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Alert is a monthly update on transportation and air quality planning activities in the Delaware Valley.



Air Quality and Transportation

Northwestern University Study Shows the Benefits of Electric Vehicle Adoption for Public Health and Climate Change

A recent study published by researchers at Northwestern University in the August edition of the online journal *Geohealth*, found that a 25% adoption rate of electric vehicles in the U.S. market could reap up to \$17 billion annually in public health and climate change mitigation benefits.

"Vehicle electrification in the United States could prevent hundreds to thousands of premature deaths annually while reducing carbon emissions by hundreds of millions of tons," said Daniel Peters, who led the study. "This highlights the potential of co-beneficial solutions to climate change that not only curb greenhouse gas emissions but also reduce the health burden of harmful air pollution."

The researchers reviewed vehicle fleet and emissions data from 2014. If 25 percent of U.S. drivers adopted electric vehicles (EVs) in 2014, using the energy generation infrastructure that was in place in 2014, then 250 million tons of carbon dioxide (CO₂) emissions would have been mitigated. Although the impact of carbon emissions on the climate is well documented, combustion engines also produce other harmful pollutants, such as particulate matter and the precursors to ground-level ozone. Such pollutants can trigger a variety of health problems, including asthma, emphysema, chronic bronchitis, and ultimately premature death.

The researchers then used a chemistry-climate model developed at the Geophysical Fluid Dynamics Laboratory to simulate the atmosphere's weather and chemistry, including how emissions from combustion engines and power generation sources interact with each other to form harmful pollutants and greenhouse gases.

With this model, the researchers simulated air pollutant changes across the lower 48 states, based on different levels of EV adoption and renewable energy generation. Then, they combined this information with publicly available county health data from the U.S. Environmental Protection Agency. This combination enabled the research team to assess health consequences from the air quality changes caused by each electrification scenario.

The research team assigned dollar values to the avoided climate and health impacts that could be brought about by EV adoption by applying the social cost of carbon and value of statistical life metrics to their emission change results. These commonly used policy tools attach a price tag to long-term health, environmental, and agricultural damage caused to the environment by fossil fuel usage. The results of



Save the Date

Monday
October 26, 2020

**Application Deadline for FHWA
Commuter Authority Rail
Safety Improvement (CARSI)
Grants**

For more information,
please visit:

www.grants.gov

Friday
November 13, 2020

**Application Deadline for
DVRPC Regional Trails
Program**

For more information,
please visit:

[https://www.dvrpc.org/trails/
regionaltrailsprogram/](https://www.dvrpc.org/trails/regionaltrailsprogram/)

the research show that EV adoption provides benefits to reducing greenhouse gases as well as the precursors to harmful air pollutants like ground-level ozone.

This research, and similar studies, are supporting policy decisions in states across the nation that are vulnerable to climate change and air pollution issues. On January 17, 2020, New Jersey Governor Phil Murphy signed legislation establishing statewide goals and incentives for increased use of electric vehicles and charging infrastructure to help meet the state's clean energy and air quality goals. The legislation sets aggressive goals for public EV charging stations and EV sales goals as well as benchmarks for EV usage at NJ Transit and for New Jersey government vehicles.

To learn more about the Northwestern University research on the benefits of EV usage, please visit: www.news.northwestern.edu.

To learn more about New Jersey's Drive Green EV Incentive Program, please visit: www.drivegreen.nj.gov.

Study Shows a Connection Between Weather Forecast and Transit Use

Researchers at the University of Utah report a correlation between words used in media coverage related to weather or air quality, and transit ridership. Preliminary findings indicate that riders take cues about the comfort and safety of transit rides from local media weather reports and use those clues to decide whether or not to take transit on a given day.

The researchers scanned 40 local Utah media outlets for words related to weather (such as "cloudy," "freezing," or "summer"), air quality ("red, yellow, or green air day", according to the state's color-coded air quality system) and air pollution (such as "ozone," "PM_{2.5}" or "particulate matter") for the years 2014-2016. Then they looked at the transit ridership the day after the media coverage and noted the actual air quality of that day.

The Utah Transit Authority (UTA) has three main modes of transportation: buses, light rail, and commuter rail (FrontRunner). FrontRunner riders tend to ride for farther distances, and their behavior didn't vary much with media terms. The authors found that the most variation was in bus ridership.

Within that variation, a few media terms related to weather stood out. On average, more usage of the term "good weather" was correlated with more ridership the following day. Few UTA bus stops have a weather shelter. The research suggests that media reports of bad weather could discourage bus ridership.

When looking at color-coded air quality terms, the researchers found less ridership on the bus system on days following use of "orange air day" and "red air day." That could be due to non-commuter bus users who ride the bus for discretionary transportation choosing to stay home to avoid poor air quality.

"Ridership is associated with favorable weather conditions and air quality," the authors wrote, "suggesting that ridership volume may be influenced by an overall sense of comfort and safety."

According to lead author Tabitha Benney, the research is encouraging, because it suggests that messages may be able to influence day-to-day rider behavior. "This opens up a lot of opportunities for large institutional actors to help promote better air quality through ridership," she says. By learning what messages motivate transit ridership, employers and advocates can tailor the message to resonate with commuters.

The Utah Legislature passed a bill in 2019 that launched a three-year pilot program to provide free fares on UTA transit on poor air quality days. Preliminary findings from this research provided part of the bill's supporting scientific basis.

To learn more about the potential impacts of weather forecast language on transit ridership, please visit: <https://attheu.utah.edu/facultystaff/how-the-transit-weather/>.



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