Attorneys General of New York, California, Connecticut, Delaware, Hawaii, Illinois, Iowa, Maine, Maryland, Massachusetts, Minnesota (by and through its Minnesota Pollution Control Agency), New Jersey, New Mexico, North Carolina, Oregon, Pennsylvania, Rhode Island, Vermont, Virginia, Washington, and the District of Columbia, the County Attorney of Broward (FL), and the City Attorneys/Corporation Counsel of Boulder (CO), Chicago, Los Angeles, New York, Philadelphia, and South Miami

December 21, 2018

Letter submitted via email: a-and-r-docket@epa.gov
Letter with copy of report submitted via courier to EPA Docket Center

Re: Docket ID No. EPA-HQ-OAR-2017-0355/Additional Comments re. Fourth National Climate Assessment

The undersigned State Attorneys General, City and County Attorneys, and Corporation Counsel (together "States and Cities") respectfully submit this letter along with a copy of the recent national climate assessment report issued by the Environmental Protection Agency and twelve other U.S. government agencies. *See* U.S. Global Change Research Program, "Impacts, Risks, and Adaptation in the United States: Fourth National Climate Assessment, Volume II," (D.R. Reidmiller et al. eds., 2018) (*"Assessment"*).[1] The States and Cities wrote Acting Administrator Wheeler on December 11, 2018 requesting withdrawal of EPA's proposed replacement of the Clean Power Plan, Emission Guidelines for Greenhouse Gas Emissions from Existing Electric Utility Generating Units; Revisions to Emission Guideline Implementing Regulations; Revisions to New Source Review Program," 83 Fed. Reg. 44,746 (Aug. 31, 2018) (proposed rule) in light of the Assessment's findings (letter attached hereto). We asked that, at a minimum, the comment period for the proposed rule be reopened so that the implications of the Assessment's findings could be adequately considered.

In our December 11 letter, we further stated our intent to submit a copy of the Assessment to the rulemaking docket for the proposed rule, which we are doing through this letter. This letter also highlights aspects of the Assessment that support or are relevant to points made in our comments on the proposed rule. Under the Clean Air Act, the Assessment must be included in the rulemaking docket because it is of "central relevance" to the proposed rule. *See* 42 U.S.C. § 7607(d)(4)(B)(i) ("All documents which become available after the proposed rule has been published and which the Administrator determines are of central relevance to the rulemaking shall be placed in the docket as soon as possible after their availability."). The Assessment's findings regarding extensive climate change harms and the need for prompt and

[1] The full report is available at: https://nca2018.globalchange.gov/. Because the size of the full report is extremely large, we are submitting a copy on disc with this letter to the rulemaking docket via overnight courier.

significant mitigation measures is centrally relevant to the lawfulness of EPA's proposed approach of requiring no emission reductions (or, at most, very limited emission reductions) from fossil-fueled power plants—one of the nation's largest sources of the greenhouse gas emissions—that EPA has found endanger public health and welfare.

As set forth below, the Assessment's findings are fully consistent with numerous points raised in our comments on the proposed rule dated October 31, 2018 ("Comments").[2] Certain relevant findings are discussed below, organized under the headings and subheadings in our rulemaking comments, including: I. Background, III. EPA's Revised Determinations of the Best System of Emission Reduction for Existing Fossil-Fueled Power Plants, V. Pollution Impacts of the Proposed Rule, and VII. Economic Impacts of the Proposal.

I. Background

A. Recent Evidence of Climate Change

As discussed in our Comments (pp. 4-6), the scientific evidence of climate change caused predominantly by the burning of fossil fuels has only grown since EPA promulgated the Clean Power Plan. In addition to the examples set forth in our Comments, the Assessment discusses many other instances, several of which are highlighted here:

- "Earth's climate is now changing faster than at any point in the history of modern civilization, primarily as a result of human activities."[3]
- "The impacts of global climate change are already being felt in the United States and are projected to intensify in the future."[4]
- "Climate change is transforming where and how we live and presents growing challenges to human health and quality of life, the economy, and the natural systems that support us."[5]
- "Increased atmospheric carbon dioxide levels change ocean conditions through three main factors: warming seas, ocean acidification, and deoxygenation. These factors are

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[2] A copy of our main comments with appendices may be found in the docket at: https://www.regulations.gov/document?D=EPA-HQ-OAR-2017-0355-24817.

[3] U.S. Global Change Research Prog., "Impacts, Risks, and Adaptation in the United States: Fourth National Climate Assessment, Volume II: Report-in-Brief" at 24 (D.R. Reidmiller et al. eds., 2018) (*Report-in-Brief"*). A copy of the Report-in-Brief is available at: https://nca2018.globalchange.gov/downloads/NCA4_Report-in-Brief.pdf. Because the size of the Report-in-Brief is very large, we are submitting a copy on the disc with the full report via overnight courier.

[4] *Id.*

[5] *Id.* at 26.

transforming ocean ecosystems, and these transformations are already impacting the U.S. economy and coastal communities, cultures, and businesses."[6]

- "Climate-related changes in weather patterns and associated changes in air, water, food, and the environment are affecting the health and well-being of the American people, causing injuries, illnesses, and death."[7]
- "The impacts of climate change, variability, and extreme events outside the United States are affecting and are virtually certain to increasingly affect U.S. trade and economy, including import and export prices and businesses with overseas operations and supply chains."[8]
- "Global average sea level has risen by about 7–8 inches (about 16–21 cm) since 1900, with almost half this rise occurring since 1993."[9]
- "Since the 1960s, sea level rise has already increased the frequency of high tide flooding by a factor of 5 to 10 for several U.S. coastal communities."[10]
- "Annual average temperature over the contiguous United States has increased by 1.2°F (0.7°C) over the last few decades and by 1.8°F (1°C) relative to the beginning of the last century."[11]

B. Climate Change-Related Harms Impacting States and Cities

The Background section of our Comments also highlighted harms caused by climate change that our States and Cities are facing. *See* Comments at 6-8; *see also id.* at 87-92 & *Appendix A* (describing in harms in detail). The Assessment contains findings regarding climate change harms in each major region of the U.S., including those identified below in which the States and Cities are located. Several of these adverse impacts are highlighted below:

Hawaii

- ***Harms from ocean acidification and sea level rise.*** "Sea level rise is now beginning to threaten critical assets such as ecosystems, cultural sites and practices, economies, housing and energy, transportation, and other forms of infrastructure. By 2100, increases of 1–4 feet in global sea level are very likely, with even higher levels than the global average in the U.S.-Affiliated Pacific Islands. This would threaten the food and freshwater supply of Pacific island populations and jeopardize their continued sustainability and resilience. . . . Widespread coral reef bleaching and mortality have been occurring more frequently, and by mid-century these events are projected to occur annually, especially if current trends in emissions continue. Bleaching and acidification

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[6] *Report-in-Brief* at 86.

[7] *Id.* at 102.

[8] *Id.* at 107.

[9] *Id.* at 65.

[10] *Id.* at 66.

[11] *Id.* at 65.

will result in loss of reef structure, leading to lower fisheries yields and loss of coastal protection and habitat.[12]

Midwest

- ***Reduced agricultural productivity due to increased temperatures and extreme precipitation.*** "[A]gricultural productivity (the ratio of outputs to inputs) is projected to decline by 2050 to the levels of the 1980s (that is, yields may increase but at the cost of substantial increases in inputs)."[13] "[I]ncreases in warm-season absolute humidity and precipitation have eroded soils, created favorable conditions for pests and pathogens, and degraded the quality of stored grain. Projected changes in precipitation, coupled with rising extreme temperatures before mid-century, will reduce Midwest agricultural productivity to the levels of the 1980s without major technological advances."[14] A 2017 study projects that increased growing-season temperatures in the Midwest will be the largest contributing factor to declines in the productivity of U.S. agriculture.[15]

- ***Harms to public health from extreme weather (increased flooding and high temperatures) and increased air pollution, allergens, and diseases.*** "Climate change is expected to worsen existing health conditions and introduce new health threats by increasing poor air quality days, extreme high temperature events, and heavy rainfalls; extending pollen seasons; and modifying the distribution of disease-carrying pests and insects."[16] "[T]he Midwest is projected to have the largest increase in extreme temperature-related premature deaths under the higher scenario (RCP8.5): by 2090, 2,000 additional premature deaths per year . . . are projected" according to EPA.[17]

- ***Harms to transportation and infrastructure from extreme weather, especially flooding.*** "A [2015] study of six Iowa bridges deemed to be critical infrastructure found that under all emission scenarios . . . each location was projected to have increased vulnerability from more frequent episodes of overtopping and potential scour [damage from erosion of bridge bases]. The EPA estimates that the annual cost of maintaining current levels of service on Midwestern bridges in the face of increased scour damage from climate change could reach approximately $400 million in the year 2050 under either the lower or higher scenario." "[In a 2017 analysis,] EPA has estimated that the Midwest is among the regions with the largest expected damages to infrastructure, including the highest estimated damages to roads, rising from $3.3 billion per year in 2050 to $6 billion per year in 2090 (in 2015 dollars) under a higher [emissions] scenario."[18]

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[12] *Assessment* at 1243-44.

[13] *Id.* at 879.

[14] *Id.* at 907.

[15] *Id.* at 875.

[16] *Id.* at 896.

[17] *Id.* at 898.

[18] *Id.* at 905.

Northeast

- ***Adverse impacts from higher temperatures.*** By 2035, under lower or higher emission scenarios the Northeast region is projected to be, on average, more than 3.6°F warmer than it was in the preindustrial era—the largest such regional increase in the contiguous United States.[19] "The seasonality of the Northeast is central to the region's sense of place and is an important driver of rural economies," and decreasing seasonality is "already altering ecosystems and environments in ways that adversely impact tourism, farming, and forestry."[20] "Shorter, more moderate winters will present new challenges for rural industries," and trends towards increased rainfall intensity will pose significant challenges for agriculture.[21]

- ***Harms from ocean acidification and sea level rise.*** A variety of impacts result from oceans in the Northeast becoming warmer, higher, and more acidified. For example, warming and acidification are expected to substantially reduce populations of fish species and other marine species, including those that are economically and ecologically significant. Sea levels are expected to rise as much as 11 feet, threatening marshes, beaches, and other features of the Northeastern coastal environment.[22]

- ***Adverse effects from extreme weather.*** The effects of climate change, including increased coastal flooding and higher storm surges, will strain and damage the Northeast region's already-aging infrastructure. Areas of vulnerability include electrical systems, water supply, telecommunications, and transportation, just to name a few.[23] Extreme weather will adversely affect human health in significant ways. For instance, increased temperatures, including increases in extreme heat events, are likely to result in more hospital admissions and premature deaths. Increases in ground-level ozone—a consequence of higher temperatures, and a particular problem in the Northeast—will substantially increase premature deaths.[24]

Northwest

- ***Adverse impacts from hotter temperatures.*** In 2015, the Northwest experienced its warmest year on record, and the impacts are a prelude to what will become the norm by the mid-to-late 2000s. The warm winter led to record low mountain snowpack as precipitation fell largely as rain instead of snow. The 2015 "snow drought" caused irrigation shortages, agricultural losses, hydropower shortages, and fish die-offs,[25] including hundreds of thousands of sockeye salmon in the Columbia and Snake River

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[19] *Assessment* at 675.

[20] *Id.* at 670.

[21] *Id.* at 680, 682.

[22] *Id.* at 687-93.

[23] *Id.* at 677.

[24] *Id.* at 700.

[25] *Id.* at 1066.

Basins.[26] The Washington State Department of Ecology allocated $7 million in drought relief funds for water supplies for irrigation or human consumption.[27] Lack of snowpack and the dry spring led to the most severe wildfire season in the Northwest's recorded history, causing damage to infrastructure in Washington and Idaho and air quality and health concerns.[28]

- ***Harms to marine resources.*** Also in 2015, the largest harmful algal bloom recorded on the West Coast closed commercial, recreational, and tribal fisheries, including salmon, shellfish, and Dungeness crab along the entire Northwest coast.[29]

Southeast

- ***Increased flooding.*** Due to increasing extreme rainfall events and sea level rise, low lying regions in the Southeast are projected to experience "daily high tide flooding by the end of the century."[30] The Southeast has experienced "increases in the number of days with more than 3 inches of precipitation and a 16% increase in observed 5-year maximum daily precipitation (the amount falling in an event expected to occur only once every 5 years)."[31]

- ***More incidences of diseases.*** Many southeastern cities are increasingly at risk due to vector-borne disease brought about by a changing climate.[32] Summer increases in dengue cases are expected across every state in the Southeast.[33] "The Southeast is also the region with the greatest projected increase in cases of West Nile neuro-invasive disease."[34]

- ***More heat waves.*** Increased frequency of heat waves is likely to occur particularly in southeastern cities.[35] For example, of the five large cities that have increasing trends exceeding the national average for all aspects of heat waves (timing, frequency, intensity, and duration), three of those cities are in the Southeast region—Birmingham, New

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[26] *Assessment* at 1067.

[27] *Id.* at 1054.

[28] *Id.* at 1067.

[29] *Id.* at 1067.

[30] *Id.*, Ch. 19, Key Message 2.

[31] *Id.* at 762.

[32] *Id.*, Ch. 19, Key Message 1.

[33] *Id.* at 754.

[34] *Id.* at 755.

[35] *Id.*, Ch. 19, Key Message 1.

Orleans, and Raleigh.[36] Sixty-one percent of major Southeast cities are exhibiting some aspects of worsening heat waves, a higher percentage than any other region.[37]

- ***More wildfires.*** As explained in our Comments, rising temperatures and longer droughts will increase the frequency and intensity of wildfires. Comments at 7; *Appendix A* at A-41 (impacts of wildfires in North Carolina). The Assessment confirms these findings. For example, it also links the 2016 wildfires in the Southern Appalachians—the worst the region had seen in a century—to a combination of invasive insects and high temperatures linked to climate change.[38]

- ***Loss of coral reefs.*** "Coral elevation and volume in the Florida Keys have been declining in recent decades, and present-day temperatures in the region are already close to bleaching thresholds; hence, it is likely that many of the remaining coral reefs in the Southeast region will be lost in the coming decades."[39]

Southwest

- ***Increased flooding.*** "Climate models project an increase in the frequency of heavy downpours, especially through atmospheric rivers, which are narrow bands of highly concentrated storms that move in from the Pacific Ocean."[40] "Atmospheric rivers, which have caused many large floods in California, may increase in severity and frequency under climate change. In the winter of 2016–2017, a series of strong atmospheric rivers generated high runoff in northern California and filled reservoirs."[41]

- ***Harms from invasive species.*** "The forests and other ecosystems of the Southwest region that provide natural habitat and essential resources for people have declined in fundamental ways due in part to climate change. Vast numbers of trees have died across Southwest forests and woodlands, disproportionately affecting larger trees. Tree death in mid-elevation conifer forests doubled from 1955 to 2007 due in part to climate change."[42] "Climate change has also contributed to increased forest pest infestations, another major cause of tree death in Southwest forests and woodlands. Bark beetle infestations killed 7% of western U.S. forest area from 1979 to 2012, driven by winter warming due to climate change and by drought. Tree death from bark beetles in Colorado increased organic matter in local streams, elevating precursors of cancer-causing trihalomethane in local water treatment plants to levels that exceed the maximum contaminant levels for

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[36] *Assessment* at 752.

[37] *Id.*

[38] *Id.*, Ch. 19, Key Message 3.

[39] *Id.*

[40] *Id.* at 1110.

[41] *Id.* at 1111-12.

[42] *Id.* at 1115.

drinking water specified by EPA. Without greenhouse gas emissions reductions, further increases in heat and drought could kill many more trees, especially affecting piñon pine, white-bark pine, and tall old-growth trees."[43]

- ***Decreased agricultural productivity.*** Drought-related agricultural changes, stricter drilling regulations, and rapid aquifer depletion have already led to a decline in irrigation in parts of the region. The 2011-16 California drought led to losses of more than 10,000 jobs and the fallowing of 540,000 acres (220,000 hectares), at a cost of $900 million in gross crop revenue in 2015.[44]

- ***More heat waves.*** Parts of the Southwest region experienced record-breaking heat in five of the six years from 2012 to 2017.[45] "[E]xposure to hotter temperatures and heat waves already leads to heat-associated deaths in Arizona and California. Mortality risk during a heat wave is amplified on days with high levels of ground-level ozone or particulate air pollution."[46]

III. EPA's Revised Determinations of the Best System of Emission Reduction for Existing Fossil-Fueled Power Plants

C. EPA's Revised Determination of the Best System of Emission Reduction for Coal Plants is Arbitrary and Capricious because EPA Failed to Consider Relevant Evidence

1. EPA has ignored relevant evidence in the record regarding additional proven systems of emission reduction

a. EPA grounded its analysis of potential best systems on assertions about the nation's electrical grid that are not supported by evidence

As discussed in Section III.C of our Comments, EPA's revised Best System of Emission Reduction (BSER) determination for coal plants failed to consider relevant evidence in the record. *See* Comments at 29-34. The Assessment's findings in the "Energy" chapter are particularly relevant to our argument in III.C.1.a that the agency's analysis of potential BSERs is flawed because it is founded on erroneous assumptions about the electrical grid. Those findings include:

- **Clean energy resources and energy efficiency programs have many economic and system benefits beyond emissions reduction.** "[T]he growing adoption of energy efficiency programs, demand response programs, transmission capacity increases, and

[43] *Assessment* at 1116-17.

[44] *Id.* at 1127.

[45] *Id.* at 1129.

[46] *Id.* at 1104.

microgrids with energy storage technologies is enhancing system flexibility, reliability, and resilience." "Energy efficiency has been remarkably successful over several decades in helping control energy costs to homes, buildings, and industry, while also contributing to enhanced resilience through reduced energy demand."[47]

- **Coal plants are *not* inherently more "secure."** "[M]ost electric service disruptions are caused by transmission and distribution outages . . . . Most generation technologies have experienced fuel deliverability challenges in the past. Coal facilities typically store enough fuel onsite to last for 30 days or more, but extreme cold can lead to frozen fuel stockpiles and disruptions in train deliveries."[48]

V. Pollution Impacts of the Proposed Rule

A. EPA Admits that Air Pollution Under the Proposed Rule Would Be Higher Compared to Under the Clean Power Plan

In Section V.A of our Comments, we argued that the proposed rule's emission guidelines are unlawful under section 111 of the Clean Air Act in light of, *inter alia*, the fact that EPA now has more compelling scientific evidence than it had when it promulgated the Clean Power Plan that prompt and aggressive reductions are necessary to avoid catastrophic harm to public health and welfare. Comments at 83. Several findings in the Assessment further support this argument:

- "Unless counteracting efforts to improve air quality are implemented, climate change will worsen existing air pollution levels," which "would increase the incidence of adverse respiratory and cardiovascular health effects, including premature death."[49] There is robust evidence from models and observations that climate change is worsening ozone pollution.[50] Moreover, the prevailing evidence "strongly suggests" a "climate penalty," i.e., an increase in air pollution resulting from climate change alone, for ozone from warmer temperatures and increases in natural emissions over most of the United States.[51]

- With respect to $PM_{2.5}$, certain studies indicate that even without considering increased wildfire frequency, "climate change will cause a small but important increase in $PM_{2.5}$ over North America."[52] Accounting for increased wildfires amplifies the amount of $PM_{2.5}$ particles resulting from climate change, since wildfires are a major source of $PM_{2.5}$, especially in the western United States during the summer and in the Southeast.[53] And, "[m]ore frequent and severe wildfires due to climate change would further diminish air

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[47] *Assessment* at 184.

[48] *Id.* at 184-85.

[49] *Id.*, Ch. 13, Key Message 1.

[50] *Id.* at 516.

[51] *Id.* at 518.

[52] *Id.* at 520.

[53] *Id.* at 519.

quality, increase incidences of respiratory illness from exposure to wildfire smoke, impair visibility, and disrupt outdoor recreational activities."[54] Wildfires also emit gases that contribute to ozone formation.[55]

- Rising temperatures and increased CO_2 concentrations can also influence plant-based allergens, hay fever and asthma by increasing the duration of the pollen season, by increasing the amount of pollen produced by plants, and by altering the degree of allergic reactions to pollen.[56]

- Mitigating carbon dioxide and other greenhouse gas emissions can lower emissions of PM, ozone, and other hazardous pollutants, reducing the risks to human health from air pollution.[57]

D. Increased Air Pollution Will Result in Numerous Harms to the States and Cities

2. More pollution will cause disproportionate harm to environmental justice communities

As previously discussed, in the proposed rule EPA improperly ignored the disproportionate harm that climate change causes vulnerable populations, and unlike in the Clean Power Plan, the agency did not require states to engage with vulnerable and overburdened communities when developing state plans. *See* Comments at 87. The Assessment underscores the implications for this failure, finding that low-income communities, communities of color, the elderly, and children are particularly vulnerable to health-related climate impacts and that "these groups are among the most exposed, most sensitive, and have the least individual and community resources to prepare for and respond to health threats."[58]

3. More pollution will harm public welfare in the States and Cities in myriad ways

Section V.D of our Comments discusses the numerous harms the States and Cities will experience as a result of the increased pollution the proposed rule would allow. The Assessment's findings support our contention in V.D.3 that additional carbon pollution from power plants will harm our public welfare in myriad ways, including:

- ***Harms from sea level rise.*** The States and Cities, representing the entire West Coast and most of the east cost of the continental United States, as well as Hawaii, face a disproportionate burden from sea level rise and related impacts. Comments at 88-89. The Assessment provides further support for the current and escalating effects of sea level rise caused by climate change. Relevant findings in the Assessment include that storms,

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[54] *Assessment* at 521, Key Message 2.

[55] *Id.* at 519.

[56] *Id.* at 522; *see also* Key Message 3.

[57] *Id.* at 522-23.

[58] *Id.* at 542, 546-48, 555-56.

floods, and erosion, exacerbated by rising sea levels, threaten approximately $1 trillion in national wealth held in coastal real estate and the continued viability of coastal communities that depend on coastal water, land, and other resources for economic health and cultural integrity.[59] Flooding from rising sea levels and storms is likely to destroy, or make unsuitable for use, billions of dollars of property by the middle of this century, with the Atlantic and Gulf coasts facing greater-than-average risk compared to other regions of the country.[60] High tide flooding is forcing some East Coast cities to install costly pump stations to frequently clear floodwaters from the streets (such as Miami Beach) and to mobilize emergency responders to routinely close flooded streets.[61] For example, low-lying Norfolk—Virginia's second-largest city—is enduring serious physical, financial, and social impacts as the frequency of high tide flooding accelerates due to rising local sea level.[62] Sea level rise might reshape the U.S. population distribution, with 13.1 million people potentially at risk of needing to migrate due to a sea level rise of 6 feet (about 2 feet less than the Extreme scenario) by the year 2100.[63]

- ***Spread of infectious diseases.*** In our Comments, we explained that by expanding the habitat of disease-carrying insects, climate change has increased and will continue to increase the incidence and spread of infectious diseases in our States and Cities. Comments at 91. Similarly, the Assessment notes that "[c]limate change is expected to alter the geographic range, seasonal distribution, and abundance of disease vectors, exposing more people in North America to ticks that carry Lyme disease or other bacterial and viral agents, and to mosquitoes that transmit West Nile, chikungunya, dengue, and Zika viruses."[64]

- ***Undermining the reliability of the electrical grid.*** "[E]xtreme weather impacts are expected to continue growing in frequency and severity over the coming century, affecting all elements of the Nation's complex energy supply system."[65] "Repairs to electricity generation, transmission, and distribution systems from recent hurricane events are costing billions of dollars. Con Edison and Public Service Electric and Gas invested over $2 billion (in 2014 dollars) in response to Superstorm Sandy. An estimate to build back Puerto Rico's electricity systems in response to Hurricanes Irma and Maria is approximately $17 billion (in 2017 dollars)."[66] "Unless other mitigation strategies are implemented, more frequent, severe, and longer-lasting extreme heat events are expected to make blackouts and power disruptions more common, increase the potential for

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[59] *Assessment* at 324.

[60] *Id.* at 330.

[61] *Id.* at 329-30.

[62] *Id.* at 336-37.

[63] *Id.* at 335.

[64] *Id.* at 545.

[65] *Id.* at 179.

[66] *Id.*

electricity infrastructure to malfunction, and result in increased risks to public health and safety."[67] In addition, "[e]nergy infrastructure is long-lived and, as a result, today's decisions about how to locate, expand, and modify the Nation's energy system will influence system reliability, resilience, and economic security for decades."[68]

- ***Increased costs of electricity.*** "[H]igher temperatures are projected to drive up electricity costs not only by increasing demand but also by reducing the efficiency of power generation and delivery, and by requiring new generation capacity costing residential and commercial ratepayers by some estimates up to $30 billion per year by mid-century." "By the end of the century, an increase in average annual energy expenditures from increased energy demand under the higher [emissions] scenario is estimated at $32–$87 billion . . . . Nationwide, electricity demand is projected to increase by 3%–9% by 2040 under the higher scenario."[69]

- ***Damage to transportation systems.*** Climate change is projected to increase the costs of maintaining, repairing, and replacing infrastructure, with regional differences proportional to the magnitude and severity of impacts. Nationally, the total annual damages from temperature- and precipitation-related damages to paved roads are estimated at up to $20 billion under RCP8.5 in 2090 (in 2015 dollars, undiscounted, five-model average). Inland flooding, projected to increase over the coming century, threatens approximately 2,500 to 4,600 bridges across the United States and is anticipated to result in average annual damages of $1.2 to $1.4 billion each year by 2050 (in 2015 dollars, undiscounted, five-model average).[70] Combined sewer and storm sewer systems used in many cities are often not designed to withstand the capacity demand currently experienced during heavy rainfall events or rising high tides. This situation is becoming increasingly problematic with more frequent localized flooding, leading to more frequent travel disruptions for commuters, travelers, and freight. The effect is compounded in cities with older infrastructure, such as Philadelphia, Miami, Chicago, and Charleston.[71] Higher temperatures, combined with increased salinity and humidity, accelerates deterioration in bridges and roads constructed with concrete.[72] Similarly, sea level rise poses a major threat to functional performance of low-elevation roadways, rail and bridges. On the East Coast alone, more than 7,500 miles of roadway are located in high tide flooding zones.[73]

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[67] *Assessment* at 181.

[68] *Id.* at 189.

[69] *Id.* at 181.

[70] *Id.* at 485.

[71] *Id.* at 490.

[72] *Id.* at 489.

[73] *Id.* at 487.

- ***Multisector impacts.*** EPA's analysis in the proposed rule failed to engage with multi-sector impacts to the States and Cities, despite the fact it considered those impacts in the Clean Power Plan. Comments at 87-92 (summarizing direct and indirect effects of climate change that the States and Cities are already experiencing). By contrast, the Assessment concludes that climate change risk assessments should "encompass[] interactions among sectors," and should not stop at describing "first order direct . . . impacts" only.[74] Although acknowledging that it is "hard to quantify all the ways in which climate-related stressors might lead to severe or widespread consequences for natural, built and social systems," the Assessment faults analyses that "fail[] to recognize indirect and cascading consequences" of climate-related phenomena.[75]

4. The paltry emission reductions (if any) from implementation of the proposed rule cannot be squared with EPA's findings in the Clean Power Plan and other current EPA rulemakings regarding the urgent threat climate change poses and the need to demonstrate international leadership to facilitate other countries' commitments to reduce greenhouse gas emissions

In our Comments, we noted that EPA had not retracted or rebutted its findings in the Clean Power Plan rulemaking that climate change poses an existential threat that requires prompt action. Comments at 92-93. The Assessment's chapter on "Mitigation" confirms the importance of significantly cutting greenhouse gases now in order to avoid more severe harms in the future:

- "Many climate change impacts in the United States can be substantially reduced over the course of the 21st century through global-scale reductions in GHG emissions."[76] Reducing greenhouse gases could avoid "thousands to tens of thousands of deaths per year from extreme temperatures, hundreds to thousands of deaths per year from poor air quality, and the annual loss of hundreds of millions of labor hours from extreme temperatures."[77] These impacts also have significant economic impacts: each "represents domestic economic benefits of tens to hundreds of billions of dollars per year."[78]

- The Assessment reinforces the urgency of mitigation, finding that "early and substantial mitigation offers a greater chance of avoiding increasingly adverse impacts."[79] Failing to act will lead to harmful and unpredictable effects, even if later action is taken to mitigate climate change: "delayed and much steeper emissions reductions jeopardize achieving any long-term goal given uncertainties in the physical response of the climate system to changing atmospheric CO_2, mitigation deployment uncertainties, and the potential for

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[74] *Assessment* at 639, 641.

[75] *Id.* at 640-41.

[76] *Id.* at 1359.

[77] *Id.*

[78] *Id.*

[79] *Id.* at 1348.

abrupt consequences."[80] Similarly, the Assessment's authors warn that "[d]ecisions that decrease or increase emissions over the next few decades will set into motion the degree of impacts that will likely last throughout the rest of this century, with some impacts (such as sea level rise) lasting for thousands of years, or even longer."[81]

In addition, the Assessment's Frequently Asked Questions section further underscores the need for meaningful reduction of greenhouse gases now. For example, in response to the question "**Is timing important for climate mitigation?**" the Assessment answers:

> Yes. The choices made today largely determine what impacts may occur in the future.... The sooner greenhouse gas emissions are reduced, the easier it may be to limit the long-term costs and damages due to climate change. Waiting to begin reducing emissions is likely to increase the damages from climate-related extreme events (such as heat waves, droughts, wildfires, flash floods, and stronger storm surges due to higher sea levels and more powerful hurricanes).[82]

The Assessment further describes "**The Risks of Inaction**" as follows:

> In the absence of more significant global mitigation efforts, climate change is projected to impose substantial damages on the U.S. economy, human health, and the environment. Under scenarios with high emissions and limited or no adaptation, annual losses in some sectors are estimated to grow to hundreds of billions of dollars by the end of the century. It is very likely that some physical and ecological impacts will be irreversible for thousands of years, while others will be permanent.[83]

VII. Economic Impacts of the Proposal

A. The RIA Underestimates the Foregone Benefits of Reducing Carbon Pollution

1. EPA erroneously failed to consider international costs of climate change in calculating the social cost of carbon

In our Comments (pp. 128-32), the States and Cities explained how EPA's RIA for the proposed rule underestimated the foregone benefits of reducing carbon pollution by taking an unduly narrow view of the Social Cost of Carbon. The Assessment further bolsters that argument, including:

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[80] *Assessment* at 1351.

[81] *Id.*

[82] *Id.* at 1488.

[83] *Id.* at 1347.

- The Assessment identifies numerous public health impacts of climate change—including extreme weather events, elevated heat, droughts, vector borne diseases, water related illnesses, food availability and nutrition, and mental health—that EPA should have separately considered in evaluating the Social Cost of Carbon.[84] The RIA for the Proposed Rule merely states that EPA considered "net changes in agricultural productivity and human health" in the Social Costs of Carbon, without specifically defining what human health impacts were included and how EPA ensured it properly accounted for them.

- The Assessment's key message that climate change impacts will have widespread, often unpredictable but costly downstream effects on many sectors and systems exposed to climate change further refutes EPA's outdated and very low Social Cost of Carbon range of $1 to $7 per ton.[85] Even if EPA could lawfully limit its analysis to domestic costs only, its cost range fails to consider up-to-date, peer-reviewed findings that recent multi-sector research into the domestic costs of climate change on the agricultural and energy sectors, and on domestic economic output generally, are much higher than estimated by EPA.

- The Assessment supports our point that EPA ignored the Department of Defense's finding that "climate change is an urgent and growing threat to our national security." *See* Comments at 130 (citing 2015 Department of Defense report). Specifically, the Assessment explains that "[c]limate change and extremes increase risks to national security through direct impacts on U.S. military infrastructure and by affecting factors, including food and water availability, that can exacerbate conflict outside U.S. borders."[86]

- In our comments, we noted that in adopting a "domestic only" estimate of the cost of carbon, EPA "implicitly assumes that U.S. citizens and residents derive no utility from the welfare of citizens of other countries." Comments at 129. The Assessment directly contradicts that assumption, stating that "U.S. citizens have long been concerned about the welfare of those living beyond U.S. borders and their vulnerability to the global impacts of climate."[87]

- We previously noted that EPA "fails to account for climate change impacts on foreign trading partners and the resulting impacts to domestic welfare," and "ignores the fact that lower economic growth in other regions could reduce demand for U.S. exports, and lower productivity could increase the prices of U.S. imports." Comments at 129. Similarly, the Assessment observes that "[t]he impacts of climate change, variability, and extreme events outside the United States are affecting and are virtually certain to increasingly affect U.S.

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[84] *See Assessment* at 543-46, 551-52.

[85] *See id.* at 636, Key Message 1.

[86] *Id.* at 612.

[87] *Id.* at 608; *see also id.* at 611 ("The impacts of climate change ... [can] undermin[e] international aid and investments made by the United States and increas[e] the need for humanitarian assistance and disaster relief.").

trade and economy, including import and export prices and businesses with overseas operations and supply chains."[88]

3. EPA failed to meaningfully consider the non-monetized costs of climate change that are not incorporated in the social cost of carbon models, as required by OMB Circular A-4 and Supreme Court precedent

The States and Cities faulted EPA for ignoring the complexity of climate impacts by wholly disregarding non-monetized costs of climate change in the proposed rule. *See* Comments at 136-38. Similarly, the Assessment provides that rather than ignoring complexity that is difficult to quantify, EPA should "integrate diverse evidence, combining quantitative and qualitative results," and drawing on multidisciplinary "forms of analysis" to fill the gap.[89] The Assessment further highlights the importance of specific examples of non-monetized costs of carbon that we had previously referenced. In our comments, we mentioned "damages caused by ocean acidification and wildfires" as among the non-monetized costs of climate change. Comments at 137. The Assessment similarly states: "Marine fisheries and fishing communities are at high risk from climate-driven changes in the distribution, timing, and productivity of fishery-related species. Ocean warming, acidification, and deoxygenation are projected to increase these changes in fishery-related species, reduce catches in some areas, and challenge effective management of marine fisheries and protected species."[90] The Assessment also states: "Wildfire smoke degrades air quality, increasing the health risks to tens of millions of people in the United States. More frequent and severe wildfires due to climate change would further diminish air quality, increase incidences of respiratory illness from exposure to wildfire smoke, impair visibility, and disrupt outdoor recreational activities."[91]

In addition, the Assessment supports the States' and Cities' argument that EPA ignored the dictates of OMB Circular A-4 by not using its professional judgment to highlight, categorize, or rank non-quantifiable impacts. Comments at 136 (quoting Circular A-4). The Assessment explains that "numerical estimates" should be "complemented by methods quantifying expert judgment in order to consider uncertainties not well represented by" existing models.[92] EPA's failure to grapple with the "diverse evidence" of climate harms[93] in the manner described by

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[88] *Assessment* at 608 (noting that in 2010-11, "drought in Russia, Ukraine and the United States and damaging precipitation in Australia" resulted in "reduction in wheat production," which "contributed to a spike in global wheat prices … increasing the cost of flour and bread in the United States.").

[89] *Id.* at 640.

[90] *Id.* at 361.

[91] *Id.* at 513.

[92] *Id.* at 640.

[93] *Id.* at 639.

Circular A-4 and the Assessment, means it has arbitrarily limited its consideration of costs and benefits in a manner prescribed in these guidance documents for federal agencies.

Conclusion

The Assessment is of central relevance to the proposed rule and therefore EPA must include it in the rulemaking docket. The Assessment's findings confirm the States and Cities' grave concerns with EPA's proposed rule. We renew our request that the agency withdraw its flawed proposal and work to implement and strengthen the Clean Power Plan.

Respectfully Submitted,

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