



Rhode Island

Public Health Brief

Climate Change: Diesel bus emissions in RI

Carbon emissions are major contributors to environmental health problems in Rhode Island. Statewide, ozone and fine particulate matter (PM) are in the air. Having more traffic pollutes our cities and worsens the air. Particulate Matter (PM) is one of many substances found in the air that affects air quality. PM_{2.5} is calculated by the number of fine particles per cubic meter that are 2.5 micrometers in diameter or smaller. These minuscule particles stay in the air longer, can bypass the nose and throat, and penetrate deep into the lungs. Some fine particles may even enter the circulatory system.ⁱ Older adults, children, outdoor workers, and athletes are especially susceptible to the negative health effects of poor air quality,ⁱⁱ which can exacerbate serious health problems, such as decreased lung function, chronic bronchitis, and asthma.ⁱⁱⁱ In addition, continued burning of fossil fuels, such as gasoline and diesel, puts the health of our children at risk.^{iv} Diesel emissions contain carbon monoxide, hydrocarbons, and nitrogen oxides. Diesel exhaust also contains diesel particulate matter, which is made up primarily of carbon, ash, metallic abrasion particles, sulfates and silicates. In 2012, the International Agency for Research on Cancer, which is part of the World Health Organization, classified diesel exhaust as a “known human carcinogen”.^v

Figure 1: Rhode Island's Air Pollution Ranking Among New England states



Source: 2018 United Health Foundation report on Air Pollution, web 2018

Rhode Island earns a low grade when it comes to the quality of air we breathe. According to the 2019 United Health Foundation report,^{vi} RI ranks 25th for air pollution in the country. Figure 1 shows how RI compares to other New England states.

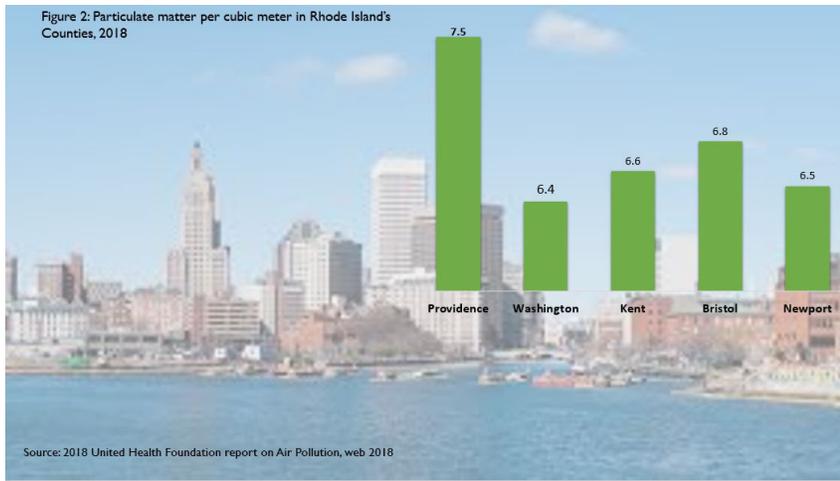
Two measurements used to determine air quality are the Air Quality Index (AQI) and Particulate Matter rating (PM_{2.5}). The Air Quality Index measures the health of our air and assigns a value and color that ranges from 0-500 on any given day in any given national zip code. Values between 0-50 are considered good, 51-100 are moderate, 101-150 are unhealthy for sensitive groups, 151-200 are unhealthy, 201-300 are very unhealthy and 301-500 are hazardous.^{vii} Daily AQI scores are affected by multiple substances such as soot, smoke, pollen or by a change in temperature. The Environmental Protection Agency (EPA) regularly scores and reports Particulate Matter. Rhode Island is attaining the federal PM_{2.5} standard with an average annual PM_{2.5} score is 7.6 units of micrograms per cubic meter.^{viii} It is beneficial to look at both measurements that are provided daily on www.airnow.gov.^{vii}

What has been done? Groundwork has begun to improve our state’s climate health. Governor Gina M. Raimondo signed Executive Order appointing a Chief Resilience Officer. Also, Rhode Island is involved in the Transportation and Climate Initiative (TCI),^{ix} thereby reaffirming Rhode Island’s commitment to the principles of the Paris climate agreement^x. The Northeast Electric Vehicle Network coordinates electric vehicle infrastructure planning and deployment throughout the Northeast and Mid-Atlantic region. The Rhode Island Department of Health website chronicles local climate health initiatives.

Most importantly, RI has begun replacing public diesel transit buses with electric ones.^{xi} Electric buses are cleaner, healthier and in the long term, often cheaper for transit agencies, school districts, and bus contractors to run. One electric bus purchased in 2016 can save \$458,000 in fuel and maintenance costs over its lifetime compared to a diesel bus.^{iv} In June 2016, the U.S. EPA and the Federal Trade Commission won a suit claiming that nitrogen oxides (NOx) emissions released from Volkswagen vehicles were in excess of federally regulated nitrogen oxides (NOx) limits, which violated the Clean Air act.^{xii} Rhode Island has benefitted from environmental mitigation trust funds made available through the Volkswagen settlement, which requires the money be used on public transit projects to reduce diesel emissions.^{xii}

What can we do? The American Cancer Society recommends reducing harmful emissions from diesel exhaust. Diesel exhaust can cause respiratory diseases and worsen existing conditions, such as asthma,ⁱⁱⁱ yet approximately 95 percent of America’s school buses, which included 1,691 buses in Rhode Island in the 2016-2017^{xiii} school year, and more than 60 percent of the nation’s nearly 70,000 transit buses, run on diesel.^{iv}

In Rhode Island, Providence County has a high bus density.^{xiv} The diesel emissions in these cities affect vulnerable populations: low-income families, those without cars, youths and older adults, all of whom are already at greater risk for health issues. In 2016, Providence County had the highest particulate matter score (7.5) when compared to other RI counties. Washington County had the best PM_{2.5} score (6.4) for Rhode Island. The difference of 1.1 PM_{2.5} between these locations represents a considerable disparity in air quality between a RI urban county and a RI rural one (Figure 2).^{vi} Research has found that diesel exhaust from trucks, buses, and cars that travel along the state’s highways have a significant impact on increasing the particulate matter levels in the



neighborhoods that border the highways.^{xv}

In sum, the Rhode Island Public Health Association supports reduction in carbon emissions to improve air quality and associated health conditions.

Further Recommendations:

1. Accelerate the replacement of diesel and other fossil fuel-powered buses with clean, electric buses.
2. Create incentives for transit agencies, school districts and bus contractors to help finance the

upfront cost of electric buses and electric charging infrastructure, from sources such as the EPA through the Diesel Emissions Reduction Act.^{xvi}

3. Encourage utility companies to support electric buses through affordable power rates.
4. Leverage sources of funding, such as the Volkswagen settlement, to buy more public transit electric buses.
5. Learn more about climate health in RI^{vii} at <http://www.dem.ri.gov/programs/air/climate-change.php>. See the AQI and PM_{2.5} scores in your own city or town at <https://www.airnow.gov>.^{vii}
6. Reduce diesel emissions caused by trucks and freight that travel through our state.
7. Work to ready routes I-95 and U.S. 6 as Alternative Fuel Corridors.^{xvii}

ⁱ Federal register. “National ambient air quality standards for particulate matter.” *U.S. Environmental Protection Agency*, 2013. Web.
ⁱⁱ *2015 Climate change and health resiliency report*. Rhode Island Department of Health Climate Change Program, Web.
ⁱⁱⁱ “Diesel exhaust and cancer. What is diesel exhaust?” *American Cancer Society*, 2019. Web.
^{iv} Miller, Alana, Kim, Hye-Jin, Robinson, Jeffrey, & Casale, Matthew. (2018). “Electric buses. Clean transportation for healthier neighborhoods and cleaner air”. *The United States Public Interest Research Group*, 2018. Web.
^v “The dangers of diesel exhaust”. *National Safety Council*, (2016). Web.
^{vi} “America’s Health Rankings analysis of U.S. Environmental Protection Agency; U.S. Census Bureau, Annual Estimates of the Resident Population: April 1, 2010 to July 1 2017.” *United Health Foundation*, 2019. Web.
^{vii} “Local Air Quality Conditions.” *U.S. Environmental Protection Agency*, 2019. Web.
^{viii} *2019 Annual report on air pollution*. United Health Foundation, Web.
^{ix} “Nine states and D.C. to design regional approach to cap greenhouse gas pollution from transportation.” *Transportation and Climate Initiative*, 2018. Web.
^x “Reaffirming Rhode Island’s Commitment to the Principles of the Paris Climate Agreement”. *Governor Gina M. Raimondo. Executive Order 17-06* (June 12, 2017). Web.
^{xi} Kane, Mark. (2018). “Rhode Island buys 3 Proterra electric buses with money from VW.” *Inside Electric Vehicles*. 2018. Web.
^{xii} “VW Settlement Clearinghouse.” *National Association of State Energy Officials and National Association of Clean Air Agencies*. (n.d.). Web.
^{xiii} “Pupil transportation statistics. 2016-2017 school year. *School Bus Fleet*. 2019. Web.
^{xiv} *Providence metropolitan transit enhancement study. 2009 final report*. Rhode Island Public Transit Authority, Web.
^{xv} “Community-Scale Air Toxics Monitoring Grant. Evaluation of the Impact of On-Road Mobile Source Air Toxics on Air Quality at Sensitive Receptors Adjacent to Interstate Route 95 in the Providence Metropolitan Area. Final Report”. *Rhode Island Department of Environmental Management Office of Air Resources*, (2019). Web.
^{xvi} *FY 2017 state clean diesel grant program information guide*. U.S. Environmental Protection Agency. Web.
^{xvii} “Alternative Fuel Corridors”. *U.S. Department of Transportation. Federal Highway Administration*, (2019). Web.