

Stopping Climate Change in Virginia

100 percent renewable energy by 2035

Rising global temperatures risk irreversible worldwide ecological and climatic changes, with widespread impacts on human health and ecosystems. The threats include more violent storms, droughts, floods, acidifying and rapidly warming oceans, and altered growing seasons.¹ In Virginia, increasing temperatures and rising sea levels due to climate change have resulted in saltwater intrusion, disappearing beaches and more intense storms and floods.² We must transition away from dirty fossil fuels like coal, oil and natural gas to clean, renewable energy as soon as possible to prevent the worst effects of a warming planet.³ Virginia must — and can — shift to 100 percent renewable energy by 2035.

The Urgent Need to Act Now on Climate

The warming of the planet is already causing significant damage that is expected to get worse.⁴ U.S. temperatures have increased dramatically over the past century, and this warming has only accelerated over the past few decades.⁵ Since 1970, average Virginia temperatures have increased by more than 2 degrees Fahrenheit (about 1 degree Celsius).⁶ Warming oceans and sinking land have caused sea levels in Virginia to rise one or two inches every decade, which is one of the highest rates in the country.⁷ The U.S. Geological Survey estimates that sea-level rise will “very likely” contribute to the loss of Virginia’s barrier islands.⁸ Multiple highly populated Virginia communities will face chronic inundation of seawater by the end of the century.⁹

Increasing temperatures contribute to more frequent and stronger extreme weather events.¹⁰ Heavy storm precipitation has increased by 27 percent in the southeastern United States over the past five decades and is expected to keep rising.¹¹ In 2003, the storm surge from Hurricane Isabel caused severe flooding in Virginia’s Fairfax County as well as flash flooding of the South and Shenandoah rivers, costing the state over \$925 million.¹² Sea-level rise contributed to Hurricane Isabel’s higher proportional impact than previous and more powerful storms.¹³



Hurricane Isabel, 2003 / PHOTO COURTESY OF NASA

Climate change impacts will be expensive. In addition to the pricey effects of Hurricane Isabel, losses from hurricanes are likely to increase significantly by the middle of the century.¹⁴ Rising sea levels and more storms may increase flood and homeowner insurance rates in the state.¹⁵ Certain Virginia industries will also be impacted. The \$1.5 billion sport fishing industry and the \$27 billion agricultural industry may be harmed with economic losses due to rising water acidification and salinity, extreme heat and droughts.¹⁶

Detrimental public health impacts on local communities are expected to worsen with rising temperatures.¹⁷ In Virginia, climate change will increase the frequency of extreme heat days, as well as the associated risk of heart and lung disease, with disproportionate impacts on elderly residents.¹⁸ Climate change will also worsen air quality and raise water temperatures that increase the risk of vector-borne diseases like Lyme disease and West Nile virus.¹⁹ The most vulnerable residents — including lower-income populations and communities of color, who already suffer from disparate environmental exposures and illness — will experience the brunt of these impacts.²⁰

Virginia's Electricity Mix Needs to Rapidly Shift to Clean, Renewable Energy

Currently, much of Virginia's power comes from greenhouse gas-emitting fossil fuels. In 2017, nearly two-thirds of the state's electricity came from fossil fuels like natural gas (50 percent) and coal (12 percent).²¹ A mere 0.4 percent of Virginia's electricity came from clean renewables like wind, solar, tidal or geothermal energy.²²

Fossil fuel use has significant human health and environmental impacts. Virginia's largest utility company — Dominion Energy — stored nearly 30 million tons of coal ash, a waste byproduct from coal-fired power plants, in ponds across Virginia.²³ Environmental testing has found that Dominion's coal ash ponds have leaked potentially toxic coal residues into nearby water bodies.²⁴

Natural gas is no climate solution: gas-fired power plants emit greenhouse gases, and natural gas infrastructure like pipelines and power plants leaks the potent greenhouse gas methane that warms the climate. There are currently two proposed and controversial Virginia gas pipelines — the Atlantic Coast Pipeline and the Mountain Valley pipeline — that would lock the Commonwealth into a fossil-fueled future for decades. Constructing these pipelines would threaten

wetlands and water systems, disrupt vulnerable geologic areas and imperil efforts to protect endangered and threatened species.²⁵

Virginia Must and Can Shift to Clean Renewables

Virginia's continued reliance on fossil fuels only perpetuates a dirty energy future that threatens our climate. The Virginia Off Fossil Fuels Act (OFF Act) is the strongest climate bill in history and charts a path for Virginia to achieve 100 percent renewable energy by 2035. The bill curbs climate change and removes dirty energy from the state renewable program and calls for a complete and rapid overhaul of the current energy system — a daunting task, but we can and must do it. As President John F. Kennedy said about the Apollo mission to put a man on the moon, we do it "because that challenge is one that we are willing to accept, one that we are unwilling to postpone, and one which we intend to win."

The Virginia OFF Act is our best chance at tackling climate change, and the most necessary. It promotes a clean energy system based on wind, solar and other clean sources of renewable energy, energy storage and continued improvements in energy efficiency. We have no time to lose.

Virginia's Untapped Reservoir of Clean Energy

Virginia has the ability to tap into large potentials of clean energy. While renewable energy makes up only a sliver of the state's total energy consumption, Virginia solar power generation is increasing steadily.²⁶ The state now has over 630 megawatts of installed solar capacity, powering 69,000 homes as of 2018.²⁷ And solar is expected to keep growing significantly over the coming years. According to the Solar Energy Industries Association, solar capacity could increase by 2,206 megawatts over the next five years in Virginia, while the U.S. Department of Energy (DOE) found that Virginia's solar capacity could reach 8,700 megawatts by 2030, over 22 times the 2017 solar capacity.²⁸

While there are currently no wind energy farms in Virginia, the state has immense wind energy potential waiting to be utilized. According to the DOE, Virginia has over 89,000 megawatts of potential wind power capacity.²⁹ And although no wind technologies are installed at present, a number of projects are in the development pipeline. For example, a Charlottesville developer has plans to build Virginia's first commercial wind farm, although construc-



tion was delayed as of late 2017.³⁰ Virginia is already moving toward increasing battery storage technology to integrate its renewable power resources into a reliable and resilient electricity system.³¹

Even conservative estimates suggest that current and emerging renewable technologies could fulfill a significant share of Virginia's electricity requirements.³² Renewable technology costs are dropping rapidly and are being deployed at unprecedented rates, achieving goals years in advance and exceeding expectations many times over.³³ A more rapid shift to genuine renewables under the 100% Clean Renewable Energy and Equity Act would supercharge this shift.

Benefits of Clean and Efficient Power

These changes will protect the planet and strengthen the economy. Increased solar and wind energy will substantially reduce greenhouse gas emissions, lower overall energy costs and improve electric power grid reliability.³⁴ Renewable energy will also add jobs to the economy. The nascent solar industry already provides Virginians with over 3,000 jobs

statewide, and this number is expected to nearly double over the next decade.³⁵ Utilizing even a fraction of Virginia's wind energy potential could generate nearly 4,000 to 12,000 jobs.³⁶

Energy efficiency is another key component to reducing consumption and dependence on dirty fuels and is an incredibly cost-effective way to reduce greenhouse gas emissions and toxic pollutants.³⁷ In 2007, Virginia set an energy efficiency goal of a 10 percent reduction in electricity consumption by 2022, and in 2014 Governor McAuliffe issued an executive order directing all agencies and departments to pursue energy efficiency measures.³⁸ Since 2013, these energy efficiency initiatives in Virginia have supported more than 75,000 jobs and produced \$1.5 billion in economic revenue.³⁹

Take Action

The Virginia OFF Act charts the strongest path to tackle climate change by pushing for a 100 percent clean energy economy. Virginia has the potential to achieve this transition and reap the substantial economic benefits. Tell your members of the Virginia legislature to support the Virginia OFF Act today: fwwat.ch/VA100Renew

Endnotes

- 1 Pachauri, Rajendra K. et al. "Climate Change 2014: Synthesis Report Summary for Policymakers." Intergovernmental Panel on Climate Change (IPCC). 2015 at 2; Pachauri, Rajendra K. et al. "Climate Change 2014: Synthesis Report." IPCC. 2015 at 40 to 41, 49 to 53, 60, 67, 73 and 97.
- 2 U.S. Environmental Protection Agency (EPA). "What Climate Change Means for Virginia." EPA 430-F-16-048. August 2016 at 1.
- 3 United Nations Framework Convention on Climate Change. "Report of the Conference of the Parties on its twenty-first session, held in Paris from 30 November to 13 December 2015." Part two: Action taken by the Conference of the Parties at its twenty-first session. January 29, 2016 at 22.
- 4 EPA (2016) at 1 and 2.
- 5 Tebaldi, Claudia, Dennis Adams-Smith and Nicole Heller. Climate Central. "The Heat Is On: U.S. Temperature Trends." June 2012 at 3 and 5.
- 6 *Ibid.* at 5.
- 7 EPA (2016) at 1; Ezer, Tal and Larry P. Atkinson. "Sea level rise in Virginia — causes, effects and response." *Virginia Journal of Science*. Vol. 66, Iss. 3. Fall 2015 at 355 and 360.
- 8 Gutierrez, Benjamin, S. Jeffress Williams and E. Robert Thieler. U.S. Department of the Interior and U.S. Geological Survey. "Potential for Shoreline Changes Due to Sea-Level Rise Along the U.S. Mid-Atlantic Region: U.S. Geological Survey Open-File Report 2007-1278." 2007 at 12.
- 9 Spanger-Siegfried, Erika et al. Union of Concerned Scientists. "When Rising Seas Hit Home: Hard Choices Ahead for Hundreds of U.S. Coastal Communities." July 2017 at 1, 25 and Figure 11.
- 10 Trenberth, Kevin E., John T. Fasullo and Theodore G. Shepherd. "Attribution of climate extreme events." *Nature Climate Change*. Vol. 5. August 2015 at 725 to 727; Walsh, John et al. "Chapter 2: Our Changing Climate." In *Climate Change Impacts in the United States*. May 2014 at 20 and 38 to 42.
- 11 EPA (2016) at 2.
- 12 National Oceanic and Atmospheric Administration. "Service Assessment: Hurricane Isabel September 18-19, 2003." May 2004 at 2, 3 and 5.
- 13 Boon, John, Harry Wang and Jian Shen. Virginia Institute for Marine Science. "Planning for Sea Level Rise and Coastal Flooding." October 2008 at 2; Boon, John. "Isabel's Silent Partners: Seasonal and Secular Sea Level Change." 2005 at 49. In Sellner, Kevin G. and Nina Fisher (Eds.). *Hurricane Isabel in Perspective: Proceedings of a Conference*. Chesapeake Research Consortium.
- 14 Repetto, Robert. Demos. "Economic and Environmental Impacts of Climate Change in Virginia." April 19, 2012 at 5; Georgetown Climate Center. "Understanding Virginia's Vulnerability to Climate Change." February 17, 2015 at 1.
- 15 EPA (2016) at 2; Repetto (2012) at 4.
- 16 Repetto (2012) at 6; Georgetown Climate Center (2015) at 2.
- 17 Smith, K. R. et al. "Human health: Impacts, adaptation, and co-benefits." *Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part A: Global and Sectoral Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*. 2014 at 717; EPA (2016) at 2.
- 18 EPA (2016) at 2; Repetto (2012) at 7 to 8.
- 19 Repetto (2012) at 7; Chesapeake Physicians for Social Responsibility. "Climate Change and Health in Virginia." Health & Energy Brief. February 2017 at 2; Natural Resources Defense Council (NRDC). "Climate and Health in Virginia." February 2015 at 3.
- 20 Smith et al. (2014) at 717 to 718, 734 and 742.
- 21 Food & Water Watch analysis of U.S. Energy Information Administration (EIA) data "Net generation for electric power, Virginia." Available at www.eia.gov/electricity/data/browser. Accessed November 2018.
- 22 *Ibid.*
- 23 Gardner, Kevin H. and Scott Greenwood. "Beneficial Reuse of Coal Ash From Dominion Energy Coal Ash Sites: Feasibility Assessment." November 30, 2017 at 2; Zullo, Robert. "Under measure, Dominion again delays closing of coal ash ponds." *Richmond Times-Dispatch*. February 8, 2018.
- 24 Zullo, Robert "Dominion rules, part three: A changing landscape for a power player." *Richmond Times-Dispatch*. October 13, 2017.
- 25 U.S. Department of Agriculture. National Forest Service. "Special Use Permit: Atlantic Coast Pipeline." February 8, 2018; Atlantic Coast Pipeline. "Project Update." April 2017 at 3; "ACP gets approval to be built beneath the Blue Ridge Parkway." *CBS-TV Channel 19*. Richmond. December 14, 2017; Mishkin, Kate. "Court pulls permit from Atlantic Coast Pipeline." *Charleston (WV) Gazette-Mail*. May 16, 2018; "Pipeline's path stirs opposition in Va., W.Va." *Associated Press*. October 4, 2014; DiSavino, Scott. "Dominion does not expect court order to hold up Atlantic Coast pipe." *Reuters*. August 6, 2018; "Pipeline generates environmental concerns." *Pocahontas Times (Marlinton, WV)*. September 11, 2014; "UPDATE 1-U.S. court order stops some work on Mountain Valley natgas pipeline in W. Virginia." *Reuters*. June 25, 2018.
- 26 Food & Water Watch analysis of EIA data for "Net solar generation for all sectors, Virginia." Total change takes into account both small- and utility-scale solar for all sectors.
- 27 Solar Energy Industries Association (SEIA). "Solar Spotlight — Virginia." Updated June 2018.
- 28 *Ibid.*; U.S. Department of Energy (DOE). "SunShot Vision Study." Appendices. February 2012 at Table B-5.
- 29 WINDExchange. DOE. "Wind Energy in Virginia." Accessed November 2018.
- 30 Hammack, Laurence. "Plans ok'd for Botetourt's North Mountain as site of Virginia's first commercial wind farm." *Roanoke Times*. March 2, 2017; "Virginia wind farm project delayed for a second time." *Associated Press*. October 26, 2017.
- 31 Office of the Governor. [Press release]. "Governor McAuliffe signs clean energy legislation." May 8, 2017; Virginia Solar Energy Development and Energy Storage Authority. Virginia Department of Mines, Minerals and Energy (DMME). "Virginia Solar Energy and Development and Energy Storage Authority: Annual Report." November 28, 2017 at 1.
- 32 Richardson, Jeremy, Alison Bailie and Rachel Cleetus. Union of Concerned Scientists. "Meeting — and Exceeding — the Clean Power Plan in Virginia: A Robust Plan for Securing a Clean Energy Future." February 2016 at 1.
- 33 DOE. [Press release]. "Energy Department announces achievement of SunShot goal, new focus for Solar Energy Office." September 12, 2017; NRDC. "NRDC's Fifth Annual Energy Report: America's Clean Energy Revolution." October 2017 at 12.
- 34 Siler-Evans, Kyle et al. "Regional variations in the health, environmental, and climate benefits of wind and solar generation." *Proceedings of the National Academy of Sciences*. Vol. 110, No. 29. 2013 at 11768 and 11769; Bloomberg New Energy Finance. "Sustainable Energy in America Factbook." 2017 at 1; Ela, Erik et al. National Renewable Energy Laboratory (NREL). "Active Power Controls From Wind Power: Bridging the Gaps." January 2014 at xi; NREL. "Distributed Solar PV for Electricity System Resiliency: Policy and Regulatory Considerations." NREL/BR-6A20-62631. November 2014 at 1; Farrell, John. Institute for Local Self-Reliance. "Rooftop Revolution: Changing Everything With Cost-Effective Local Solar." March 2012 at 16; Acadia Center. "Value of Distributed Generation: Solar PV in Massachusetts." April 2015 at 1 to 2; World Economic Forum. "Renewable Infrastructure Investment Handbook: A Guide for Institutional Investors." December 2016 at 4 and 6.
- 35 SEIA (2018); Meister Consultants Group. "Assessing Virginia's Energy Future." Prepared for the Advanced Energy Economy Institute and the Virginia Advanced Energy Industries Coalition. April 2015 at 22.
- 36 Southern Wind Energy Association. "Virginia Wind Energy Opportunities." May 2016; DMME. "Virginia Energy Plan." October 1, 2014 at Section 4, at 15.
- 37 Schwartz, Lisa et al. DOE. Office of Energy Efficiency and Renewable Energy. "SEE action guide for states: energy efficiency as a least-cost strategy to reduce greenhouse gases and air pollution and meet energy needs in the power sector." February 2016 at 2.
- 38 EIA. "Virginia state energy profile." Updated August 17, 2017 at 8; Virginia Energy Efficiency Council (VEEC). "Why Energy Efficiency Is a Smart Investment for Virginia." May 2017 at 3; DMME. "Virginia Energy Efficiency Roadmap." December 31, 2017 at 3, 4, 6 and 15.
- 39 VEEC (2017) at 2, 3 and 6.