

**Written Testimony of Dr. Jeremy Richardson
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**Senate Environment and Public Works Committee Field Hearing
“Regional Impacts of EPA Carbon Regulations: The Case of West Virginia”**

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My name is Jeremy Richardson and I am a senior energy analyst at the Union of Concerned Scientists (UCS). UCS is the nation’s leading science-based nonprofit working for a healthy environment and a safer world. We appreciate the opportunity to provide input on this critical issue.

I have a unique perspective on reducing carbon emissions from the burning of fossil fuels. As a scientist, I understand the **urgency to reduce emissions to protect the planet’s climate**. As the brother, son, and grandson of West Virginia coal miners, the question of **how we go about tackling climate change is deeply personal to me**.

First, on behalf of UCS’s more than 450,000 supporters, I want to say that we strongly support the Environmental Protection Agency’s (EPA’s) efforts and authority to limit carbon emissions from fossil fuel-fired power plants through the Clean Power Plan (CPP). **Simultaneously**, however, I want to emphasize the need for **special consideration** for the families and communities facing the negative consequences of the transition to a cleaner, low carbon energy system.

UCS provided extensive comments on the Clean Power Plan to EPA as part of its public comment period that closed on December 1, 2014. I have attached our full comments for inclusion in the record, and I highlight some key points here.

Climate Change is Real and Caused by Human Activity

Human-induced climate change is **already having impacts** that are being felt by people here in West Virginia, our nation, and around the world. If we collectively fail to make deep reductions in our carbon emissions, we will greatly increase the risk of **serious economic, health, and environmental consequences** from accelerating sea level rise, storm surges, heat waves, drought, wildfires, more frequent heavy downpours, and increased hurricane intensity.

These impacts are a direct consequence of the **increasing concentration of greenhouse gases like carbon dioxide (CO₂)** in our planet’s atmosphere. Power plants are the largest single source of U.S. CO₂ emissions, representing about 40 percent of the total. Reducing emissions from the electric power sector is therefore crucial to our overall efforts to tackle climate change. UCS has worked for many years to educate the public on the science of climate change and to advance solutions. I have

attached two recent UCS reports on climate change: “Encroaching Tides”¹ and “National Landmarks at Risk.”²

These facts compel us to act, and to act decisively. In doing so, we must recognize that some regions of our country are **facing a heavier burden** than others in accelerating this transition to a less fossil-intensive electricity system.

Carbon emissions are driving climate change with accelerating pace

Evidence of the heat-trapping role of carbon dioxide (CO₂) in the atmosphere was established in 1859 and by the end of that century the discovery emerged that fossil fuel emissions could cause a shift in Earth’s climate.³ The first confirmation that these emissions were already changing Earth’s temperature emerged during the 1930s.⁴

The accelerating pace of emissions after these discoveries is alarming, with over half emitted since 1970 of the total human CO₂ emissions between 1750 and 2010.⁵ The annual atmospheric CO₂ increase (2.9 ppm) over 2012-2013 was the highest over the 1984 to 2013 period of record.⁶ Accelerating emissions has occurred despite the worldwide trend, since 1850, in the mix of primary energy supply shifting away from less carbon intensive fuels from primarily biomass to primarily coal to more oil and gas in the mix.⁷ The latest tracking for each country’s share of CO₂ emissions ranks China (27 percent) and the United States (17 percent) as the top two in 2011.⁸ The bulk of 2012 U.S. heat-trapping emissions was in the form of CO₂ (82 percent) with nearly a third of all U.S. emissions that year coming from electricity generation (32 percent).⁹ Carbon standards aimed at reducing emissions from existing U.S. power plants tackles one of the largest current sources of global CO₂ emissions in the world.

¹ UCS 2014. Encroaching Tides: How Sea Level Rise and Tidal Flooding Threaten U.S. East and Gulf Coast Communities over the Next 30 Years. Online at http://www.ucsusa.org/global_warming/impacts/effects-of-tidal-flooding-and-sea-level-rise-east-coast-gulf-of-mexico#.VQxARuEuwfg

² UCS 2014. National Landmarks at Risk: How Rising Seas, Floods, and Wildfires Are Threatening The United States' Most Cherished Historic Sites. Online at: http://www.ucsusa.org/global_warming/science_and_impacts/impacts/national-landmarks-at-risk-from-climate-change.html#.VQxAtuEuwfg

³ Fleming, J.R. 1998. Historical Perspectives on Climate Change, Oxford University Press.

⁴ Callendar, G.S. 1938. The artificial production of carbon dioxide and its influence on temperature. Quarterly J. Royal Meteorological Society 64:223-240.

⁵ IPCC, 2014: Summary for Policymakers, In: Climate Change 2014, Mitigation of Climate Change. Contribution of Working Group III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Edenhofer, O., R. Pichs-Madruga, Y. Sokona, E. Farahani, S. Kadner, K. Seyboth, A. Adler, I. Baum, S. Brunner, P. Eickemeier, B. Kriemann, J. Savolainen, S. Schlömer, C. von Stechow, T. Zwicker and J.C. Minx (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.

⁶ WMO. 2014. WMO Greenhouse Gas Bulletin: The State of Greenhouse Gases in the Atmosphere Based on Global Observations through 2013. World Meteorological Organization. ISSN 2078-0796.

⁷ Blanco G. et al., Chapter 5: Drivers, Trends, and Mitigation, in Climate Change 2014: Mitigation of Climate Change. Contribution of Working Group III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change.

⁸ U.S. Energy Information Administration. Indicators CO₂ Emissions Tables for 2011. Online at <http://www.eia.gov/cfapps/ipdbproject/iedindex3.cfm?tid=90&pid=44&aid=8&cid=regions&syid=2007&eyid=2011&unit=MTCDPP>.

⁹ EPA. 2014. Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990–2012. U.S. Environmental Protection Agency, Washington D.C. The EPA 430-R-14-003.

Future risks of catastrophic climate outcomes add urgency for emissions reductions

Certain catastrophic climate outcomes are a growing risk unless substantial progress in global heat-trapping emissions occurs. The northern permafrost soil organic carbon pool is estimated to be around 1672 petagrams carbon (PgC).¹⁰ This is larger than the anthropogenic budget of around 1,000 PgC emissions to stay below a global mean temperature rise of 2°C above the 1861–1880 period; half (445-585 PgC) has already been emitted by 2011.¹¹

Keeping this region cold enough to prevent the release of these vast stores of carbon in the form of methane (CH₄) and CO₂, trapping heat and warming Earth even faster, is a key factor in the urgency for substantial emissions reductions. Reasons include the processes that lead to amplified warming in the Arctic which pose risks of increased permafrost degradation rates.¹² The loss of the upper few meters of permafrost is projected to decrease 37 percent to 81 percent by the end of this century under RCP2.6 and RCP8.5 future scenarios respectively.¹³ Carbon released from permafrost is irreversible for millennia.¹⁴

Another catastrophic climate outcome, that is irreversible for millennia, is ice sheet collapse.¹⁵ Long before total collapse, significant ice sheet shrinking would transform coastlines of the world to a degree that would be unrecognizable to many coastal residents of today. Paleoclimate evidence from the last interglacial period, around 130,000 years ago, occurred with the combined shrinking of the perimeter of the Greenland ice sheet and the West Antarctic Ice Sheet with an associated sea level rise of more than 4 to 6 meters above current sea level.¹⁶ Today's CO₂ levels in the atmosphere are much higher than when these changes occurred over the last interglacial. At 6 meters additional sea level rise, south Florida and the Mississippi Delta regions of Louisiana would be severely inundated as well as large portions of other coastlines around the world.¹⁷

Climate change impacts in the U.S. are growing

Already, people living in the U.S. are exposed to climate change impacts that vary in severity depending on the season, location, socioeconomic factors as well as local, regional, and national

¹⁰ Kuhry, P., Grosse, G., Harden, J. W., Hugelius, G., Koven, C. D., Ping, C.-L., Schirrmeister, L. and Tarnocai, C. 2013. Characterisation of the Permafrost Carbon Pool. *Permafrost Periglac. Process.*, 24:146–155. doi: 10.1002/ppp.1782

¹¹ Collins, M., R. Knutti, J. Arblaster, J.-L. Dufresne, T. Fichefet, P. Friedlingstein, X. Gao, W.J. Gutowski, T. Johns, G. Krinner, M. Shongwe, C. Tebaldi, A.J. Weaver and M. Wehner. 2013. Long-term Climate Change: Projections, Commitments and Irreversibility. In: *Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change* [Stocker, T.F., D. Qin, G.-K. Plattner, M. Tignor, S.K. Allen, J. Boschung, A. Nauels, Y. Xia, V. Bex and P.M. Midgley (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.

¹² Lawrence, D.M., Slater, A.G., Tomas, R.A., Holland, M.M., and Deser, C. 2008. Accelerated Arctic land warming and permafrost degradation during rapid sea ice loss. *Geophys. Res. Lett.* 35 DOI 10.1029/2008GL033985

¹³ IPCC. 2013. Summary for Policymakers. In: *Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change* [Stocker, T.F., D. Qin, G.-K. Plattner, M. Tignor, S.K. Allen, J. Boschung, A. Nauels, Y. Xia, V. Bex and P.M. Midgley (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.

¹⁴ *Ibid.*

¹⁵ *Ibid.*

¹⁶ Overpeck J.T., B.L. Otto-Bliesner, G.H. Miller, D.R. Muhs, R.B. Alley, and J.T. Kiehl. 2006. Paleoclimatic Evidence for Future Ice-Sheet Instability and Rapid Sea-Level Rise. *Science*:311:1747-1750.

¹⁷ Overpeck, J.T. and J.L. Weiss. 2009. Projections of future sea level becoming more dire. *PNAS*. 106: 21461–21462.

resilience policies.¹⁸ Land ice and warming oceans both contribute to global sea level rise with the former at a much higher increasing pace than the latter.^{19,20} This combined with local land elevation shifts and the loss of natural barriers has increased so-called “nuisance flooding” in areas of the U.S. with more than 300 percent increase (Norfolk, VA, San Francisco, CA, and Washington DC) to more than 900 percent increase (Baltimore, MD, and Annapolis, MD) in the number of flood days in recent years (2007–2013) compared to around 50 years earlier (1957–1963).²¹ The future risk of nuisance flooding is directly tied to the rate at which the U.S. and the world choose the pace of emissions going forward. Emissions really matter to many coastal communities. For example, in Annapolis, MD, which currently experiences nearly 50 tidal flood events per year, the community could face over 220 such events under an intermediate-low scenario or over 380 such events under the highest emissions scenario.²² Since there are only 365 days a year, that means tidal flooding twice a day at current Annapolis locations or for all practical purposes—inundation.

The growing risk of extreme events that lead to too much water (or snow) or too little water (and associated consequences) have cost lives, property and at times transformed local communities when severe enough to permanently displace a critical number of residents. The fundamental consequence of more water vapor in the atmosphere from global warming, has led to an increase in precipitation volume in the heaviest annual events, in Alaska and the Continental U.S. (e.g., Northeast (71 percent); Midwest (37 percent)).²³

Higher temperatures increase soil and surface water evaporation and plant transpiration rates leading to increased drought risk in some regions, seasons or time periods.²⁴ Warmer temperatures in the Western U.S. have brought earlier snowmelt leaving high mountain forests hotter and drier, especially comparing the dry La Niña years compared with La Niña years decades earlier, increasing the risk of large wildfires.²⁵ Federal fire suppression costs, in 2012 dollars, have increased from around \$440 million in 1985 to around 1.7 billion in 2013.²⁶

¹⁸ Melillo, Jerry M., Terese (T.C.) Richmond, and Gary W. Yohe, Eds. 2014. *Climate Change Impacts in the United States: The Third National Climate Assessment*. U.S. Global Change Research Program, 841 pp. doi:10.7930/J0Z31WJ2.

¹⁹ Church, J.A., N.J. White, L.F. Konikow, C.M. Domingues, J.G. Cogley, E. Rignot, J.M. Gregory, M.R. van den Broeke, A.J. Monaghan, and I. Velicogna. 2011. Revisiting the Earth’s sea-level and energy budgets from 1961 to 2008. *Geophys. Res. Lett.* 38. doi:10.1029/2011GL048794.

²⁰ Walsh, J., D. Wuebbles, K. Hayhoe, J. Kossin, K. Kunkel, G. Stephens, P. Thorne, R. Vose, M. Wehner, J. Willis, D. Anderson, V. Kharin, T. Knutson, F. Landerer, T. Lenton, J. Kennedy, and R. Somerville. 2014. Appendix 3: Climate Science Supplement. *Climate Change Impacts in the United States: The Third National Climate Assessment*, J. M. Melillo, Terese (T.C.) Richmond, and G. W. Yohe, Eds., U.S. Global Change Research Program, 735-789. doi:10.7930/J0KS6PHH.

²¹ Sweet, W., J. Park, J. Marra, C. Zervas, S. Gill. 2014. *Sea Level Rise and Nuisance Flood Frequency Changes around the United States*. NOAA Technical Report NOS CO-OPS 073 and online at http://www.noaanews.noaa.gov/stories2014/20140728_nuisanceflooding.html.

²² Spanger-Siegfried, E., M.F. Fitzpatrick, and K. Dahl. 2014. *Encroaching tides: How sea level rise and tidal flooding threaten U.S. East and Gulf Coast communities over the next 30 years*. Cambridge, MA: Union of Concerned Scientists.

²³ Walsh, J., D. Wuebbles, K. Hayhoe, J. Kossin, K. Kunkel, G. Stephens, P. Thorne, R. Vose, M. Wehner, J. Willis, D. Anderson, S. Doney, R. Feely, P. Hennon, V. Kharin, T. Knutson, F. Landerer, T. Lenton, J. Kennedy, and R. Somerville. 2014. Ch. 2: Our Changing Climate. *Climate Change Impacts in the United States: The Third National Climate Assessment*, J. M. Melillo, Terese (T.C.) Richmond, and G. W. Yohe, Eds., U.S. Global Change Research Program, 19-67. doi:10.7930/J0KW5CXT.

²⁴ *Ibid.*

²⁵ Westerling A.L., H.G. Hidalgo, D.R. Cayan, and T.W. Swetnam. 2006. Warming and earlier spring increase western U.S. forest wildfireactivity. *Science* 313:940–943.

²⁶ Cleetus, R., and K. Mulik. 2014. *Playing with fire: How climate change and development patterns are contributing to the soaring costs of western wildfires*. Cambridge, MA: Union of Concerned Scientists.

Significantly reducing U.S. existing power plant emissions in the next decade and beyond can help reduce the risks of negative consequences from climate change in the U.S. and the world. As part of the global effort to reduce emissions, in 2009 the U.S. committed to reducing emissions 17 percent below 2005 levels by 2020,²⁷ and recently announced a commitment to further reduce emissions 26 to 28 percent below 2005 levels by 2025.²⁸ These commitments would put the U.S. on a path to the goal of reducing emissions by at least 80 percent by 2050, a goal consistent with international agreements. Scientists conclude that to meet international goals to limit warming to 2°C above preindustrial levels,²⁹ the world must stay within a budget of around 1,000 PgC emissions.³⁰ For the U.S. to make good on those commitments, the power sector will need to cut emissions by more than the estimated reductions from the Clean Power Plan of 30 percent below 2005 levels by 2030.

West Virginia is not immune from the impacts of climate change

Like the rest of the country and the world, the state of West Virginia is witnessing the impacts of a changing climate. In June 2014 the Allegheny Highlands Climate Change Impacts Initiative³¹ organized a conference focusing on local climate impacts in the highlands region. Experts discussed the changes in precipitation and temperature, impacts on forests and streams, wildlife, and economic impacts on outdoor recreation on the region.³²

EPA's Proposed Carbon Standards are Flexible and Must Be Strengthened

The Clean Power Plan provides a **sound framework for reducing emissions** from the power sector, but is **not ambitious enough in the overall result** of a 30 percent reduction in emissions in 2030 relative to 2005. UCS analysis shows that, by increasing the contribution from renewable energy in the CPP, we could cost-effectively increase emission reductions to 40 percent below 2005 levels by 2030. We detailed our methodology in our comments to the agency, and I have also attached a shorter policy brief on our findings for the record.

UCS **supports EPA's proposal to incorporate renewable energy (RE) and energy efficiency (EE) in state compliance plans.** Renewables such as wind, solar, and geothermal energy emit no carbon, and are already delivering **safe, reliable, and affordable** power to consumers. They also help diversify the electricity mix, improve public health, strengthen state and local economies, and reduce the risks of over reliance on natural gas.

²⁷ United States. 2010. Copenhagen Accord submission. Online at

http://unfccc.int/files/meetings/cop_15/copenhagen_accord/application/pdf/unitedstatescphaccord_app.1.pdf

²⁸ The White House. 2014. U.S.-China Joint Announcement on Climate Change and Clean Energy Cooperation. Fact sheet. Online at <http://www.whitehouse.gov/the-press-office/2014/11/11/fact-sheet-us-china-joint-announcement-climate-change-and-clean-energy-c>

²⁹ National Research Council. 2010. Limiting the magnitude of future climate change. Washington, DC: National Academies Press.

³⁰ Collins, M., R. Knutti, J. Arblaster, J.-L. Dufresne, T. Fichefet, P. Friedlingstein, X. Gao, W.J. Gutowski, T. Johns, G. Krinner, M. Shongwe, C. Tebaldi, A.J. Weaver and M. Wehner. 2013. Long-term Climate Change: Projections, Commitments and Irreversibility. In: Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Stocker, T.F., D. Qin, G.-K. Plattner, M. Tignor, S.K. Allen, J. Boschung, A. Nauels, Y. Xia, V. Bex and P.M. Midgley (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.

³¹ <http://www.alleghenyclimate.org/>

³² Allegheny Highlands Climate Change Impacts Initiative 2015. On the Chopping Block: The Impacts of Global Warming and Climate Change on the Mid-Atlantic Allegheny Highlands. Online at: <http://www.alleghenyclimate.org/documents/Updated%201-19-15%20TCB%20Report.pdf>

EPA used four "building blocks" to determine the Best System of Emission Reduction (BSER) and establish emission rate reduction goals for each state. For the renewables block, EPA has really proposed an **"average"** system of emission reduction, seriously underestimating the true potential for renewable energy to cut carbon emissions. EPA's state renewable energy targets are in many cases close to a business-as-usual approach—four states had **more renewable generation in 2012** than their EPA targets for **2030**.

States could be **more ambitious** in using renewables to reduce emissions. Costs of renewable energy have fallen dramatically. For example, prices for residential and commercial solar systems fell by half from 2009 to 2013,³³ and dropped an additional 9-12 percent over 2014.³⁴ Meanwhile, the cost of wind power dropped 43 percent in the last four years—and is now **competitive with power from new fossil fuel plants** in some regions of the country.

EPA's framework also includes the option for states to comply on a multi-state or regional basis, which not only rewards early actors like the RGGI states but also creates an opportunity for new or expanded **multi-state collaborations to drive down emissions at a lower cost**.

Challenges Facing Coal

As we all know, the **coal industry faces challenging times**. Many blame environmental regulations entirely for the downturn, but the truth is that **regardless of who occupies the White House**, the industry faces strong and persistent headwinds. The **primary driver is economics**—cheap natural gas has **dramatically reduced** coal's role in the electricity sector, and competition with other coal-producing regions has reduced the competitive advantage of Central Appalachian coal. After 150 years, we have mined the highest quality and easiest-to-get seams, and the rest is getting harder—and **more expensive**—to get.³⁵

The future of the coal industry, even without this rule, is uncertain at best,³⁶ and it has already declined, particularly in Central Appalachia, due to cheap and abundant natural gas, competition with other coal mining regions, decreasing labor productivity (and increasing costs), and earlier environmental regulations. Although the EPA concludes that the proposed standard likely will result in an increase in net jobs nationally, **it must be recognized that job impacts will be unevenly dispersed—some regions and states will be winners, and others will experience economic consequences from a shift away from coal**. Although the agency has no authority under the CAA to provide assistance to states facing negative impacts, it can and should offer guidance to those states on ways to help to address such concerns. **Coal-heavy states, in turn, should consider using compliance plans as an opportunity to help diversify their economies**.

³³ Solar Energy Industry Association 2014. Q3 2014 Solar Market Insight fact sheet:

<http://www.seia.org/sites/default/files/Q3%202014%20SMI%20Fact%20Sheet.pdf>.

³⁴ Solar Energy Industry Association 2014. Solar Market Insight Report 2014 Q4. <http://www.seia.org/research-resources/solar-market-insight-report-2014-q4>

³⁵ McIlmoil, R., E. Hansen, N. Askins, and M. Betcher. 2013. The continuing decline in demand for Central Appalachian coal: Market and regulatory influences. Downstream Strategies, 2013. Online at

http://www.downstreamstrategies.com/documents/reports_publication/the-continuing-decline-in-demand-for-capp-coal.pdf.

³⁶ Richardson, L. J., R. Cleetus, S. Clemmer, and J. Deyette. 2014. Economic impacts on West Virginia from projected future coal production and implications for policymakers. Environmental Research Letters, 18 Feb 2014. 9(2): 024006. doi:10.1088/1748-9326/9/2/024006.

In short, multiple market factors are making **coal-fired power too expensive** relative to other **cheaper, less polluting options** like natural gas, renewable energy, and energy efficiency.

Economic Justice: Job Creation and Worker Transition

The EPA and states must pay particular attention to both environmental and economic justice issues. **Overburdened communities, including low-income and minority populations, often face the greatest impacts from criteria air pollutants; conversely, coal workers may face the loss of their livelihoods in the transition to a clean energy economy.** The impacts of climate change will disproportionately affect certain communities, such as the poor, the elderly, and the very young, who are most vulnerable to health impacts, as well as minority and disadvantaged communities, which notably already face significantly greater health impacts due to poor air quality. Similarly, **without foresight and planning, policies to address the threat of climate change could negatively impact communities that depend on fossil-related industries for economic activity and jobs.**

In its proposal, the EPA outlined specific elements of an approvable state compliance plan. Given the complex nature of the proposed standard, the agency should specify a menu of options that states could use to address both environmental and economic justice concerns. **State compliance plans should direct resources to the most impacted communities, while reducing emissions, protecting workers, and mitigating direct health impacts.** Shutting down old, inefficient, and polluting coal plants³⁷ can help reduce health impacts in overburdened communities³⁸ while investments in renewable energy and energy efficiency can help create jobs and strengthen local economies, which is of critical importance to communities heavily reliant on coal and related industries.

In our comments to the EPA, UCS recommended that the agency emphasize—and provide guidance to states on—**the potential for job creation and economic development from investments in renewable energy and energy efficiency and in supporting industries, especially manufacturing.** With the rapid decline in cost and corresponding increase in deployment of renewable energy resources like wind³⁹ and solar,⁴⁰ fossil generation is under increasing competition from cleaner alternatives for electricity. The proposed standard for carbon emissions represents an opportunity for states to amplify or jumpstart investments in both renewables and efficiency and to stimulate local economies. Many studies have demonstrated the job growth and economic benefits of such investments. Most recently, a report looking at California as a case study⁴¹ demonstrates how federal, state, and construction industry policies have led to the

³⁷ Cleetus, R., S. Clemmer, E. Davis, J. Deyette, J. Downing, and S. Frenkel. 2012. Ripe for retirement: The case for closing America's costliest coal plants. Cambridge, MA: Union of Concerned Scientists, November 2012. Online at http://www.ucsusa.org/assets/documents/clean_energy/Ripe-for-Retirement-Full-Report.pdf.

³⁸ Wilson, A. et al. 2012. Coal blooded: Putting people before profits. Online at <http://www.naacp.org/page/-/Climate/CoalBlooded.pdf>.

³⁹ American Wind Energy Association (AWEA). 2014. U.S. wind industry annual market report 2013. Washington, DC: AWEA.

⁴⁰ Solar Energy Industries Association (SEIA). 2014. Solar energy facts: 2013 year in review. Washington, DC: SEIA. Online at www.seia.org/sites/default/files/YIR%202013%20SMI%20Fact%20Sheet.pdf, accessed on September 15, 2014.

⁴¹ Philips, P. 2014. Environmental and economic benefits of building solar in California. Donald Vial Center on Employment in the Green Economy. Institute for Research on Labor and Employment, UC Berkeley. Online at

development of nearly 5000 MW and the creation of more than 15,000 jobs.⁴² Thanks to strong labor agreements, not only are workers well-paid and receive solid health and pension benefits, but also contractors have contributed \$17.5 million for training programs. Solar development in California “is preparing a new generation of California blue collar workers for a future of skilled and productive work and a life of financial security.”⁴³

Fortunately, there are a **variety of policy mechanisms, both within the context of state compliance plans and through complementary policies enacted by state legislatures, to retrain workers and invest in economic diversification.** Many such policies have the potential to generate revenue that the states can then invest as they see fit. Policies could include:

- **Market-Based Mechanisms.** The Regional Greenhouse Gas Initiative (RGGI) offers an example of how state collaboration on market-based solutions could generate revenue for states as they lower carbon emissions. For example, in 2012 RGGI states invested 73 percent of auction revenue in energy efficiency programs, which is expected to save participants \$1.8 billion on electricity bills over the lifetime of the measures.⁴⁴ During the first compliance period from 2009-2012, **RGGI auctions generated \$912 million in proceeds and produced \$1.6 billion in net present value to the (then) ten-state region, corresponding to almost \$33 per capita spread throughout the region.**⁴⁵ Cumulatively, from 2009-2012, 65 percent of proceeds went to energy efficiency, 17 percent to direct bill assistance, 6 percent to clean and renewable energy, and 6 percent to GHG abatement—but states direct their own auction revenue as they see fit. Coal-heavy states that join regional programs could decide to direct auction revenue to worker retraining and economic diversification, and should be encouraged to do so. California's AB 32 similarly sets up a market-based mechanism for reducing emissions that generates revenue for the state.
- **Carbon Fees.** Sub-national governments have enacted prices on carbon emissions. British Columbia, for example, enacted a carbon tax⁴⁶ in 2008; the revenue neutral program in fiscal year 2013-14 is expected to generate \$1.2 billion in proceeds to offset other taxes. Such policies can be used to generate revenue that could be directed to affected workers and communities.
- **Permanent Mineral Trust Funds.** Many resource-rich states have enacted permanent mineral trust funds, which levy a special tax on companies for right to remove resources from the ground.⁴⁷ Wyoming, for example, enacted its program in 1974, and as of 2013, the

<http://laborcenter.berkeley.edu/environmental-and-economic-benefits-of-building-solar-in-california-quality-careers-cleaner-lives/>.

⁴² Includes 10,200 construction jobs, 136 permanent O&M jobs, and over 3,700 additional jobs (induced).

⁴³ Philips 2014.

⁴⁴ RGGI 2014. Regional Investment of RGGI CO₂ Allowance Proceeds, 2012.

⁴⁵ Hibbard et al. 2011. The economic impacts of the Regional Greenhouse Gas Initiative on ten Northeast and Mid-Atlantic states. The Analysis Group.

⁴⁶ http://www.fin.gov.bc.ca/tbs/tp/climate/carbon_tax.htm.

⁴⁷ Boettner T., J. Kriesky, R. McIlmoil, and E. Paulhus. 2012. Creating an economic diversification trust fund: Turning nonrenewable natural resources into sustainable wealth for West Virginia. West Virginia Center on Budget and Policy, January 2012. Online at <http://www.wvpolicy.org/downloads/WVEconomicDiversificationTrustFundRpt013012.pdf>.

fund was worth \$5.88 billion.⁴⁸ In March 2014, West Virginia established the **Future Fund**,⁴⁹ similarly designed to **direct a fraction of severance tax revenue from mineral resources (notably, including coal) to economic diversification and development focusing on regions where the extraction takes place**. Although no revenue is currently being directed toward the Future Fund due to other budget priorities, the legislation specifically allows for other sources of revenue to be deposited into the fund.

- **Renewable Electricity Standards.** In addition to helping states meet their carbon reduction goals, RES policies⁵⁰ can spur renewable development. Some states have even defined their RESs to designate a portion of RE development from in-state resources to support local job creation. Studies find limited cost impacts from such policies, and some states have quantified measurable economic benefits from the programs.⁵¹
- **Energy Efficiency Resource Standards.** Similarly, policies that promote energy efficiency in homes and businesses can not only help states meet the EPA targets, but also **create local jobs that cannot be outsourced, while saving consumers money on their electricity bills**.⁵²
- **Worker Training Programs.** The federal government already has a number of programs to support worker retraining and community development, all of which are currently funded and not reliant on further action from Congress. In particular, the Department of Agriculture's Rural Development program, the Department of Commerce's Economic Development Administration, the Department of Labor's Economic Training Administration, and the Appalachian Regional Commission all have programs in place to support workers and communities. By leveraging existing authority, the federal government can direct targeted resources to affected communities and help coal states diversify their economies. For example, the Obama Administration designated southeastern Kentucky as a federal Promise Zone⁵³ to focus on poverty alleviation by establishing a partnership between federal agencies and local institutions. Together, federal agencies should work with Congress to develop targeted legislation to address displaced workers in coal mining, coal fired power plants, and related industries. Numerous examples in recent history serve as a roadmap for successful worker retraining programs, including the Trade Adjustment Act and the Workforce Reinvestment Act. More recently, a bipartisan bill was introduced in the 113th Congress specifically directed at coal workers.⁵⁴

⁴⁸ Gordon, M. 2013. Wyoming State Treasurer Annual Report for the Period July 1, 2012 through June 30, 2013. Online at <http://treasurer.state.wy.us/pdf/annualweb2013.pdf>.

⁴⁹ Bill Text, as passed, March 10, 2014:

http://www.legis.state.wv.us/Bill_Status/Bills_history.cfm?input=461&year=2014&sessiontype=RS&btype=bill.

⁵⁰ See Lawrence Berkeley National Laboratory, <http://emp.lbl.gov/rps>.

⁵¹ Heeter, J., G. Barbose, L. Bird, S. Weaver, F. Flores-Espino, K. Kuskova-Burns, and R. Wiser. 2014. A survey of state-level cost and benefit estimates of Renewable Portfolio Standards. Online at <http://www.ourenergypolicy.org/wp-content/uploads/2014/06/nrel.pdf>.

⁵² Alliance to Save Energy. 2013. Energy Efficiency Resource Standard. Online at

https://www.ase.org/sites/ase.org/files/resources/Media%20browser/eers_fact_sheet_9-13.pdf.

⁵³ <http://www.nytimes.com/2014/01/10/us/politics/obama-announces-promise-zones-in-5-stricken-areas.html>.

⁵⁴ <http://blogs.rollcall.com/218/in-a-partisan-climate-two-lawmakers-try-to-talk-past-climate-change/>.

With foresight and planning, states can develop implementation plans that lead to net job creation nationally. As the BlueGreen Alliance⁵⁵ emphasizes, it is **critical to provide direct support to workers and communities**—extending to ancillary and support sectors as well as the utility sector—if and when a power plant shuts down, by providing wages, benefits, training, education, and the recognition of basic workers’ rights. **Communities will need resources to diversify their economies and create high-paying jobs that can match or exceed those that may have been lost.** The private sector, including utilities, and all levels of government must work in tandem with communities to make these transitions a success. Regulated entities should not be allowed to skirt commitments made to workers—as power plants and coal mines close or idle, owners should honor the commitments they made to workers, including pensions and health benefits.

Economic Diversification: A No-Regrets Strategy

Thankfully, West Virginia has many assets it can leverage to diversify its economy. But **we must let go of the idea that coal is all we’ve got.**

Communities all around Coal Country, from Beckley to Welch to Pikeville, are eager to have this conversation. They realize that times are changing, and they are calling for leadership. Over 200 people from a wide range of perspectives attended a forum UCS organized in September 2013 to talk about the state’s Bright Future⁵⁶ (report attached). Participants pointed to the state’s **top-notch work force**, natural resources, opportunities for **recreation and tourism, advanced manufacturing**, and more.

And the **conversations have continued**, from the ground up. Williamson is remaking itself as a healthy community focused on sustainability. Communities across West Virginia have been participating in a series of dialogues called “What’s Next, West Virginia?”⁵⁷ A few state leaders are listening—as evidenced by the Shaping Our Appalachian Region (SOAR) initiative⁵⁸ in eastern Kentucky and the Southern Coalfields Organizing and Revitalizing the Economy (SCORE) initiative in southern West Virginia.

Even the President’s proposed budget includes **significant investments in the Appalachian region** and recognizes that **coal miners "have kept the lights on in this nation for generations."** The proposal recognizes that there are a variety of existing federal programs that support workers. The initiative, the POWER Plus Plan, or Partnerships for Opportunity and Workforce and Economic Revitalization (POWER), is slated to build on existing programs during FY 2015 and expand in FY 2016. POWER Plus calls **for targeted funding for workforce development programs** at federal agencies, **strengthening the health care and pension plans that support over 100,000 retired miners**, releasing **\$1 billion over 5 years for restoring abandoned mine land (AML) communities while promoting sustainable development**, and establishing **two new tax credits to spur deployment of carbon capture and sequestration (CCS) technology.**

⁵⁵ <http://www.bluegreenalliance.org/news/publications/testimony-of-the-bluegreen-alliance-at-public-hearing-on-EPAs-clean-power-plan>.

⁵⁶ UCS 2014. “A Bright Economic Future for the Mountain State.” Online at www.ucsusa.org/wvbrightfuture

⁵⁷ <http://whatsnextwv.org/>

⁵⁸ <http://www.soar-ky.org/>

Together with federal policy makers, states should help ensure that economic diversification and resources for worker transition are an important part of their compliance plans. In doing so, together we can not only **establish a strong standard to protect the planet's climate**, but also **ensure that workers and communities have fresh economic opportunities**, as market forces drive a shift away from coal.

I do not accept that this is an “either-or” proposition.

Our children and our grandchildren will face the risks of a **vastly different climate caused by our failure to act to reduce emissions today**. My young niece, and maybe someday her children and grandchildren, will face an **uncertain future** if we don't get the second part right too.

It is much harder, but it is **imperative** that we do both.