th least carbon dependent state in the US.⁴⁹
- Altogether, the emissions covered by California’s Cap-and-Trade Program total 80 percent of all GHG emissions in the state. The Cap-and-Trade Program guarantees GHG emissions reductions through a strict overall emissions limit that decreases each year, while trading provides businesses with flexibility in their approach to reducing emissions. The Cap-and-Trade Program also generates revenue when the allowances to emit pollution are auctioned. Some of the revenue is returned directly to electricity ratepayers, and the rest is dedicated to reducing GHG emissions by making legislatively-directed investments in California with an emphasis on programs or projects that benefit disadvantaged and low-income communities. Including the latest budget, approximately \$5 billion has been appropriated to reduce GHG emissions, reduce air pollutant emissions where reductions are needed most, grow markets for clean technologies, and spur emissions reductions in sectors not covered by Cap-and-Trade. Fifty percent of the \$1.2 billion dollars spent on projects so far provided benefits to disadvantaged communities, and 34 percent of this funding was used on projects located directly in disadvantaged communities.⁵⁰
- In 2007, North Carolina adopted a Renewable Energy and Energy Efficiency Portfolio Standard (REPS).⁵¹ Under REPS, North Carolina’s investor-owned utilities are currently required to meet 6 percent of their previous year’s retail electricity sales through renewable energy resources (RE) or energy efficiency measures (EE), with a goal of 12.5 percent of retail sales from RE and EE by 2021. North Carolina’s smaller electricity providers must meet a smaller percentage of retail sales with RE and EE. The rule is flexible in its approach to RE, just like the CPP, allowing generation and use to occur both in and out of state. North Carolina developed a robust measurement, tracking, and banking system for solar and EE similar to what is required under the CPP. All of this has been accomplished without great expense to the tax payers and rate payers of North Carolina. The utilities and small providers are currently meeting or exceeding their REPS goals while maintaining costs below the cost recovery caps.⁵²

⁴⁹ Next 10, *California Green Innovation Index* (8th ed. 2016), <http://next10.org/sites/next10.org/files/2016-california-green-innovation-index-1.pdf>.

⁵⁰ California Climate Investments, *California Climate Investments Using Cap-and-Trade Auction Proceeds* (2017), https://arb.ca.gov/cc/capandtrade/auctionproceeds/ccl_annual_report_2017.pdf.

⁵¹ N.C. Gen. Stat. § 62-133.8.

⁵² North Carolina Utilities Commission, *Annual Report Regarding Renewable Energy and Energy Efficiency Portfolio Standard in North Carolina Required Pursuant to G.S. 62-133.8(J)* (October 1, 2017), <http://www.ncuc.commerce.state.nc.us/reports/repereport2017.pdf>.

- In addition to REPS, North Carolina has also incentivized growth of the renewable energy sector through the state's Utility Savings Initiative,⁵³ property tax abatements for solar energy electric systems,⁵⁴ and, most recently, the Competitive Energy Solutions for NC Act.⁵⁵ These programs have spurred remarkable growth in North Carolina's clean energy industry. Between 2007 and 2016, approximately \$10 billion was invested in clean energy development in the state.⁵⁶ North Carolina is now home to over 34,000 clean energy jobs.⁵⁷ North Carolina has the second-largest solar capacity in the nation.⁵⁸ And in 2017, a 208 megawatt wind farm came online in North Carolina, making the state home to the largest wind farm in the Southeast.⁵⁹ According to a recent report, between 2000 and 2014 North Carolina reduced its CO₂ emissions by 14.6 percent, while minimizing the effect on electricity rates and growing its GDP by 26.3 percent.⁶⁰
- North Carolina's experience demonstrates that power plants can and do reduce emissions by replacing higher-emitting generation with lower-emitting generation, or generation shifting based on the interconnected nature of the power grid. In 2017, North Carolina's CO₂ emissions from power plants were below the 2030 CPP mass target for the state. Between 2010 and 2016, North Carolina's emissions of SO_x decreased by 75 percent and emissions of NO_x decreased 40 percent. These reductions are mainly due to the retirement of coal plants, based on EPA's Air Markets Program data. In 2016 alone, North Carolina's REPS resulted in avoided emissions of over 2,200 tons of NO_x and 2,600 tons of SO_x, which is equivalent to the retirement of a 700 MW coal plant.⁴⁶

⁵³ North Carolina Department of Environmental Quality, *Utility Savings Initiative*, <https://deq.nc.gov/conservation/energy-efficiency-resources/utility-savings-initiative>. Accessed Jan. 4, 2018.

⁵⁴ N.C. Gen. Stat. § 105-275(45).

⁵⁵ Office of NC Governor Roy Cooper, *Gov. Cooper Signs Law Securing Thriving Solar Industry, Shows Commitment to Wind Energy with Strong Executive Order* (July 27, 2017), <https://governor.nc.gov/news/gov-cooper-signs-law-securing-thriving-solar-industry-shows-commitment-wind-energy-strong>.

⁵⁶ RTI International, *Economic Impact Analysis of Clean Energy Development in North Carolina – 2017 Update* (Oct. 2017), available at https://energync.org/wp-content/uploads/2017/10/Summary-Findings_Economic-and-Rate-Impact-Analysis-of-Clean-Energy-Development-in-North-Carolina%E2%80%942017-Update-October-Version.pdf.

⁵⁷ U.S. Climate Alliance, *2017 Annual Report*, available at https://static1.squarespace.com/static/5936b0bde4fcb5371d7ebe4c/t/59bc4959bebafb2c44067922/1505511771219/USCA_Climate_Report-V2A-Online-RGB.PDF; RTI International, *Economic Impact Analysis of Clean Energy Development in North Carolina – 2017 Update* (October 2017),

⁵⁸ "Solar Industry Data," Solar Energy Industries Association, <https://www.seia.org/solar-industry-data> (Last visited Jan. 4, 2018)

⁵⁹ "State Profiles and Energy Estimates: North Carolina," U.S. Energy Information Administration <https://www.eia.gov/state/?sid=NC>. Last updated Aug. 17, 2017.

⁶⁰ Devashree Saha & Mark Muro, Brookings Institute, *Growth, carbon, and Trump: State progress and drift on economic growth and emissions 'decoupling'* (Dec. 8, 2016), available at <https://www.brookings.edu/research/growth-carbon-and-trump-state-progress-and-drift-on-economic-growth-and-emissions-decoupling/#fullreport>.

Observed Health Benefits of Carbon Regulation

- A recent study found that the RGGI program has substantially reduced the number of premature deaths, heart attacks, and respiratory illnesses in the Northeast, since 2009.⁶¹ The study estimated the economic value of RGGI's public health and productivity benefits through 2014 at a cumulative \$5.7 billion.⁶²
- Coincident with a 22 percent decline in total power sector CO₂ emissions from 2005 to 2015, Connecticut experienced 34 percent reduction NO_x and 83 percent reduction in SO_x.⁶³ These pollutants form to PM_{2.5} pollution and smog. The reductions contribute significantly to improved air quality in Connecticut. However, these pollutants are transported on prevailing winds into Connecticut thwarting the state's efforts to attain and maintain compliance with EPA NAAQS. The CPP offered a cost effective, well-reasoned compliment to other EPA policies to reduce transported air pollution.
- According to data from the United States Centers for Disease Control and Prevention, the burning of fossil fuels has resulted in negative impacts to air and water quality and been linked to increased incidence of asthma and cardiovascular disease.⁶⁴ Across the United States, warmer temperatures have been linked to increased ground-level ozone⁶⁵ and more frequent and sustained wildfires,⁶⁶ a major contributor to particulate matter pollution harmful to public health. Evidence from the Virginia Department of Health shows increased incidences of West Nile virus and Lyme disease,⁶⁷ an indication that recent environmental shifts may have improved survival rates for disease vectors like ticks and mosquitos.

⁶¹ M. Manion, M, et al., Abt Associates, *Analysis of the Public Health Impacts of the Regional Greenhouse Gas Initiative, 2009-2014* (2017), 2.

⁶² *Id.*

⁶³ Energy Information Administration, https://www.eia.gov/electricity/data/state/emission_annual.xls.

⁶⁴ C.J. Portier, et al., Interagency Working Group on Climate Change and Health, *A Human Health Perspective on Climate Change* (2010), https://www.cdc.gov/climatechange/pubs/hhcc_final_508.pdf.

⁶⁵ G. G. Pfister et al., "Projections of Future Summertime Ozone Over the U.S.," *Journal of Geophysical Research: Atmospheres* 119 (9) (2014): 5559-5582, <http://onlinelibrary.wiley.com/doi/10.1002/2013JD020932/abstract>.

⁶⁶ A. L. Westerling, H. G. Hidalgo, D. R. Cayan, T. W. Swetnam, "Warming and Earlier Spring Increase Western U.S. Forest Wildfire Activity," *Science Magazine* 313 (2006): 940-943, <http://science.sciencemag.org/content/313/5789/940.full>.

⁶⁷ Virginia Department of Health, *Ten-Year Trend in Number of Reported Cases of Reportable Diseases in Virginia, 2006-2015* (2016), http://www.vdh.virginia.gov/content/uploads/sites/13/2016/03/table2a_trend2015.pdf.