



Regions Take Action:

Healthy Transportation

By creating better mobility options and electrifying vehicles, air pollution can be reduced while giving people more choices for transportation.



This document is excerpted from *Regions Take Action: The Benefits of Major Climate Policy*.



Healthy Transportation

The transportation sector is a primary contributor to air quality, economic, and climate concerns, but recent advancements in vehicle electrification show great potential for eliminating the negative impacts of petroleum-fueled cars and trucks. A little over 10 years ago, electric vehicles (EVs) were nonexistent in the global vehicle market. Today, they account for 2.6% of global car sales and are continuing to capture significant market share; in 2019, global EV sales registered a 40% increase over 2018. Many experts anticipate EV sales to overtake internal combustion engine vehicles (ICEs) by 2030.

EVs offer significant health benefits over ICEs. Having no tailpipe, EVs produce considerably lower levels of volatile organic compounds (VOCs), sulfur oxides (SO_x), nitrogen oxides (NO_x) and particulate matter (PM_{2.5} and PM₁₀), which makes them a clear part of the solution to transportation-related health concerns.

EVs also offer economic advantages for drivers. Given the comparatively lower cost of electricity, EVs are considerably cheaper to operate than vehicles fueled by petrol, gasoline, and natural gas. These lower operational costs enable EVs to achieve a much lower total cost of ownership than ICEs. These savings pass directly to drivers, easing the high cost of transportation for many.

Transportation accounts for 24% of global energy-related CO₂ emissions.¹ In many locations, transportation's share of the problem continues to grow. Vehicle ownership and demand are climbing in developing nations, with carbon-intensive vehicles claiming the lion's share of the vehicle market. The commercial market, too, poses significant challenges, as freight and delivery services are producing increasing amounts of carbon emissions.²

Subnational governments can unlock a broad set of benefits if they employ a comprehensive approach to decarbonizing mobility. Though the following case study focuses on the very important approach of electrifying vehicles, policymakers should also consider measures for reducing dependence on personal vehicles, expanding nonmotorized transportation infrastructure, and creating car-free districts. Together, these measures will lead to a cleaner, healthier, and better quality of life.

1 IEA (International Energy Agency). n.d. "Transport: Improving the Sustainability of Passenger and Freight Transport." Accessed August 5, 2020. <https://www.iea.org/topics/transport>.

2 Scott, Mike. 2019. "Shipping Sector Comes Under Increasing Pressure to Cut Its Carbon Footprint." *Forbes*, June 28, 2019. <https://www.forbes.com/sites/mikescott/2019/06/28/shipping-sector-comes-under-increasing-pressure-to-cut-its-carbon-footprint/#3363789c1487>





Leadership in Action

Delhi, India: EV Policy

The Delhi EV Policy, passed in December 2019 and enacted in August 2020, is arguably the most comprehensive subnational policy of its kind. With a strong focus on demand creation, the policy calls for 25% of all new vehicles to be battery operated by 2024. This target is estimated to amount to 500,000 EVs and 4.82 million tons in CO₂ emissions savings.

While many subnational EV policies around the world have chosen to focus on four-wheeled personal vehicles,

Delhi's policy covers a wide array of vehicle types, with incentives for electric two-wheelers; shared transport vehicles, such as three-wheelers and buses; as well as goods carriers and freight vehicles. These other vehicle types produce tremendous amounts of air pollutants and carbon emissions. For instance, two-wheelers and three-wheelers contribute about 75% of the vehicular PM_{2.5} emissions in Delhi, which is equal to the total amount of pollution from trucks and eight times that of buses.

Key Milestones

Delhi realizes the potential of EVs

Through a series of stakeholder workshops and analyses, the Delhi government identifies EVs as a key solution to the problem. There was an understanding within the government that policy could accelerate the transition to EVs.



Awareness of air pollution increases

Understanding the threats to quality of life and public health, the government of Delhi seeks to develop a policy that combats vehicles' contribution to air pollution. Studies indicated that 30% of the particulate matter in Delhi is emitted from tailpipes.

Leaders formulate draft policy

The Delhi government develops a policy for consideration by cabinet ministers and various stakeholders. The policy focuses on electric two-wheelers, shared transport vehicles, goods carriers, and freight vehicles.



Driving Forces

The Delhi EV Policy provides the following incentives and policies by vehicle type:

Two-Wheelers

- Purchase incentive of 5,000 Indian rupees (INR) per kilowatt-hour (kWh) of battery capacity.
- "Scrapping incentive" of 5,000 INR for the scrapping and deregistration of an old internal combustion vehicle. The incentive is subject to a matching contribution made by the dealer at the time of the sale.
- Mandate that all companies providing last-mile deliveries must transition 50% of their two-wheeler fleet to electric by March 2023 and 100% by March 2025.

Electric Autos, Rickshaws, and Carriers

- Purchase incentive of 30,000 INR
- Interest reduction of 5% on loans for the purchase of electric autos

Polymakers engage stakeholders

The draft policy is put forward for discussion among various stakeholders representing government agencies, industry, civil society, and academia. An estimated 300 stakeholders participate in the process and provide feedback on the draft policy.



Government enacts policy

The final policy emerges as a highly comprehensive set of demand incentives aimed at making EVs affordable. The policy also provides several non-fiscal incentives, such as waivers on road tax, registration, and parking fees.

Four-Wheelers

- Purchase incentive of 10,000 INR per kWh of battery capacity

Buses

- Commitment that electric buses must account for 50% of all new buses in the fleet of the government of the National Capital Territory of Delhi

The Delhi EV Policy also includes incentives for the expansion of charging infrastructure. To that end, the government has committed to providing accessible charging or battery swapping facilities within 3 kilometers' travel of anywhere in Delhi. To ensure this expansion, the Delhi government will subsidize the cost of installation.

Keys to Success

The Delhi EV initiative has seen mounting success as a result of the following factors:



Vehicle demand generation

The Delhi EV Policy provides motivation in the form of up-front purchase incentives, loan interest waivers, and a “scrapping bonus” that serves as payment for retiring an internal combustion vehicle. The incentives help EVs achieve cost parity with ICEs. In addition, the policy includes a number of non-fiscal incentives, such as waivers on road tax, registration, and license fees.



Demand assurance to industry

The policy sends a clear signal to industry that EV market is viable and here to stay. By incentivizing demand across all vehicle types—two-wheelers, three-wheelers, and four-wheelers—the Delhi EV Policy raises the visibility of electrification and invites industry participation.



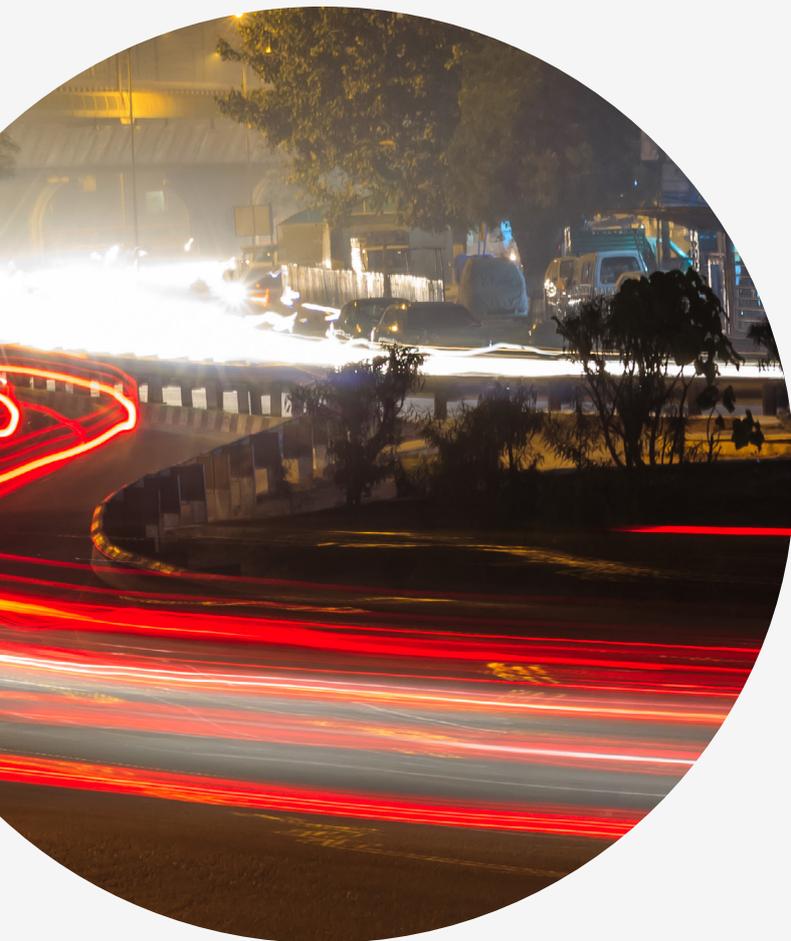
Charging infrastructure expansion

Delhi offers a host of incentives for charging infrastructure as well as reduced-rate tariffs that further improve the cost-effectiveness of owning and operating an EV.



Skills training

Innovative jobs and skills training programs provide hands-on education and training for charging station operators, technicians, and drivers.





Benefits

Economic Development

Cost savings. Delhi's transition to EVs will produce significant individual cost savings and community-wide economic benefits.

Efficiencies. Analysis conducted by RMI finds that the EVs sold through 2024 will require 120.8 petajoules less energy than an equivalent ICE, which in turn will save \$865 million.³

Economic stimulus. Those funds effectively act as a large economic development stimulus into the region. Further, the Delhi government intends to attract significant investment from a variety of industries, including automotive manufacturers, electric distribution companies, charging station providers, financing services, and others, which will help further the advancement of the EV market. Together, these entities will provide jobs and improve the Delhi economy.

Health

Air quality. The Delhi EV Policy is directly aimed at improving air quality. Delhi is well known for its air quality problems, and vehicles play a significant role in those problems, contributing up to 40% of PM_{2.5}, 20% of PM₁₀, and more than 80% of NO_x, CO, and non-methane volatile organic compounds (NMVOCs).⁴

Emission reductions. Analysis suggests that the Delhi EV Policy will offset 159 tons of PM_{2.5} tailpipe emissions by 2024.⁵ Commercial drivers and citizens most exposed to vehicular emissions will see direct and near-term improvements to health and quality of life.

Reduced exposure to pollutants. Drivers of Delhi's omnipresent green and yellow autos and other carriers will have the opportunity to purchase a clean, zero-emissions vehicle at a steeply discounted price and in turn significantly reduce their exposure to harmful pollutants.

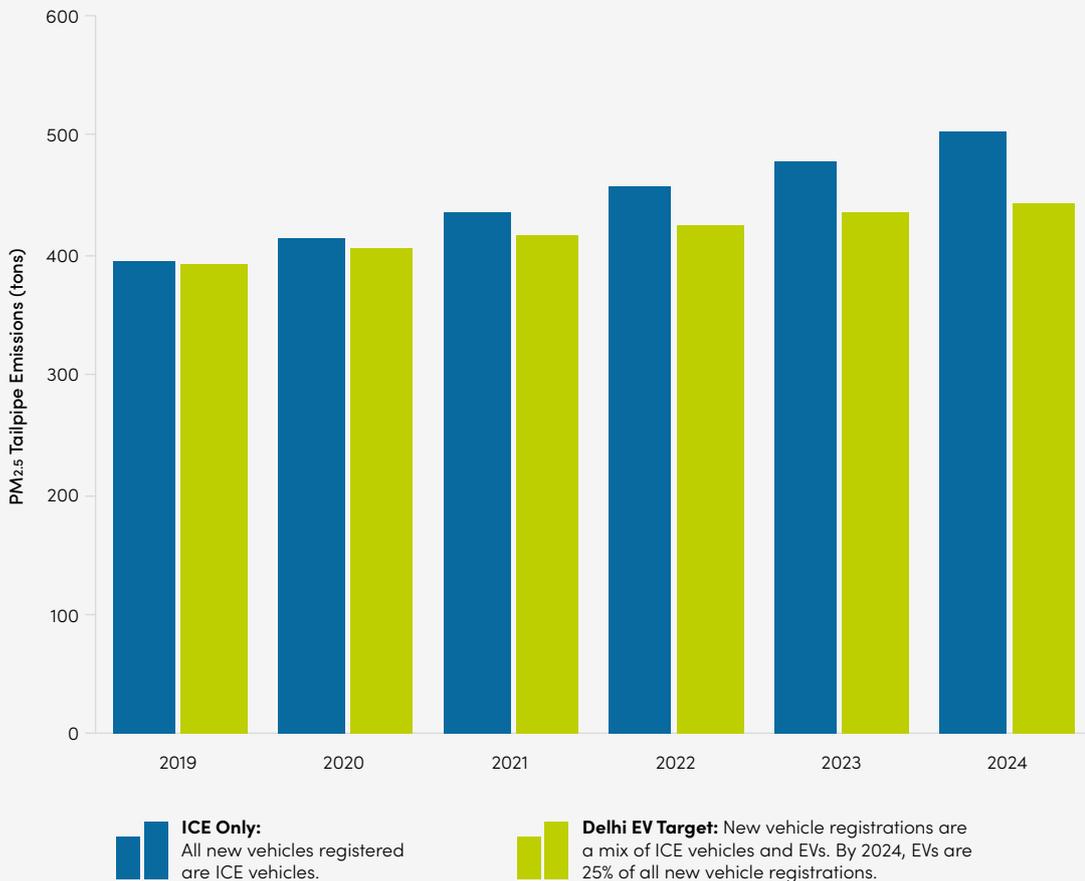
³ Dialogue and Development Commission of Delhi and Rocky Mountain Institute. 2019. *Accelerating Delhi's Mobility Transition: Insights from the Urban Mobility Lab in Delhi*. Rocky Mountain Institute. <https://rmi.org/insight/urban-mobility-lab-delhi/>.

⁴ Suneja, Dimpy. 2020. "Delhi's Electric Vehicle Policy: Will It Be a Game Changer." Rocky Mountain Institute. January 17, 2020., <https://rmi-india.org/delhis-electric-vehicle-policy-will-it-be-a-game-changer/>.

⁵ Ghate, Akshima. 2019. "Delhi EV Policy: Govt Lays Foundation for a Clean Mobility Future." Rocky Mountain Institute. December 28, 2019. <https://rmi-india.org/delhi-ev-policy-govt-lays-foundation-for-a-clean-mobility-future/>.

EVs reduce air pollution.

Lifetime $PM_{2.5}$ emissions of all new vehicles registered in the specified year¹



Note: Total avoided $PM_{2.5}$ emissions is estimated at 159 tons from new vehicle registrations. However, this does not account for long-term vehicle stock turnover and an accelerated adoption of EVs from incentives, which will result in significantly greater emissions reductions.

EV Policy Resources

- [Delhi EV Policy: Delhi Transport Department](#)²
- [Dialogue and Development Commission of Delhi and Rocky Mountain Institute: Accelerating Delhi's Mobility Transition: Insights from the Urban Mobility Lab in Delhi](#)³

¹ Dialogue and Development Commission of Delhi and Rocky Mountain Institute. 2019. *Accelerating Delhi's Mobility Transition: Insights from the Urban Mobility Lab in Delhi*. Figure 5. Rocky Mountain Institute. <https://rmi.org/insight/urban-mobility-lab-delhi/>.

² GNCTD Transport Department. 2018. "Delhi Electric Vehicle Policy." <https://transport.delhi.gov.in/content/delhi-electric-vehicle-policy-2018>



Broader View

In the initial months following the outbreak of COVID-19, Delhi and many other states across the globe got a firsthand look at life without extreme levels of air pollution. Cars stopped moving, industry significantly slowed down, and people everywhere saw where they live in a new light. Those images will serve as unforgettable reminders of the negative consequences of our carbon-intensive and polluting practices—particularly in our transportation choices—and the opportunities to make positive changes for our health and environment.

Delhi is, of course, a unique example of a place that contends with very high levels of air pollution, which has undoubtedly enabled the government to build support for its EV policies. However, air quality is a universal problem with direct effects on everyone's health, happiness, and prosperity. As subnational and developing economies continue to grow, so too will the demand for mobility and the potential for untenable levels of air pollution and carbon emissions. Given that reality, it is imperative that policymakers employ ambitious measures to incentivize EV adoption.

It is also important to acknowledge the full breadth and diversity of mobility options as Delhi did with its EV policy. After all, electric mobility technologies and services continue to expand globally. Policymakers would do well to pursue electrification policies for public transit as well as smaller modes of mobility. Shenzhen, China, for instance, has electrified its entire fleet of 16,000 buses, giving the city the single largest deployment of electric buses in the country.³

³ Sisson, Patrick. "How a Chinese City Turned All Its 16,000 Buses Electric." *Curbed*, May 4, 2018. <https://www.curbed.com/2018/5/4/17320838/china-bus-shenzhen-electric-bus-transportation>.



In addition to focusing on the personal vehicle market, a number of smaller and shared services show promise in reducing emissions. Electrifying two-wheelers, three-wheelers, scooters, and e-bikes, and supporting micro-mobility services will provide additional benefits through clean alternatives to larger personal vehicles.

Another approach that subnational governments, cities, and countries may take is to attract manufacturing capacity and investment. Many state governments across the globe are creating incentives to attract automakers and battery manufacturers to

where the services are needed most. Also, in India, the state of Uttar Pradesh has crafted a policy to attract manufacturers through a set of interest subsidies.⁴ In addition to the creation of jobs from a growing sector of the economy, the economies of scale captured through increased manufacturing will help ensure a steady supply of readily available EVs, continued improvements to vehicle performance, and cost reductions.

EVs also hold the promise of playing a beneficial role in the electricity sector, underscoring the synergies between

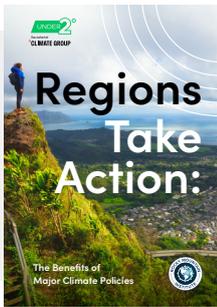
⁴ Prateek, Saamy. 2018. "Uttar Pradesh Releases Draft EV Manufacturing Policy." *Mercom India*, March 15, 2018. <https://mercomindia.com/uttar-pradesh-ev-manufacturing-policy/>.



sectors. As mobile sources of storage, EVs can capture cleaner energy from rooftop solar or when renewables are available on the grid. Further, as technology advances, EVs may provide grid services by delivering energy back into the system. Such vehicle-to-grid (V2G) opportunities may provide private and commercial EV owners with a revenue source, enabling them to sell power to electric utilities. This future will require significant investment in infrastructure and smart charging technologies that enable a seamless integration between EVs, buildings, and the grid. Integrated resource planning and policies that account, well in advance, for the impending increase of

EV and the associated interactions with buildings and the grid will drastically reduce infrastructure costs over time.

Finally, we cannot overlook the equity implications of vehicle electrification. All over the world, lower-income people are disproportionately exposed to air pollution—whether from living in communities, using services, or working in industries with high exposure to pollutants. Electrifying public transit, cleaning up congested corridors, and giving people access to zero-emissions services will allow people of all walks of life to enjoy cleaner air and improved health.



These pages are excerpts from **Regions Take Action: The Many Benefits of Major Climate Policies**. This action is one of five featured actions which may be relevant to others in your region. Download and share the full guide for free at under2coalition.org/news/regions-take-action or rmi.org/regions-take-action.



About Rocky Mountain Institute

Rocky Mountain Institute (RMI)—an independent nonprofit founded in 1982—transforms global energy use to create a clean, prosperous, and secure low-carbon future. It engages businesses, communities, institutions, and entrepreneurs to accelerate the

adoption of market-based solutions that cost-effectively shift from fossil fuels to efficiency and renewables. RMI has offices in Basalt and Boulder, Colorado; New York City; the San Francisco Bay Area; Washington, D.C.; and Beijing.



This guide was produced in partnership with the Under2 Coalition and The Climate Group.

About the Under2 Coalition and the Climate Group

The Under2 Coalition is driven by a group of ambitious state and regional governments committed to keeping global temperature rises to under 2°C. The coalition comprises more than 200 governments that represent over 1.3 billion people and nearly 40% of the global economy.

The Climate Group is the Secretariat to the Under2 Coalition and works with governments to accelerate climate action through three work streams: planning deep decarbonization pathways, scaling innovative policy solutions, and mainstreaming transparency and reporting.

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