

# The public health benefits of a zero-emissions power sector in Virginia

## Analysis by the Virginia Climate Center

While the use of nuclear and renewable energy has expanded in recent years, much of Virginia’s electricity is still generated using fossil fuels such as oil and coal. The consequences of fossil fuel combustion extend beyond global climate change, infiltrating the concerns of public health and economics in Virginia. An analysis by researchers at the Virginia Climate Center finds that a decarbonized power sector will benefit Virginians across the state by reducing our communities’ exposure to harmful pollutants, saving lives and improving the health of Virginia residents.

Assuming a steady rate of declining air pollution between 2020 and 2045, such that there is a 100% reduction by 2045, the Commonwealth will:

- Prevent between 280 and 640 premature deaths.
- Save between \$141 million and \$356 million per year in health costs, for a total savings of \$2.8 billion to \$7 billion over the next 20 years.
- Prevent thousands of work loss days per year, ultimately saving Virginia’s citizens and businesses \$387,000 annually or \$7.8 million by 2045.
- Avoid the greatest health costs in Chesterfield, Henrico, and Fairfax counties with total annual savings of \$40 million, \$35 million, and \$26 million, respectively.

Assuming a target date of 2045 for complete decarbonization, the health economic benefits to the Commonwealth of Virginia are estimated to range between **\$141 and \$356 million per year**, for a cumulative total of **\$2.8 billion to \$7 billion** over the next two decades due to avoided adverse health impacts of power sector pollutants. Moreover, these benefits will ramp up throughout the entire assumed phase-out period, providing an immediate benefit to Virginia’s communities (Figure 1).

These benefits occur in various categories of avoided adverse health impacts. Entirely eliminating power plant emissions of pollution by 2045 will avoid over **600 adult and infant deaths** (Figure 2), as well as over **200 hospital admissions** due to respiratory and cardiovascular issues over two decades. Continuing to emit life-threatening pollution from Virginia’s fossil fuel power plants at the current rate would result in **thousands of lost workdays per year**, ultimately costing Virginians **\$387,000 annually or \$7.8 million by 2045**. Just as emissions are not evenly distributed throughout the Commonwealth, our analysis shows that communities closer to coal and oil generation will see the largest per capita benefits. Chesterfield County, home to one of the highest polluting coal-fired power plants in Virginia, could save up

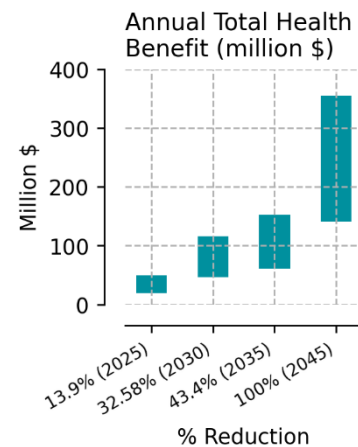
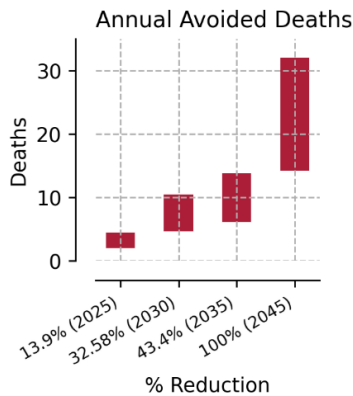


Figure 1: Total benefits of fossil fuel power plant retirements.



to **\$40 million per year by avoiding adverse health effects**. Henrico County could save approximately **\$35 million per year in total health benefits**. Fairfax County, the most populated county in Virginia, could **experience health benefit savings of up to \$26 million annually**.

In summary, our analysis shows that completely phasing out of fossil fuel powered electricity production by 2045, as mandated by Virginia law enacted in 2020, will save the lives of Virginians, provide significant economic savings, and reduce the burden of air quality on vulnerable communities and businesses.

## Methods

The analysis was conducted using EPA’s **CO-Benefits Risk Assessment Health Impacts Screening and Mapping Tool (COBRA)**. We used the model’s 2023 estimates as our demographic and emissions baseline for the analysis and projected a consistent rate of emissions reductions between 2023 and 2045 to reach 0% in 2045. Our results reflect ranges from low and high estimates of the effect of pollutants on mortality and health which are pooled from peer-reviewed studies, as well as discount rates of 3% and 7%. The scenarios evaluated were based on reducing all fossil fuels used in electric utilities as a result of power generation, and do not account for externalities due to fuel transport or large-scale changes in energy consumption patterns. Note: To keep the focus of this analysis exclusively on Virginia, the health benefits that will accrue in other states as a result of emissions reductions in Virginia were excluded from our models.

## About the Virginia Climate Center

The **Virginia Climate Center (VCC)** at George Mason University is a multidisciplinary research center providing climate extension services to all communities in the Commonwealth of Virginia. The VCC brings together scientists from a broad range of disciplines including climate science, engineering and public health. The VCC’s mission is to engage with Virginia’s municipal officials, businesses, and other community leaders as well as co-develop information and tools that will inform municipal decisions, enhance Virginia’s resiliency, save tax dollars, and improve the productivity and profitability of Virginia’s businesses.

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