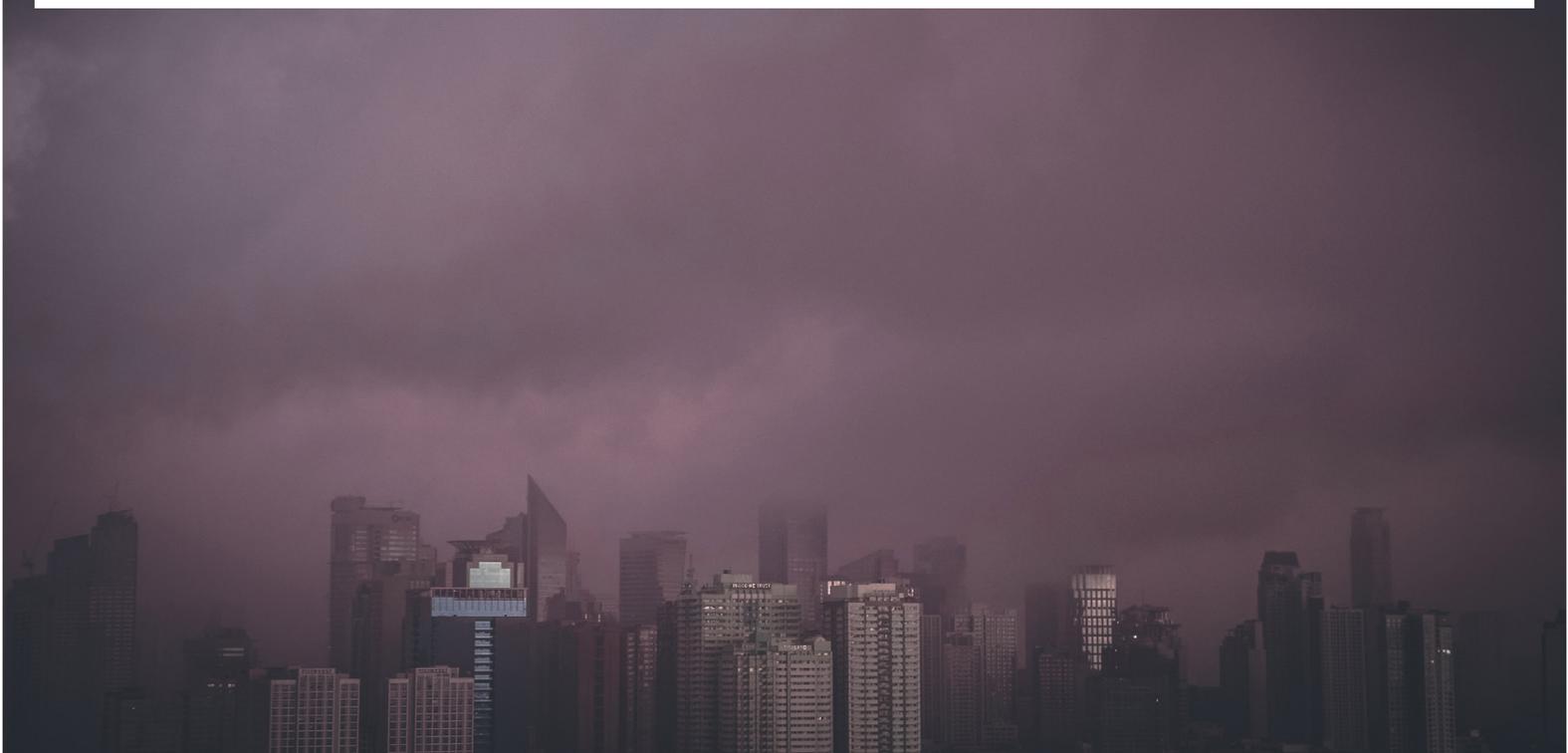




Transportation Electrification

Keeping an Eye on Equity



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Summary

In 2018, the United Nations Intergovernmental Panel on Climate Change raised the alarm when they released a report stating that we have only 12 years before the effects of climate change are irreversible.¹ The complete overhaul of the world's fossil-fuel based economy is a massive undertaking that will require concerted effort and continued coordination from governments and corporations both large and small. Since the federal government has chosen climate denialism in lieu of climate action, states need to take the lead.

For New Jersey, that means tackling serious problems with our transportation system. Nearly 50% of New Jersey's greenhouse gas emissions come from the transportation sector along with a significant amount of air pollution like particulate matter and nitrogen oxide, a precursor to ozone. With over 9 million people,² New Jersey is the most densely populated state in the country. We have more than 6 million registered vehicles,³ and New Jersey suffers from some of the worst regional air pollution.⁴

While New Jersey has made improvements to reduce air pollution, we still have some of the worst air quality in the country, with urban centers in the

state suffering the worst impacts.⁵ The Camden/Philadelphia area is ranked among the top 25 worst metropolitan areas for particle pollution.⁶ The Newark/New York and Camden/Philadelphia metropolitan areas ranked 10th and 21st among U.S. cities for worst ozone pollution, respectively.⁷ Urban and low-income communities bear the brunt of transportation pollution, with bus and freight depots more likely to be located near or within those communities.^{8,9}

The results can be seen in the massive health disparities between residents who live near high-polluting transit sites and those who do not. Black children are admitted to the emergency room for asthma twice as much as other populations, and black communities experience infant mortality, low birth weight, and lack of access to healthcare more frequently than other populations.¹⁰

Race, class, and income level also determine the types of transportation an individual chooses to use or can afford. People in low-income or urban communities use more public transit or rely on community members for carpools and rideshares. Those in wealthier communities can afford to purchase a vehicle and generate more

1 V. Masson-Delmotte, P. Zhai, H. O. Pörtner, D. Roberts, J. Skea, et al. (2018). Summary for Policymakers. *Global warming of 1.5°C. An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty*. Geneva, Switzerland. Retrieved from: https://report.ipcc.ch/sr15/pdf/sr15_spm_final.pdf

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10 Department of Health. (2018). *New Jersey State Health Assessment Data New Jersey's Public Health Data Resource*. Retrieved from: <https://www-doh.state.nj.us/doh-shad/indicator/view/NoPNC.RE.html>



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vehicle miles traveled.^{11, 12} Access and affordability of transportation directly affect an individual's opportunities for employment, access to health care, child care, education, and the ability to find healthy foods for themselves and their families. These divides consistently fall along racial as well as income lines and require a robust and more equitable approach to addressing New Jersey's transportation needs and climate mitigation policies.¹³

Developing an electrified transit system can help close the health and wealth gap by reducing air pollution and mitigating climate change by equitably distributing electrification throughout the state. The 2019 draft of New Jersey's Energy Master Plan prioritizes the electrification of transportation. State investment in electric charging infrastructure and mass transit can push New Jersey to the front of the pack on air quality and greenhouse gas emissions reductions. Renewed support for mass

“Nearly 50% of New Jersey’s greenhouse gas emissions come from the transportation sector.”

To further improve equity within New Jersey, electrification efforts must be supported by service expansion of public and paratransit to ensure all communities and workers have access to affordable public transit, as well as accessible transit to ensure that people of all abilities are able to use it. However, the scope of this paper will look exclusively at the ways in which electrification of transportation can improve equity.

transit built to make transportation more accessible and affordable for all New Jerseyans, especially our most marginalized communities, will leap our state ahead of the rest of the nation. By investing in the electric vehicle industry, still relatively new on the East Coast, New Jersey could be the benefactor of thousands of good, family-sustaining jobs that will be necessary to support an electrified transit system.

11 Anderson, M. (2016). *Who relies on public transit in the U.S.* Retrieved from: <https://www.pewresearch.org>

12 Austin, A. (2017). *To move is to thrive: public transit and economic opportunity for people of color.* Retrieved from: <https://www.demos.org/sites/default/files/publications/Public%20Transit.pdf>

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Private Vehicle Electrification

Why it matters

Light-duty vehicles like the standard family car are the dominant source of emissions from the transportation sector.

Who it helps

Transitioning private vehicles to electric will improve air quality for wealthier neighborhoods because those populations are most likely to buy a new car.¹⁴ Suburban and affluent communities are more likely to be able to afford to purchase an electric vehicle and invest in the personal charging station necessary to power it.¹⁵ Additionally, workers who spend their days along roadways like construction or toll workers and police will also benefit from improved air quality.

Barriers

One of the largest barriers to the electric vehicle transition is a lack of education among policymakers, car dealers, and drivers.

- Range anxiety, or the concern that EVs won't have enough charge to get a driver where they are going and back, is one of the main apprehensions for individuals considering an electric vehicle.¹⁶ While most electric vehicles do have a large enough range for the average person's daily drive, the perception that they do not is still common.
- Electric vehicles are still costly to purchase. While the price tag has been trending down, it may be some time before EVs are affordable enough for the average car buyer to purchase.¹⁷
- The technology is often misunderstood by policymakers and drivers making assumption that EV technology will change so much in the next few years that it does not make sense to invest in infrastructure for it now.
- While EVs will become cheaper, more efficient, and have longer ranges, the infrastructure necessary for it is standard and will not change even as the cars continue to evolve.¹⁸
- The workforce has a shortage of skilled technicians who can work on EVs.

Even with comprehensive electric vehicle education, without dedicated infrastructure funds to ensure the development of a statewide electric vehicle charging network, it is unlikely that New Jersey residents will have the confidence they need to use their EV as a primary vehicle.

14 Hedges & Company. (2019). New car buyer demographics 2019. Retrieved from: <https://hedgescompany.com>

15 DeMorro, C. (2015). Who are electric car buyers? Survey says... *Clean Technica*. Retrieved from: <https://cleantechnica.com>

16 Stumpf, R. (2019). Americans cite range anxiety, cost as largest barriers for new ev purchases: Study. *The Drive*. Retrieved from: <https://www.thedrive.com>

17 Stumpf, R. (2019). Americans cite range anxiety, cost as largest barriers for new ev purchases: Study. *The Drive*. Retrieved from: <https://www.thedrive.com>

18 Romm, J. (2019). Plummeting battery prices to make electric cars cheaper than gas cars in 3 years. *ThinkProgress*. Retrieved from: <https://thinkprogress.org>

Steps to make this a reality

- Implement a statewide strategic plan to integrate EVs into the transportation network.
- Ensure charging availability at multi-family residential buildings and other publicly accessible locations for families that do not have their own garage.
- Educate policymakers, car dealerships & drivers on EVs.
- Offer rebates to reduce the cost of EVs and further market penetration among middle class families.
- Engage with regional electrification efforts through initiatives like the Transportation & Climate Initiative, prioritizing the need for equitable distribution of resources and funding.
- Work with local colleges and tech schools to develop EV mechanic training programs.



Private Fleet Electrification

Why it matters

Private fleets are the vehicles employed by private companies to move people and freight during the course of business. As the most densely populated state in the country, positioned between New York, Philadelphia, and DC, right in the middle of the eastern seaboard, New Jersey's highways and transit system moves residents, commuters, and freight - providing critical infrastructure that supports the economy of the entire Northeast and Mid-Atlantic regions.¹⁹ However, there are more than 3 million trucks registered in New Jersey, the majority of which are privately owned for commercial use,²⁰ that pollute the environment with nitrogen oxide, ozone, and particulate matter, contributing to poor air quality and hastening climate change.²¹

Who it helps

Fleets owned and operated by private companies should be electrified to improve the health of workers and communities living near commercial activity centers and along freight routes. New Jersey has robust commercial activity at the ports, as well as substantial warehouse space, meaning that workers and vendors at these sites, as well as adjacent residential neighborhoods, would benefit from electrification.²² The companies and owners would benefit as well because while a large initial investment may give pause, electric trucks are cheaper to operate long term than their diesel counterparts and can serve as an additional revenue source when the truck batteries are used as storage for energy that can be sold or traded.^{23, 24}

Barriers

Initial costs of private fleets of electric vehicles will be high and, currently, funding for such a transition is limited to sources like the VW settlement fund at DEP, but more sustainable sources will be needed.

- Many freight truck drivers own their trucks and cannot afford the cost of a new electric truck.
- Private fleets need high-capacity charging infrastructure that must be developed at transit hubs and along freight routes.

Steps to make this a reality

- Develop an incentive or subsidy program for private fleet transitions where the employee owns and operates their vehicle.
- Foster a combination of private and public investment in charging infrastructure for freight vehicles at transit hubs and along routes.

19 A Strauss-Wieder, Inc., Rutgers University. (2001). The value of freight to the state of new jersey. *New Jersey Department of Transportation*. Retrieved from: <https://www.state.nj.us/transportation/freight/plan/pdf/vfnj.pdf>

20 Federal Highway Administration. (2017). State Motor Vehicles Registrations - 2017. *U.S. Department of Transportation*. Retrieved from: <https://www.fhwa.dot.gov/policyinformation/statistics/2017/mv1.cfm>

21 Union of Concerned Scientists. (2018). Electric Trucks and Buses. Retrieved from: <https://www.ucsusa.org/sites/default/files/imagess/2018/09/electric-buses-trucks.pdf>

22 A Strauss-Wieder, Inc., Rutgers University. (2001). The value of freight to the state of new jersey. *New Jersey Department of Transportation*. Retrieved from: <https://www.state.nj.us/transportation/freight/plan/pdf/vfnj.pdf>

23 Marsh, A. (2018). Benefits of electric trucks you didn't know were there. *FleetOwner.com*. Retrieved from: <https://www.fleetowner.com>

24 Winston, A. (2018). Inside ups's electric vehicle strategy. *Harvard Business Review*. Retrieved from: <https://hbr.org>

Ideas for Action: Car & Rideshares

Innovative shared mobility services like ride- and car sharing are opening up new avenues for transit in many communities, attempting to fill the gap between public and personal transportation. Few states have adopted policies to fully integrate carshare and rideshare programs but many have created incentive programs and public transit partnerships or reduced tax rates to encourage program development and use.

Washington provides employer tax credits for companies that give financial benefits to employees for participating in carshares. The Oregon Department of Transportation created 'mobility hubs' between Amtrak and carshare company, Zipcar, so that train passengers can easily access vehicles to connect between Portland, Eugene, and Salem. Public transit agencies in Dallas, Los Angeles, Atlanta, and Boston have similar programs to connect major metropolitan areas with their adjoining suburbs and nearby cities.¹

California, New York and Illinois have started programs to increase the number of electric vehicles in carshare fleets. Revenue from California's cap and trade program has been used to provide grants to increase the availability of electric and low emission vehicles in environmental justice communities.

The largest program of its kind provided \$1.7 million to the city of Los Angeles for adding 100 EVs and 110 EV charging stations in environmental justice communities near the downtown area.²

Similarly, the New York State Energy Research and Development Authority and the New York Department of Transportation have provided funding to develop a carshare program in economically depressed cities like Buffalo to help reduce greenhouse gas emissions.³

Meanwhile, many cities view carshare and rideshare programs as an opportunity to increase mobility for residents in low-income neighborhoods and reduce air pollution and greenhouse gas emissions. For example, Washington, D.C. was an early adopter of a car sharing program that requires carshare companies serve all neighborhoods in the city with a minimum number of vehicles required to be placed in low-income neighborhoods.⁴ Seattle allows carshare operators that distribute vehicles in all city neighborhoods to have larger fleets in the city.⁵ One of the services, car2go, reported associated reductions of greenhouse gas emissions from fewer vehicle miles traveled of 10 percent and 18 percent in Seattle and Washington, D.C., respectively.⁶ With \$1.67 million in grant support from the California Air Resources Board and \$1.82 million in electric vehicle infrastructure rebates, electric carsharing company, BlueCalifornia, launched a pilot carshare program in 2017 that placed electric cars in economically depressed neighborhoods in Central Los Angeles. The program is led by a steering committee of community-based organizations representing the neighborhoods where the program operates.⁷

However, these programs alone are unlikely to serve low-income areas because car and ridesharing programs may still be financially out of reach. Subsidies are likely necessary not just for the development of an EV car or rideshare program, but for the operation of it as well. Because public funding is often scarce, corporate, municipal, and local nonprofits can build partnerships to ensure adequate funding of EV programs in low-income communities.

1 National Conference of State Legislatures. (2017). Car sharing: state laws and legislation. Retrieved from: <http://www.ncsl.org/research/transportation/car-sharing-state-laws-and-legislation.aspx>

2 Air Resources Board. (2015). Summary of fiscal year (fy) 2014-15: car sharing and mobility options pilot project. Retrieved from: https://www.arb.ca.gov/msprog/aqip/ldv_pilots/car_sharing_faq_072315.pdf

3 Buffalo CarShare/Wellness Institute of Greater Buffalo & Western New York, Energetics Incorporated. (2015). Demonstrating electric vehicle in buffalo carshare: final report. *New York State Energy Research and Development Authority*. Report Number 15-27. Retrieved from: <https://www.nyserda.ny.gov>

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Public Fleet Electrification

Why it matters

Each municipality and county in the state, as well as the state itself, has a public fleet of vehicles used to move employees and goods.²⁵ Some of these vehicles, like police cars, spend much of their time idling in one place.

Others, like garbage trucks and public buses, spew diesel fumes through every part of the community on their daily or weekly routes.²⁶ Electrifying those fleets show that government supports and is willing to spend local and state funds on electrification.

“Urban and low-income communities bear the brunt of transportation pollution, with bus and freight depots more likely to be located near or within those communities.”

Who it helps

Public fleet electrification improves the working conditions of those who use the vehicles and maintain transit hubs. The communities through which these vehicles drive will also benefit from improved air quality.

Barriers

- Government budgets at all levels are stretched thin and electrification is not always viewed as an urgent or necessary undertaking.
- Education on EV technology can improve understanding of the role transportation plays in climate change, as well as the progression of the technology which can often be misunderstood.

Steps to make this a reality

- Municipalities can pass city or county-wide resolutions declaring intent to transition to electric vehicles by a specific deadline.
- Municipalities can apply for electrification funding from sources like the Volkswagen Settlement or similar opportunities.

25 Federal Highway Administration. (2017). State Motor Vehicles Registrations - 2017. *U.S. Department of Transportation*. Retrieved from: <https://www.fhwa.dot.gov/policyinformation/statistics/2017/mv1.cfm>

26 Vock, D. (2014). A quiet revolution in trash trucks. *Governing.com*. Retrieved from: <https://www.governing.com>

Case Study: Corporate Responsibility

Electric vehicle manufacturer BYD has taken greater steps to ensure the benefits of a booming EV industry are equitably spread throughout communities. Transitioning public transit to electric will improve public health, but company policies are a driver of economic equity as well. BYD has invested in training programs and is committed to sourcing 40% of its workers from populations that have historically been excluded from manufacturing jobs like women, people of color, citizens returning from the penal system, and veterans.¹ By partnering with a union, BYD is able to create safe, good paying jobs for workers whose interests will continue to be represented long term.

¹ Morris, C. (2017). BYD funds training programs, employs disadvantaged workers at California plant. *Charged: Electric Vehicles Magazine*. Retrieved from <https://chargedevs.com>



NJ Transit Electrification

Why it matters

The heavy-duty diesel buses still primarily in use by NJ Transit emit dangerous particulate matter throughout densely populated urban areas, increasing the risk of lung and heart disease and cancer for the populations that live there. From 2015 to 2017, ten of New Jersey's twenty-one counties averaged nine or more days with ozone and particle pollution levels considered to be a health risk. No county had fewer than three days per year that were considered to be a health risk.²⁷ Higher rates of pollution, such as that from NJ Transit hubs, correlate with areas where the state's poorest citizens live,²⁸ continuing a legacy of environmental racism.

Who it helps

Transitioning NJ Transit's fleet of public transportation vehicles would significantly improve air quality in communities located near bus depots and along bus routes. These are predominantly low-income and communities of color due to a history of environmental racism, encouraged by moneyed interests which place profits over the lives of community members. The transition to electric will also benefit NJ Transit workers who regularly operate the vehicles or maintain transit hubs. As with private fleet electrification, the initial investment in vehicles and infrastructure is significant, however electric buses and rail cost less to operate over time and can be used as supplemental energy storage when not in use.^{29, 30, 31}

Barriers

NJ Transit faces several hurdles to investment in electrification infrastructure.

- For the past decade, NJ Transit has struggled to provide adequate service and make repairs or updates due to the lack of a dedicated funding source, underfunding, and misallocation of funds from capital to operations.
- Skepticism that the technology is ready for widespread adoption.
- Unwillingness of current senior leadership to consider electrification a priority.

Steps to make this a reality

- Identify dedicated, sustainable, and adequate funding for NJ Transit's operating budget, which includes a plan to wean off the debilitating practice of capital to operating budget transfers.
- Educate NJ Transit officials on heavy-duty EV technology and its benefits.
- Set goals and implementation timeline for electrification in the NJ Transit annual capital budget as part of an organized fleet turnover.
- Train NJ Transit mechanics to perform the maintenance and repairs of EV equipment.

27 American Lung Association. (2019). *2019 State of the Air*. Retrieved from: www.stateoftheair.org

28 American Lung Association. (2019). *2019 State of the Air*. Retrieved from: www.stateoftheair.org

29 Miller, A., Kim, H.J., Robinson, J., & Casale, M. (2018). Electric buses: clean transportation for healthier neighborhoods and cleaner air. *Environment New Jersey Center*. Retrieved from: <https://environmentnewjerseycenter.org>

30 Marsh, A. (2018). Benefits of electric trucks you didn't know were there. *FleetOwner.com*. Retrieved from: <https://www.fleetowner.com>

31 Winston, A. (2018). Inside ups's electric vehicle strategy. *Harvard Business Review*. Retrieved from: <https://hbr.org>

Conclusion

New Jersey's transportation sector is a major contributor to the state's air pollution, greenhouse gas emissions and the worsening effects of climate change. While improved air quality is the immediate effect of electrification, improved health is certain to follow.

The reduction of New Jersey's greenhouse gases, along with co-pollutants such as particulate matter and ozone precursors including nitrogen oxide, is a massive improvement which will clean our air, mitigate climate change, and create opportunities for health, good paying jobs and economic equity throughout the state.



ElectrifyNJ is a subgroup of the Jersey Renew coalition focused specifically on reducing emissions from the transportation sector through electrification.

